

REQUEST FOR COMPETITIVE SEALED PROPOSALS (RFCSP)
WEBB COUNTY YOUTH VILLAGE REHABILITATION CENTER
LAREDO, TEXAS

Notice is hereby given that the County of Webb is now accepting Competitive Sealed Proposals for the following:

Proposal No. 2016-03 “Webb County Youth Village Rehabilitation Center”, Laredo, Texas

Webb County proposes a new construction project located at 111 Camino Nuevo Road, Hwy 359 in Laredo, Texas entitled “The Webb County Youth Village Rehabilitation Center” project consisting of but not limited to a new two story masonry and steel building of approx. 15,457 square feet containing sixteen beds, educational spaces, TV room, lobby and control desk on the second floor and an intake reception, offices, conference rooms, toilets, warming kitchen and dining area, entry lobby with office and a JJAEP dining area and kitchen on the ground floor. Site Improvements include but are not limited to a basketball court, outdoor lighting, utility improvements, sidewalk, ramp, paving and road improvements, and landscape/irrigation improvements on approximately eight acres and is budgeted at approximately \$2,400,000.00.

Project Documents include selection criteria and detailed information regarding the project scope and other information that offerors require to respond to the RFCSP. Construction is scheduled to begin after approval of Webb County Commissioner’s Court.

Competitive Sealed Proposals will be received no later than **Thursday, June 16, 2016 at 2:00 pm** Central Standard Time. All proposals will be opened and publicly read. Late proposals will not be considered.

One (1) original and eight (8) copies of the Competitive Sealed Proposal must be submitted in sealed envelopes to the Office of the County Clerk. Sealed envelopes must be marked (Sealed-Proposal) with proposal number on front lower left-hand corner of envelope.

Proposal No.: 2016-03 “Webb County Youth Village Rehabilitation Center”, Laredo, Texas

Proposals may be hand delivered or mailed to: **Webb County Clerk’s Office**
County Clerk
1110 Victoria St. Ste. 201
Laredo, Texas 78040

A Proposal Security in the amount of five percent (5%) of the Proposer amount must accompany each proposal in the form of a payment bond, cashier’s check, or bank money order made payable to the County of Webb. Performance and Payment Bonds each in the amount of (100) % of the contract amount, will be required from the successful Proposer.

Each Offeror must submit the information requested in the “Information for Offerors” in order to be evaluated against each of the criteria. All questions regarding this process should be submitted in writing to Ausland Architects, Attention: Kennedy C Whiteley, 6626 Silvermine Dr., Suite #700, Austin, Texas

78736, Phone number (512) 327-0444 or to Metaform Studio 6909 Springfield Ave., Suite 107, Laredo, Texas 78041 before or at the "Proposal Conference."

SELECTION CRITERIA: Each competitive sealed proposal will be evaluated based upon the following selection criteria, and the total possible points that may be awarded for each criteria are in parenthesis after each criteria:

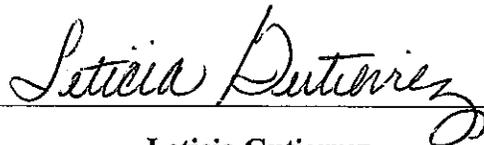
A.	Relevant Experience	(12 points)
B.	Project Management Ability	(12 points)
C.	Past Performance	(10 points)
D.	Subcontractors and Suppliers	(26 points)
E.	<u>Price</u>	<u>(40 points)</u>
	TOTAL:	100 points

A pre-proposal conference for the project will be held at **10:30 am on Friday, June 3, 2016 at Webb County Billy Hall Administration Building 1st floor Conference Room 1A.**

To review the plans and specifications and to answer any questions from potential proposers. Any questions in regard to the pre-proposal conference you may contact Ms. Leticia Gutierrez, Interim Purchasing Agent (956) 523-4125.

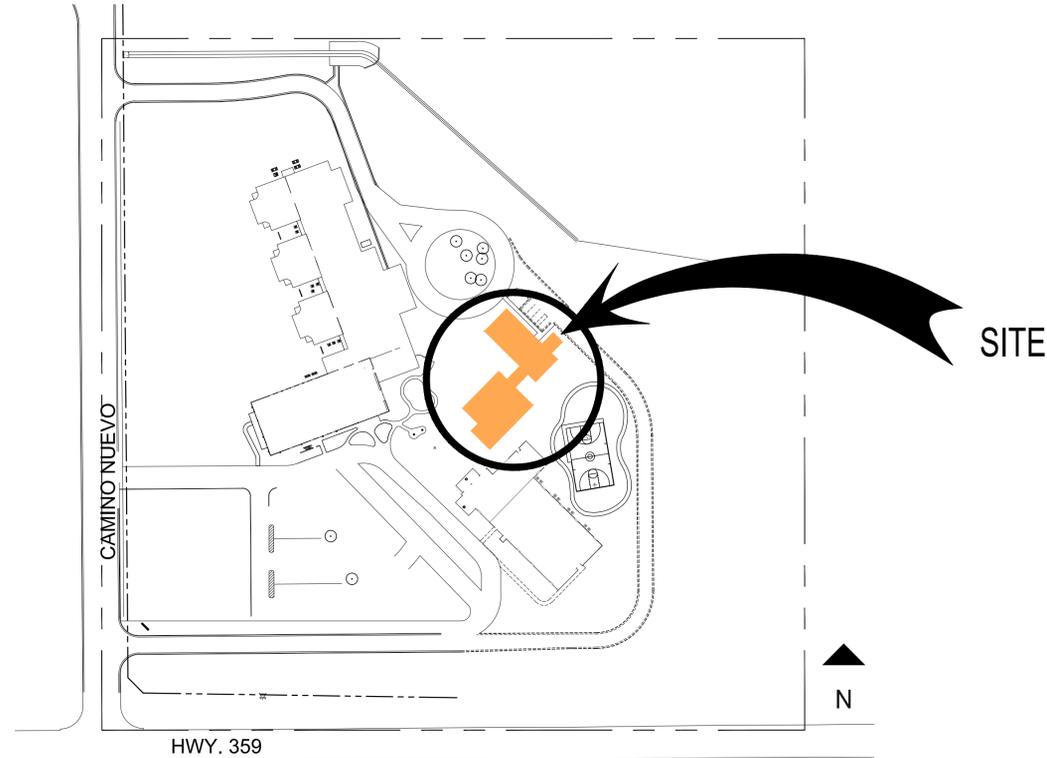
All firms interested in submitting proposals may attend, ask questions, and discuss the projects with the Architect, Engineers and Owner's representatives. Offerors are strongly encouraged to attend however; this pre-proposal conference is not mandatory.

Project Documents may be obtained from the offices of the Webb County Purchasing Department, 1110 Washington Street, Suite 101, (956) 523-4125, Laredo, Texas 78041, upon receipt of \$100.00 for each project set consisting of one (1) full size hard print copy and one (1) PDF copy on CD. The entire amount of deposit will be refunded if the plans and specifications are returned in good order within ten (10) working days after the bid opening. Webb County Commissioner's Court, reserves the right to accept or reject any or all qualification statements and to waive any formalities and/or irregularities. Plans will be available on **Tuesday, May 10, 2016.**



**Leticia Gutierrez,
Webb County Interim Purchasing Agent**

VICINITY MAP



PROJECT ADDRESS: 111 Camino Nuevo Road, Hwy 359 Laredo, TX 78046

ABBREVIATIONS

ABV	ABOVE	DIM	DIMENSION	GC	GENERAL CONTRACTOR	MONO	MONOLITHIC	SM	SMOOTH
A/C	AIR CONDITIONING	DIAM	DIAMETER	GL	GLASS	MP	MASONRY PARTITION	SPEC	SPECIFICATIONS/SPECIFIED
ACOUS	ACOUSTIC	DN	DOWN	GR	GROUND ROD ACCESS BOX	MWP	MEMBRANE WATERPROOFING	SQ	SQUARE
AD	AREA DRAIN	DP	DRYWALL PARTITION	GCT	GLAZED CERAMIC TILE	NIC	NOT IN CONTRACT	SS	SERVICE SINK
AFF	ABOVE FINISH FLOOR	DR	DOOR	GYP	GYP SUM	NTS	NOT TO SCALE	STL	STEEL
ALT	ALTERNATE	DS	DOWNSPOUT	GWB	GYP SUM WALL BOARD	OC	ON CENTER	STD	STANDARD
ALUM	ALUMINUM	DWG	DRAWING	HC	HANDICAP	OD	OUTSIDE DIAMETER	STOR	STORAGE
ANOD	ANODIZED	EA	EACH	HDW	HARDWARE	OF/C1	OWNER FURNISHED/ CONTRACTOR INSTALLED	STRUCT	STRUCTURE (AL)
AP	ACCESS PANEL	EAV	ELECTRICAL-AUDIO/VISUAL	HM	HOLLOW METAL	OF/O1	OWNER FURNISHED/ OWNER INSTALLED	SUSP	SUSPENDED
APPROX	APPROXIMATE	EDF	ELECTRIC DRINKING FOUNTAIN	HORIZ	HORIZONTAL	OH	OVERHEAD/OPPOSITE HAND	T	TREAD
AVC	AUDIO VISUAL CONSOLE	EJ	EXPANSION JOINT	HP	HIGH POINT	OPNG	OPENING	TA	TOILET ACCESSORY
BD	BOARD	EL	ELEVATION	HT	HEIGHT	OPP	OPPOSITE/OPPOSITE HAND	TB	TACKBOARD
BLDG	BUILDING	ELEC	ELECTRICAL	ID	INSIDE DIAMETER	PL	PLATE	TC	TOP OF CURB
BLKG	BLOCKING	ELEV	ELEVATOR OR ELEVATION	INSUL	INSULATION	P.C.	PRECAST CONC.	TEMP	TEMPERED
BM	BEAM	EP	ELECTRICAL PANEL	INT	INTERIOR	PLAS	PLASTER	THK	THICK
BRG	BEARING	EQ	EQUAL	INV	INVERT	PLAM	PLASTIC LAMINATE	TKBD	TACKBOARD
BRJ	BRICK RELIEF JOINT	EQUIP	EQUIPMENT	JAN	JANITOR	PLYWD	PLYWOOD	TRANS	TRANSPARENT
BRZ	BRONZE	EXTG	EXISTING	JT	JANITOR JOINT	PS	PROJECTION SCREEN	TVM	T.V. MONITOR
BYO	BY OWNER	EXP	EXPANSION	LAM	LAMINATED	PTD	PAINTED	TVP	T.V. PROJECTOR
CAB	CABINET	EXT	EXTERIOR	LAV	LAVATORY	PTN	PARTITION	TYP	TYPICAL
CAR,CPT	CARPET	FD	FLOOR DRAIN	LAV	LAVATORY	RD	ROOF DRAIN	U	URNAL
CB	CATCH BASIN	FEC	FIRE EXTINGUISHER CAB	LP	LOW POINT	RE-(REF)	REFERENCE	UNFIN	UNFINISHED
CEM	CEMENT	FHC	FIRE HOSE CABINET	LAM	LAMINATED	REINF	REINFORCE	UN.F.O.	UNLESS NOTED OTHERWISE
CER	CERAMIC	FIN	FINISH (ED)	LAV	LAVATORY	R	RISER/ OR RADIUS	UV	UNDERFLOOR VENT
CH	CHANNELS	FL	FLOOR	LP	LOW POINT	R/A	RETURN AIR	VERT	VERTICAL
CHBD	CHALKBOARD	FD	FLOOR DRAIN	LP	LOW POINT	RCP	REFLECTED CEILING PLAN	VC	VALVE CABINET
CJ	CONTROL JOINT	FEC	FIRE EXTINGUISHER CAB	MAX	MAXIMUM	RD	ROOF DRAIN	VIN	VINYL
CLG	CEILING	FHC	FIRE HOSE CABINET	MB	MARKER BOARD	RE-(REF)	REFERENCE	VP	VISION PANEL
CMU	CONCRETE MASONRY UNIT	FIN	FINISH (ED)	MECH	MECHANICAL	RM	ROOM	WC	WATER CLOSET
CLO	CLOSET	FL	FLOOR	MTL	METAL THRESHOLD	REQ'D	REQUIRED	WD	WOOD
CO	CASED OPENING	FM	FLOOR MAT	MT	METAL THRESHOLD	SCHED	SCHEDULE (D)	WOW	WINDOW
COL	COLUMN	F.R.	FIRE RATED	MFR	MANUFACTURE	SF	SQUARE FEET OR SAND FINISH	WP	WATERPROOFING
CONC	CONCRETE	FRM	FRAME	MIN	MINIMUM	SHLVS	SHELVES	W/	WITH
CONT	CONTINUOUS	FURR	FURRED (ING)	MIR	MIRROR	SHT	SHEET	W/O	WITHOUT
CONTR	CONTRACT (OR)	FTVM	FUTURE T.V. MONITOR	MISC	MISCELLANEOUS	SK	SIMILAR	WOJ	WORK OUT ON JOB
CT	CARPET TILE	GA	GAGE/GAUGE	ML	MODULE LINE/MTL LATH	SK	SINK		
DET	DETAIL	GALV	GALVANIZED	MOD	MODULE (AR)	SL	SLOPE		
DF	DRYWALL FURRING								

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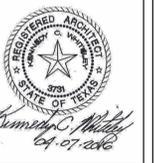
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AUSLAND ARCHITECTS—METAFORM STUDIO ARCHITECTS
 ARCHITECTURE + PLANNING + INTERIORS
 6626 SILVERMINE DRIVE, SUITE 100A
 AUSTIN, TEXAS 78736
 (512) 327-0444 FAX (512) 301-4909



WEBB COUNTY YOUTH VILLAGE
 REHABILITATION CENTER
 111 CAMINO NUEVO ROAD, HWY 359
 LAREDO, TEXAS 78046

PROJECT NUMBER

1401

REVISIONS

FILENAME:

SHEET TITLE

INDEX SHEET

VICINITY MAP

ABBREVIATIONS

SCALE: NTS

DRAWN BY: JR

SHEET NO.

A1.0

DATE: APRIL 7, 2016

GENERAL NOTES TO CONTRACTORS:

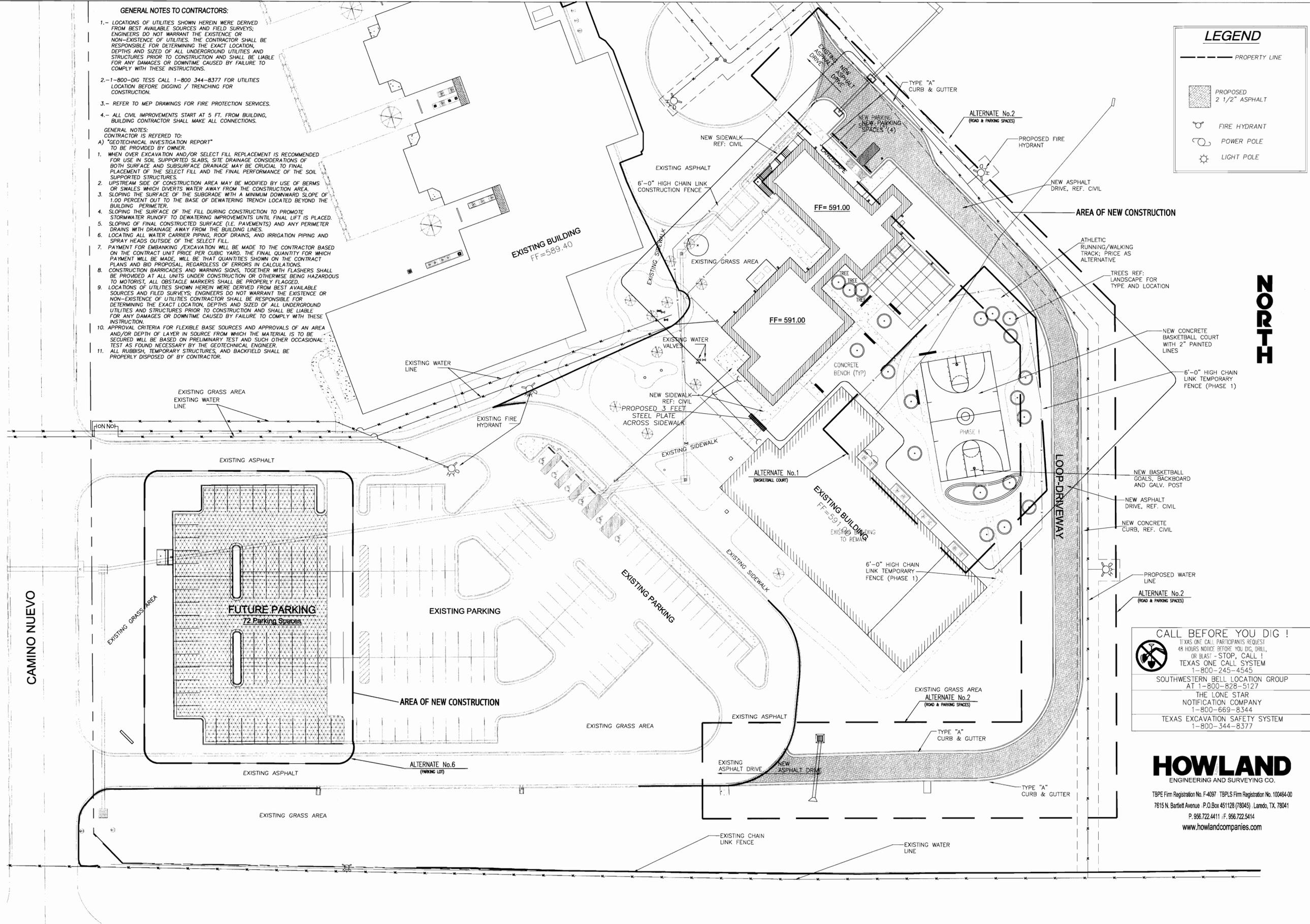
- 1.- LOCATIONS OF UTILITIES SHOWN HEREIN WERE DERIVED FROM BEST AVAILABLE SOURCES AND FIELD SURVEYS. ENGINEERS DO NOT WARRANT THE EXISTENCE OR NON-EXISTENCE OF UTILITIES. THE CONTRACTOR SHALL BE RESPONSIBLE FOR DETERMINING THE EXACT LOCATION, DEPTHS AND SIZES OF ALL UNDERGROUND UTILITIES AND STRUCTURES PRIOR TO CONSTRUCTION AND SHALL BE LIABLE FOR ANY DAMAGES OR DOWNTIME CAUSED BY FAILURE TO COMPLY WITH THESE INSTRUCTIONS.
- 2.- 1-800-DIG TESS CALL 1-800-344-8377 FOR UTILITIES LOCATION BEFORE DIGGING / TRENCHING FOR CONSTRUCTION.
- 3.- REFER TO MEP DRAWINGS FOR FIRE PROTECTION SERVICES.
- 4.- ALL CIVIL IMPROVEMENTS START AT 5 FT. FROM BUILDING. BUILDING CONTRACTOR SHALL MAKE ALL CONNECTIONS.

GENERAL NOTES:

- CONTRACTOR IS REFERRED TO:
 A) "GEOTECHNICAL INVESTIGATION REPORT" TO BE PROVIDED BY OWNER.
1. WHEN OVER EXCAVATION AND/OR SELECT FILL REPLACEMENT IS RECOMMENDED FOR USE IN SOIL SUPPORTED SLABS, SITE DRAINAGE CONSIDERATIONS OF BOTH SURFACE AND SUBSURFACE DRAINAGE MAY BE CRUCIAL TO FINAL PLACEMENT OF THE SELECT FILL AND THE FINAL PERFORMANCE OF THE SOIL SUPPORTED STRUCTURES.
 2. UPSTREAM SIDE OF CONSTRUCTION AREA MAY BE MODIFIED BY USE OF BERMS OR SHALES WHICH DIVERTS WATER AWAY FROM THE CONSTRUCTION AREA.
 3. SLOPING THE SURFACE OF THE SUBGRADE WITH A MINIMUM DOWNWARD SLOPE OF 1.00 PERCENT OUT TO THE BASE OF DEWATERING TRENCH LOCATED BEYOND THE BUILDING PERIMETER.
 4. SLOPING THE SURFACE OF THE FILL DURING CONSTRUCTION TO PROMOTE STORMWATER RUNOFF TO DEWATERING IMPROVEMENTS UNTIL FINAL LIFT IS PLACED.
 5. SLOPING OF FINAL CONSTRUCTED SURFACE (I.E. PAVEMENTS) AND ANY PERIMETER DRAINS WITH DRAINAGE AWAY FROM THE BUILDING LINES.
 6. LOCATING ALL WATER CARRIER PIPING, ROOF DRAINS, AND IRRIGATION PIPING AND SPRAY HEADS OUTSIDE OF THE SELECT FILL.
 7. PAYMENT FOR EMBANKING / EXCAVATION WILL BE MADE TO THE CONTRACTOR BASED ON THE CONTRACT UNIT PRICE PER CUBIC YARD. THE FINAL QUANTITY FOR WHICH PAYMENT WILL BE MADE, WILL BE THAT QUANTITIES SHOWN ON THE CONTRACT PLANS AND BID PROPOSAL, REGARDLESS OF ERRORS IN CALCULATIONS.
 8. CONSTRUCTION BARRICADES AND WARNING SIGNS, TOGETHER WITH FLASHERS SHALL BE PROVIDED AT ALL UNITS UNDER CONSTRUCTION OR OTHERWISE BEING HAZARDOUS TO MOTORIST. ALL OBSTACLE MARKERS SHALL BE PROPERLY FLAGGED.
 9. LOCATIONS OF UTILITIES SHOWN HEREIN WERE DERIVED FROM BEST AVAILABLE SOURCES AND FIELD SURVEYS. ENGINEERS DO NOT WARRANT THE EXISTENCE OR NON-EXISTENCE OF UTILITIES. CONTRACTOR SHALL BE RESPONSIBLE FOR DETERMINING THE EXACT LOCATION, DEPTHS AND SIZES OF ALL UNDERGROUND UTILITIES AND STRUCTURES PRIOR TO CONSTRUCTION AND SHALL BE LIABLE FOR ANY DAMAGES OR DOWNTIME CAUSED BY FAILURE TO COMPLY WITH THESE INSTRUCTIONS.
 10. APPROVAL CRITERIA FOR FLEXIBLE BASE SOURCES AND APPROVALS OF AN AREA AND/OR DEPTH OF LAYER IN SOURCE FROM WHICH THE MATERIAL IS TO BE SECURED WILL BE BASED ON PRELIMINARY TEST AND SUCH OTHER OCCASIONAL TEST AS FOUND NECESSARY BY THE GEOTECHNICAL ENGINEER.
 11. ALL RUBBISH, TEMPORARY STRUCTURES, AND BACKFILL SHALL BE PROPERLY DISPOSED OF BY CONTRACTOR.

LEGEND

- PROPERTY LINE
- PROPOSED 2 1/2" ASPHALT
- ⊕ FIRE HYDRANT
- ⊕ POWER POLE
- ⊕ LIGHT POLE



CALL BEFORE YOU DIG !
 TEXAS ONE CALL PARTICIPANTS REQUEST
 48 HOURS NOTICE BEFORE YOU DIG, DRILL,
 OR BLAST - STOP, CALL !
 TEXAS ONE CALL SYSTEM
 1-800-245-4545
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 AT 1-800-828-5127
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 NOTIFICATION COMPANY
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 TEXAS EXCAVATION SAFETY SYSTEM
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HOWLAND
 ENGINEERING AND SURVEYING CO.
 TBPE Firm Registration No. F-4097 TBPLS Firm Registration No. 100464-00
 7615 N. Bartlett Avenue P.O. Box 451126 (78045) Laredo, TX. 78041
 P. 956.722.4411 F. 956.722.5414
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WEBB COUNTY YOUTH VILLAGE
 REHABILITATION CENTER
 111 CAMINO NUEVO ROAD, HWY 359
 LAREDO, TEXAS 78046

PROJECT NUMBER
REVISIONS
FILENAME:
SHEET TITLE
SITE PLAN
DRAWN BY: J.C.N.
SHEET NO.

STATE HWY 359

1 - SITE PLAN
 SCALE: 1" = 30'

C.01
 DATE: April 07, 2016

RAMP NOTES:

1. FULL DEPTH COLORED CONCRETE SHALL BE USED AT ALL RAMPS. THE CONCRETE SHALL BE MIXED INTO THE PAINT PRIOR TO POURING. THE COLOR SHALL BE AS DIRECTED BY THE ARCHITECT / CITY OF BRUNI, TEXAS. A FINISHED TEXTURE IN COMPLIANCE WITH TDRL REQUIREMENTS SHALL BE USED AT ALL RAMPS.
2. THE FINISH SURFACE OF THE CONCRETE ACCESS RAMP IS TO BE GROOVED AS SHOWN ON THE DETAIL WITH A 3/4" WIDE BY 1/4" DEEP GROOVE SPACED AT 2" ON CENTER. THE SURFACE SHALL BE ROUGHENED WITH NO LESS THAN A BROOM FINISH TO PREVENT SLIPPING AND TO DIFFERENTIATE ITS TEXTURE FROM THAT OF THE STANDARD SIDEWALK.
3. THE CONTRACTOR IS HEREBY ADVISED THAT ADHERENCE TO THE FOLLOWING TEXAS DEPT. OF LICENSING AND REGULATION ARCHITECTURAL BARRIERS NEW REGULATIONS RELATED TO HANDICAP RAMPS WILL BE REQUIRED AND MAY SUPERCEDE NOTES 1 AND 2 SHOWN ABOVE: TEXAS ACCESSIBILITY STANDARDS, TECHNICAL MEMORANDUM TM 08-01, ISSUED DATE: JUNE 30, 2008. CURB RAMPS-SURFACE TEXTURE/CONTRACT, ADMINISTRATION RULE 68.102 (b) (2) AND TAS 4: 7-4 WHICH RELATE AND SPECIFY MATERIALS/CONSTRUCTION FOR CURB RAMPS IN THE PUBLIC RIGHT-OF-WAY AND CURB RAMPS NOT IN THE PUBLIC RIGHT-OF-WAYS.
4. DURING CONSTRUCTION, THE LOCATION OF THE CONCRETE ACCESS RAMP MAY BE SHIFTED FROM THE PROPOSED LOCATION DUE TO UNFORESEEN EXISTING CONDITIONS WITH THE ARCHITECT / ENGINEER'S APPROVAL.
5. THE LEAST POSSIBLE SLOPE SHALL BE USED FOR ANY RAMP. THE MAXIMUM SLOPE CROSS SLOPE ON ANY SIDEWALK IS 1:50 (2%). THE MAXIMUM SLOPE FOR ANY RAMP SHALL BE 1:12.

CONCRETE CURB & VALLEY GUTTER NOTES:

1. DUMMY JOINTS SHALL BE PROVIDED BY THE USE OF 1/8" THICK STEEL TEMPLATES ON 10' CENTERS AND EXTENDING 2" INTO THE CONCRETE.
2. EXPANSION JOINTS SHALL BE PROVIDED AT NO MORE THAN 40' INTERVALS BY USE OF 1/2" PREFORMED BITUMINOUS JOINT MATERIAL SET 1/2" BELOW FINISHED SURFACE.
3. TWO(2) 1/2" X 3'-0" DOWELS SHALL BE PROVIDED AT EACH JOINT AND EXTENDING 18" EITHER SIDE OF JOINT, DOWELS SHALL BE PLAIN BARS AND SHALL HAVE ONE HALF BAR DIPPED IN ASPHALT AND WRAPPED WITH 2 LAYERS OF ROOFING FELT.
4. TWO(2) 1/2" CONTINUOUS STEEL BARS SHALL BE USED FOR REINFORCEMENT AS SHOWN IN THE DETAILS.
5. CONTRACTOR TO PLACE MONOLITHICALLY POURED HIGH BACK CURB WITHIN THE CONFINES OF THE CONCRETE DRIVEWAY IN ACCORDANCE WITH THE DETAILS AND SPECIFICATIONS AS SHOWN ON THE PLANS.

SIDEWALK NOTES:

1. ALL SIDEWALKS (FORWARD SLOPE) GRADES SHALL NOT EXCEED 5% (1:20), UNLESS OTHERWISE NOTED ON THE PLANS.
2. THE TOP OF THE SIDEWALK ELEVATION SHALL BE DESIGN TO MATCH THE EXISTING TOP OF CURB, WHETHER THE CURB IS HIGH-BACK OR LOW-BACK, UNLESS THE EXISTING HIGH-BACK TOP OF CURB NEEDS TO BE BROKEN OUT, TRANSITIONED FOR RAMPS, AND DRESSED WITH GROUT.
3. UNLESS OTHERWISE NOTED ON PLANS, SIDEWALKS ARE TO BE CONSTRUCTED SIX (6) FEET WIDE AGAINST THE BACK CURB, EXCEPT WHERE A DETOUR AROUND A NON RE-LOCATABLE OBJECT IS REQUIRED. SIDEWALKS ARE TO BE CONSTRUCTED 4-INCHES THICK WITH 6"x6" NO. 6 W.W.M. REINFORCEMENT.
4. SIDEWALKS ARE TO BE CONSTRUCTED WITH A LONGITUDINAL CROSS-SLOPE NOT TO EXCEED 2% WITH A MINIMUM CROSS-SLOPE OF 0.5% SLOPING TOWARD THE BACK OF CURB. THE CONTRACTOR SHALL PROVIDE GRADING BEYOND THE EDGE OF SIDEWALK AT A MAXIMUM 1:3 SLOPE TO MATCH EXISTING NATURAL GROUND. AREAS WHERE SLOPE BEHIND SIDEWALK EXCEEDS 1:4 SLOPE, THE CONTRACTOR SHALL SOD SLOPED AREAS TO EDGE OF SIDEWALK FOR PROTECTION OF EMBANKMENT.

CONCRETE NOTES:

1. CLASS "A" 3000-PSI CONCRETE SHALL BE USED UNLESS OTHERWISE NOTED IN THE PLANS.
2. 1/2" THICK MINIMUM PRE-FORMED BITUMINOUS EXPANSION JOINT MATERIAL SET 1/2" BELOW FINISHED SURFACE SHALL BE INSTALLED AT EXPANSION JOINTS. EXPANSION JOINT AT MAXIMUM 40' WITH TWO(2) 18" SMOOTH DOWELS AND 1/2" MINIMUM PRE-FORMED BITUMINOUS EXPANSION JOINT MATERIAL SIDEWALK JOINTS TO ALIGN WITH THE CURB AND GUTTER JOINTS.
3. DOWELS SHOULD BE PLAIN BARS AND SHALL HAVE 1/2 THE BAR WRAPPED WITH 2 LAYERS OF ROOFING FELT.
4. 6" X 6" - No. 6 WIRE MESH SHALL BE USED AS CONCRETE REINFORCEMENT UNLESS OTHERWISE NOTED ON THE PLANS.
5. THE FINISH SHALL BE SEMI-SMOOTH WITH A STIFF BROOM OR BRUSH FINISH.
6. CONTROL JOINTS SHALL BE SPACED IN-BETWEEN AND IN-LINE WITH THE CURB AND GUTTER CONTROL JOINT.
7. FORMS FOR SIDEWALKS SHALL BE FULL DEPTH FOR DIMENSIONS SPECIFIED.
8. THE CONTRACTOR SHALL SCHEDULE WORK SO THAT ASPHALT AND CONCRETE PLACEMENT OPERATIONS WILL FOLLOW THE SUBGRADE WORK AS CLOSELY AS POSSIBLE IN ORDER TO REDUCE THE HAZARD TO THE TRAVELING PUBLIC AND PREVENT UNDUE DAMAGE FROM WET WEATHER.

GENERAL NOTES:

1. NO CONSTRUCTION ACTIVITIES SHALL COMMENCE UNTIL PROPER CLEARANCE IS PROVIDED BY THE OWNER / ARCHITECT.
2. WORK SHALL BE CONDUCTED SO THAT ALL MACHINERY IS OFF THE ROAD BY SUNSET UNLESS OTHERWISE DIRECTED BY THE ARCHITECT / ENGINEER IN WRITING.
3. ALL CONSTRUCTION EQUIPMENT INVOLVED IN ROADWAY WORK ON OR WITHIN 30 FEET OF THE EXISTING ROADWAYS SHALL BE EQUIPPED WITH PERMANENTLY MOUNTED APPROVED 360 DEGREE REVOLVING OR STROBE WARNING LIGHT WITH AMBER LENS. THIS LIGHT SHALL HAVE A MINIMUM LENS OF 5 INCHES AND A DIAMETER OF 5 INCHES. THIS LIGHT SHALL HAVE A MOUNTING HEIGHT OF NOT LESS THAN 6 FEET ABOVE THE ROADWAY SURFACE AND SHALL BE VISIBLE FROM ALL SIDES. THIS EQUIPMENT SHALL ALSO HAVE ATTACHED AT EACH SIDE OF THE REAR END OF THE VEHICLE AN APPROVED ORANGE WARNING FLAG MOUNTED NOT LESS THAN 6 FEET ABOVE THE ROADWAY SURFACE.
4. REFERENCES TO MANUFACTURER'S TRADE OR CATALOG NUMBERS ARE FOR THE PURPOSE OF IDENTIFICATION ONLY. THE CONTRACTOR WILL BE PERMITTED TO FURNISH LIKE MATERIALS OF OTHER MANUFACTURERS PROVIDED THEY ARE OF EQUAL QUALITY AND COMPLY WITH SPECIFICATIONS FOR THIS PROJECT AND ARE APPROVED BY THE ARCHITECT AND/OR ENGINEER.
5. IF SHOWN ON PLANS, THE CONTRACTOR SHALL FURNISH AND INSTALL STOP SIGNS, STREET SIGNS AND SPEED LIMIT SIGNS AND PAVEMENT MARKINGS. THE LOCATIONS OF THE SIGNS AND MARKINGS SHALL BE APPROVED BY THE ARCHITECT / ENGINEER.
6. ALL REPAIRS AND/OR REPLACEMENT OF EXISTING IMPROVEMENTS SHALL BE MADE WITH MATERIALS LIKE THOSE DAMAGED OR REPLACED. ALL CONSTRUCTION OUTSIDE THE CITY R.O.W. SHALL BE COORDINATED WITH PROPERTY OWNER REPRESENTATIVES AND CITY OF LAREDO, WEBB COUNTY, TEXAS INCLUDING THE CITY OF LAREDO WATER UTILITIES DEPARTMENT (WHEN IN THE CITY R.O.W.).
7. CONTRACTOR TO SAW-CUT, REMOVE, AND DISPOSE OF EXISTING CURB & GUTTER, ASPHALT, DRIVEWAYS, CONCRETE ISLANDS, CONCRETE SLABS, AND SIDEWALKS AS SHOWN WITHIN THE DESIGNATED CONSTRUCTION AREAS. CONTRACTOR TO RECONSTRUCT NEW CURB & GUTTER, ASPHALT, DRIVEWAYS, CONCRETE ISLANDS, CONCRETE SLABS, AND SIDEWALKS INCLUDING RAMP SECTIONS AS PER DIMENSIONS AND GRADES SHOWN ON THESE PLANS. CONTRACTOR TO REMOVE AND RECONSTRUCT ONE FOOT (1') OF ASPHALT PAVEMENT AROUND RECONSTRUCTED NEW CURB & GUTTER, DRIVEWAYS, CONCRETE ISLANDS, CONCRETE SLABS, AND SIDEWALKS WHERE NECESSARY TO ACHIEVE THE PROPOSED DESIGN SHOWN ON THESE PLANS, UNLESS OTHERWISE SPECIFICALLY STATED TO REMAIN OR REMOVED COMPLETELY. CONTRACTOR SHALL HULL ALL DEMOLISHED MATERIAL OFFSITE WHERE IT SHALL BE PROPERLY BE DISPOSED OF IN ACCORDANCE WITH ANY REGULATORY CODES FOR DISPOSAL OF REMOVED MATERIAL. DEMOLISHED MATERIAL SHALL NOT BE STORED ON-SITE, UNLESS OTHERWISE APPROVED IN WRITING BY THE ARCHITECT ENGINEER.
8. REFER TO THE ARCHITECTURAL SITE PLAN FOR SPECIFIC LOCATIONS OF CURB RAMPS, SIDEWALK WIDTHS, DRIVEWAYS, ETC.
9. UNLESS OTHERWISE SHOWN ON PLANS, CONTRACTOR TO PLACE HIGH BACK CURB (TYPE A) THROUGHOUT IN ACCORDANCE WITH (IN LIEU OF ANY OTHER STANDARDS) THE CITY OF LAREDO STANDARDS. LOW BACK CURB ONLY ON EXISTING REPLACEMENTS AS REQUIRED TO ACHIEVE ORIGINAL UNIFORMITY. REVERSE CURBS SHALL (TYPE B) BE USED AT ALL LOCATIONS WHERE THE PAVEMENT SLOPES AWAY FROM THE FACE OF THE CURB SECTION. CONCRETE DRIVEWAYS SHALL BE SIX INCHES (6") THICK WITH NO. 4 BARS @ 12" O.C. IN ACCORDANCE WITH THE CITY OF LAREDO DRIVEWAY STANDARDS AND SHALL BE CONSTRUCTED WITH CALICHE BASE COMPACTED TO 95% OF STANDARD PROCTOR +/- TWO PERCENT (2%) OF OPTIMUM MOISTURE CONTENT. ALL CONCRETE FOR CIVIL PLAN SHALL BE 3500 PSI WITH A BROOM FINISH, UNLESS OTHERWISE NOTED.
10. ALL MATERIALS AND CONSTRUCTION PROCEDURES WITHIN THE SCOPE OF THIS PROJECT WHERE NOT SPECIFICALLY COVERED ON THESE PLANS SHALL GO TO ACHIEVE UNIFORM TO ALL APPLICABLE CITY OF LAREDO STANDARD TECHNICAL SPECIFICATION MANUAL, WITH SPECIFIC ATTENTION TO THE FOLLOWING SECTIONS:
 - SECTION 102 - EXCAVATION AND BACKFILL FOR UTILITIES
 - SECTION 104 - PVC WATER PIPE
 - SECTION 110 - WATER VALVES
 - SECTION 112 - FIRE HYDRANTS
 - SECTION 114 - FLUSH VALVE
 - SECTION 116 - HYDROSTATIC TESTS FOR PRESSURE MAINS
 - SECTION 118 - DISINFECTION OF POTABLE WATER MAINS
 - SECTION 120 - CONCRETE ENCASEMENT, CRADLES, SADDLES, AND COLLARS
 - SECTION 122 - ADJUSTING VALVE BOXES TO GRADE
 - SECTION 128 - DISPOSAL OF WASTE MATERIAL AND SALVAGEABLE MATERIAL
 - SECTION 132 - PIPE, JOINT RESTRAINT SYSTEMS
 - SECTION 134 - FLOWABLE BACKFILL
 - SECTION 136 - CEMENT STABILIZED BACKFILL
 - SECTION 202 - PVC SEWER PIPE
 - SECTION 206 - SERVICE CONNECTION
 - SECTION 208 - FIBERGLASS REINFORCED PLASTIC MANHOLE
 - SECTION 210 - CONCRETE MANHOLES
 - SECTION 214 - SANITARY SEWER CLEANOUTS
 - SECTION 216 - ADJUSTING MANHOLES, CLEANOUTS, AND INLETS
 - SECTION 218 - TESTING SEWER SYSTEMS
 - SECTION 226 - PIPE CLEANING AND CCTV INSPECTION
 - SECTION 308 - PIPE HIGH DENSITY POLYETHYLENE STROM DRAIN PIPE
 - SECTION 316 - CONCRETE ENCASEMENT, CRADLES, SADDLES, AND COLLARS
 - SECTION 318 - CHANNEL, EXCAVATION AND EMBANKMENT
 - SECTION 402 - CLEARING AND GRUBBING
 - SECTION 404 - GENERAL CONSTRUCTION AND PREPARATION OF SITE SPECIFICATIONS
 - SECTION 406 - CONCRETE STRUCTURES
 - SECTION 408 - RIPRAP
 - SECTION 410 - REINFORCING STEEL
 - SECTION 412 - WELDED WIRE FABRIC
 - SECTION 416 - EXPANSION JOINT MATERIALS
 - SECTION 418 - MEMBRANE CURING
 - SECTION 420 - CHAIN LINK FENCE
 - SECTION 422 - CONDUIT
 - SECTION 424 - RELOCATING WIRE FENCE
 - SECTION 426 - CONCRETE DRIVEWAYS
 - SECTION 430 - CONCRETE SIDEWALKS
 - SECTION 502 - EXCAVATION AND EMBANKMENT OF STREETS
 - SECTION 504 - CONCRETE
 - SECTION 506 - CONCRETE CURB AND GUTTER
 - SECTION 508 - MACHINE LAID CONCRETE CURB AND GUTTER
 - SECTION 510 - FLEXIBLE BASE COURSE
 - SECTION 512 - ASPHALT STABILIZED BASE
 - SECTION 514 - GEOGRID REINFORCEMENT
 - SECTION 516 - BITUMINOUS PRIME COAT
 - SECTION 518 - BITUMINOUS TACK COAT
 - SECTION 520 - HOT MIX ASPHALTIC CONCRETE PAVEMENT
 - SECTION 522 - CUTTING AND REPLACING PAVEMENT
 - SECTION 536 - PARKING LOTS
 - SECTION 538 - PEDESTRIAN RAILING
 - SECTION 540 - VALLEY GUTTER
 - SECTION 602 - SILT FENCE
 - SECTION 604 - EROSION CONTROL BLANKETS
 - SECTION 606 - NPDES REQUIREMENTS
 - SECTION 608 - HYDRO-MULCH SEEDING
 - SECTION 610 - SEEDING
 - SECTION 702 - PERMANENT TRAFFIC BARRICADES
 - SECTION 704 - STREET SIGNS
 - SECTION 804 - WORK PERFORMED ON NON-WORKING DAYS
 - 102-1 TRENCH BACKFILL CONDITION "A"
 - 102-2 TRENCH BACKFILL CONDITION "B"
 - 102-3 TRENCH BACKFILL CONDITION "C"
 - 102-4 TRENCH BACKFILL CONDITION "D"
 - 104-1 SINGLE WATER SERVICE

GRADING NOTES:

1. ALL GRADING ACTIVITIES SHALL CONFORM TO THE SPECIFICATIONS AND APPROPRIATE REQUIREMENTS BY CITY OF LAREDO, WEBB COUNTY, TEXAS AND/OR CITY OF LAREDO, TEXAS AND/OR ANY GEOTECHNICAL SUBSURFACE EXPLORATION REPORTS FOR SITE GRADING AND PAVEMENT DESIGN. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO FOLLOW THESE SPECIFICATIONS AND REQUIREMENTS. ANY DIFFERENCE BETWEEN SPECIFICATIONS, REQUIREMENTS, REPORTS AND THESE PLANS SHALL BE ADDRESSED WITH THE ARCHITECT/ENGINEER PRIOR TO CONSTRUCTION ACTIVITIES. MATERIAL PLACED BY THE CONTRACTOR WHICH DOES NOT CONFORM TO THE SPECIFIED DESIGN REQUIREMENTS OR LAB REPORT SHALL BE REMOVED AND/OR REWORKED UNTIL ACCEPTABLE RESULTS ARE ACHIEVED. THE COST FOR ANY ADDITIONAL TESTING REQUIRED BECAUSE OF A CONSTRUCTION FAILURE SHALL BE PAID FOR BY THE CONTRACTOR.

2. ALL TOPSOIL (WHERE EXPOSED BY EXCAVATION), PLANTS AND OTHER ORGANIC MATERIAL SHALL BE REMOVED FROM THE SITE AND DISPOSED OF BY THE CONTRACTOR. IN AREAS TO BE EXCAVATED AND/OR WHERE FILL IS TO BE PLACED, VEGETATION AND LOOSE OR EXCESSIVE ORGANIC MATERIAL SHALL BE STRIPPED TO A MINIMUM DEPTH OF SIX INCHES (6") AND REMOVED FROM THE SITE. THE EXPOSED SURFACE SHALL BE SCARIFIED, MOISTENED IF NECESSARY, AND COMPACTED IN THE MANNER SPECIFIED FOR SUBSEQUENT LAYERS OF FILL. FILL MATERIAL SHALL CONTAIN NO ORGANIC OR OTHER PERISHABLE MATERIAL, AND NO STONES LARGER THAN SIX INCHES (6"). FILL MATERIAL SHALL HAVE A LIQUID LIMIT OF 35 OR LESS AND A PLASTICITY INDEX OF LESS THAN 18 BUT NOT LESS THAN 5. FILL MATERIAL SHALL BE PLACED IN HORIZONTAL LAYERS NOT EXCEEDING EIGHT INCHES (8") THICKNESS AFTER COMPACTION. COMPACTION. DENSITIES SHALL BE 95% OF THE STANDARD PROCTOR +/- TWO PERCENT (2%) OF OPTIMUM MOISTURE CONTENT. WHERE REQUIRED TO ACHIEVE THE DESIGN, THE SUBGRADE SHALL BE FINISHED TO TWELVE INCHES (12") BELOW THE LINES AND GRADES AS INDICATED ON THE PLANS. BASE MATERIAL SHALL BE CALICHE MEETING THE FOLLOWING MINIMUM STANDARDS: LIQUID LIMIT SHALL NOT EXCEED 35, PLASTICITY INDEX SHALL NOT EXCEED 12 AND THE MATERIAL SHALL BE TYPE F CONFORMING TO THE ITEM NO. 248 OF THE 1982 TxDOT STANDARDS.

3. CONTRACTOR TO GRADE AREA OUTSIDE OF CURB AT OR NEAR PERIMETERS TO MATCH EXISTING NATURAL GROUND.

UTILITIES NOTES:

1. AS REQUIRED BY "THE TEXAS UNDERGROUND FACILITY DAMAGE PREVENTION AND SAFETY ACT," TEXAS ONE CALL SYSTEM MUST BE CONTACTED (800-245-4545) AT LEAST 48 HOURS PRIOR TO ANY EXCAVATION OPERATIONS BEING PERFORMED. IT IS THE CONTRACTOR'S RESPONSIBILITY TO CONTACT TEXAS ONE CALL SYSTEM.
2. UNDERGROUND UTILITY LINES SHOWN ON THE PLANS CONSTITUTE AN ATTEMPT BY THE ENGINEER TO LOCATE THESE UTILITIES FOR THE CONVENIENCE OF THE CONTRACTOR. THE CONTRACTOR SHALL FIELD LOCATE ALL UNDERGROUND UTILITY LINES AND MAKE PROVISIONS FOR THEIR PROTECTION. THE CONTRACTOR SHALL SUBMIT TO THE ENGINEER FOR APPROVAL ANY FIELD CHANGES IN THE WATER & SEWER LINE GRADES TO ACHIEVE THE DESIGN REQUIRED. ANY OTHER WORK REQUIRED TO ACCOMPLISH THESE CHANGES IN GRADE WILL BE INCLUDED IN THE PRICE OF THE LINE IN PLACE. ANY DAMAGE TO CITY OR PRIVATE UTILITY LINES SHALL BE IMMEDIATELY REPORTED TO THE ENGINEER, THE CITY OF LAREDO WATER UTILITIES DEPARTMENT AND/OR APPROPRIATE UTILITY COMPANY. REPAIRS TO THESE UTILITY LINES WILL BE AT THE DIRECTION OF THE CITY AND/OR THE UTILITY COMPANY AFFECTED AND WILL BE AT THE CONTRACTORS EXPENSE.
3. ALL UNDERGROUND ELECTRICAL, TELEPHONE, AND CABLE LINES MAY NOT BE SHOWN ON THESE PLANS. THE CONTRACTOR SHALL COORDINATE WITH THE UTILITY COMPANIES TO DETERMINE LOCATIONS, DEPTHS, AND LINE SIZES AND TO REQUEST EXACT FIELD LOCATION OF UTILITIES. THE CONTRACTOR SHALL PROVIDE AT LEAST 72 HOUR ADVANCE NOTIFICATION TO THE UTILITY COMPANIES PRIOR TO ANY EXCAVATION. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO COORDINATE THE RELOCATION ANY EXISTING UTILITIES WHICH CONFLICT WITH PROPOSED IMPROVEMENTS.

4. THE CONTRACTOR SHALL EXERCISE CAUTION WHEN WORKING UNDER AND AROUND UTILITY LINES.

5. DURING THE EXECUTION OF THE WORK, UTMOST CARE SHALL BE EXERCISED TO PREVENT DAMAGE TO ANY UTILITIES, STRUCTURES OR RIGHT-OF-WAY. ANY DAMAGE TO EXISTING UTILITIES OR STRUCTURES SHALL BE REPAIRED AT THE CONTRACTOR'S EXPENSE.

6. IF ANY OVERHEAD OR UNDERGROUND ELECTRICAL LINES NEED TO BE DE-ENERGIZED, THE CONTRACTOR SHALL CALL THE POWER COMPANY TO DO THIS WORK. ANY COST ASSOCIATED WITH DE-ENERGIZING THE ELECTRICAL LINES AND/OR ANY OTHER PROTECTIVE MEASURES REQUIRED SHALL BE AT THE CONTRACTOR'S EXPENSE.

7. WHEN THE CONTRACTOR IS WORKING NEAR ANY POWER LINES, IT IS HIS/HER RESPONSIBILITY TO COMPLY WITH THE APPROPRIATE SECTIONS OF THE TEXAS STATE LAW AND FEDERAL REGULATIONS RELATING TO THE TYPE OF WORK INVOLVED.

8. CONTRACTOR SHALL PROVIDE TRENCHING FOR ALL UTILITY RELOCATIONS OR ADJUSTMENTS AS MAY BE REQUIRED FOR THIS PROJECT.

DEMOLITION NOTES: (IF APPLICABLE)

1. EXISTING BUILDINGS NOTED ON THIS PLAN ARE TO REMAIN IN SERVICE THROUGHOUT DEMOLITION AND CONSTRUCTION ACTIVITIES. CONTRACTOR SHALL MAKE PROVISIONS TO MAINTAIN ACCESS TO THESE EXISTING BUILDINGS AT ALL TIMES OR OTHERWISE COORDINATE LIMITED ACCESS WITH PROPERTY OWNERS AND BUILDING OCCUPANTS.
2. EXISTING CONCRETE FLATWORK AND ASPHALT DESIGNATED TO BE REMOVED SHALL BE HAULED OFF SITE INCLUDING SLABS, SIDEWALKS, HEADER CURBS, DRIVES, AND PADS DESIGNATED TO BE REMOVED.
3. EXISTING CONCRETE CURB AND GUTTERS DESIGNATED TO BE REMOVED SHALL BE HAULED OFF SITE. WHERE EXISTING CURB AND GUTTERS ARE TO REMAIN, THE CONTRACTOR SHALL REMOVE TO NEAREST JOINT. WHERE NEW CURB AND GUTTERS ARE PROPOSED WITHIN EXISTING STREETS, CONTRACTOR TO SAW CUT AND REMOVE ASPHALT AT THE PROPOSED DESIGN LOCATION AND PROVIDE FOR PROTECTION OF SAWCUT EDGE DURING INTERIM CONSTRUCTION.
4. EXISTING ASPHALT PAVEMENT DESIGNATED TO BE REMOVED SHALL BE HAULED OFF SITE. WHERE NEW CONCRETE PAVEMENT IS PROPOSED, CONTRACTOR TO FOLLOW GRADING PLAN AND APPROPRIATE NOTES FOR LOT PAVEMENT GRADING.
5. EXISTING FENCE DESIGNATED TO BE REMOVED SHALL INCLUDEING GATES, POST AND FOUNDATIONS.
6. EXISTING LIGHT POLES & SERVICE LINES DESIGNATED TO BE REMOVED SHALL BE FIRST COORDINATED WITH THE APPROPRIATE UTILITY COMPANY FOR TERMINATION AND RELOCATION OF SERVICE. WHERE IN THE EXISTING RIGHT-OF-WAY OR EASEMENT, CONTRACTOR TO COORDINATE WITH APPROPRIATE UTILITY COMPANY AS MAY BE REQUIRED.
7. IF NOTED ON PLANS, EXISTING TREES WITHIN PLANTER AREAS ARE TO REMAIN ALONG WITH GRASS AREA. CONTRACTOR SHALL MAKE PROVISIONS TO PROTECT THESE LANDSCAPED AREAS. CONTRACTOR SHALL COORDINATE ANY TREE REMOVAL WITH APPROVAL OF THE OWNER.

8. IF NOTED ON PLANS EXISTING WATER METERS AND SERVICE CONNECTION TO BE RELOCATED AS PER UTILITY PLAN. EXISTING WATER LINES AND VALVES SHALL BE REMOVED AND WHERE POSSIBLE SALVAGED FOR REUSE. ANY LINE REUSE SHALL BE COORDINATED WITH THE CITY OF BRUNI AND BRWSD AND UNITED WATER. WATER LINES TO BE CAPPED OR ABANDONED ARE AS PER THE UTILITY PLAN. CONTRACTOR TO COORDINATE WITH THE CITY OF BRUNI AND BRWSD WATER WORKS DEPARTMENT FOR METER DISCONNECTS AND RECONNECTS. IF NOTED ON PLANS, FIRE HYDRANTS SHALL BE SALVAGED AND REUSED WITHIN THE PROPOSED PLAN.

9. EXISTING ELECTRICAL POWER POLE AND GUY WIRES DESIGNATED TO BE RELOCATED BY OTHERS SHALL BE COORDINATED BY THE CONTRACTOR WITH THE APPROPRIATE ELECTRICAL COMPANY.

10. EXISTING SIGNS INCLUDING CONCRETE BASE SHALL BE REMOVED WHERE IMPACTED BY PROPOSED IMPROVEMENT.

SEWER LINES NOTES:

1. SANITARY SEWER LINES AND SEWER SERVICE LINES SHALL BE SDR 26, MEETING THE REQUIREMENTS OF ASTM D3034 AND THE CITY OF LAREDO WATER UTILITIES DEPARTMENT REQUIREMENTS. SEWER SERVICE LINES SHALL BE CONSTRUCTED AT THE LOCATIONS SHOWN ON THESE PLANS AND SHALL BE COORDINATED WITH THE CITY OF LAREDO, WEBB COUNTY, TEXAS AND ARCHITECT / ENGINEER. SEWER SERVICE CONNECTIONS TO THE BUILDING SHALL BE CONSTRUCTED WITH THE SAME SIZE AS THE ORIGINAL. CLEANOUTS FOR THE SERVICE CONNECTIONS SHALL BE PLACED AS INDICATED ON THESE PLANS AND SHALL BE COORDINATED WITH THE OWNER AND PLACED AT GRADE WITH AN EXPOSED PVC CAP AND OR CONCRETE PAD. THE CONTRACTOR SHALL ADHERE TO TCEQ'S DESIGN REQUIREMENTS FOR SEPARATION & CROSSING OF POTABLE WATER AND SANITARY SEWER LINES.

WATER LINES NOTES:

1. IF APPLICABLE, ALL 6", 8" AND 12" DIAMETER WATER LINES SHALL BE DR 14, CLASS 200, MEETING THE REQUIREMENTS OF AWWA C-900. THE CONTRACTOR SHALL MAINTAIN A MINIMUM OF 4'-0" OF COVER FROM TOP OF PIPE TO FINISHED GRADE, INCLUDING LANDSCAPED AND PAVED AREAS. FITTING FOR WATER LINES SHALL CONFORM TO IN LIEU OF ANY OTHER CODES, THE CITY OF LAREDO BUILDING AND PLUMBING CODES. WATER VALVES SHALL BE PLACED AS SHOWN ON THE PLANS AND CONFORM TO THE LOCAL DESIGN STANDARDS. FIRE HYDRANTS SHALL BE INSTALLED WITH 6" DIAMETER PRESSURE RATED PVC AND SHALL BE DR-14, CLASS 200, MEETING THE REQUIREMENTS OF AWWA C-900. FIRE HYDRANT 8" TAPPING SLEEVE/SERVICE SADDLE SHALL BE IN CONFORMANCE WITH THE CITY OF BRUNI AND BRWSD WATER UTILITIES STANDARDS. WATER SERVICE CONNECTIONS SHALL BE CONSTRUCTED AS PER DETAIL SHOWN ON THE PLANS. WATER SERVICE CONNECTIONS TO THE BUILDING SHALL BE CONSTRUCTED WITH THE SAME SIZE AS THE ORIGINAL. THE CONTRACTOR SHALL COORDINATED WITH THE CITY OF LAREDO WATER UTILITIES DEPARTMENT TO DETERMINE THE WATER METER LOCATIONS WHICH ARE TO BE INSTALLED BY CITY OF LAREDO WATER UTILITIES DEPARTMENT AND PAID FOR BY THE OWNER.

2. UNLESS OTHERWISE APPROVED BY ENGINEER, ALL PVC WATERLINES 4" IN DIAMETER AND SMALLER SHALL BE MANUFACTURED FROM A TYPE I POLYVINYL CHORIDE (PVC) COMPOUND WITH A CELL CLASSIFICATION OF 12454 ASTM D1784. THE PIPE SHALL BE MANUFACTURED IN STRICT COMPLIANCE TO ASTM D1785. ALL PIPE SHALL BE STORED INDOORS AT THE MANUFACTURING SITE UNTIL SHIPPED FROM THE FACTORY. THE PIPE SHALL CARRY THE NATIONAL SANITATION FOUNDATION (NSF) SEAL OF APPROVAL FOR POTABLE WATER APPLICATIONS.

TRENCHING NOTES:

1. THE CONTRACTOR SHALL PROVIDE TRENCHING AND BACKFILL FOR THE UTILITY COMPANIES AS REQUIRED AND SHALL COMPLY WITH ALL APPLICABLE SAFETY REGULATIONS FOR UTILITY WORK.

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 LAREDO, TEXAS 78046

PROJECT NUMBER
REVISIONS
FILE NAME:
SHEET TITLE
GENERAL NOTES
DRAWN BY: J.C.N.
SHEET NO.
DATE: April 07, 2016

HOWLAND
 ENGINEERING AND SURVEYING CO.
 TBP Firm Registration No. F-4097 TBP/S Firm Registration No. 100464-00
 7615 N. Bartlett Avenue P.O. Box 451128 (78045) Laredo, TX 78041
 P. 956.722.4411 F. 956.722.5414
 www.howlandcompanies.com

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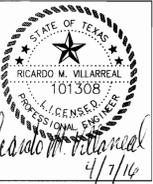
GENERAL NOTES:

1. VEHICULAR AND PEDESTRIAN TRAFFIC MUST BE MAINTAINED AT ALL TIMES WITHIN PUBLIC RIGHT-OF WAY.
2. THE CONTRACTOR IS RESPONSIBLE FOR PROPER DISPOSAL OF ALL DEMOLITION ITEMS. ALL ITEMS THAT ARE DEMOLISHED, SHALL BE PROPERLY DISPOSED OF OFFSITE IN ACCORDANCE WITH ALL APPLICABLE FEDERAL, STATE AND LOCAL LAWS AND REGULATIONS. EFFORT WAS MADE TO IDENTIFY EXISTING IMPROVEMENTS TO BE DEMOLISHED. HOWEVER, CONTRACTOR IS RESPONSIBLE TO VISIT THE SITE TO INCLUDE A LUMP SUM FOR DEMOLITION.
3. EFFORT WAS MADE TO IDENTIFY EXISTING IMPROVEMENTS TO BE DEMOLISHED. HOWEVER, CONTRACTOR IS RESPONSIBLE TO VISIT THE SITE TO INCLUDE A LUMP SUM FOR DEMOLITION.

GENERAL UTILITY NOTES:

1. UNDERGROUND UTILITIES SHOWN WERE DERIVED FROM FIELD OBSERVATION, AVAILABLE RECORD DRAWINGS, AVAILABLE MAPS AND FIELD SURVEY. THE DRAWING DOES NOT REPORT TO CONTAIN ALL EXISTING UTILITIES.
2. THE CONTRACTOR IS RESPONSIBLE FOR CONTACTING ALL UTILITY COMPANIES TO FURTHER VERIFY THE LOCATION OF UTILITIES. THE CONTRACTOR SHALL REPORT TO THE ENGINEER ANY UNCHARTED UTILITIES THAT ARE UNCOVERED DURING CONSTRUCTION.

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FILENAME:

SHEET TITLE
DEMOLITION PLAN

DRAWN BY: J.C.N.

SHEET NO.

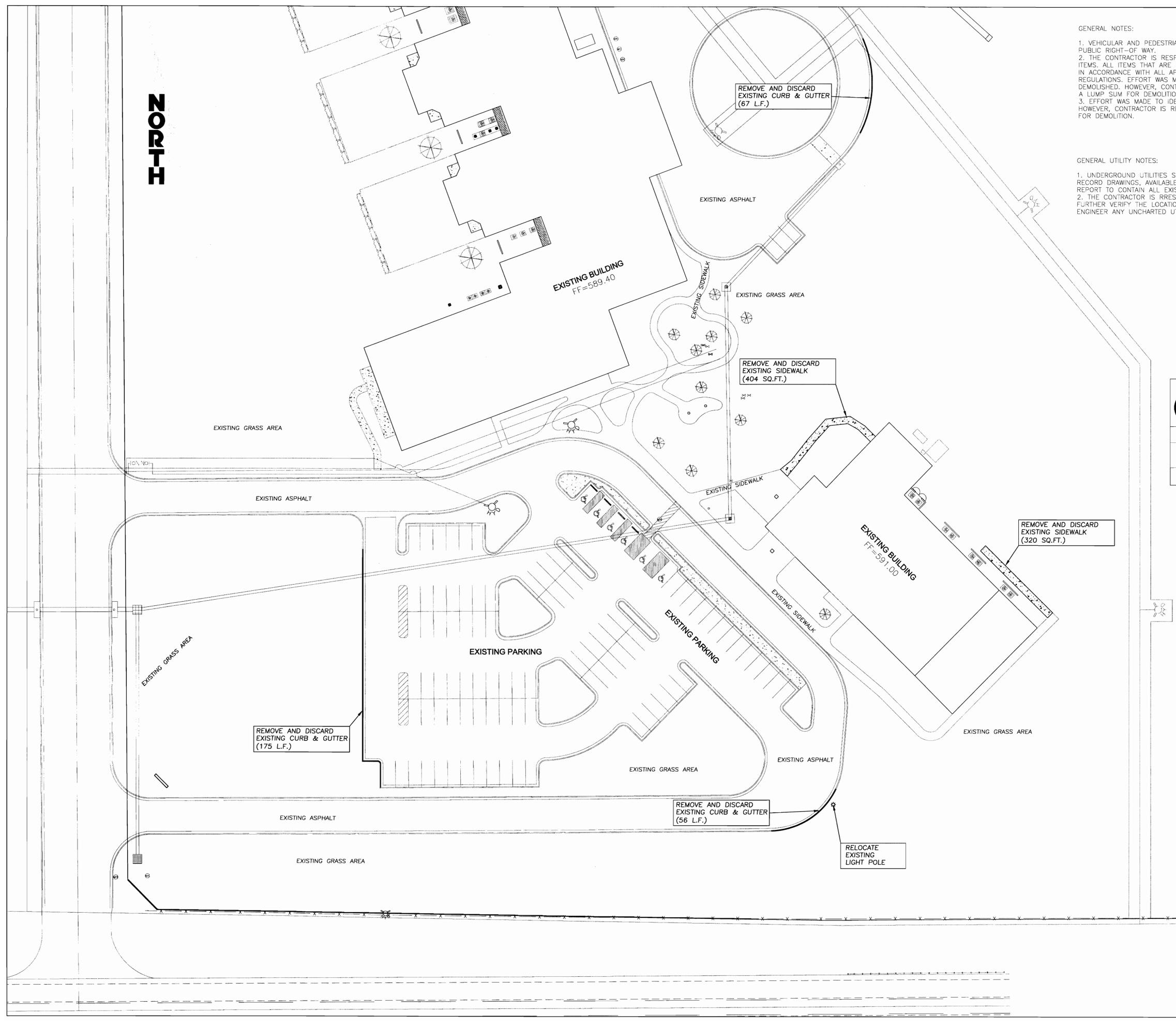
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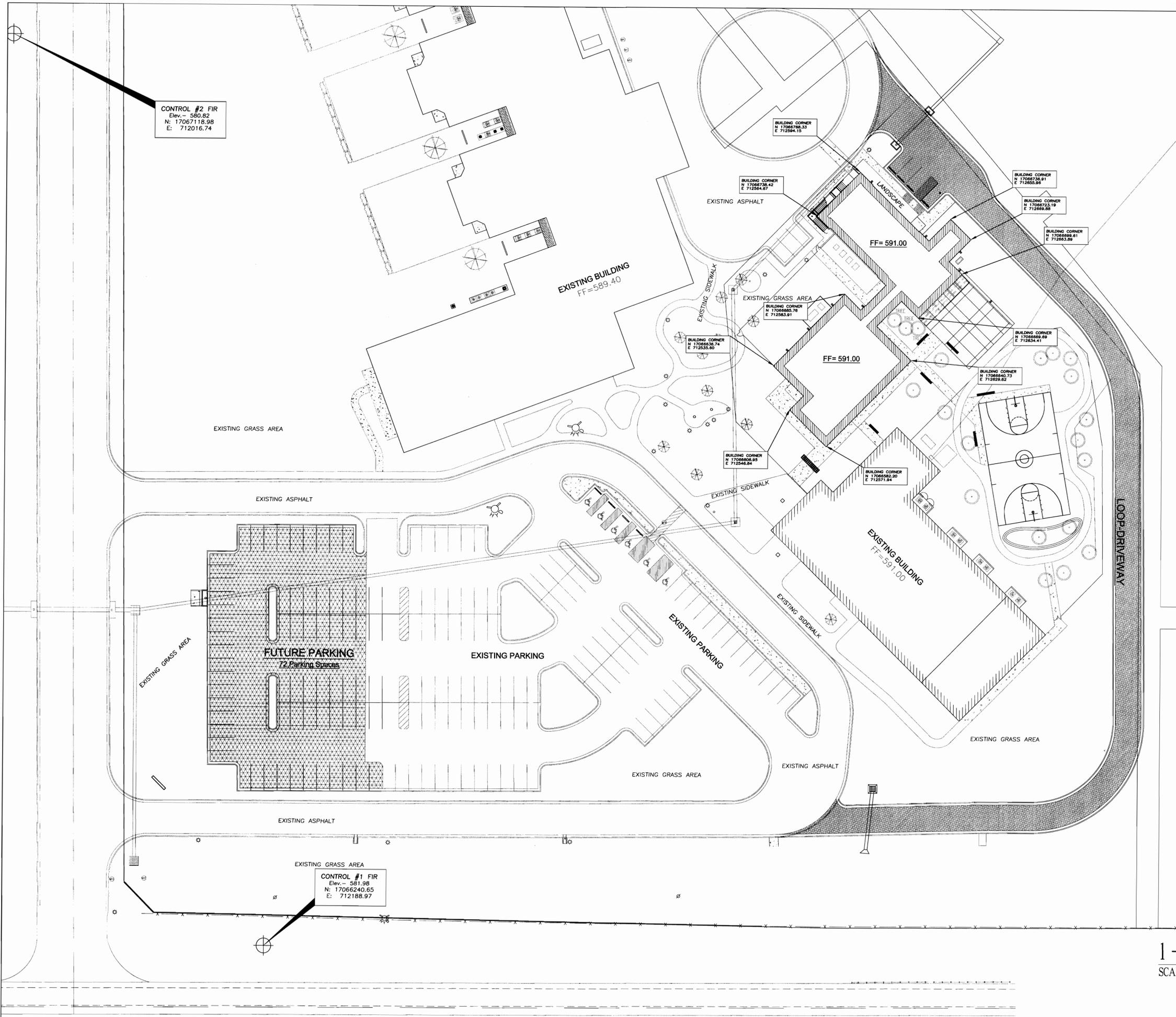
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1 - DEMOLITION PLAN
 SCALE: 1" = 30'





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PROJECT NUMBER
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SHEET TITLE
 SURVEY CONTROL MAP
 DRAWN BY: J.C.N.

SHEET NO.
C.04
 DATE: April 07, 2016

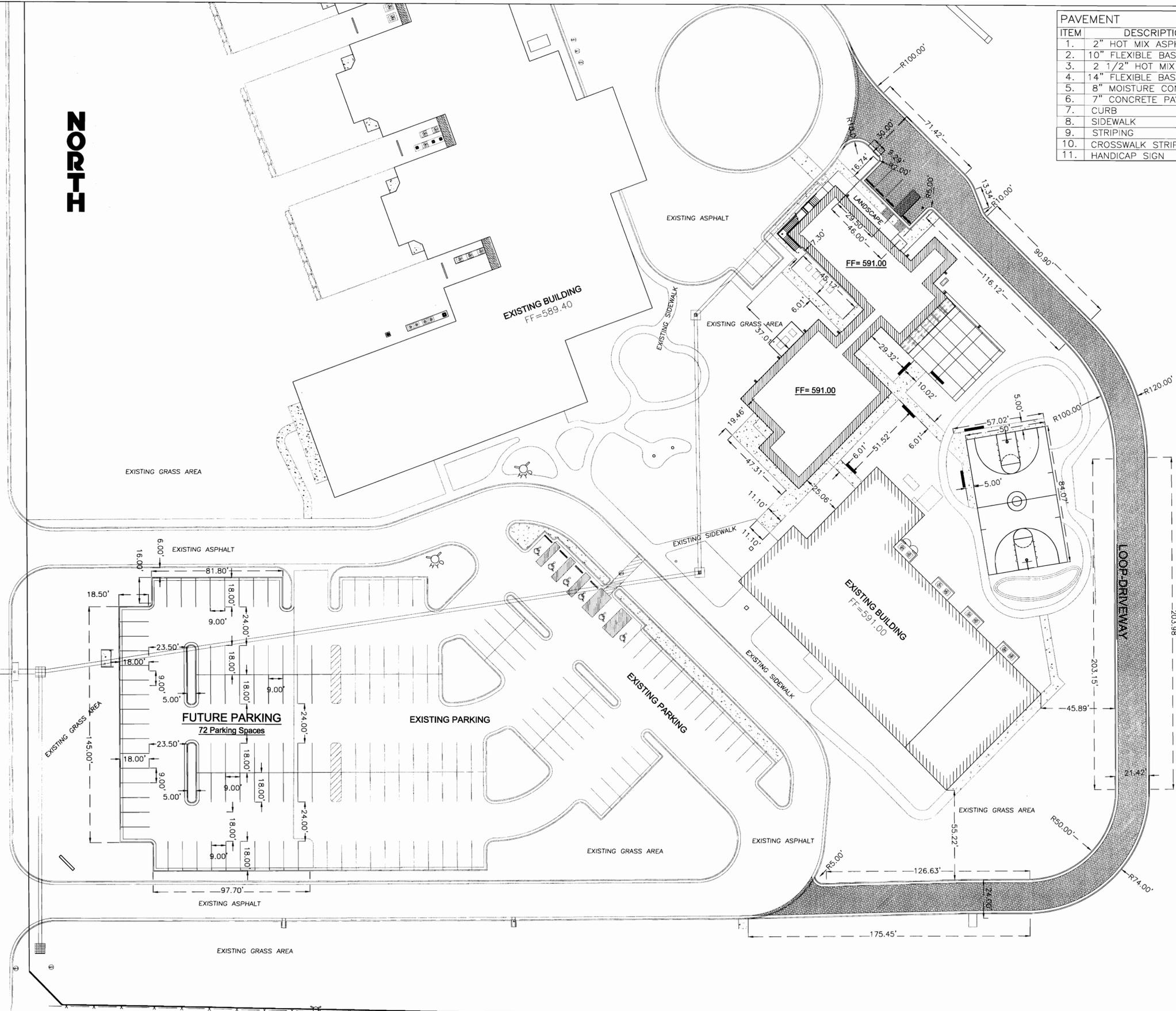
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1 - SURVEY CONTROL MAP
 SCALE: 1" = 30'

I-HROZ

ITEM	DESCRIPTION	QUANTITY	UNIT
1.	2" HOT MIX ASPHALT (Parking Lot)	1,945	SY
2.	10" FLEXIBLE BASE (Parking Lot)	2,141	SY
3.	2 1/2" HOT MIX ASPHALT (Loop Run)	1,527	SY
4.	14" FLEXIBLE BASE (Loop Run)	2,133	SY
5.	8" MOISTURE CONDITIONED SUBGRADE	4,485	SY
6.	7" CONCRETE PAVEMENT	1,894	SF
7.	CURB	2,168	LF
8.	SIDEWALK	3,210	SF
9.	STRIPING	1,392	LF
10.	CROSSWALK STRIPING	18	LF
11.	HANDICAP SIGN	2	EA

Refer to geotechnical report for material specifications.



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 PLAN

DRAWN BY: J.C.N.

SHEET NO.

C.05

DATE: April 07, 2016

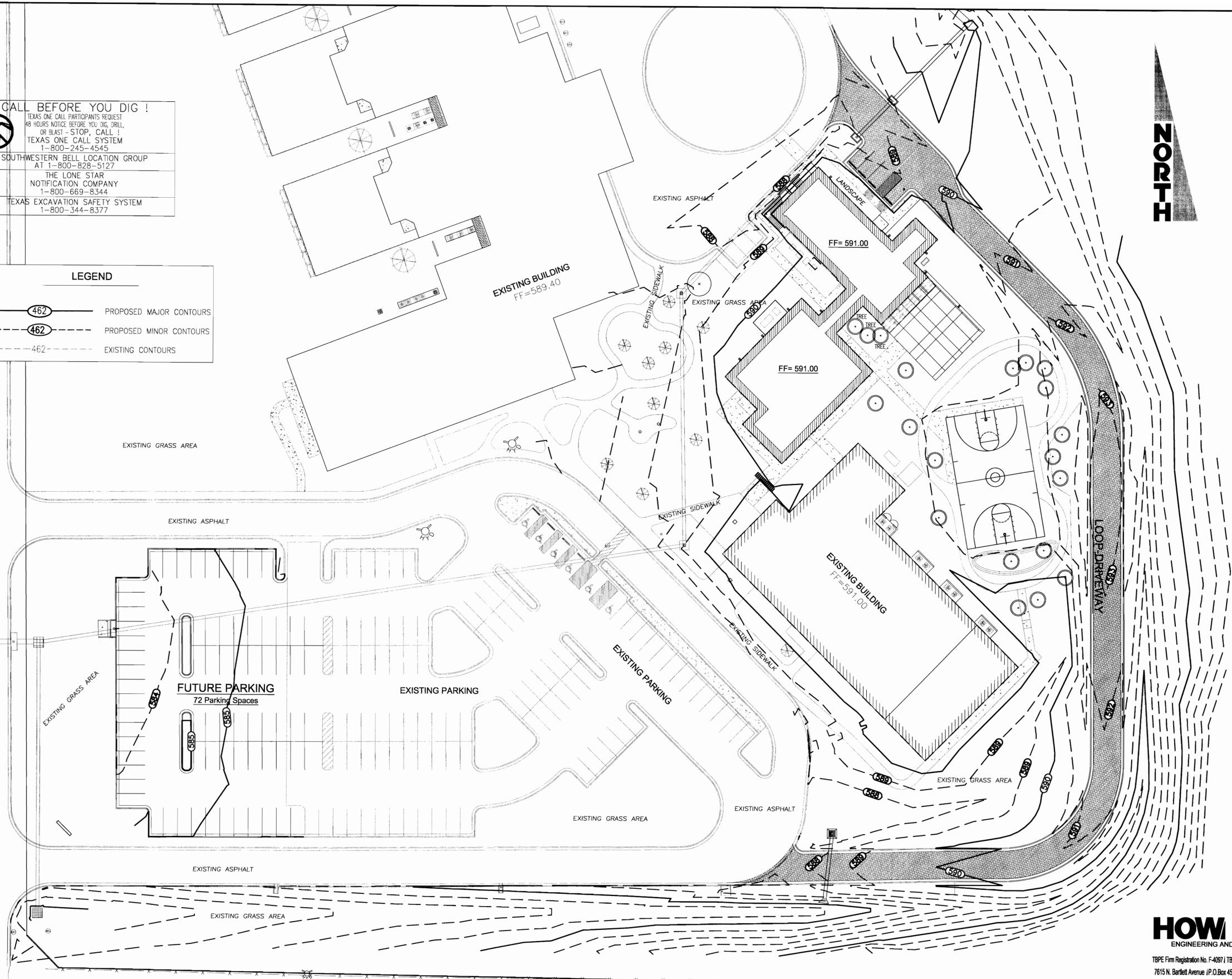
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 TBPE Firm Registration No. F-4097 / TBPLS Firm Registration No. 100464-00
 7615 N. Bartlett Avenue / P.O. Box 451128 (78045) Laredo, TX 78041
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1 - DIMENSIONAL PLAN
 SCALE: 1" = 30'

CALL BEFORE YOU DIG !
 TEXAS ONE CALL PARTICIPANT'S REQUEST
 48 HOURS NOTICE BEFORE YOU DIG, DRILL,
 OR BLAST - STOP, CALL !
 TEXAS ONE CALL SYSTEM
 1-800-245-4545
 SOUTHWESTERN BELL LOCATION GROUP
 AT 1-800-828-5127
 THE LONE STAR
 NOTIFICATION COMPANY
 1-800-669-8344
 TEXAS EXCAVATION SAFETY SYSTEM
 1-800-344-8377

LEGEND

-  PROPOSED MAJOR CONTOURS
-  PROPOSED MINOR CONTOURS
-  EXISTING CONTOURS



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WEBB COUNTY YOUTH VILLAGE
 REHABILITATION CENTER
 111 CAMINO NUEVO ROAD, HWY 359
 LAREDO, TEXAS 78046

PROJECT NUMBER
 REVISIONS
 FILENAME:
 SHEET TITLE
 FINISHED GRADING PLAN
 DRAWN BY: J.C.N.

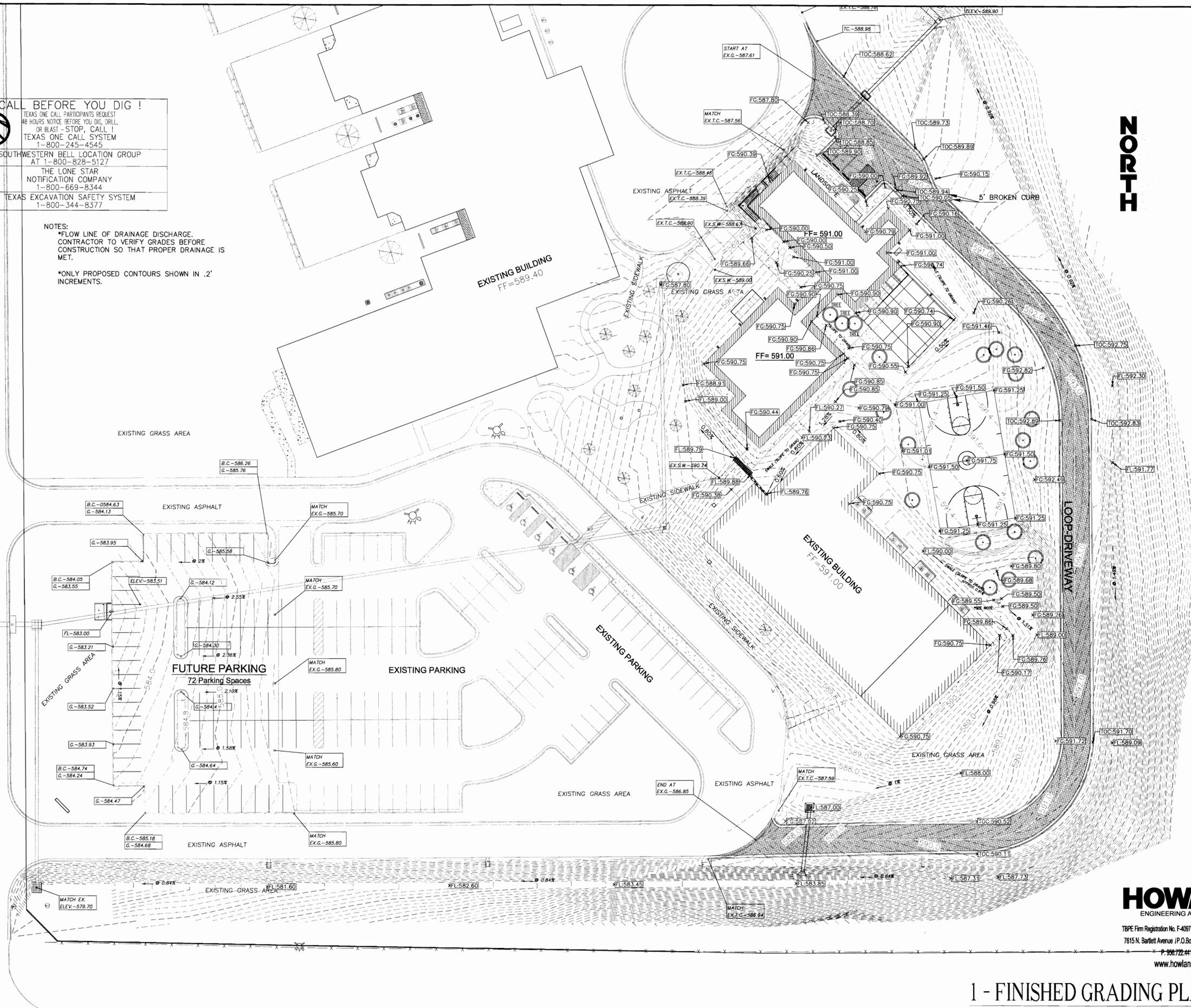
SHEET NO.
C.06
 DATE: April 07, 2016

HOW
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 P: 356.722.4411 / F: 356.722.5414
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1 - FINISHED GRADING PLAN
 SCALE: 1" = 30'

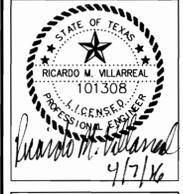
CALL BEFORE YOU DIG !
 TEXAS ONE CALL PARTICIPANTS REQUEST
 48 HOURS NOTICE BEFORE YOU DIG, DRILL,
 OR BLAST - STOP, CALL !
 TEXAS ONE CALL SYSTEM
 1-800-245-4545
 SOUTHWESTERN BELL LOCATION GROUP
 AT 1-800-828-5127
 THE LONE STAR
 NOTIFICATION COMPANY
 1-800-669-8344
 TEXAS EXCAVATION SAFETY SYSTEM
 1-800-344-8377

NOTES:
 *FLOW LINE OF DRAINAGE DISCHARGE.
 CONTRACTOR TO VERIFY GRADES BEFORE
 CONSTRUCTION SO THAT PROPER DRAINAGE IS
 MET.
 *ONLY PROPOSED CONTOURS SHOWN IN .2'
 INCREMENTS.



H-IRON

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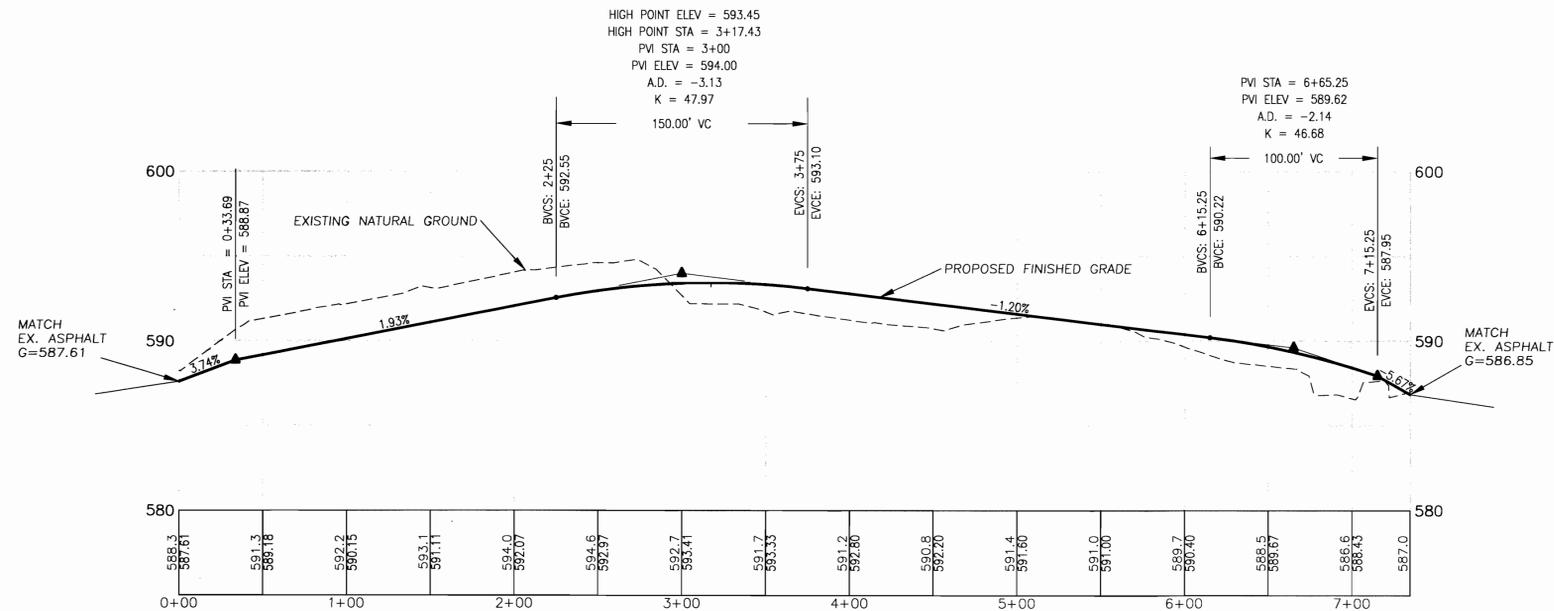
WEBB COUNTY YOUTH VILLAGE
 REHABILITATION CENTER
 111 CAMINO NUEVO ROAD, HWY 359
 LAREDO, TEXAS 78046

PROJECT NUMBER
REVISIONS
FILENAME:
SHEET TITLE
FINISHED GRADING PLAN (SPOTS)
DRAWN BY: J.C.N.

SHEET NO.
C.07
 DATE: February 9, 2016

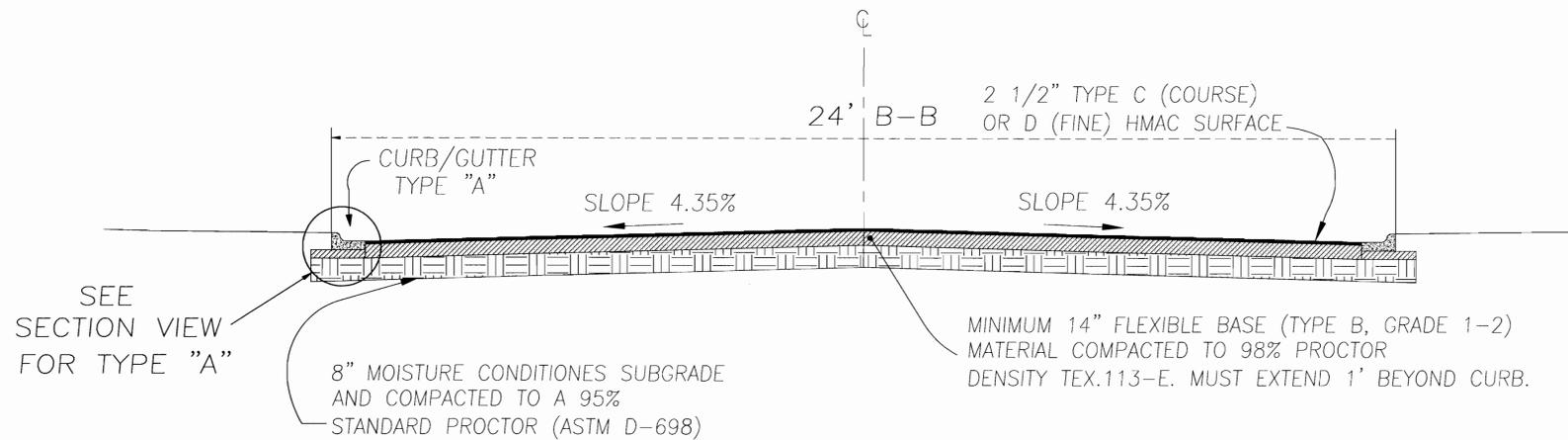
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1 - FINISHED GRADING PLAN (SPOTS)
 SCALE: 1" = 30'



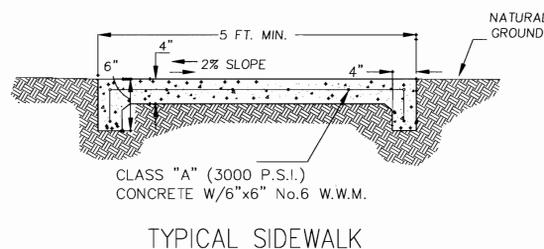
LOOP-DRIVEWAY PROFILE

SCALE: HOR: 1"=50'
VER: 1"=5'



TYPICAL LOOP-DRIVEWAY SECTION

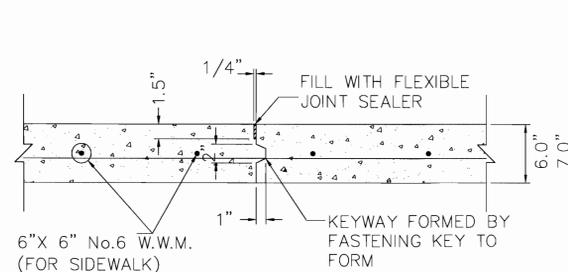
N.T.S.



TYPICAL SIDEWALK

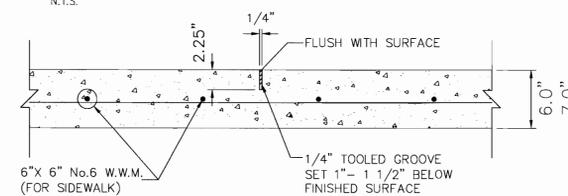
NOTES ON SIDEWALK CONSTRUCTION:

- CONCRETE SHALL BE CLASS "B" (2500 PSI)
- ONE-HALF (1/2) INCH THICK MINIMUM PREFORMED BITUMINOUS JOINT MATERIAL SET 3/4 INCHES BELOW FINISHED SURFACE SHALL BE INSTALLED AT EXPANSION JOINTS AS SHOWN IN PLAN ABOVE.
- DOWELS SHALL BE PLAIN BARS AND SHALL HAVE ONE HALF (1/2) THE BAR WRAPPED (ALT. LAYER 6"X 6", 10 GAUGE WITH 2 LAYERS OF ROOFING FELT).
- 6"X 6", 6 GAUGE WIRE MESH SHALL BE USED AS REINFORCEMENT ACCEPTABLE.)
- THE FINISH SHALL BE SEMI SMOOTH WITH A STIFF BROOM OR BRUSH FINISH.
- CONTROL JOINTS SHALL BE SCORED AT SPACING EQUAL TO WIDTH OF SIDEWALK.
- EXPANSION JOINTS AT MAX. 40-FOOT SPACING WITH 2-1/2" X 36" SMOOTH DOWELS & 1/2" MIN. BITUMINOUS EXPANSION JOINT MATERIAL.
- FULL WIDTH FORMS WILL BE USED.



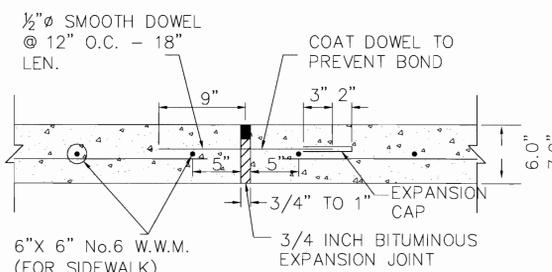
CONTROL JOINT

N.T.S.



CONTRACTION/DUMMY JOINT

N.T.S.



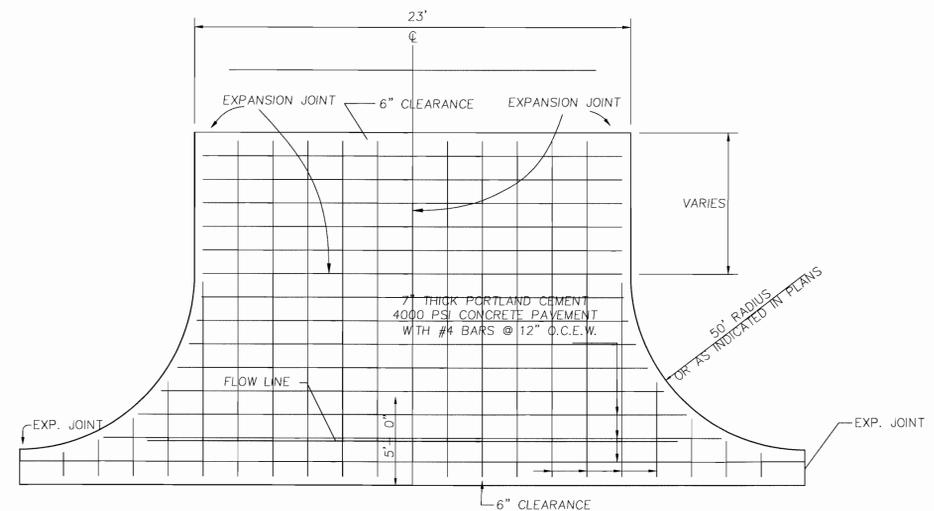
EXPANSION JOINT

N.T.S.

@ 70' - MAX.
@ 65' - TYP.

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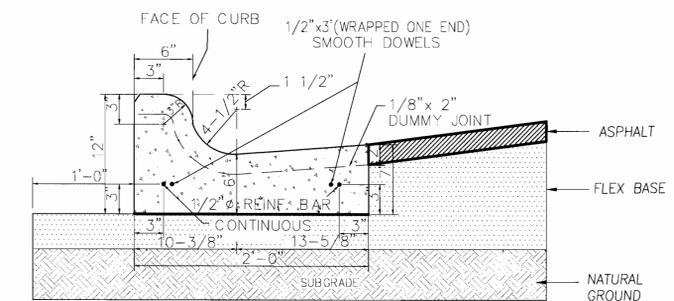
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CONCRETE APPROACH

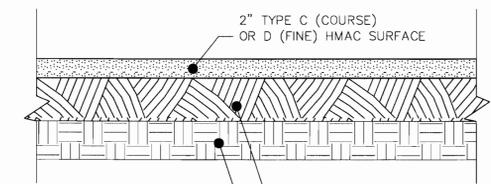
(TO BE CONSTRUCTED WITH CONTINUOUS POUR)
AFTER FLEXIBLE BASE IS IN PLACE

N.T.S.



**SECTION VIEW
TYPE "A" CURB & GUTTER / PAVEMENT**

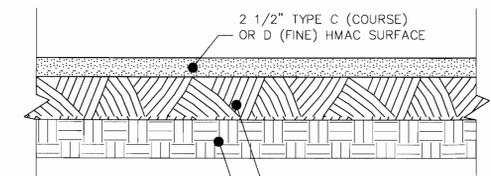
N.T.S.



**PARKING LOT
TYP. ASPHALT PAVEMENT SECTION**

N.T.S.

- * ALTERNATIVE 6" CONCRETE PAVEMENT
- * 8" MOISTURE CONDITIONED SUBGRADE

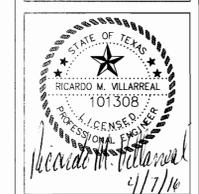


**LOOP DRIVEWAY
TYP. ASPHALT PAVEMENT SECTION**

N.T.S.

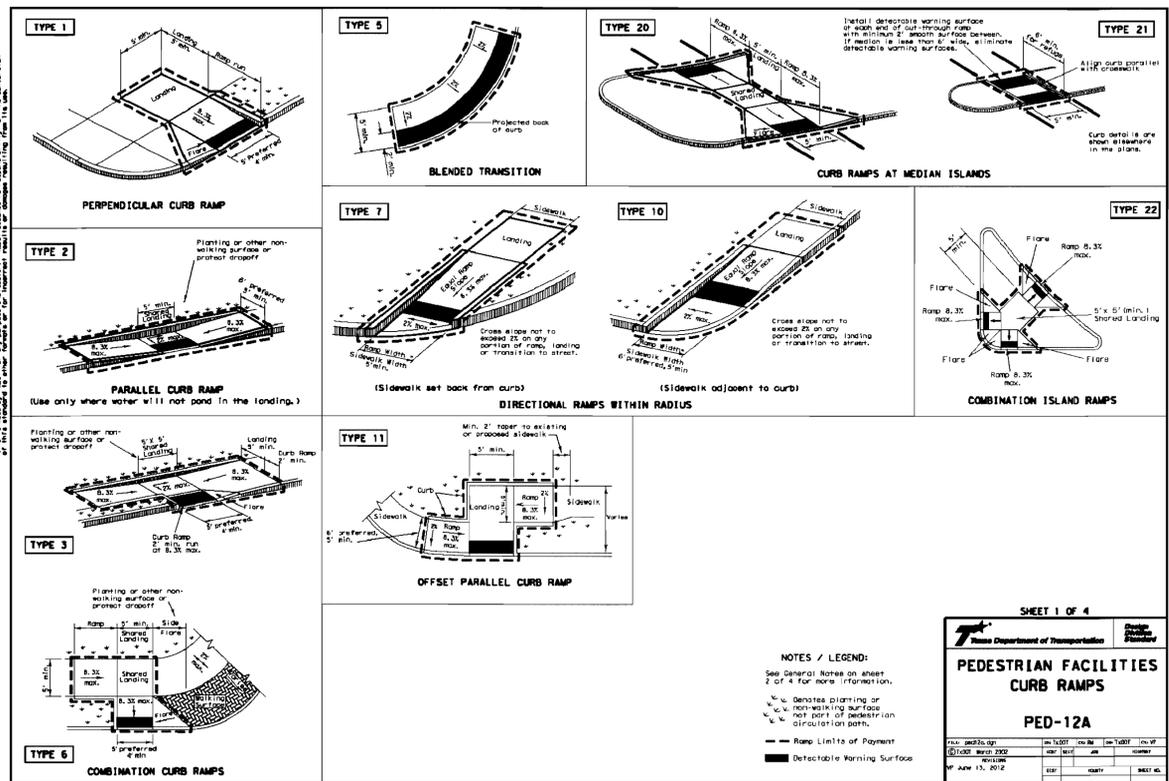
- * ALTERNATIVE 7" CONCRETE PAVEMENT
- * 8" MOISTURE CONDITIONED SUBGRADE

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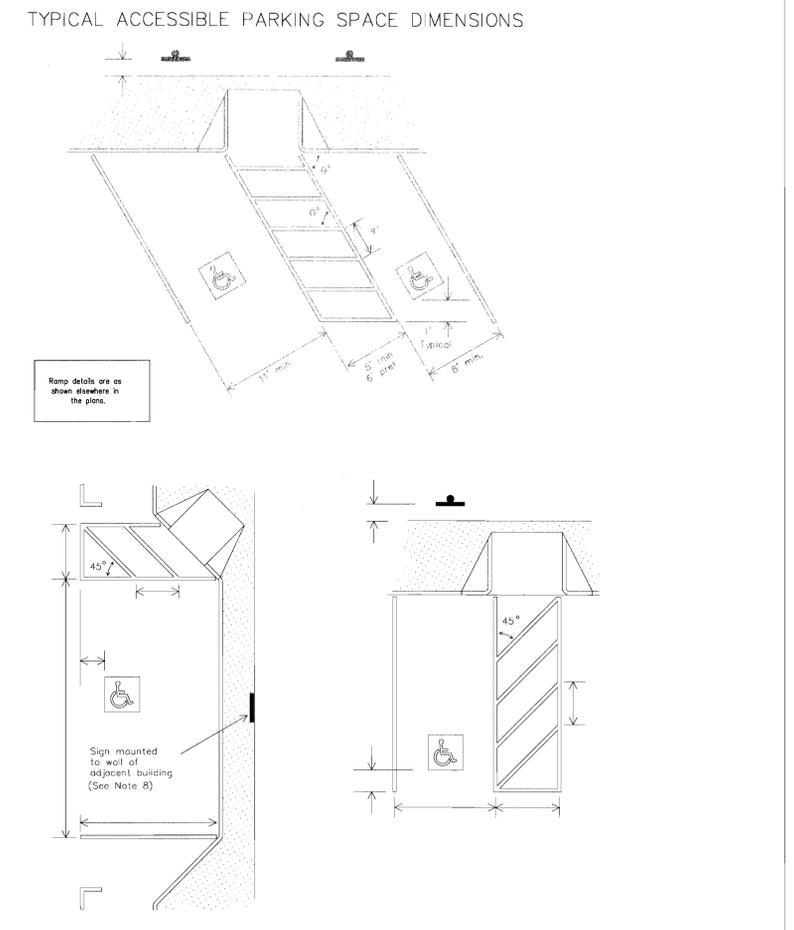


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PROJECT NUMBER
REVISIONS
FILENAME:
SHEET TITLE LOOP-DRIVEWAY PROFILE AND PAVING DETAILS
DRAWN BY: J.C.N.
SHEET NO. C.08
DATE: April 07, 2016



NOTES / LEGEND:
 See General Notes on sheet 2 of 4 for more information.
 - Planning or other non-walking surface or material overlay
 - Ramp Limits of Payment
 - Detectable Warning Surface

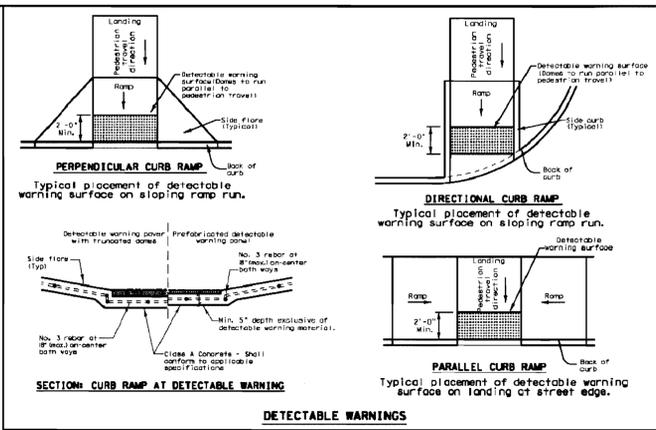


General Notes

- Install a curb ramp or blended transition at each pedestrian street crossing.
- All slopes shall be maximum allowable. Lesser slopes that will still drain properly should be used. Adjust curb ramp length or grade of approach sidewalks as directed.
- The minimum sidewalk width is 5'. Where the sidewalk is adjacent to the back of curb, a 5' sidewalk width is desirable. Where a 5' sidewalk cannot be provided due to site constraints, sidewalk width may be reduced to 4' for short distances. 5' x 5' passing area or intervals not to exceed 200' are required.
- Landings shall be 5' x 5' minimum with a maximum 2% slope in any direction.
- Working space at the bottom of curb ramps shall be a minimum of 4' x 4' wall to wall within the crosswalk and shall provide the parallel wheelchair travel path.
- Maximum allowable cross slope on sidewalk and curb ramp surface is 2%.
- Provide flared sides where the pedestrian circulation path crosses the curb ramp. Flared sides shall be sloped at 10% maximum, measured parallel to the curb. Returned curbs may be used only where pedestrians would not normally walk across the curb, either because the adjacent surface is planted, substantially obstructed, or otherwise protected.
- Additional information on curb ramp location, design, light reflective value and texture may be found in the current edition of the Texas Accessibility Standards (TAS) and ISAC 68.102.
- To serve as a pedestrian refuge area, the section should be a minimum of 8' wide, measured from back of curb. Medians should be designed to provide complete passage over or through them.
- Small channelization islands, which do not provide a minimum 5' x 5' landing at the top of curb ramps, shall be cut through level with the surface of the street.
- Crosswalk dimensions, crosswalk markings and stop bar locations shall be as shown elsewhere in the plans. All impressions where crosswalk markings are not required, curb ramps shall align with theoretical crosswalk unless otherwise directed.
- Handrails are not required on curb ramps. Provide curb ramps wherever an accessible route crosses (overlapped) a curb.
- Curb ramps and landings shall be constructed and paid for in accordance with Item 531 "Sidewalks".
- Place concrete at a minimum depth of 5" for ramps, flares and landings, unless otherwise directed.
- Provide a smooth transition where the curb ramps connect to the street.
- Curb shown on sheet 1 within the limits of payment are considered part of the curb ramp for payment, whether it is concrete curb, gutter, or combined curb and gutter.
- Existing features that comply with TAS may remain in place unless otherwise shown on the plans.

Detectable Warning Material

- Curb ramps must contain a detectable warning surface that consists of raised truncated domes complying with Section 706 of the TAS. The surface must conform visually with adjoining surfaces, including side flares. Furnish and install an approved cast-in-place concrete or dark red detectable warning surface material adjacent to uncoated concrete, unless specified elsewhere in the plans.
- Detectable warning surfaces must be also resistant and not allow water to accumulate.
- Detectable warning surfaces shall be a minimum of 24" in length in the direction of pedestrian travel, and extend the full width of the curb ramp or landing where the pedestrian access route enters the street.
- Detectable warning surfaces shall be located so that the edge nearest the curb line is at the back of curb. All on the face of curb to be perpendicular to the curb break between the ramp run and the street. Detectable warning surfaces may be curved along the corner radius.
- Shaded areas on sheet 1 of 4 indicate the approximate location for the detectable warning surface for each curb ramp type.

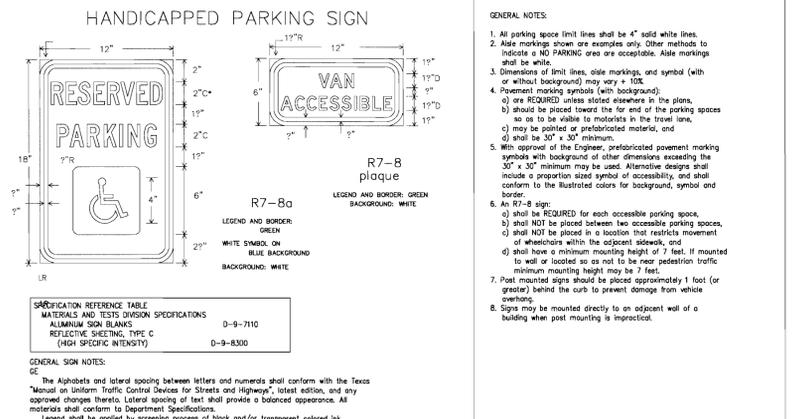
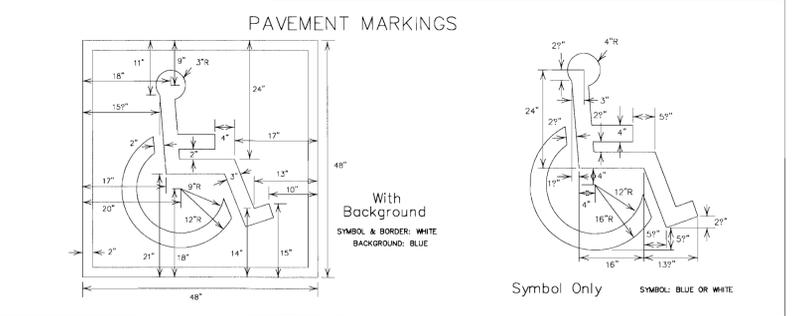


Detectable Warning Pavers

- Furnish detectable warning paver units meeting all requirements of ASTM C-336, C-33. Lay in a top by top unit layout pattern or as directed.
- Lay full-size units first followed by a course of units consisting of at least 25 percent of a full unit. Cut detectable warning paver units using a power saw.

Sidewalks

- Provide clear ground space of accessible parts, including pedestrian push buttons, operable parts shall be placed within one or more reach ranges specified in TAS 308.
- Place traffic signal or illumination poles, ground boxes, controller boxes, signs, drainage facilities and other items so as not to obstruct the pedestrian access route or other ground space.
- Street grade and cross slopes shall be as shown elsewhere in the plans.
- Changes in level greater than 1/4" high are not permitted.
- The least possible grade should be used to maximize accessibility. The running slope of sidewalk and crosswalk within the public right of way may follow the grade of the parallel roadway, where a continuous grade greater than 2% shall be provided, handrails may be desirable to improve accessibility, handrails may also be needed to protect pedestrians from potentially hazardous conditions. If provided, handrails shall comply with TAS 505.
- Handrail extensions shall not protrude into the usable landing area or into intersecting pedestrian routes.
- Driveways and turnpikes shall be constructed and paid for in accordance with Item 531 "Sidewalks". Sidewalks shall be constructed and paid for in accordance with Item 531 "Sidewalks".
- Sidewalk details are shown elsewhere in the plans.



GENERAL SIGN NOTES:

- The Alphabets and lateral spacing between letters and numerals shall conform with the Texas "Manual on Uniform Traffic Control Devices for Streets and Highways", latest edition, and any approved changes thereto. Lateral spacing of text shall provide a balanced appearance. All materials shall conform to Department Specifications.
- Legend shall be applied by screening process of black and/or transparent colored ink, cut-out black vinyl non-reflective sheet and/or reflective sheeting or combination thereof. Background shall be white reflective sheeting (Type C).
- Sign blanks shall be one piece 0.08 inch thick sheet aluminum alloy (Type A), unless otherwise noted elsewhere in the plans.

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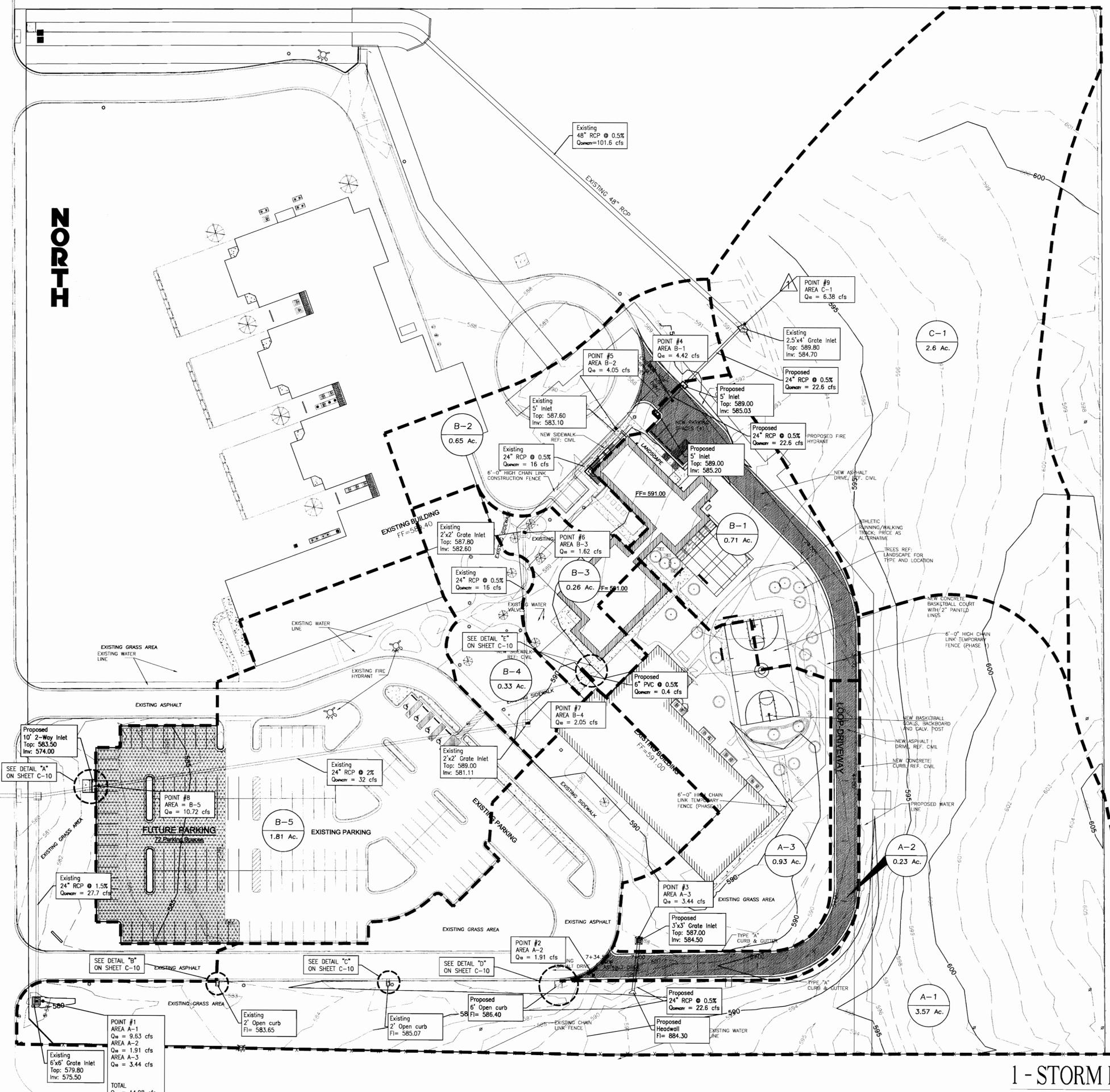
PROJECT NUMBER
 REVISIONS
 FILENAME:
 SHEET TITLE
 CURB RAMPS
 DETAILS
 DRAWN BY: J.C.N.
 SHEET NO.
 C.09
 DATE: April 07, 2016

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DATE	BY	CHECK	DATE	BY	CHECK
04/07/2016	JCN	JCN	04/07/2016	JCN	JCN

I-TRON

CAMINO NUEVO



DRAINAGE AREA A-1

Area = 3.57 Acres
Tc = 37 Min.
POST-DEVELOPMENT C = 0.65

h ₁₀ = 4.15	Q ₁₀ = 9.63 cfs
h ₂₅ = 4.73	Q ₂₅ = 10.97 cfs
h ₅₀ = 5.27	Q ₅₀ = 12.22 cfs
h ₁₀₀ = 5.71	Q ₁₀₀ = 13.25 cfs

DRAINAGE AREA A-2

Area = 0.23 Acres
Tc = 10 Min.
POST-DEVELOPMENT C = 1.0

h ₁₀ = 8.30	Q ₁₀ = 1.91 cfs
h ₂₅ = 9.30	Q ₂₅ = 2.14 cfs
h ₅₀ = 10.30	Q ₅₀ = 2.37 cfs
h ₁₀₀ = 11.13	Q ₁₀₀ = 2.56 cfs

DRAINAGE AREA A-3

Area = 0.93 Acres
Tc = 28 Min.
POST-DEVELOPMENT C = 0.75

h ₁₀ = 4.93	Q ₁₀ = 3.44 cfs
h ₂₅ = 5.59	Q ₂₅ = 3.90 cfs
h ₅₀ = 6.22	Q ₅₀ = 4.34 cfs
h ₁₀₀ = 6.74	Q ₁₀₀ = 4.70 cfs

DRAINAGE AREA B-1

Area = 0.71 Acres
Tc = 10 Min.
POST-DEVELOPMENT C = 0.75

h ₁₀ = 8.30	Q ₁₀ = 4.42 cfs
h ₂₅ = 9.30	Q ₂₅ = 4.95 cfs
h ₅₀ = 10.30	Q ₅₀ = 5.48 cfs
h ₁₀₀ = 11.13	Q ₁₀₀ = 5.92 cfs

DRAINAGE AREA B-2

Area = 0.65 Acres
Tc = 10 Min.
POST-DEVELOPMENT C = 0.75

h ₁₀ = 8.30	Q ₁₀ = 4.05 cfs
h ₂₅ = 9.30	Q ₂₅ = 4.53 cfs
h ₅₀ = 10.30	Q ₅₀ = 5.02 cfs
h ₁₀₀ = 11.13	Q ₁₀₀ = 5.42 cfs

DRAINAGE AREA B-3

Area = 0.26 Acres
Tc = 10 Min.
POST-DEVELOPMENT C = 0.75

h ₁₀ = 8.30	Q ₁₀ = 1.62 cfs
h ₂₅ = 9.30	Q ₂₅ = 1.81 cfs
h ₅₀ = 10.30	Q ₅₀ = 2.01 cfs
h ₁₀₀ = 11.13	Q ₁₀₀ = 2.17 cfs

DRAINAGE AREA B-4

Area = 0.33 Acres
Tc = 10 Min.
POST-DEVELOPMENT C = 0.75

h ₁₀ = 8.30	Q ₁₀ = 2.05 cfs
h ₂₅ = 9.30	Q ₂₅ = 2.30 cfs
h ₅₀ = 10.30	Q ₅₀ = 2.55 cfs
h ₁₀₀ = 11.13	Q ₁₀₀ = 2.75 cfs

DRAINAGE AREA B-5

Area = 1.81 Acres
Tc = 13 Min.
POST-DEVELOPMENT C = 0.80

h ₁₀ = 7.41	Q ₁₀ = 10.72 cfs
h ₂₅ = 8.32	Q ₂₅ = 12.05 cfs
h ₅₀ = 9.22	Q ₅₀ = 13.35 cfs
h ₁₀₀ = 9.97	Q ₁₀₀ = 14.44 cfs

DRAINAGE AREA C-1

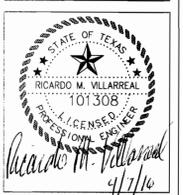
Area = 2.6 Acres
Tc = 19 Min.
POST-DEVELOPMENT C = 0.40

h ₁₀ = 6.13	Q ₁₀ = 6.38 cfs
h ₂₅ = 6.92	Q ₂₅ = 7.20 cfs
h ₅₀ = 7.68	Q ₅₀ = 7.99 cfs
h ₁₀₀ = 8.32	Q ₁₀₀ = 8.65 cfs

TOTAL

Q₁₀ = 14.98 cfs

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PROJECT NUMBER
REVISIONS
FILENAME:
SHEET TITLE STORM DRAINAGE AREA MAP
DRAWN BY: J.C.N.
SHEET NO. C.10
DATE: April 07, 2016

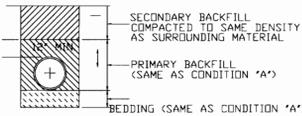
1 - STORM DRAINAGE AREA MAP

SCALE: 1" = 40'

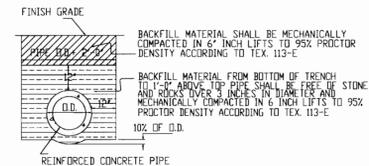
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REPLACEMENT OF PAVEMENT ACCORDING TO SPECIFICATIONS AND CITY REQUIREMENTS IN 6" LIFTS TO 95% PROCTOR DENSITY ACCORDING TO TEX. 113-E. SECONDARY BACKFILL SHALL BE MECHANICALLY COMPACTED IN 10" LIFTS TO 95% PROCTOR DENSITY ACCORDING TO TEX. 113-E. BEDDING AND PRIMARY BACKFILL MATERIAL SHALL BE MECHANICALLY COMPACTED IN 6" LIFTS (MAX) TO 95% PROCTOR DENSITY ACCORDING TO TEX. 113-E.

TYPICAL PIPE IN TRENCH DETAIL
CONDITION 'A' BACKFILL



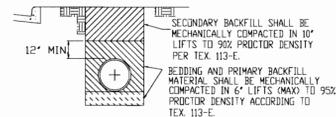
CONDITION 'C'



TYPICAL BACKFILL SECTION
N.T.S.

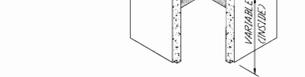
PIPE BACKFILL

N.T.S.



UTILITY TRENCH CONDITION 'D'
CEMENT STABILIZED SAND (FLOWABLE FILL)
N.T.S.

CENTER SECTION

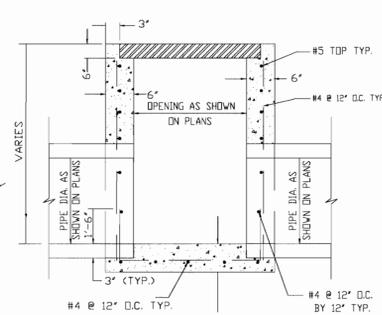


BOTTOM SECTION

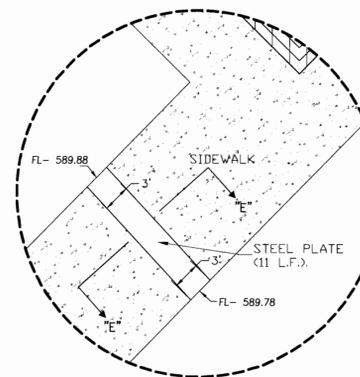
GRATE AREA INLET

N.T.S.

- GENERAL NOTES
- ALL BARS INTERCEPTING MANHOLE RING & REINFORCING CONCRETE PIPE SHALL BE FIELD CUT.
 - CONCRETE FOR STRUCTURES SHALL BE CLASS 'A', 3000 P.S.I. IN 28 DAYS.
 - ALL DIMENSIONS RELATING TO REINFORCING STEEL ARE TO CENTER OF BARS.
 - ALL EXPOSED CORNERS SHALL BE CHAMFERED TO 3/4".
 - INVERT OF DROP INLET TO BE SHAPED WITH CONCRETE FILL TO EFFECT DRAINAGE TO OUTLET PIPE.
 - MANHOLE FRAMES AND COVERS TO BE HEAVY DUTY DUCTILE IRON, RATED LOADING AND INDENTED TOP DESIGN, WITH LETTERING 'STORM SEWER' CAST INTO COVER, MINIMUM WEIGHT 260 LBS.
 - GRATE INLETS SHALL BE DALWORTH QUICKSET CD OR EQUAL WITH GALVANIZED STEEL GRATE WITH OPENINGS AS SHOWN ON PLANS. HEAVY DUTY DUCTILE IRON, RATED HS-20 LOADING.

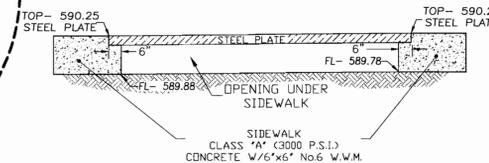


AREA INLET SECTION
N.T.S.



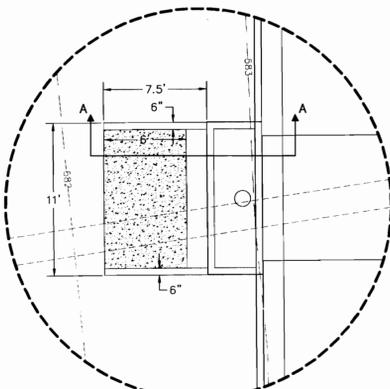
DETAIL "E"

N.T.S.



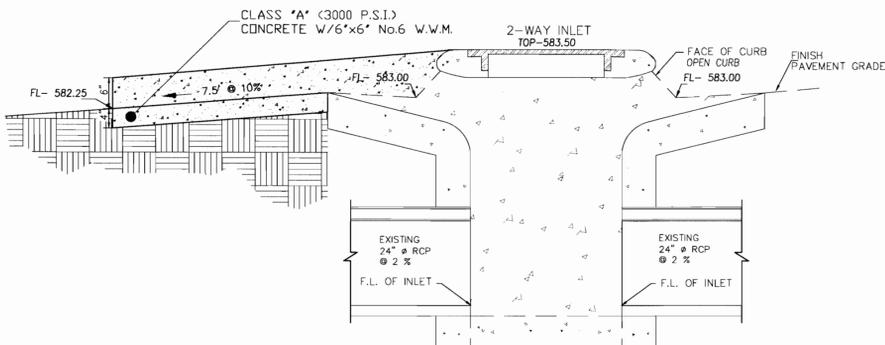
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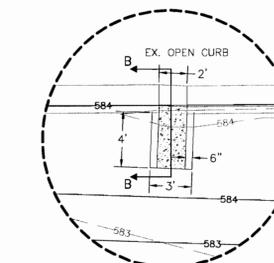
DETAIL "A"

N.T.S.



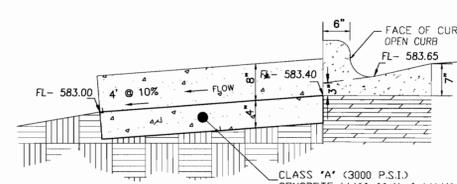
SECTION "A"

N.T.S.



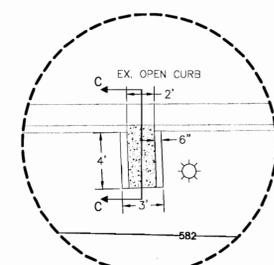
DETAIL "B"

N.T.S.



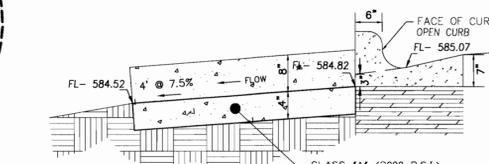
SECTION "B"

N.T.S.



DETAIL "C"

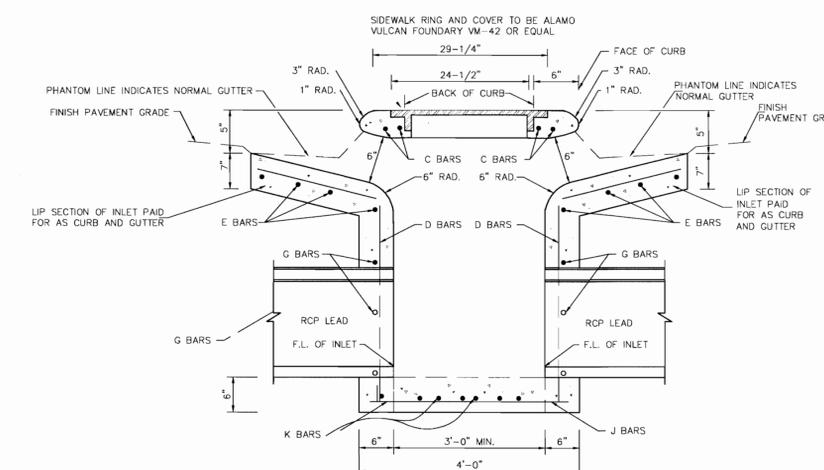
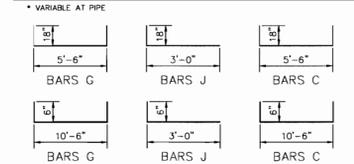
N.T.S.



SECTION "C"

N.T.S.

REINFORCING STEEL & TABLE OF ESTIMATED QUANTITIES FOR TYPE 'A' INLETS (10' SLOT INLET)					
BAR	SIZE	No.	AV. LGTH.	SPACING	WT. LBS.
A	#4	10	2'-8"		3.6
B	#4	4	3'-2"		8.4
C	#4	4	6'-8"		19.5
D	#4	20	3'-2"	10"	19.0
E	#4	8	5'-0"	5"	15.0
F	#4	21	4'-2"	10"	81.2
G	#4	9	6'-8"	10"	22.3
H	#4	12	2'-8"	10"	17.8
J	#4	11	4'-6"	10"	16.7
K	#4	7	5'-8"	5"	42.6
REINFORCING STEEL					246 LBS.
CLASS 'A' CONCRETE					18 C.Y.



2-WAY INLET

N.T.S.

TRENCH EXCAVATION PROTECTION

CONTRACTOR AND/OR CONTRACTOR'S INDEPENDENTLY RETAINED EMPLOYEE OR STRUCTURAL DESIGN/GEOTECHNICAL/SAFETY/EQUIPMENT CONSULTANT, IF ANY, SHALL REVIEW THESE PLANS AND ANY AVAILABLE GEOTECHNICAL INFORMATION AND THE ANTICIPATED INSTALLATION SITE(S) WITHIN THE PROJECT WORK AREA IN ORDER TO DEVELOP THE CONTRACTOR'S PLANS TO IMPLEMENT THE PROJECT DESCRIBED IN THE CONTRACT DOCUMENTS. THE CONTRACTOR'S PLANS SHALL PROVIDE FOR ADEQUATE TRENCH SAFETY SYSTEMS THAT COMPLY WITH, AS A MINIMUM, OSHA STANDARDS FOR TRENCH EXCAVATIONS. SPECIFICALLY, CONTRACTOR AND/OR CONTRACTOR'S INDEPENDENTLY RETAINED EMPLOYEE OR SAFETY CONSULTANT SHALL DEVELOP AND IMPLEMENT A TRENCH SAFETY PROGRAM IN ACCORDANCE WITH OSHA STANDARDS GOVERNING THE PRESENCE AND ACTIVITIES OF INDIVIDUALS WORKING IN AND AROUND TRENCH EXCAVATION.

HOWLAND
ENGINEERING AND SURVEYING CO.

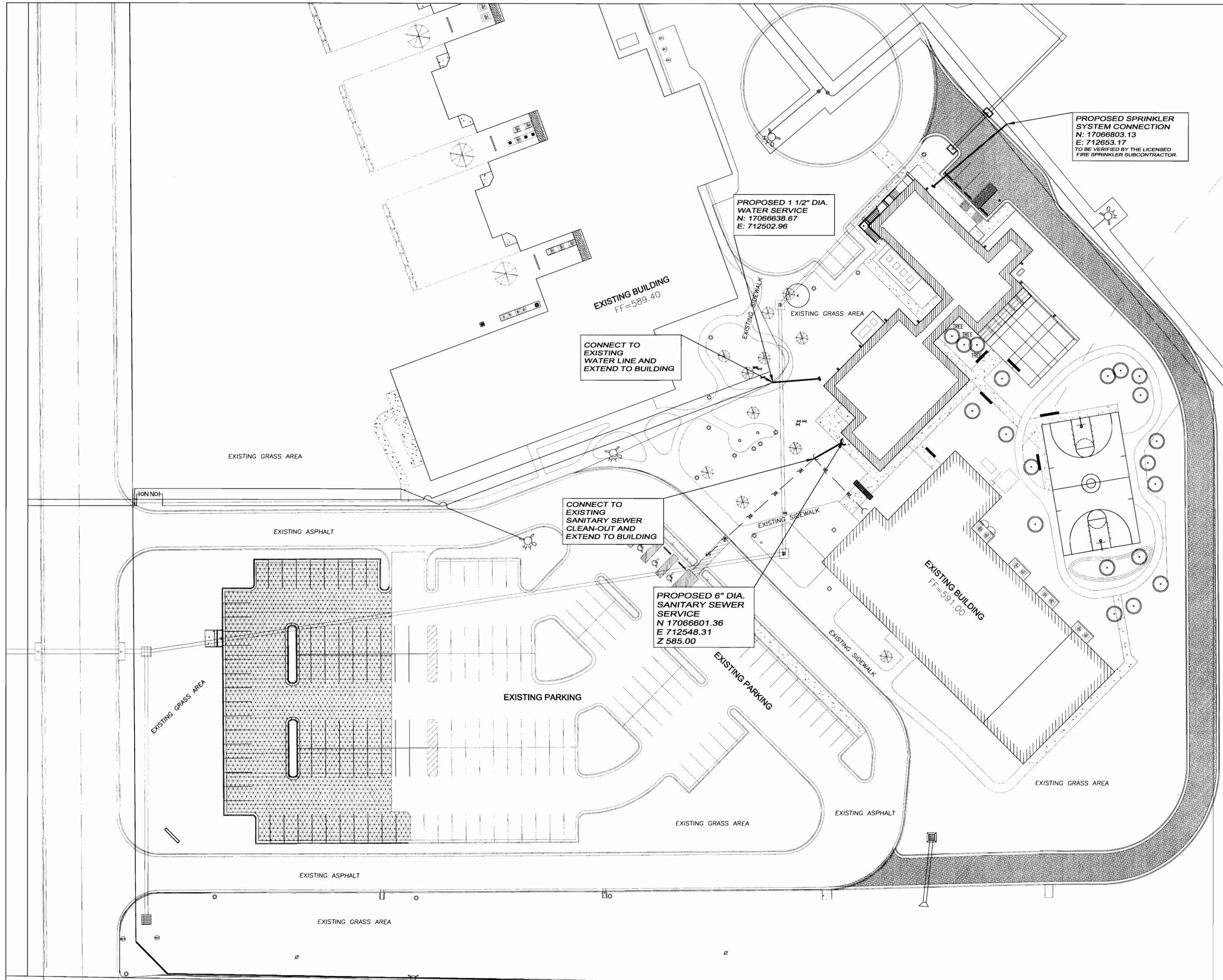
TBPE Firm Registration No. F-4097 / TBPLS Firm Registration No. 100464-00
7615 N. Bartlett Avenue / P.O. Box 45128 (78045) / Laredo, TX 78041
P. 956.722.4411 / F. 956.722.5414
www.howlandcompanies.com

AUSLAND ARCHITECTS-METAFORM STUDIO ARCHITECTS
ARCHITECTURE + PLANNING + INTERIORS
6626 SILVERMINE DRIVE, SUITE 100A
AUSTIN, TEXAS 78736
(512) 327-0444 FAX (512) 301-4909



WEBB COUNTY YOUTH VILLAGE
REHABILITATION CENTER
111 CAMINO NUEVO ROAD, HWY 359
LAREDO, TEXAS 78046

PROJECT NUMBER
REVISIONS
FILENAME:
SHEET TITLE
STORM DRAINAGE DETAILS
DRAWN BY: J.C.N.
SHEET NO.
C.11
DATE: April 07, 2016



I-PROZ

PROPOSED SPRINKLER SYSTEM CONNECTION
 N: 17066803.13
 E: 712653.17
 TO BE VERIFIED BY THE LICENSED FIRE SPRINKLER SUBCONTRACTOR.

PROPOSED 1 1/2" DIA. WATER SERVICE
 N: 17066638.67
 E: 712502.96

CONNECT TO EXISTING WATER LINE AND EXTEND TO BUILDING

CONNECT TO EXISTING SANITARY SEWER CLEAN-OUT AND EXTEND TO BUILDING

PROPOSED 6" DIA. SANITARY SEWER SERVICE
 N 17066601.36
 E 712548.31
 Z 585.00

CALL BEFORE YOU DIG !
 TEXAS ONE CALL PARTICIPANT'S REQUEST
 48 HOURS NOTICE BEFORE YOU DIG, DRILL, OR BLAST - STOP, CALL !
 TEXAS ONE CALL SYSTEM
 1-800-245-4545
 SOUTHWESTERN BELL LOCATION GROUP
 AT 1-800-828-5127
 THE LONE STAR NOTIFICATION COMPANY
 1-800-669-8344
 TEXAS EXCAVATION SAFETY SYSTEM
 1-800-344-8377

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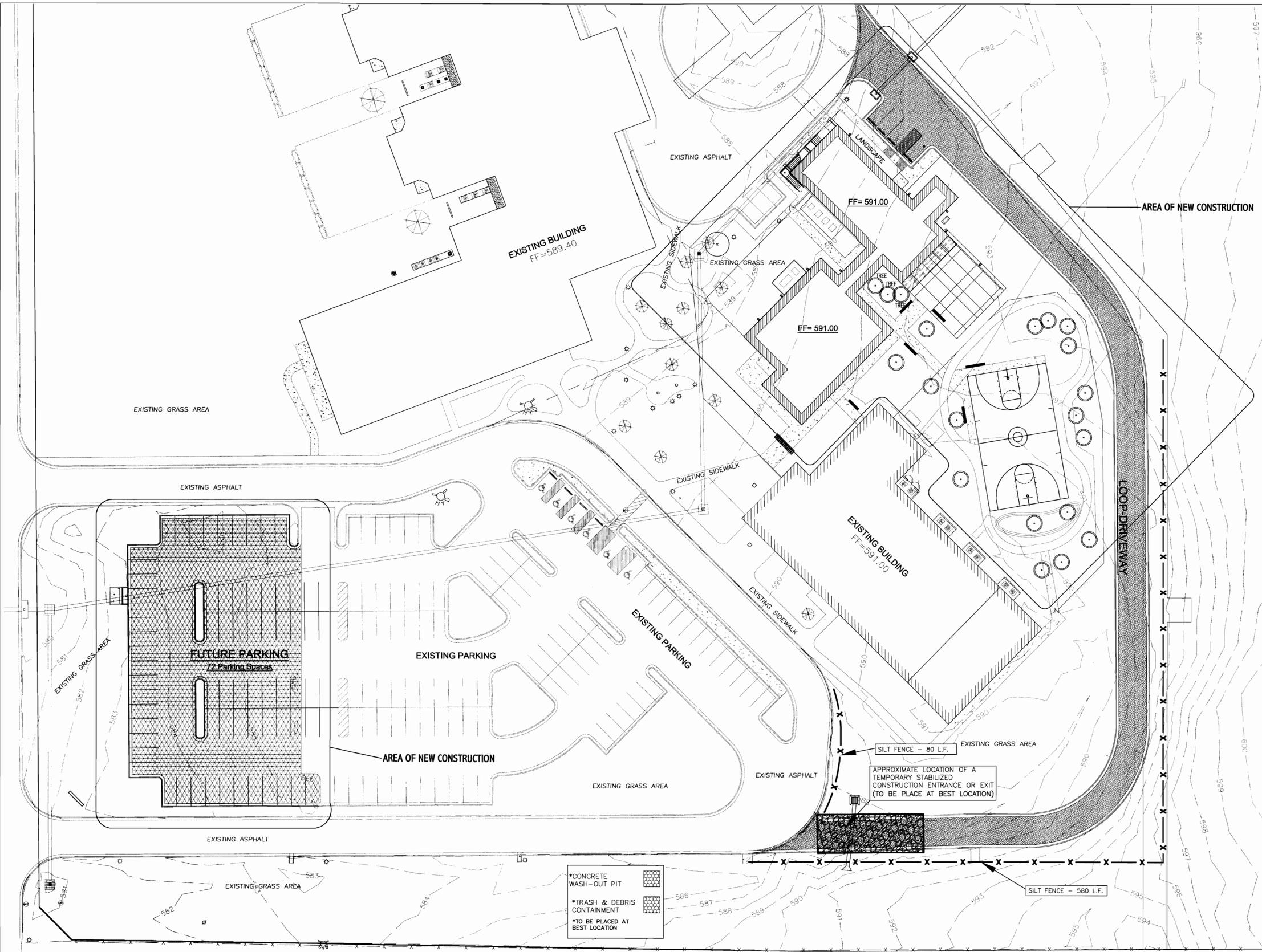
PROJECT NUMBER
 REVISIONS
 FILENAME:

SHEET TITLE
 UTILITY DISTRIBUTION PLAN
 DRAWN BY: J.C.N.

SHEET NO.
C.12
 DATE: April 07, 2016

HOWLAND
 ENGINEERING AND SURVEYING CO.
 TBPE Firm Registration No. F-4087 / TBPLS Firm Registration No. 100464-00
 7615 N. Bartlett Avenue (P.O. Box 451128 (78045)) Laredo, TX 78041
 P. 956.722.4411 / F. 956.722.5414
 www.howlandcompanies.com

1 - UTILITY DISTRIBUTION PLAN
 SCALE: 1" = 30'



IRON

* CONTRACTOR TO LOCATE AT TIME OF CONSTRUCTION WITH ENGINEERS CONSENT



* CONSTRUCTION ENTRANCE

IF CONSTRUCTION ENTRANCE IS PLACED WHERE CURB & GUTTER IS EXISTING, MEASURES MUST BE TAKEN TO PROTECT CURB & GUTTER, SIDEWALK, ETC.



10'X10' CONCRETE WASH OUT PIT *



TRASH & DEBRIS STORAGE WITH REFLECTIVE ORANGE NETTING *

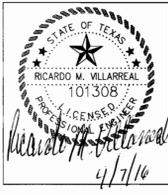
CALL BEFORE YOU DIG !
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 48 HOURS NOTICE BEFORE YOU DIG, DRILL,
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 NOTIFICATION COMPANY
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 TEXAS EXCAVATION SAFETY SYSTEM
 1-800-344-8377

- *CONCRETE WASH-OUT PIT
- *TRASH & DEBRIS CONTAINMENT
- *TO BE PLACED AT BEST LOCATION

STORM WATER POLLUTION PREVENTION PLAN			
DESCRIPTION	QUANTITY	UNIT	
1. SILT FENCE	660	LF	
2. STABILIZED CONSTRUCTION ENTRANCE	1	EA	
3. CONCRETE WASH OUT PIT	1	EA	
4. TRASH DEBRIS	1	EA	
5.			

1 - STORM WATER POLLUTION PREVENTION PLAN
 SCALE: 1" = 30'

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 ARCHITECTURE + PLANNING + INTERIORS
 6626 SILVERMINE DRIVE, SUITE 100A
 AUSTIN, TEXAS 78736
 (512) 327-0444 FAX (512) 301-4909



WEBB COUNTY YOUTH VILLAGE
 REHABILITATION CENTER
 111 CAMINO NUEVO ROAD, HWY 359
 LAREDO, TEXAS 78046

PROJECT NUMBER
 REVISIONS
 FILENAME:

SHEET TITLE
 STORM WATER POLLUTION PREVENTION PLAN
 DRAWN BY: J.C.N.

SHEET NO.
C.14
 DATE: April 07, 2016

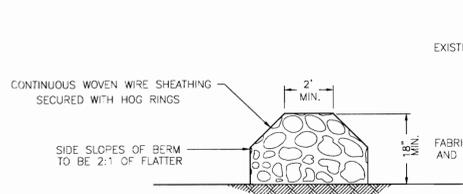
HOWLAND
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STABILIZED ENTRANCE GENERAL NOTES:

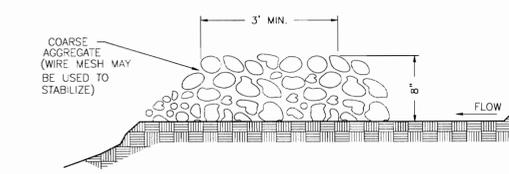
1. LENGTH SHALL BE AS SHOWN ON THE CONSTRUCTION DRAWINGS, BUT NOT LESS THAN 50 FEET.
2. THICKNESS SHALL BE NOT LESS THAN 8 INCHES.
3. STABILIZED FOR OTHER AREAS SHALL HAVE THE SAME AGGREGATE THICKNESS AND WIDTH REQUIREMENTS AS THE STABILIZED CONSTRUCTION EXIT, UNLESS OTHERWISE SHOWN ON THE CONSTRUCTION DRAWINGS.
4. STABILIZED AREA MAY BE WIDENED OR LENGTHENED TO ACCOMMODATE A TRUCK WASHING AREA WHEN SHOWN ON THE CONSTRUCTION DRAWING. AN OUTLET SEDIMENT TRAP MUST BE PROVIDED FOR THE TRUCK WASHING AREA.

CONSTRUCTION NOTES FOR ROCK BERM:

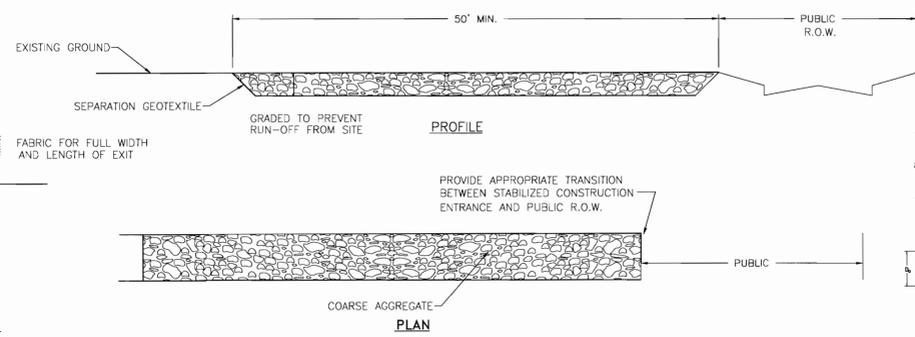
1. USE ONLY OPEN GRADED ROCK OR BROKEN CONCRETE 4-8 INCHES IN DIAMETER FOR STREAMFLOW CONDITIONS. USE OPEN GRADED ROCK OR BROKEN CONCRETE 3-5 INCHES IN DIAMETER FOR OTHER CONDITIONS.
2. THE ROCK BERM SHALL BE SECURED WITH A WOVEN WIRE SHEATHING HAVING A MAXIMUM OF 1-INCH OPENING AND A MINIMUM WIRE DIAMETER OF 20 GAUGE.
3. THE ROCK BERM SHALL BE INSPECTED WEEKLY OR AFTER EACH RAIN, AND THE STONE AND/OR FABRIC CORE-WOVEN WIRE SHEATHING SHALL BE REPLACED WHEN THE STRUCTURE CEASES TO FUNCTION AS INTENDED. DUE TO SILT ACCUMULATION AMONG THE ROCKS, WASHOUT, CONSTRUCTION TRAFFIC DAMAGE, ETC.
4. WHEN SILT REACHES A DEPTH EQUAL TO ONE-THIRD THE HEIGHT OF THE BERM OR ONE FOOT, WHICHEVER IS LESS. THE SILT SHALL BE REMOVED AND DISPOSED OF IN AN APPROVED SITE AND IN A MANNER AS TO NOT CREATE A SILTATION PROBLEM.
5. WHEN THE SITE IS COMPLETELY STABILIZED, THE BERM AND ACCUMULATED SILT SHALL BE REMOVED AND DISPOSED OF IN AN APPROVED MANNER.



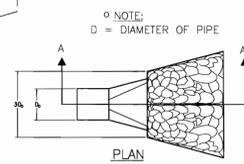
ROCK BERM CROSS SECTION
N.T.S.



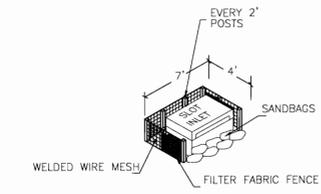
TYPICAL GRAVEL FILTER BERM
N.T.S.



STABILIZED CONSTRUCTION EXIT
N.T.S.

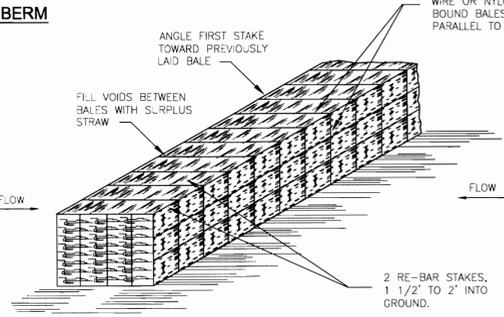
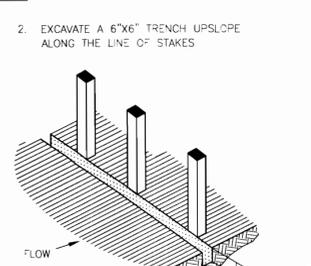
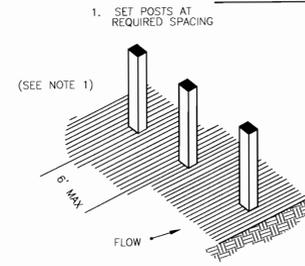


TYPICAL DETAIL FOR ROCK OUTLET PROTECTION
N.T.S.

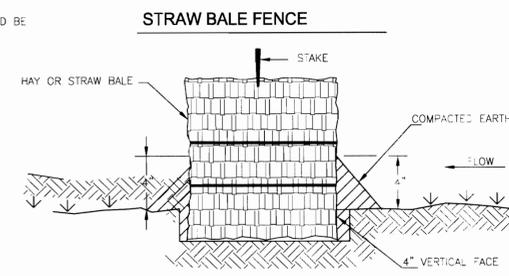


STORM INLET SEDIMENT TRAPS
N.T.S.

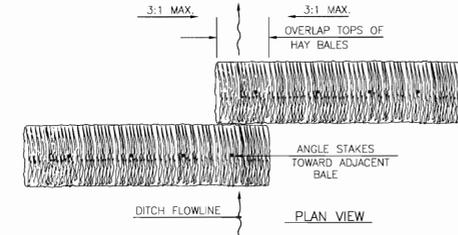
FILTER FABRIC FENCE



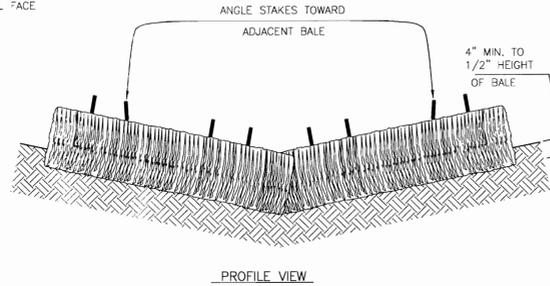
ANCHORING DETAIL



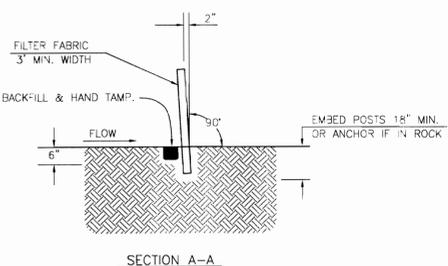
SECTION



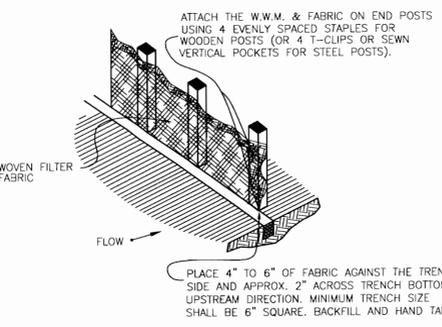
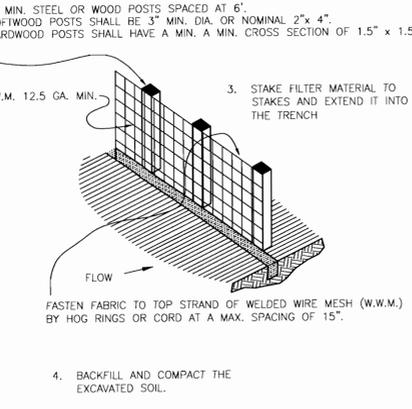
PLAN VIEW



PROFILE VIEW



SECTION A-A



GENERAL NOTES:

1. POSTS TO BE SET AT 6-FOOT MAXIMUM SPACING.
2. WHEN TWO SECTIONS OF FILTER CLOTH ADJOIN EACH OTHER, THEY SHOULD BE OVERLAPPED 8 INCHES AT THE POSTS, AND FOLDED.

4" MIN. STEEL OR WOOD POSTS SPACED AT 6'. SOFTWOOD POSTS SHALL BE 3" MIN. DIA. OR NOMINAL 2"x 4". HARDWOOD POSTS SHALL HAVE A MIN. A MIN. CROSS SECTION OF 1.5" x 1.5".

W.W.M. 12.5 GA. MIN. FASTEN FABRIC TO TOP STRAND OF WELDED WIRE MESH (W.W.M.) BY HOG RINGS OR CORD AT A MAX. SPACING OF 15".

4. BACKFILL AND COMPACT THE EXCAVATED SOIL.

ATTACH THE W.W.M. & FABRIC ON END POSTS USING 4 EVENLY SPACED STAPLES FOR WOODEN POSTS (OR 4 T-CRIPS OR SEWN VERTICAL POCKETS FOR STEEL POSTS).

PLACE 4" TO 6" OF FABRIC AGAINST THE TRENCH SIDE AND APPROX. 2" ACROSS TRENCH BOTTOM IN UPSTREAM DIRECTION. MINIMUM TRENCH SIZE SHALL BE 6" SQUARE. BACKFILL AND HAND TAMP.

GENERAL NOTES:

1. BALES SHALL BE PLACED IN A ROW WITH ENDS TIGHTLY ABUTTING THE ADJACENT BALES. FILL THE VOIDS BETWEEN BALES WITH SURPLUS STRAW. PLACE BALES WITH BINDING PARALLEL TO GROUND SURFACE.
2. WHERE POSSIBLE, EACH BALE SHALL BE IMBEDDED IN THE SOIL A MINIMUM OF 4 INCHES.
3. BALES SHALL SECURELY ANCHORED IN PLACE BY 3/8 INCH REBAR STAKES DRIVEN THROUGH THE BALES. THE FIRST STAKE IN EACH BALE SHALL ANGLE TOWARDS THE PREVIOUS BALE TO FORCE THE BALES TOGETHER.
4. BALES SHALL BE BOUND BY EITHER WIRE OR NYLON ROPE TIED ACROSS THE HAY BALES.
5. MAINTENANCE WILL BE PERFORMED AS NEEDED.
6. HAY BALES SHALL BE A MINIMUM OF 30" IN LENGTH AND WEIGH A MINIMUM OF 50 LBS.
7. HAY BALES SHALL BE SECURELY ANCHORED IN PLACE WITH 3/8" DIA. REBAR OR 2"x 2" WOOD STAKES, DRIVEN THROUGH THE BALES. THE FIRST STAKE SHALL BE ANGLE TOWARDS THE PREVIOUSLY LAID BALE TO FORCE THE BALES TOGETHER.
8. THE GUIDELINES SHOWN HEREON ARE SUGGESTIONS ONLY AND MAY BE MODIFIED BY THE ENGINEER.

CONSTRUCTION SPECIFICATIONS FOR SILT FENCE

- A. MATERIALS
1. SYNTHETIC FILTER FABRIC SHALL BE A PERVIOUS SHEET OF POLYPROPYLENE NYLON, POLYESTER OR ETHYLENE YARN AND SHALL BE CERTIFIED BY THE MANUFACTURER OR SUPPLIER AS CONFORMING TO THE FOLLOWING REQUIREMENTS (PER ASTM METHODS):

PHYSICAL PROPERTY	REQUIREMENTS
FILTERING EFFICIENCY	75% (MIN.)
TENSILE STRENGTH @ 20% EXT. STRENGTH	= 50 LBS./LIN. INC. (MIN.)
MAX. ELONGATION	STD. STRENGTH = 30 LBS./LIN. INC. (MIN.)

- B. INSTALLATION
1. THE HEIGHT OF THE SILT FENCE SHALL BE A MINIMUM OF 15" AND A MAXIMUM OF 18" ABOVE FINAL GRADE.
 2. STANDARD STRENGTH SYNTHETIC FILTER FABRIC SHALL BE PURCHASED IN A CONTINUOUS ROLL AND CUT TO THE LENGTH OF THE BARRIER'S STRENGTH AND EFFICIENCY.
 3. STAKES FOR THE SILT FENCE SHALL BE 2" X 2" WOOD WITH A MINIMUM LENGTH OF 3 FEET.
 4. THE STAKES SHALL BE SPACED A MAXIMUM OF 10' APART AT THE BARRIER LOCATION AND DRIVEN SECURELY INTO THE GROUND (18" MIN.).
 5. A TRENCH SHALL BE EXCAVATED APPROX. 6" WIDE AND 6" DEEP ALONG THE LINE OF STAKES AND UPSLOPE FROM THE BARRIER.
 6. THE SILT FENCE SHALL BE STAPLED TO THE STAKES, WITH 8" (MIN.) OF FABRIC EXTENDED INTO THE TRENCH. HEAVY DUTY WIRE STAPLES AT LEAST ONE-HALF INCH LONG SHALL BE USED. THE FENCE SHALL NOT BE STAPLED TO THE EXISTING TREES.
 7. THE TRENCH SHALL BE BACKFILLED AND THE SOIL COMPACTED OVER THE FENCE MATERIAL.
 8. IF A SILT FENCE IS TO BE CONSTRUCTED ACROSS A DITCH LINE OR SWALE, THE BARRIER SHALL BE OF SUFFICIENT LENGTH TO ELIMINATE END FLOW, AND THE PLAN CONFIGURATION SHALL RESEMBLE AN ARC OR HORSESHOE WITH THE ENDS ORIENTED UPSLOPE.
 9. SILT FENCE SHALL BE REMOVED WHEN THEY HAVE SERVED THEIR USEFUL PURPOSE, BUT NOT BEFORE THE UPSLOPE AREA HAS BEEN PERMANENTLY STABILIZED.

C. MAINTENANCE

1. SILT FENCES SHALL BE INSPECTED IMMEDIATELY AFTER RAINFALL AND AT LEAST DAILY DURING PROLONGED RAINFALL. ANY REQUIRED REPAIRS SHALL BE MADE IMMEDIATELY.
2. SHOULD THE FABRIC ON A SILT FENCE DECOMPOSE OR BECOME INEFFECTIVE PRIOR TO THE END OF THE EXPECTED USABLE LIFE AND THE SILT FENCE IS STILL NECESSARY, IT SHALL BE REPLACED IMMEDIATELY.
3. SEDIMENT DEPOSITS SHALL BE REMOVED WHEN DEPOSITS REACH APPROX. 1/3 THE HEIGHT OF THE FENCE.
4. ANY SEDIMENT DEPOSITS REMAINING IN PLACE AFTER THE SILT FENCE IS NO LONGER REQUIRED SHALL BE DRESSED TO CONFORM WITH THE EXISTING GRADE, PREPARED AND SEEDED.
5. THERE SHOULD BE NO GAP OR SACS IN THE SILT FENCE.

NOTES:

1. THE STABILIZED CONSTRUCTION ENTRANCE (S.C.E.) IS DESIGNED FOR VEHICLES EXITING THE AREA DURING THE CONSTRUCTION PERIOD. IT SHALL BE PROVIDED WASH DOWN WATER TO FACILITATE TIRE CLEANING WHEN NEEDED. ITS INTENDED PURPOSE IS TO PREVENT SEDIMENT FROM BEING TRACKED OFF SITE. IT WILL REQUIRE PERIODIC MAINTENANCE AND SHOULD BE USED BY ALL VEHICLES EXITING THE SITE PRIOR TO PAVED ROAD COMPLETION.
2. INSTALLATION OF SEDIMENT CONTROL AND POLLUTION PREVENTION FEATURES TO BE ACCOMPLISHED PRIOR TO BEGINNING ANY UPGRADE CONSTRUCTION ACTIVITY.
3. CONTRACTORS SHALL INSTALL SILT FENCING OR HAY/STRAW BALE FENCE AS NEEDED TO CONTROL EROSION ALONG CURB CUTS AND OTHER UNSTABILIZED CONSTRUCTION AREAS IN ADDITION TO DESIGNATED PERIMETER CONTROLS.
4. INLET PROTECTION (I.P.): CONTRACTORS WILL PROVIDE INLET PROTECTION FOR STORM DRAINS. (SEE FOR TYPICAL DETAILS.)
5. S.W.P.P.P. DRAWINGS AND DOCUMENTS MUST BE RETAINED IN CONTRACTOR'S OFFICE ON SITE.
6. REFER TO PROJECT S.W.P.P.P. DOCUMENT FOR WRITTEN INSPECTION REPORTS AND ADDITIONAL PLAN INFORMATION.
7. THE GENERAL PERMIT FOR STORM WATER DISCHARGE ASSOCIATED WITH INDUSTRIAL ACTIVITY FROM CONSTRUCTION ACTIVITIES REQUIRES THAT A NOTICE OF INTENT (N.O.I.) BE SUBMITTED AT

LAST TWO (2) DAYS BEFORE CONSTRUCTION ACTIVITIES BEGIN.

EPA CONSTRUCTION GENERAL PERMIT CHECKLIST

- STORM WATER POLLUTION PREVENTION PLAN CONSTRUCTION/IMPLEMENTATION CHECKLIST
1. MAINTAIN RECORDS OF CONSTRUCTION ACTIVITIES, INCLUDING:
 - DATES WHEN MAJOR GRADING ACTIVITIES OCCUR
 - DATES WHEN MAJOR GRADING ACTIVITIES TEMPORARILY CEASE ON A PORTION OF THE SITE
 - DATES WHEN CONSTRUCTION ACTIVITIES PERMANENTLY CEASE ON A PORTION OF THE SITE
 - DATES WHEN STABILIZED MEASURES ARE INITIATED ON THE SITE
 2. PREPARE INSPECTION REPORTS SUMMARIZING:
 - NAME OF INSPECTOR
 - QUALIFICATIONS OF INSPECTOR
 - MEASURES/AREAS INSPECTED
 - OBSERVED CONDITIONS
 - CHANGES NECESSARY TO THE S.W.P.P.P.
 3. REPORT RELEASES OF REPORTABLE QUANTITIES OF OIL OR HAZARDOUS MATERIALS (IF THEY OCCUR):
 - NOTIFY NATIONAL RESPONSE CENTER 800/424-8802 IMMEDIATELY
 - NOTIFY PERMITTING AUTHORITY IN WRITING WITHIN 14 DAYS
 - MODIFY THE POLLUTION PREVENTION PLAN TO INCLUDE:
 - THE DATE OF RELEASE
 - CIRCUMSTANCES LEADING TO THE RELEASE
 - STEPS TAKEN TO PREVENT REOCCURRENCE OF THE RELEASE
 4. MODIFY POLLUTION PREVENTION PLAN AS NECESSARY TO:
 - COMPLY WITH MINIMUM PERMIT REQUIREMENTS WHEN NOTIFIED BY EPA THAT THE PLAN DOES NOT COMPLY
 - ADDRESS A CHANGE IN DESIGN, CONSTRUCTION OPERATION OR MAINTENANCE WHICH HAS AN EFFECT ON THE POTENTIAL FOR DISCHARGE OF POLLUTANTS
 - PREVENT REOCCURRENCE OF REPORTABLE QUANTITY RELEASES OF A HAZARDOUS MATERIAL OR OIL

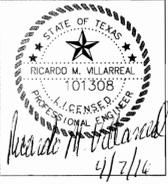
STORM WATER POLLUTION PREVENTION PLAN FINAL STABILIZATION/ TERMINATION CHECKLIST

1. ALL SOIL DISTURBING ACTIVITIES ARE COMPLETE
2. TEMPORARY EROSION AND SEDIMENT CONTROL MEASURES HAVE BEEN REMOVED OR WILL BE REMOVED AT AN APPROPRIATE TIME.
3. ALL AREAS OF THE CONSTRUCTION SITE NOT OTHERWISE COVERED BY A PERMANENT PAVEMENT OR STRUCTURE HAVE BEEN STABILIZED WITH A UNIFORM PERENNIAL VEGETATIVE COVER WITH A DENSITY OF 70% OR EQUIVALENT MEASURES HAVE BEEN EMPLOYED

GENERAL NOTES TO CONTRACTOR

1. LOCATE FUEL/MATERIAL STORAGE AREAS AWAY FROM WATER CONVEYANCE SYSTEMS. USE A LINER UNDER ABOVE GROUND STORAGE TANKS. USE SILT FENCING, HAY BALES, OR BERMS AROUND FUEL STORAGE AREAS. NO SEPARATE PAY.
2. CONTRACTOR WILL ADVISE OWNER IMMEDIATELY, VERBALLY, AND IN WRITING, OF ANY FUEL SPILLS ONTO THE PROJECT/CONSTRUCTION AREA AND THE ACTIONS TAKEN TO REMEDY THE PROBLEM.
3. CONTRACTOR IS RESPONSIBLE FOR COMPLYING WITH ALL ENVIRONMENTAL LAWS.
4. CONTRACTOR IS RESPONSIBLE FOR DISPOSING OF FUELS, MATERIALS, AND EXCAVATIONS IN A LEGALLY APPROVED MANNER.
5. CONTRACTOR IS TO INSPECT ALL STRUCTURAL CONTROLS SPECIFIED HEREIN, AT A MINIMUM, ONCE EVERY 7 CALENDAR DAYS OR WITHIN 24 HOURS AFTER ANY STORM EVENT THAT MEETS OR EXCEEDS 0.5 INCHES/24 HOURS PERIOD.
6. CONTRACTOR WILL PROVIDE PROTECTED STORAGE AREAS FOR CHEMICALS, PAINTS, SOLVENTS, FERTILIZERS, AND OTHER POTENTIALLY TOXIC MATERIALS.
7. CONTRACTOR IS RESPONSIBLE FOR PROVIDING ADEQUATELY MAINTAINED SANITARY FACILITIES.
8. CONTRACTOR SHALL BE RESPONSIBLE FOR INSTALLATION, IDENTIFICATION, AND REMOVAL OF ALL DEBRIS FOR DESIGNATED CONCRETE WASH-OUT SITE.
9. ALL UNSATISFACTORY AND/OR WASTE MATERIALS INCLUDING VEGETATION, ROOTS, CONCRETE AND DEBRIS SHALL BE DISPOSED OF OFFSITE BY THE CONTRACTOR.
10. CONTRACTOR IS RESPONSIBLE FOR CLEANING MUD AND/OR DIRT TRACKED ONTO EXISTING STREETS BY HIS WORKMAN'S SUPPLIER'S OR SUBCONTRACTOR'S VEHICLES. STREETS MUST BE CLEANED WITHIN 24 HOURS OF WHEN THE TRACKING OCCURS.
11. ALL DISTURBED AREAS, BOTH ON-SITE AND OFF, NOT COVERED BY PAVEMENT OR PERMANENT STRUCTURES SHALL BE HYDRAULIC SEEDED WITHIN 21 DAYS OF COMPLETION OF WORK. CONTRACTOR MUST ESTABLISH AND PROVIDE FOR A MAINTENANCE PROGRAM UNTIL ADEQUATE TURF ESTABLISHMENT IS ACCOMPLISHED AND THE CONSTRUCTION IS ACCEPTED BY THE OWNER.
12. CONTRACTOR MAY SUBSTITUTE SILT FENCE FOR STRAW BALE FENCE WHERE INDICATED AT HIS OPTION, NO EXTRA PAY.

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(512) 327-0444 FAX (512) 301-4909



WEBB COUNTY YOUTH VILLAGE
REHABILITATION CENTER
111 CAMINO NUEVO ROAD, HWY 359
LAREDO, TEXAS 78046

PROJECT NUMBER

REVISIONS

FILENAME:

SHEET TITLE

STORM WATER POLLUTION PREVENTION DETAILS

DRAWN BY: J.C.N.

SHEET NO.

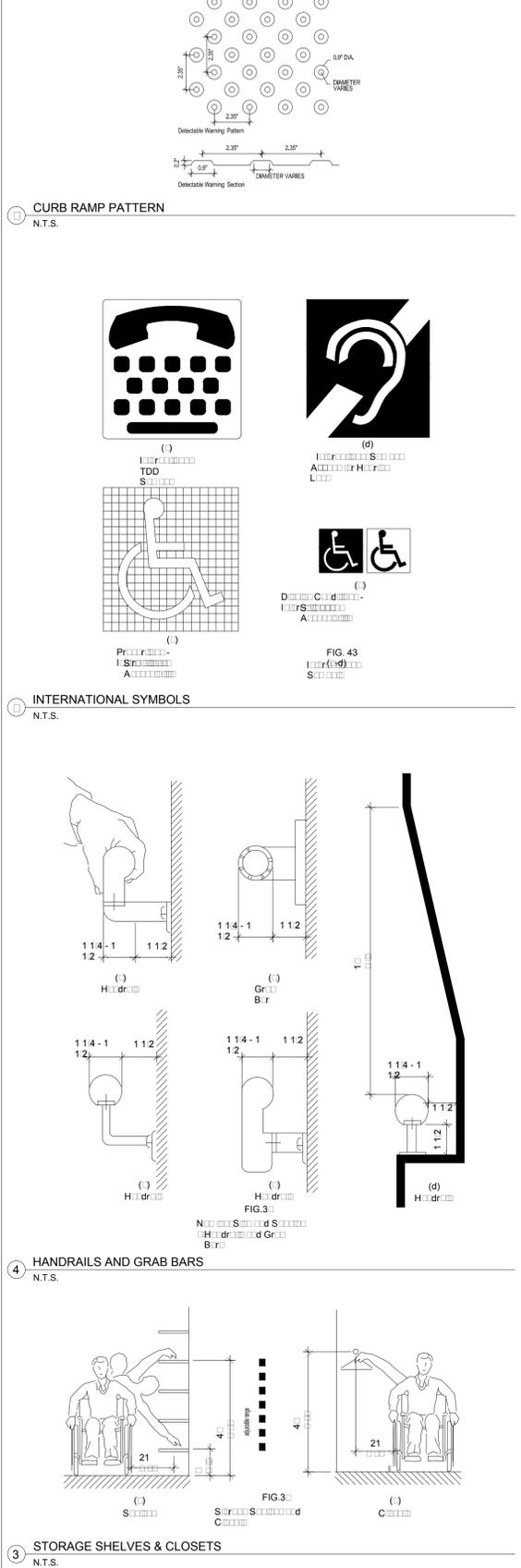
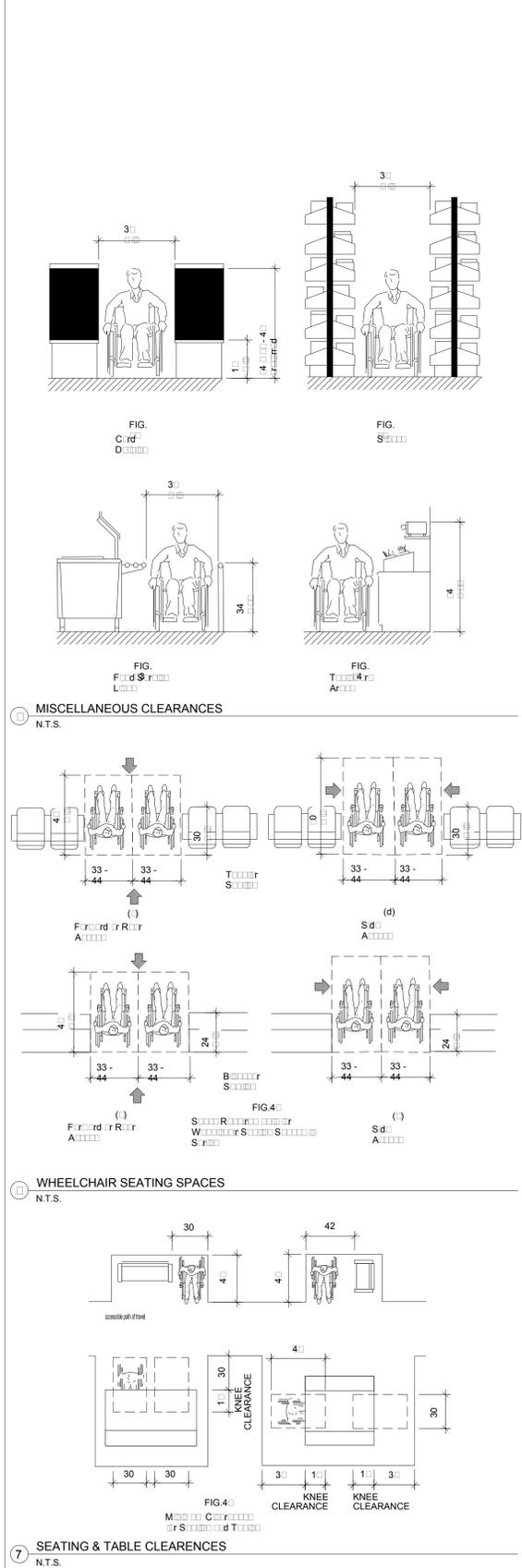
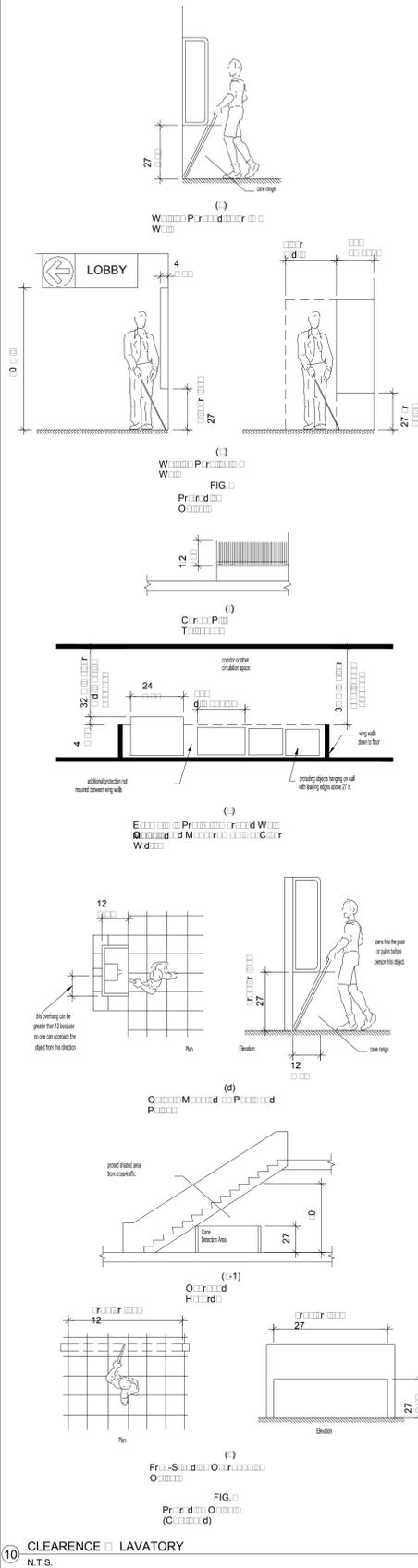
C.15

DATE: April 07, 2016

HOWLAND
ENGINEERING AND SURVEYING CO.

TBPE Firm Registration No. F-4297 / TBPLS Firm Registration No. 100484-00
7615 N. Bartlett Avenue | P.O. Box 451128 (78045) | Laredo, TX 78041
P. 956.722.4411 F. 956.722.5414
www.howlandcompanies.com

ACCESSIBILITY STANDARDS



GENERAL NOTES:

IN ACCORDANCE WITH THE 2010 A.D.A. STANDARDS FOR ACCESSIBLE DESIGN AND THE 2012 TEXAS ACCESSIBILITY STANDARDS, THE FOLLOWING STANDARDS AND REQUIREMENTS SHALL BE INCLUDED WHEN BIDDING ON PROJECTS INVOLVING RENOVATIONS OF EXISTING FACILITIES OR NEW CONSTRUCTION OF FACILITIES FOR PUBLIC ACCOMMODATION OR COMMERCIAL USE. ANY ITEMS NOT CONFORMING TO THESE OR ANY OTHER APPLICABLE STANDARDS, CODES, OR ORDINANCES SHALL BE BROUGHT TO THE ATTENTION OF THE PROJECT ARCHITECT FOR HIS/HER INTERPRETATION. IN THE EVENT THAT THE INFORMATION LISTED IN THIS DOCUMENT CONFLICTS WITH ANY PORTION OF THE WORK DESCRIBED IN THE CONTRACT DOCUMENTS, THE CONTRACTOR SHALL NOTIFY THE ARCHITECT, IN WRITING, OF HIS NEED FOR A SOLUTION TO RESOLVE THE CONFLICT.

THE MOUNTING HEIGHTS INDICATED ARE FOR ITEMS THAT REQUIRE ACCESSIBILITY BY INDIVIDUALS WITH DISABILITIES. WHERE TWO OR MORE ITEMS ARE GROUPED IN ONE AREA (MIRRORS, SINKS, TOILETS, DRINKING FOUNTAINS, URINALS, SHELVES, TELEPHONES, ETC.) NOT ALL ITEMS IN THE AREA HAVE TO BE MOUNTED AT THE ACCESSIBLE MOUNTING HEIGHT. MOUNTING HEIGHTS OF ITEMS WHERE MORE THAN ONE IS FURNISHED IN A PARTICULAR SPACE SHALL BE DETERMINED BY THE ARCHITECT IN THE FIELD. THESE NEED NOT BE INSTALLED AT THE ACCESSIBLE MOUNTING HEIGHT. CONTRACTOR TO COORDINATE THESE INSTALLATION HEIGHTS WITH THE ARCHITECT OR THE ARCHITECT'S REPRESENTATIVE.

- DOORS AND OPENINGS**
 - RAISED THRESHOLDS AND FLOOR LEVEL CHANGES AT DOORWAYS: CHANGES IN LEVEL AT DOORS SHALL NOT EXCEED ONE-HALF INCH (1/2") IN HEIGHT AND SHALL BE BEVELED WITH A SLOPE NO GREATER THAN 1:2.
 - DOOR HARDWARE: HANDLES, PULLS, LATCHES, LOCKS, AND OTHER OPERATING DEVICES ON DOORS SHALL HAVE A SHAPE THAT IS EASY TO GRASP WITH ONE HAND AND DOES NOT REQUIRE TIGHT GRASPING, TIGHT PINCHING, OR TWISTING TO OPERATE. THE FORCE REQUIRED TO ACTIVATE DOOR HARDWARE SHALL BE NO GREATER THAN FIVE LBS. ACCEPTABLE DESIGNS INCLUDE LEVER-OPERATED MECHANISMS, PUSH-TYPE MECHANISMS, AND U-SHAPED HANDLES. WHEN SLIDING DOORS ARE FULLY OPEN, OPERATING HARDWARE SHALL BE EXPOSED AND USABLE FROM BOTH SIDES. DOORS TO HAZARDOUS AREAS SUCH AS LOADING PLATFORMS, BOILER ROOMS, MECHANICAL AND ELECTRICAL ROOMS, STAGE, AND OTHER AREAS THAT MIGHT BE DANGEROUS TO A BLIND PERSON, SHALL BE MADE IDENTIFIABLE TO THE TOUCH BY A TEXTURED SURFACE ON THE DOOR HANDLE, PULL, OR OTHER OPERATING HARDWARE. THIS TEXTURED SURFACE MAY BE MADE BY KNURLING OR ROUGHENING (NO TAPE ALLOWED). SUCH TEXTURED SURFACES SHALL NOT BE PROVIDED FOR EMERGENCY EXIT DOORS OR ANY DOORS OTHER THAN THOSE TO HAZARDOUS AREAS.
 - DOOR CLOSER: IF A DOOR HAS A CLOSER, THEN THE SWEEP PERIOD OF THE CLOSER SHALL BE ADJUSTED SO THAT FROM AN OPEN POSITION OF: (A) 90 DEGREES, THE DOOR WILL TAKE AT LEAST THREE SECONDS TO MOVE TO A JOINT 3 INCHES FROM THE LATCH, MEASURED TO THE LEADING EDGE OF THE DOOR; OR (B) 70 DEGREES, THE DOOR WILL TAKE AT WILL TAKE AT LEAST THREE SECONDS TO MOVE TO A JOINT 3 INCHES FROM THE LATCH, MEASURED TO THE LEADING EDGE OF THE DOOR.
 - DOOR OPENING FORCE: THE MAXIMUM FORCE FOR PUSHING OR PULLING OPEN A DOOR SHALL COMPLY WITH THIS PARAGRAPH. FOR HINGED DOORS, THE FORCE SHALL BE APPLIED PERPENDICULAR TO THE DOOR AT THE DOOR OPENER OR 30 INCHES FROM THE HINGED SIDE, WHICHEVER IS FATHER FROM THE HINGE. FOR SLIDING OR FOLDING DOORS, THE FORCE SHALL BE APPLIED PARALLEL TO THE DOOR AT THE DOOR PULL OR LATCH.
 - EXTERIOR HINGED DOORS SHALL NOT EXCEED 8.5 LBS. SLIGHT INCREASE IN OPENING FORCE SHALL BE ALLOWED WHERE 8.5 LBS. IS INSUFFICIENT TO COMPENSATE FOR AIR PRESSURE DIFFERENTIALS.
 - SLIDING DOORS, FOLDING DOORS, AND INTERIOR HINGED DOORS SHALL NOT REQUIRE A FORCE EXCEEDING 5 (FIVE) LBS.
 - FIRE DOORS MAY BE ADJUSTED TO MEET THE MINIMUM OPENING FORCE ALLOWED BY THE GOVERNING AUTHORITY OR APPLICABLE BUILDING CODE.
- CONTROLS AND OPERATING MECHANISMS**
 - ALL CONTROLS AND DEVICES HAVING GENERAL USE MECHANICAL OR ELECTRICAL OPERATING MECHANISMS WHICH ARE EXPECTED TO BE OPERABLE BY OCCUPANTS, VISITORS, OR OTHER USERS OF A BUILDING OR FACILITY, SHALL COMPLY WITH THIS SUBSECTION. SUCH MECHANISMS MAY INCLUDE, BUT ARE NOT LIMITED TO, THERMOSTATS, LIGHT SWITCHES, ALARM ACTIVATING UNITS, VENTILATORS, ELECTRICAL OUTLETS, PAPER TOWEL DISPENSERS, ETC.
 - CLEAR FLOOR SPACE: A CLEAR FLOOR SPACE THAT ALLOWS A FORWARD OR PARALLEL APPROACH BY A PERSON USING A WHEELCHAIR SHALL BE PROVIDED AT ALL CONTROLS, DISPENSERS, RECEPTACLES, AND OTHER OPERABLE EQUIPMENT. THE SPACE SHALL NEVER BE LESS THAN AN AREA 30 X 48 INCHES.
 - HEIGHT: THE HIGHEST OPERABLE PART OF ANY CONTROL, DISPENSER, RECEPTACLE, AND OTHER OPERABLE EQUIPMENT SHALL BE NO HIGHER FROM THE FLOOR THAN HEIGHTS INDICATED ON ATTACHED SKETCHES FOR FORWARD AND SIDE APPROACH EXCEPT WHERE THE USE OF SPECIAL EQUIPMENT DICTATES OTHERWISE. ELECTRICAL AND COMMUNICATIONS SYSTEMS RECEPTACLES ON WALLS SHALL BE MOUNTED NO LESS THAN FIFTEEN INCHES (15") ABOVE THE FLOOR.
 - OPERATION: CONTROLS AND OPERATING MECHANISMS SHALL BE OPERABLE WITH ONE HAND AND SHALL NOT REQUIRE TIGHT GRASPING, PINCHING, OR SEVERE TWISTING OF THE WRIST. THE FORCE REQUIRED TO ACTIVATE CONTROLS SHALL BE NO GREATER THAN 5 LBS.
- SIGNAGE**
 - WHEREVER SIGNAGE IS USED FOR EMERGENCY INFORMATION OR GENERAL CIRCULATION DIRECTIONS OF FOR THE IDENTIFICATION OF ROOMS AND SPACES, AT LEAST ONE UNIT OF SIGNAGE SHALL BE PROVIDED FOR EACH FUNCTION AND EACH ROOM OR SPACE THAT IS IDENTIFIED.
 - CHARACTER PROPORTION: LETTERS AND NUMBERS ON SIGNS SHALL HAVE WIDTH-TO-HEIGHT RATIO BETWEEN 3:5 AND 1:1, AND A STROKE WIDTH-TO-HEIGHT RATIO BETWEEN 1:5 AND 1:10, USING AN UPPER CASE "X" FOR MEASUREMENT.
 - COLOR CONTRAST: CHARACTERS AND SYMBOLS SHALL HAVE CONTRAST WITH THEIR BACKGROUND.
 - TACTILE: TACTILE SHALL BE RAISED 1/32 IN. MINIMUM. LETTERS AND NUMBERS SHALL BE SANS SERIF CHARACTERS; SHALL BE AT LEAST 5/8 IN. HIGH, BUT SHOULD BE NO HIGHER THAN 2 IN.; AND SHALL BE PROPORTIONED IN ACCORDANCE WITH SUBPARAGRAPH 3.A.1) ABOVE.
 - MOUNTING HEIGHT AND LOCATION: ROOM (STRIKE) SIDE OF DOORS BETWEEN APPROXIMATELY 54 IN. (5'4") AND 66 IN. (6'6") ABOVE THE FINISH FLOOR AND WITHIN 8 IN. (8") FROM THE OUTSIDE EDGE OF THE DOOR FRAME. OTHER SIGNS FOR DIRECTIONAL INFORMATION ONLY SHALL BE MOUNTED BETWEEN 54" AND 66" ABOVE FINISH FLOOR.

THE FOLLOWING SECTION OF DETAILS PROVIDES INFORMATION ON REQUIREMENTS FOR ACCESSIBILITY. THE REQUIREMENTS COMBINE MINIMUM REQUIREMENTS OF STATE AND FEDERAL AGENCIES. THE PURPOSE OF THIS SECTION IS TO HELP AVOID INSTALLATION OF MATERIALS ON CONSTRUCTION PROJECTS THAT WOULD LIMIT ACCESSIBILITY. THE SCOPE OF THIS SECTION IS LIMITED AND THE INDIVIDUALS WORKING ON THE PROJECT SHOULD FAMILIARIZE THEMSELVES WITH TEXAS ACCESSIBILITY STANDARDS (TAS) AND THE AMERICANS WITH DISABILITIES ACT ACCESSIBILITY GUIDELINES (ADAAG) FOR ADDITIONAL INFORMATION AND REQUIREMENTS. COPIES OF THESE DOCUMENTS MAY BE OBTAINED BY CONTACTING THE FOLLOWING:

TAS: OFFICE OF THE SECRETARY OF STATE TEXAS REGISTER DIVISION P.O. BOX 13824 AUSTIN, TEXAS 78711-3824 (512) 463-5569 FAX (512) 463-5581 TOD (800) 735-2989

SOUTHWEST DISABILITY AND BUSINESS ADAAG: TECHNICAL ASSISTANCE CENTER FOR REGION VI. 2323 S. SHEPHERD, SUITE 1000 HOUSTON, TEXAS 77019 ADA HOTLINE: (800) 949-4232/TDD (713) 520-5136 (713) 520-0232 FAX (713) 520-5785

IN THE EVENT THE INFORMATION ON THE PLAN SHEETS DOES NOT MEET THE MINIMUM REQUIREMENTS OF THE SECTION, THEN THE INFORMATION SHALL BE PRESENTED TO THE ARCHITECT FOR CLARIFICATION PRIOR TO CONSTRUCTION OF SPECIFIC AREA OF WORK.

3 STORAGE SHELVES & CLOSETS
N.T.S.

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(512) 327-0444 FAX (512) 301-4909

REGISTERED ARCHITECT
STATE OF TEXAS
Kensley C. Milled
04.07.2016

WEBB COUNTY YOUTH VILLAGE
REHABILITATION CENTER
111 CAMINO NUEVO ROAD, HWY 359
LAREDO, TEXAS 78046

PROJECT NUMBER
1401

REVISIONS

FILENAME:

SHEET TITLE
ACCESSIBILITY STANDARDS

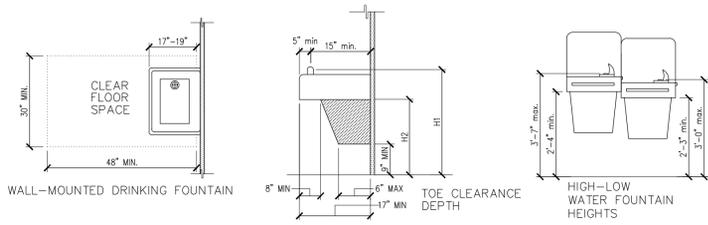
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SHEET NO.
AG.1

DATE: APRIL 7, 2016

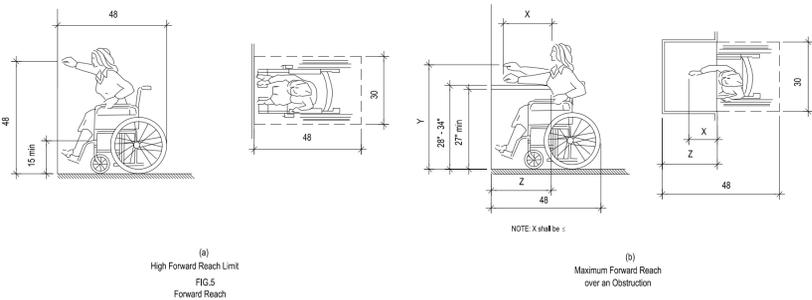
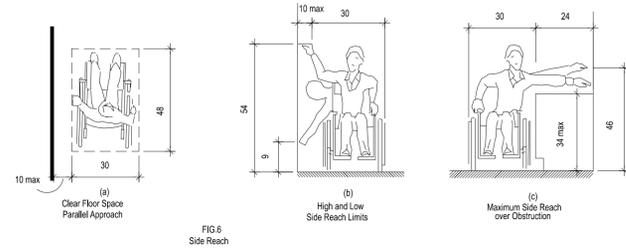
ACCESSIBILITY STANDARDS



MOUNTING HEIGHTS		
H1 SPOUT HEIGHT (TO OUTLET)	H2 KNEE CLEARANCE	SIDE APPROACH SPOUT HEIGHT
36" MAX	27" MIN.	36" MAX

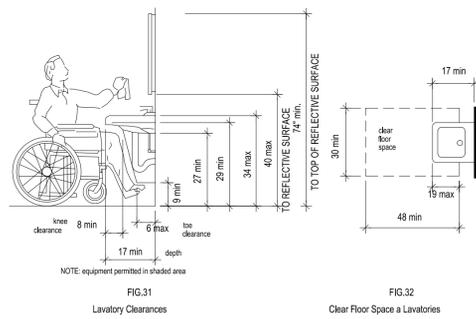
11 DRINKING FOUNTAINS

N.T.S.



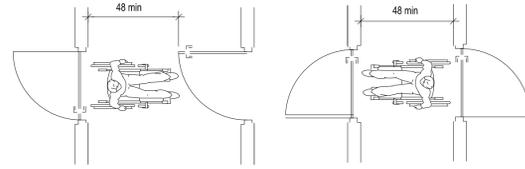
10 REACH CLEARANCES FORWARD AND SIDE

N.T.S.



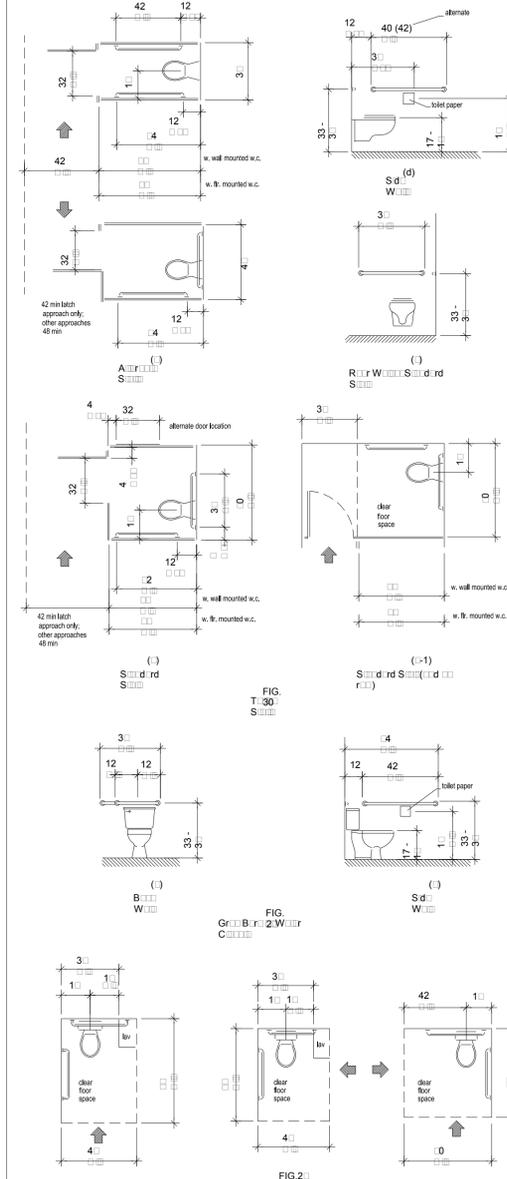
10 CLEARANCE LAVATORY

N.T.S.



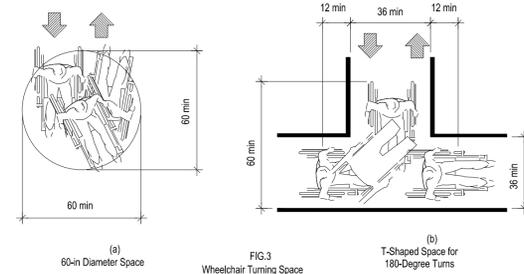
10 DOORS IN A SERIES

N.T.S.



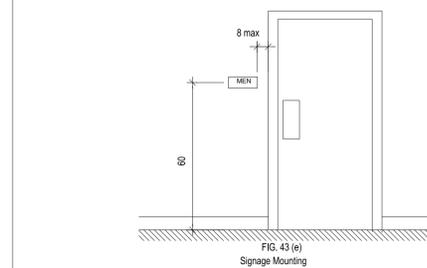
10 CLEARANCE TOILETS

N.T.S.



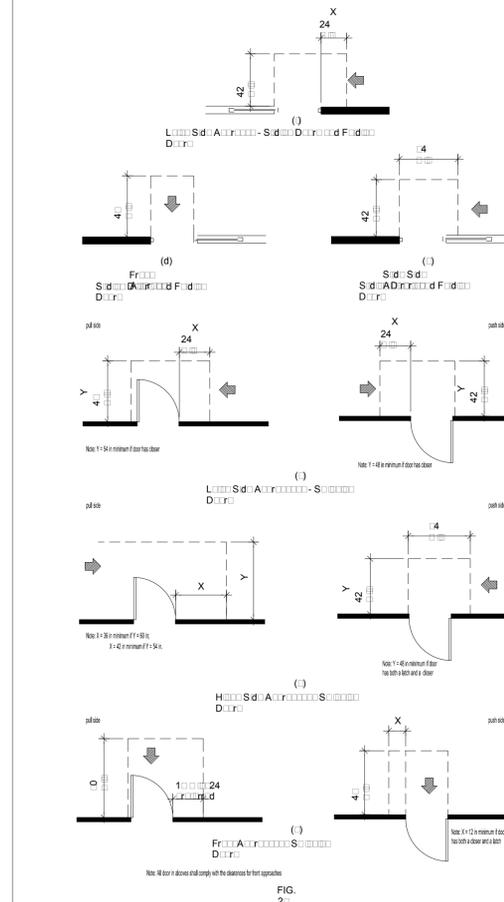
7 WHEELCHAIR TURNING

N.T.S.



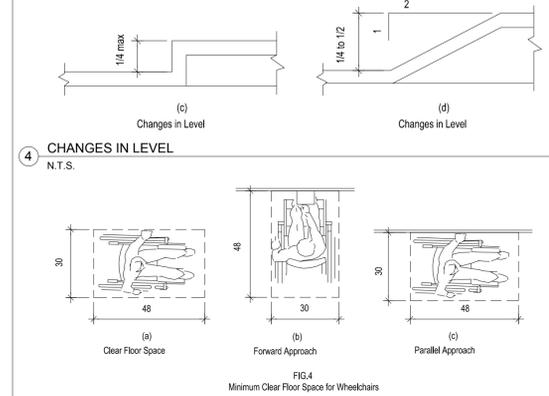
10 SIGNAGE MOUNTING

N.T.S.



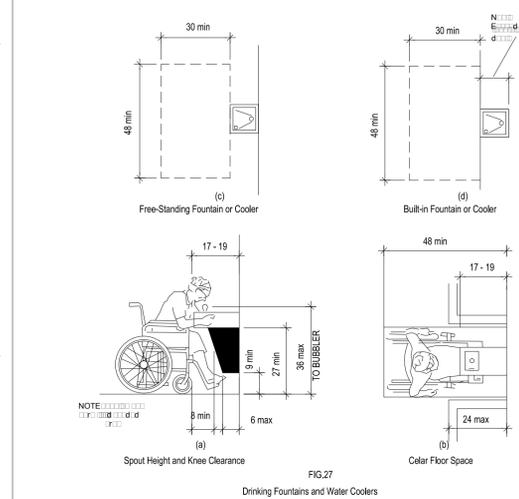
10 MIN. CLEARANCE DOORS

N.T.S.



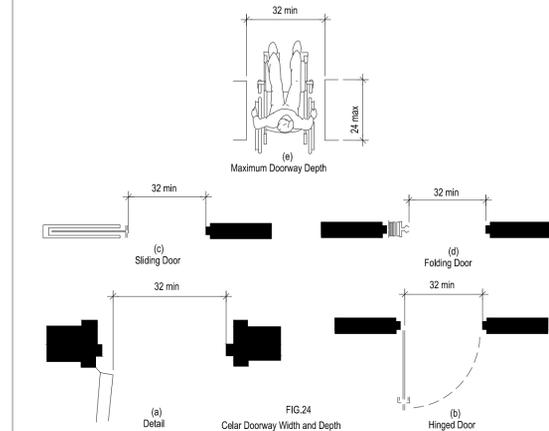
3 CLEAR FLOOR SPACE FOR WHEELCHAIRS

N.T.S.



2 MIN. CLEARANCE DRINKING FOUNTAINS

N.T.S.



1 CLEAR DOOR WIDTH/DEPTH

N.T.S.

THIS DATA IS PROVIDED AS AN ADDITIONAL RESOURCE TO THE TEAM OF OWNER, CLIENT ARCHITECT, ENGINEER, AND SPECIFICALLY CONTRACTOR. THIS IS A TOOL TO APPRISE ALL PARTIES OF GENERAL ACCESSIBLE CONDITIONS AS PUBLISHED PER THE ADAAG (AMERICANS WITH DISABILITIES ACT), TAS (TEXAS ACCESSIBILITY STANDARDS), ANS (AMERICAN NATIONAL STANDARDS INSTITUTE) AND THE ACCESSIBILITY GUIDELINES FOR BUILDINGS AND FACILITIES. THE DIAGRAMS ARE VERBATIM DUPLICATIONS OF THE TAS AND ANS STANDARDS AND ARE NOT INDICATIVE OF ALL CONDITIONS AND CERTAINLY DO NOT FULLY REPRESENT THE ENTIRETY OF THE WRITTEN GUIDELINES AS CONTAINED IN THE STANDARDS. THIS DATA IS IN SUPPORT OF GENERAL ARCHITECTURAL & ENGINEERING DOCUMENTATION, WHICH IS INTENDED TO BE CONSISTENT WITH ACCESSIBLE CONDITIONS. HOWEVER, THE ADAAG IS NOT A BUILDING CODE AND NOT NECESSARILY REVIEWABLE OR ENFORCEABLE BY TRADITIONAL BUILDING AUTHORITIES. THE ADAAG IS A CIVIL STATUTE. THEREFORE, THE ENTIRE TEAM OF OWNER, CLIENT, ARCHITECT, ENGINEER, AND SPECIFICALLY, CONTRACTOR IS RESPONSIBLE FOR COMPLIANCE TO THE SPECIFIC INTENT OF THE LAW. THIS DATA IS PROVIDED TO ACT AS AN ADDED SAFEGUARD TO FULLY FAMILIARIZE THE TEAM WITH EXPECTATIONS ASSOCIATED WITH THE ADAAG, TAS, AND THE ANS STANDARD AND TO ASSIST THE TEAM IN ACHIEVING FULLY ACCESSIBLE CONDITIONS AS REQUIRED BY CIVIL LAW. WE ENCOURAGE THE DETAILED REVIEW BY OWNER AND CONTRACTOR.

FOR QUESTIONS REGARDING TAS CONTACT:
TEXAS DEPARTMENT OF LICENSING AND REGULATION
ARCHITECTURAL BARRIERS PROGRAM
P.O. BOX 12157
AUSTIN, TEXAS 78711
TELEPHONE: (512) 463-3211 OR (877) 278-0999
FAX: (512) 475-2886
WWW.LICENSE.STATE.TX.US

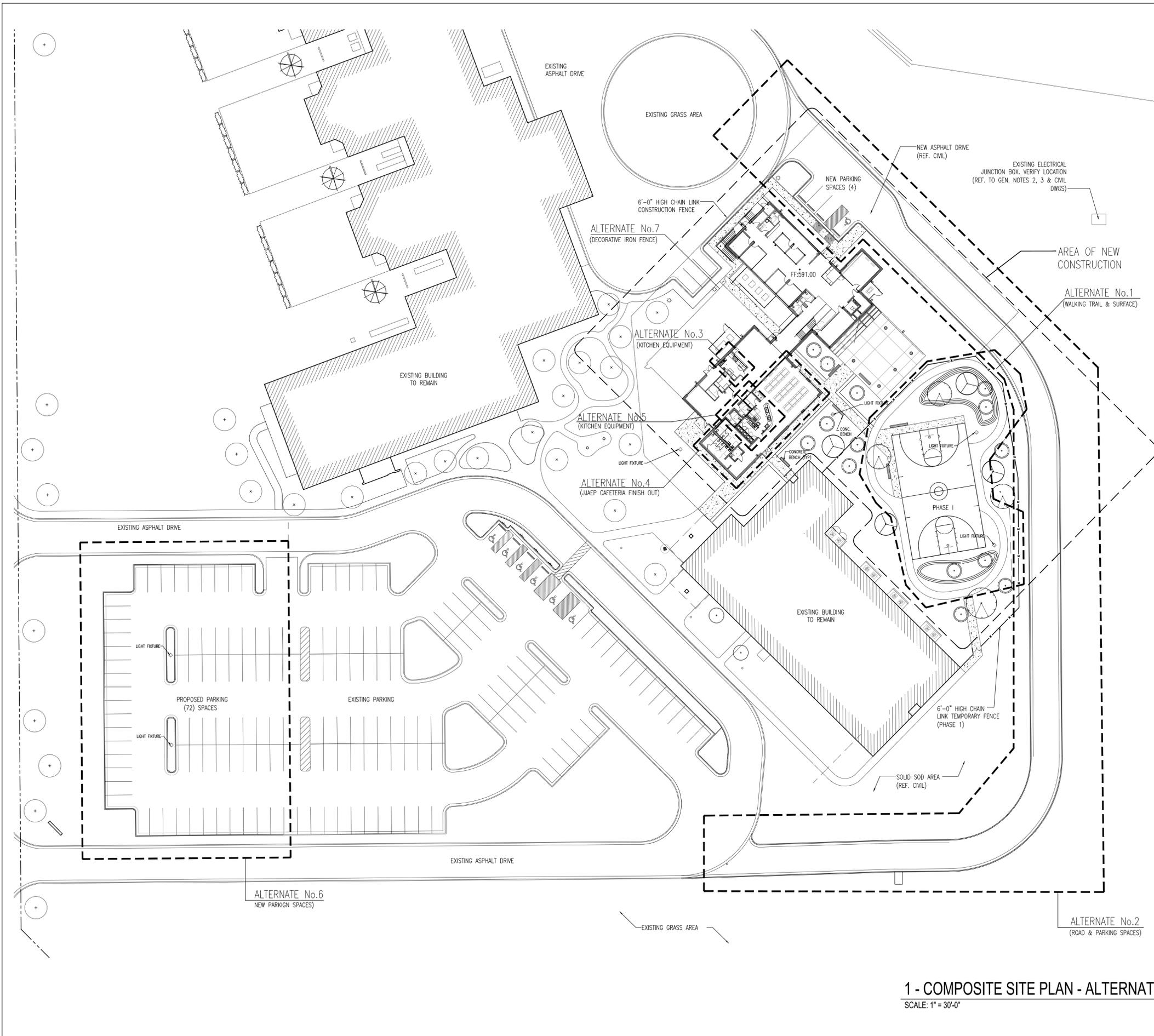
FOR QUESTIONS REGARDING ADAAG CONTACT:
U.S. DEPARTMENT OF JUSTICE
CIVIL RIGHTS DIVISION
TELEPHONE: (800) 514-0301
WWW.USDOJ.GOV/CRTIADA/ADAHOME1.HTM

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PROJECT NUMBER
1401
REVISIONS
FILENAME:
SHEET TITLE
ACCESSIBILITY STANDARDS
NOT TO SCALE
DRAWN BY: JR
SHEET NO.
AG.3
DATE: APRIL 7, 2016



GENERAL NOTES - ALTERNATES

1. CONTRACTOR SHALL REFER TO SPECIFICATIONS SECTION 012300, ARCHITECTURAL & CIVIL DRAWINGS, FOR A FULL LISTING OF ALTERNATES. THE ITEMS DEPICTED ON THE DRAWING ARE NOT A COMPREHENSIVE LIST OF ALTERNATES.
2. ALTERNATE NO. 1 - ADDITION OF WALKING TRAIL & SURFACE. CONTRACTOR TO PROVIDE CONCRETE SURFACE, INCLUDING CALICHE SUBSURFACE, ETC. (REF. TO CIVIL DRAWINGS)
3. ALTERNATE NO. 2 - DELETE PROPOSED ROAD. ALL GRADING AND SITE PREPARATION SHALL BE INCLUDED IN BASE BID. (REF. TO CIVIL SHEETS).
4. ALTERNATE NO. 3 - WARMING KITCHEN RM. 116 - EQUIPMENT (REF. TO KITCHEN DRAWINGS FS-1.00 TO FS-2.02)
5. ALTERNATE NO. 4 - JJAEP KITCHEN FINISH-OUT (REF. TO KITCHEN DRAWINGS FS-1.00 TO FS-2.02)
6. ALTERNATE NO. 5 - KITCHEN105 - EQUIPMENT (REF. TO KITCHEN DRAWINGS FS-1.00 TO FS-2.02)
7. ALTERNATE NO. 6 - SITE IMPROVEMENTS. PROVIDE (72) PARKING SPACES AS INDICATED. PROVIDE PARKING LOT LIGHT POLES, MATCH EXISTING. (REF. TO MEP & CIVIL DRAWINGS).
8. ALTERNATE NO. 7 - DECORATIVE IRON FENCING
9. ALTERNATE NO. 8 - CONCRETE BENCHES. DELETE ALL CONCRETE BENCHES

PHASE I - GENERAL NOTES

1. PHASE I - CONTRACTOR TO CONSTRUCT NEW CONCRETE BASKETBALL COURT DURING FIRST (60) DAYS OF CONSTRUCTION. ALL GOALS, BACKBOARDS, AND STRIPING SHALL BE INCLUDED. TEMPORARY ACCESSIBLE WALKWAY ACCESS SHALL BE PROVIDED FROM THE SOUTH ENTRY OF THE EXISTING JJA.E.P. BUILDING.
2. CONTRACTOR TO PROVIDE A TEMPORARY 6'-0" CHAIN LINK FENCE DURING CONSTRUCTION. PROPER BARRICADE TO SEPARATE ONGOING CONSTRUCTION SHALL BE PROVIDED.

NOTES

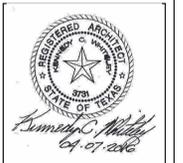
1. REFER TO CIVIL DWGS FOR FINISHED FLOOR ELEVATION. ALL GRADING OUTSIDE OF BUILDING SHALL BE BY CIVIL ENGINEER PRIOR TO CONSTRUCTION, WHERE INDICATED. HOLD TOP OF WALL ELEVATIONS OF RETAINING WALLS.
2. THE CONTRACTOR SHALL VERIFY ALL UTILITIES SHOWN ON THESE PLANS AS WELL AS ANY OTHERS IN THE FIELD PRIOR TO START OF CONSTRUCTION ACTIVITIES.
3. PRIOR TO START, CONTRACTOR SHALL LOCATE AND STAKE EXISTING UNDERGROUND ELECTRICAL LINES FROM JUNCTION BOX.

1 - COMPOSITE SITE PLAN - ALTERNATES

SCALE: 1" = 30'-0"



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WEBB COUNTY YOUTH VILLAGE
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PROJECT NUMBER
1401

REVISIONS

FILENAME:

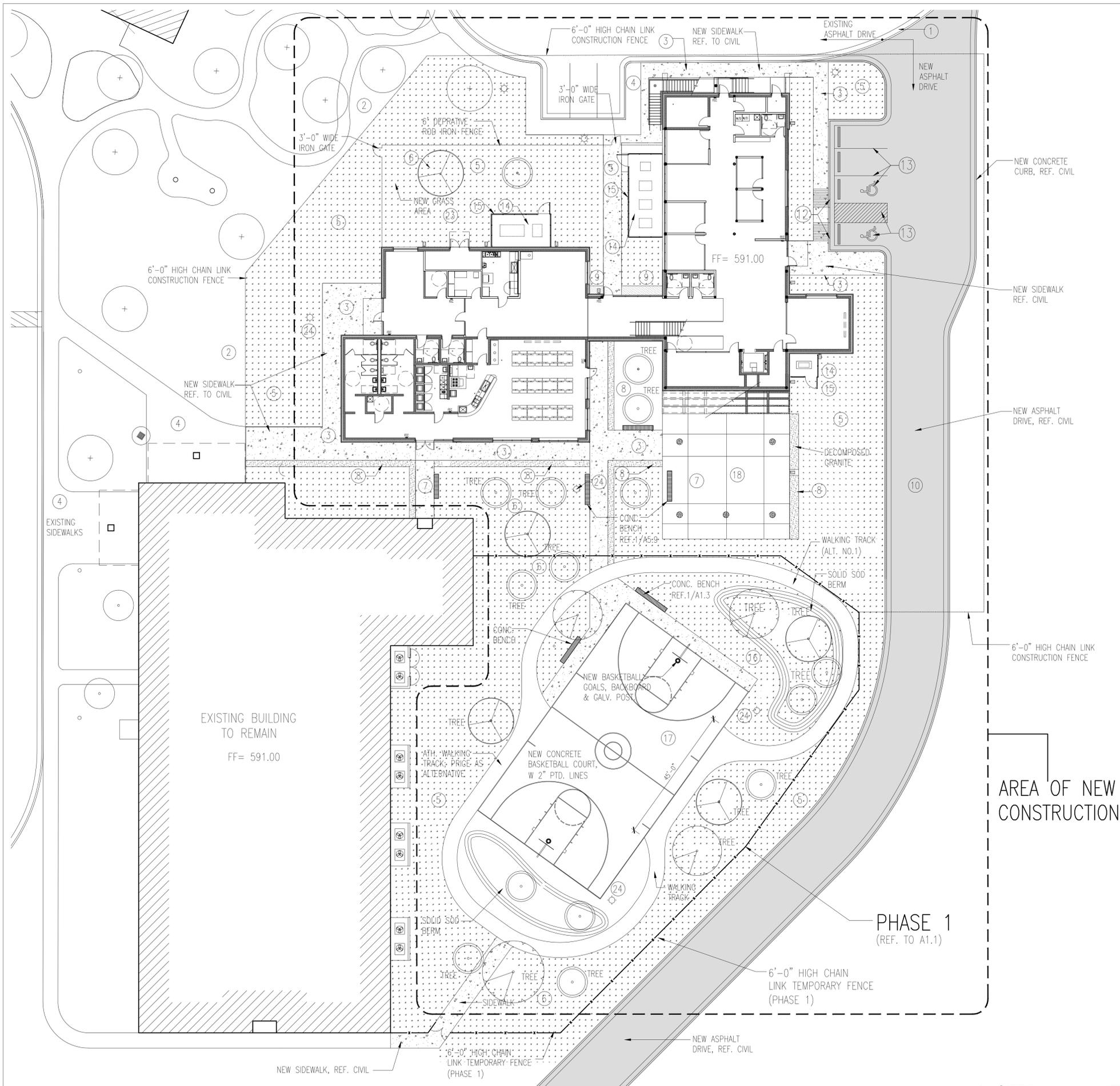
SHEET TITLE
COMPOSITE SITE PLAN

DRAWN BY: JR

SHEET NO.

A1.1

DATE: APRIL 7, 2016



GENERAL NOTES

- BEFORE COMMENCING ANY ACTIVITY UNDER OR PERTAINING TO THIS CONTRACT, THE CONTRACTOR SHALL:
 - OBTAIN ALL BUILDING & CONSTRUCTION PERMITS AS REQUIRED BY THE PERTINENT LOCAL REGULATORY & GOVERNMENTAL AGENCIES.
 - VERIFY LOCATIONS, PROPERTY LINES, LIMITS OF WORK, EASEMENTS, ELEVATIONS & DIMENSIONS OF EXISTING UTILITIES, STRUCTURES & OTHER IMPROVEMENTS AFFECTING HIS WORK & PROTECT SAME WHERE NECESSARY.
 - WHEN A MATERIAL OR PRODUCT IS IDENTIFIED ANYWHERE IN THE DRAWINGS BY REFERENCE TO MANUFACTURER'S BRAND OR TRADE NAME, IT IS FOR THE PURPOSE OF ESTABLISHING A STANDARD OR QUALITY. ANY MATERIAL OR PRODUCT OF OTHER MANUFACTURER, WHICH IN THE OPINION OF THE ARCHITECT IS OF EQUAL SUBSTANCE, APPEARANCE, FUNCTION AND PERFORMANCE, WILL BE CONSIDERED.
 - VERIFY EXISTING LOCATIONS OF ALL UTILITIES PRIOR TO PROCEEDING WITH THE WORK AND RELOCATE EXISTING UTILITIES THAT WILL INTERFERE WITH THE NEW CONSTRUCTION.
 - THE CONTRACTOR IS TO PROTECT ALL WORK DURING CONSTRUCTION SO AS NOT TO DAMAGE ANY AREAS WITHIN THE CONTRACT. ANY AREA DAMAGED SHALL IMMEDIATELY BE REPORTED TO THE ARCHITECT, AND SHALL BE PROMPTLY REPAIRED TO THE SATISFACTION OF THE ARCHITECT AND THE OWNER.
 - JOB SITE OBSERVATIONS BY THE ARCHITECT/ ENGINEER OR THEIR AUTHORIZED REPRESENTATIVES SHALL CONSIST OF VISUAL OBSERVATION OF MATERIALS, EQUIPMENT OR CONSTRUCTION WORK FOR THE PURPOSE OF ASCERTAINING THAT THE WORK IS IN SUBSTANTIAL CONFORMANCE WITH THE CONTRACT DOCUMENTS.
- ALL DETAILS AND NOTES MARKED "TYPICAL" OR "TYP." ON DRAWINGS APPLY TO ALL CONDITIONS IN THIS CONTACT, WHERE APPLICABLE.
- THE CONTRACTOR SHALL TAKE POSITIVE STEPS TO PROTECT PROPERTY FROM DAMAGE THAT COULD BE CAUSED FROM THE CONSTRUCTION. IN ADDITION, HE/SHE SHALL ADOPT MEASURES TO INSURE THE SAFETY OF THE PEOPLE ASSOCIATED AS A RESULT OF THE CONSTRUCTION.
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- THE CONTRACTOR SHALL ASSUME ALL RESPONSIBILITY FOR ANY DAMAGE TO ANY EXISTING OR NEWLY CONSTRUCTED BUILDING PAVEMENT SIDEWALKS, CURB & GUTTER, LANDSCAPING, FENCING, UTILITIES, (STORM DRAINAGE, WATER, SANITARY, IRRIGATION, ELECTRIC, GAS, CABLE TV, TELEPHONE, ETC.) OR ANY OTHER PUBLICLY OR PRIVATELY OWNED IMPROVEMENT, & SHALL REPAIR, REPLACE OR OTHERWISE PROVIDE FOR RESTORATION OF SAME TO ITS ORIGINAL AT NO COST TO THE OWNER. THE CONTRACTOR SHALL ACCURATELY LOCATE & MARK CONSTRUCTION LIMITS & PROPERTY LINES, & CONDITION AT SHALL LIMIT ALL CONSTRUCTION ACTIVITIES TO WHICHEVER APPLICABLE.
- THE CONTRACTOR SHALL MAINTAIN AT THE JOB SITE A SET OF CONSTRUCTION PLANS WHEREIN AN ACCURATE RECORD SHALL BE KEPT OF AS-CONSTRUCTED INFORMATION ON ALL SITE IMPROVEMENTS. THIS PLAN SET SHALL BE SUBMITTED TO THE ARCHITECT AT THE COMPLETION OF CONSTRUCTION FOR USE IN THE PREPARATION OF RECORD DRAWINGS. THE CONTRACTOR SHALL ALSO AT ALL TIMES MAINTAIN AT THE PROJECT SITE A COMPLETE REFERENCE SET OF APPROVED PLANS, SPECIFICATIONS, SHOP DRAWINGS & OTHER SUPPLEMENTAL CONSTRUCTION DOCUMENTS.

NOTES

- REFER TO CIVIL DWGS FOR FINISHED FLOOR ELEVATION. ALL GRADING OUTSIDE OF BUILDING SHALL BE BY CIVIL ENGINEER PRIOR TO CONSTRUCTION, WHERE INDICATED. HOLD TOP OF WALL ELEVATIONS OF RETAINING WALLS.
- CONTRACTOR TO GET APPROVAL FROM ARCHITECT ON ELEVATION OF TOP OF PAVING AND SODDED AREAS.
- REFER TO ELECTRICAL DWGS. FOR SITE LIGHTING TYPES.
- THE CONTRACTOR SHALL PREPARE AND SUBMIT IRRIGATION SHOP DRAWINGS PREPARED BY A LICENSE IRRIGATION CONTRACTOR AS REQUIRED PER APPLICABLE CODES.
- CONTRACTOR IS RESPONSIBLE FOR PREPARATION OF SURFACES TO RECEIVE PAVING MATERIALS.
- STEEL EDGING TO BE 14 GA. (REQ. AT ALL DECOMPOSED GRANITE PERIMETER EDGES.)
- REFER TO CIVIL ENGINEER DRAWINGS FOR, GRADING, TOP OF CURB, FINISH FLOOR, SLOPE DIRECTIONS, RETAINING WALL DETAILS, UTILITIES, ETC.
- REFER TO SPECIFICATIONS FOR BRICK PAVEMENT TYPES.
- WRITTEN DIMENSIONS AND COORDINATES SHALL GOVERN OVER SCALED DIMENSIONS.
- ALL IMPROVEMENTS SHALL BE STAKED IN THE FIELD BY THE CONTRACTOR AND APPROVED BY THE ARCH/ENG. PRIOR TO CONSTRUCTION OR INSTALLATION.
- THE CONTRACTOR SHALL VERIFY ALL EASEMENT LINES IN THE FIELD PRIOR TO BEGINNING WORK.
- THE CONTRACTOR SHALL VERIFY ALL UTILITIES SHOWN ON THESE PLANS AS WELL AS ANY OTHERS IN THE FIELD PRIOR TO START OF CONSTRUCTION ACTIVITIES.
- THE CONSTRUCTION SHALL WILL CONFORM TO CITY OF LAREDO'S STANDARDS AND SPECIFICATIONS.
- ALL CURBS ARE TO BE INTEGRAL WITH CONCRETE PAVEMENTS.
- REINFORCEMENT SHOULD BE CONTINUOUS THROUGH CONTROL JOINTS, BUT NOT CONTINUOUS THROUGH EXPANSION JOINTS.
- THE CONTRACTOR IS TO PROVIDE TRENCH SAFETY PLANS, SIGNED AND SEALED BY A REGISTERED ENGINEER PRIOR TO THE START OF CONSTRUCTION.
- CITY STANDARD DETAILS ARE AVAILABLE AT THE CITY.
- PRIOR TO START, CONTRACTOR SHALL LOCATE AND STAKE EXISTING UNDERGROUND ELECTRICAL LINES FROM JUNCTION BOX & TRANSFORMER.

LEGEND

- EXTERIOR LIGHT
 - ⊙ EXTERIOR POLE LIGHT
 - LIVE OAK (QTY:) MIN 4" CALIPER, 14'-15' HT./8' SPREAD, B&B STRAIGHT TRUNK, MATCHING SPECIMENS
 - LIVE OAK (QTY:) MIN 6" CALIPER, 18' HT./12' SPREAD, B&B STRAIGHT TRUNK, MATCHING SPECIMENS
 - CEDAR ELM (QTY:) 6" CALIPER, 16' HT./8' SPREAD, B&B STRAIGHT TRUNK
- GROUND COVER:**
- 1. SOLID SOD (BERMUDA) RE: IRRIGATION SYSTEM REQUIRED.
 - 2. CONCRETE
 - 3. DECOMPOSED GRANITE
 - 4. BLACK RIVER STONE

KEY LEGENDS

- DEMO CURB
- EXISTING GRASS TO REMAIN
- NEW SIDEWALK
- EXISTING SIDEWALK TO REMAIN
- NEW SOLID SOD
- NEW TREES (REF. TO LEGEND)
- CONCRETE BENCH RE:1/A5.9
- DECOMPOSED GRANITE
- BLACK RIVERSTONE (1 1-3/4")
- NEW ROAD
- 6'-0" HIGH CONSTRUCTION CHAIN LINK FENCE
- ACCESSIBLE PARKING SIGN
- ACCESSIBLE PARKING STRIPING
- HVAC CONCRETE PADS; RE:MEP
- HVAC ORSGORIL SCREEN WALL
- TREE BERM
- BASKETBALL GOAL, BACKBOARD AND POST
- CONCRETE SAWCUTS; COORDINATE W/ STRUCTURAL
- GROUND MOUNTED SIGN LIGHTING
- SITE LIGHTING RE:ES1.1
- UNDERGROUND CONDUIT; RE:ES1.1
- EXISTING TRANSFORMER
- GREASE TRAP; RE: MEP-P1.1
- LIGHT POLE; RE: MEP

AREA OF NEW CONSTRUCTION

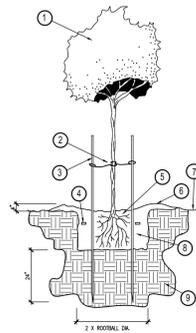
PHASE 1
(REF. TO A1.1)

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AUSTIN, TEXAS 78736
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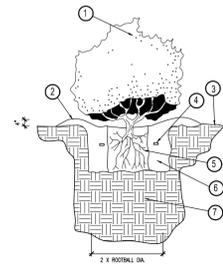


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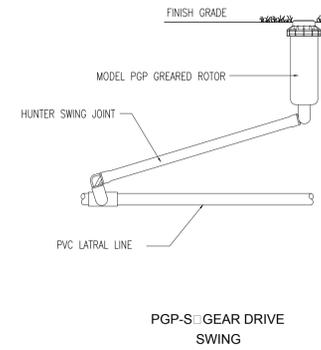
PROJECT NUMBER
REVISIONS
FILENAME:
SHEET TITLE
SITE PLAN
DRAWN BY: JP/RP
SHEET NO.
A1.2
DATE: APRIL 7, 2016



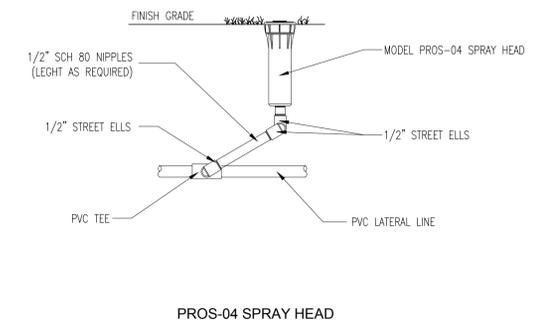
- LEGEND**
1. TREE PER PLAN
 2. CROSS TIE BETWEEN STAKE AND TREE PER PLANTING SPECIFICATION
 3. 6" STEEL "T POST" STAKES (INSTALL WIDER THAN ROOTBALL)
 4. 21 GRAM PLANT TABLETS (SCALE=3, 15GAL=5, 24" BOX=8)
 5. ROOTBALL (SET CROWN +/- 3" ABOVE FINISH GRADE)
 6. EARTH WATERING BASING (RAKE SMOOTH PRIOR TO SEEDING IN HYDROSEED AREAS; AT END OF PLANT ESTABLISHMENT PERIOD FOR ALL REMAINING BASIN)
 7. FINISH GRADE
 8. COMPACTED BACKFILL MIX (PER PLANTING SPECS/NOTES)
 9. UNDISTURBED NATIVE SOIL



- LEGEND**
1. SHRUB OR VINE PER PLAN
 2. EARTH WATERING BASIN (RAKE SMOOTH PRIOR TO SEEDING IN HYDROSEED AREAS; AT END OF PLANT ESTABLISHMENT PERIOD FOR ALL REMAINING BASINS)
 3. FINISH GRADE
 4. 7 GRAM PLANT TABLETS (SCALE=3.5, 6A=6, 15 GAL = 9)
 5. ROOTBALL (SET CROWN +/- 3" ABOVE FINISH GRADE)
 6. COMPACTED BACKFILL MIX (PER PLANTING SPECS/NOTES)
 7. UNDISTURBED NATIVE SOIL



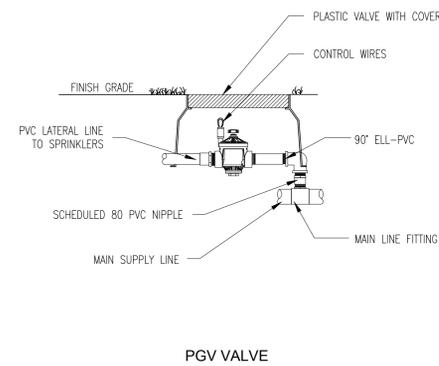
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NOT TO SCALE



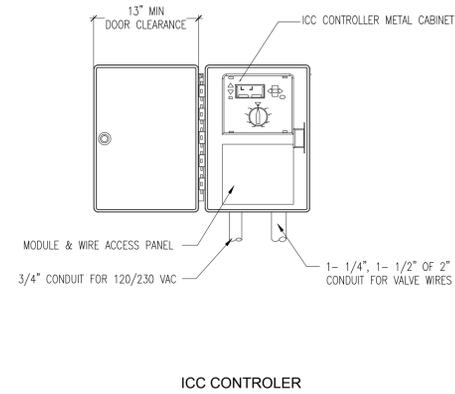
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1 - PLANTING DETAIL
NOT TO SCALE

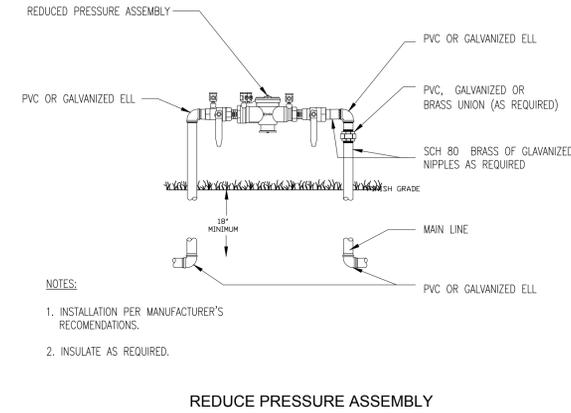
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NOT TO SCALE



5 - INSTALLATION DETAIL
NOT TO SCALE



6 - INSTALLATION DETAIL
NOT TO SCALE



7 - INSTALLATION DETAIL
NOT TO SCALE

8 - NOT USED
NO SCALE

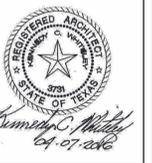
9 - NOT USED
NO SCALE

10 - NOT USED
NO SCALE

11 - NOT USED
NO SCALE

12 - NOT USED
NO SCALE

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LAREDO, TEXAS 78046

PROJECT NUMBER

REVISIONS

FILENAME:

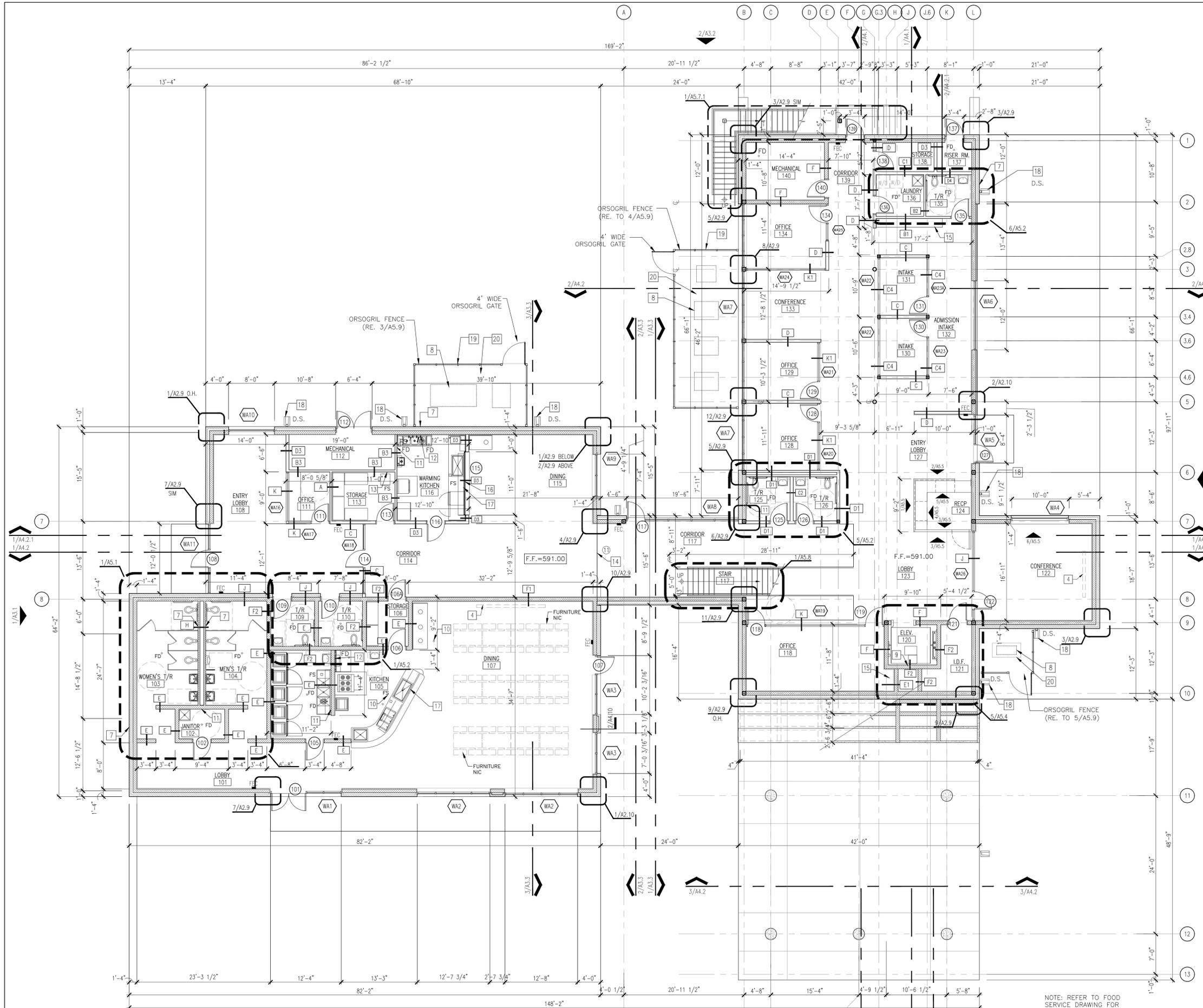
SHEET TITLE
PLANTING & IRRIGATION
DETAILS

DRAWN BY: RP

SHEET NO.

A1.3

DATE: APRIL 7, 2016



1 - FIRST FLOOR PLAN

SCALE: 1/8" = 1'-0"

NOTE: REFER TO FOOD SERVICE DRAWING FOR KITCHEN EQUIPMENT

GENERAL NOTES:

1. THE CONTRACTOR SHALL FIELD VERIFY ALL EXISTING AND PROPOSED DIMENSIONS, CONDITIONS, AND WORK, AND SHALL NOTIFY THE ARCHITECT OF ANY DISCREPANCIES BETWEEN THE DRAWINGS AND THE ACTUAL CONDITIONS BEFORE PROCEEDING WITH THE WORK.
2. USE THE DIMENSIONS THAT ARE ON THE DRAWINGS OR ARE PROVIDED BY THE ARCHITECT. FIELD VERIFY ALL DIMENSIONS. WRITTEN DIMENSIONS ON DRAWINGS TAKE PREFFERENCE.
3. WHEN A MATERIAL OR PRODUCT IS IDENTIFIED ANYWHERE IN THE DRAWINGS BY REFERENCE TO MANUFACTURER'S BRAND OR TRADE NAME, IT IS FOR THE PURPOSE OF ESTABLISHING A STANDARD OR QUALITY. ANY MATERIAL OR PRODUCT FROM OTHER MANUFACTURER, WHICH IN THE OPINION OF THE ARCHITECT IS OF EQUAL SUBSTANCE, APPEARANCE, FUNCTION AND PERFORMANCE, WILL BE CONSIDERED.
4. VERIFY EXISTING LOCATIONS OF ALL UTILITIES PRIOR TO PROCEEDING WITH THE WORK AND RELOCATE EXISTING UTILITIES THAT WILL INTERFERE WITH THE NEW CONSTRUCTION.
5. THE CONTRACTOR IS TO PROTECT ALL WORK DURING DEMOLITION AND CONSTRUCTION AS NOT TO DAMAGE ANY AREAS WITHIN THE CONTRACT. ANY AREA DAMAGED SHALL IMMEDIATELY BE REPORTED TO THE ARCHITECT AND SHALL BE PROMPTLY REPAIRED TO THE SATISFACTION OF THE ARCHITECT AND OWNER.
6. JOB SITE OBSERVATIONS BY THE ARCHITECT/ ENGINEER OR THEIR AUTHORIZED REPRESENTATIVES SHALL CONSIST OF VISUAL OBSERVATION OF MATERIALS, EQUIPMENT OR CONSTRUCTION WORK FOR THE PURPOSE OF ASCERTAINING THAT THE WORK IS IN SUBSTANTIAL CONFORMANCE WITH THE CONTRACT DOCUMENTS.
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10. ALL DIMENSIONS ARE FROM COLUMN CENTER LINES, FACE OF STUD, FACE OF CMU OR FACE OF CONCRETE UNLESS NOTED OTHERWISE.
11. SEE SHEET A2.8 FOR ALL INTERIOR WALL TYPES. ALL INTERIOR WALLS ARE TO BE TYPE "A" UNLESS NOTED OTHERWISE.
12. PROVIDE BULL NOSE AT ALL CMU CORNERS UNLESS OTHERWISE SPECIFIED.
13. KITCHEN COUNTERS BY KITCHEN EQUIPMENT MANUFACTURER. CONTRACTOR SHALL PROVIDE ALL WALLS, INCLUDING OVERHEAD, SIDE AND BOTTOM.

KEY NOTES SCHEDULE

- | | |
|--|--|
| 1 FIRE EXTINGUISHER & CABINET | 13 ICE MAKER CONNECTION |
| 2 METAL HANDRAIL, PTD. | 14 EXPANSION JOINT |
| 3 ROLL DOWN SHADE | 15 CASEWORK N.I.C. |
| 4 PROJECTION SCREEN | 16 ROLL DOWN DOOR |
| 5 ACCESS PANEL (Ref. MEP) | 17 REFER TO FOOD SERVICE DWGS FOR KITCHEN EQUIPMENT. |
| 6 WATER HEATER ABOVE CEILING. (REF. MEP) | 18 CONCRETE SPLASH BLOCK REF. 6/A6.2 |
| 7 HOSE BIBB BOX (Ref. MEP) | 19 ORSOGRIL FENCE REF. A5.9 |
| 8 HVAC UNITS | 20 A/C UNITS CONCRETE PAD |
| 9 SUMP PUMP (Ref. MEP) | |
| 10 FLOOR CLEAN OUT (Ref. MEP) | |
| 11 WALL CLEAN OUT (Ref. MEP) | |
| 12 PROVIDE BLOCKING TO COORDINATE W/EQUIPMENT. | |

SYMBOL LEGEND

	ELEVATION RE: A3 SERIES		WALL SECTION RE: A4 SERIES
	ALUM. WINDOW TYPE RE: A2.4 & A2.5		ENLARGED DETAIL/PLAN
	HOLLOW METAL WDW TYPE RE: NOT USED		TACK BOARD (NIC)
	DOOR TYPE RE: A2.3		MARKER BOARD (NIC)
	PARTITION TYPE RE: A2.8		DETAIL SECTION
	BUILDING SECTION RE: A4 SERIES		FIRE EXTINGUISHER CABINET
	WALL CLEAN OUT RE: A4 SERIES		FLOOR FINISH TRANSITION RE: A8.1

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WEBB COUNTY YOUTH VILLAGE
REHABILITATION CENTER
111 CAMINO NUEVO ROAD, HWY 359
LAREDO, TEXAS 78046

PROJECT NUMBER
1401

REVISIONS

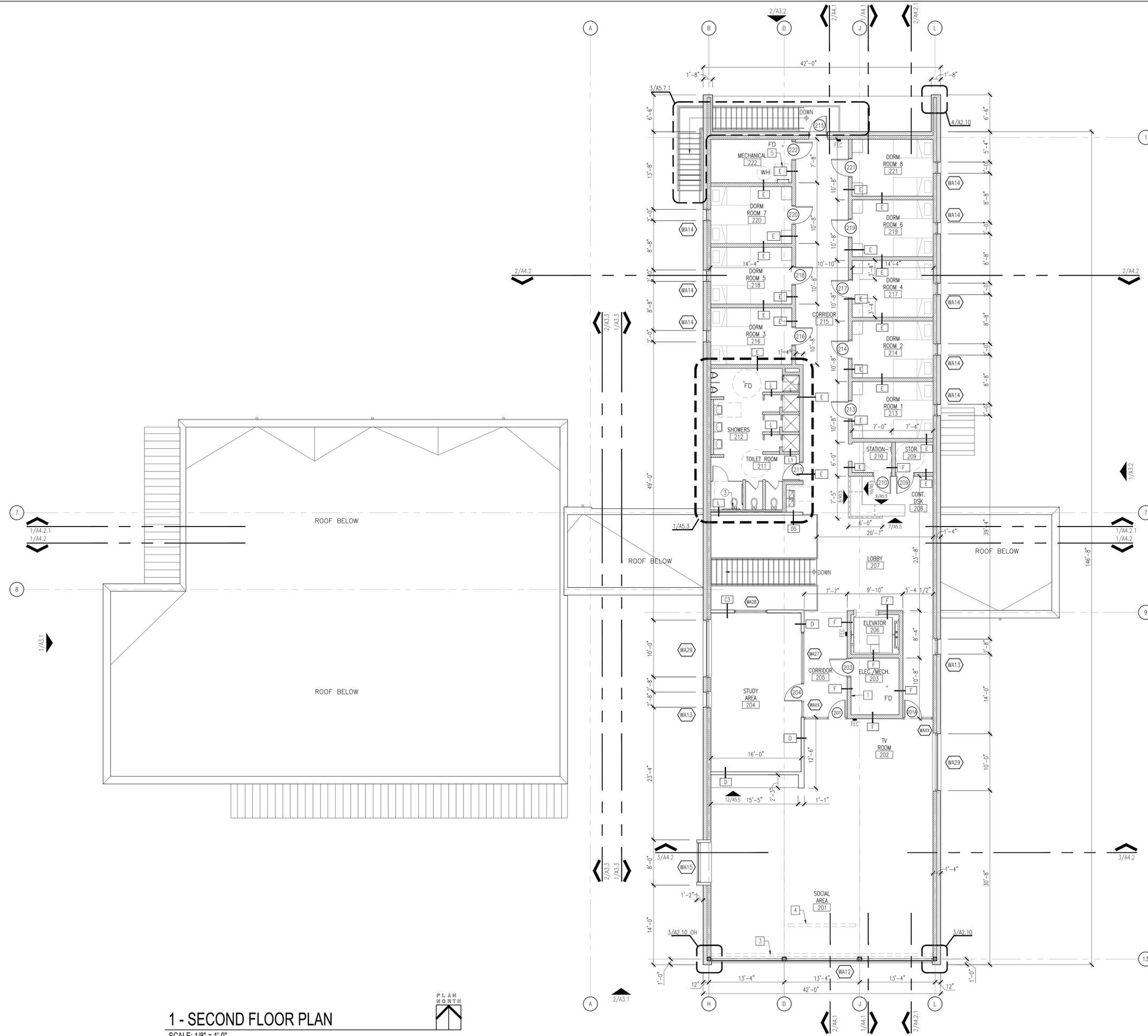
FILENAME:

SHEET TITLE
FIRST FLOOR PLAN

DRAWN BY: JR

SHEET NO.
A2.1

DATE: APRIL 7, 2016



GENERAL NOTES:

1. THE CONTRACTOR SHALL FIELD VERIFY ALL EXISTING AND PROPOSED DIMENSIONS, CONDITIONS, AND WORK, AND SHALL NOTIFY THE ARCHITECT OF ANY DISCREPANCIES BETWEEN THE DRAWINGS AND THE ACTUAL CONDITIONS BEFORE PROCEEDING WITH THE WORK.
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12. PROVIDE BULL NOSE AT ALL CMU CORNERS UNLESS OTHERWISE SPECIFIED.

KEY NOTES SCHEDULE

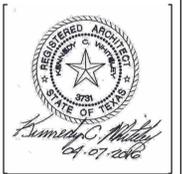
- | | |
|--|--|
| 1 FIRE EXTINGUISHER & CABINET | 13 ICE MAKER CONNECTION |
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| 3 ROLL DOWN SHADE | 15 CASEWORK N.I.C. |
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| 7 HOSE BIBB BOX (Ref. MEP) | 19 ORSOGRIL FENCE REF. A5.9 |
| 8 HVAC UNITS | 20 A/C UNITS CONCRETE PAD |
| 9 SUMP PUMP (Ref. MEP) | |
| 10 FLOOR CLEAN OUT (Ref. MEP) | |
| 11 WALL CLEAN OUT (Ref. MEP) | |
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SYMBOL LEGEND

	ELEVATION RE: A3 SERIES		WALL SECTION RE: A4 SERIES
	ALUM. WINDOW TYPE RE: A2.4 & A2.5		ENLARGED DETAIL/PLAN
	HOLLOW METAL WDW TYPE RE: NOT USED		TACK BOARD (NIC)
	DOOR TYPE RE: A2.3		MARKER BOARD (NIC)
	PARTITION TYPE RE: A2.8		DETAIL SECTION
	BUILDING SECTION RE: A4 SERIES		FIRE EXTINGUISHER CABINET
	WALL SECTION RE: A4 SERIES		FLOOR FINISH TRANSITION RE: A8.1

1 - SECOND FLOOR PLAN
SCALE: 1/8" = 1'-0"

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111 CAMINO NUEVO ROAD, HWY 359
LAREDO, TEXAS 78046

PROJECT NUMBER 1401
REVISIONS
FILENAME:
SHEET TITLE SECOND FLOOR PLAN
DRAWN BY: JR
SHEET NO. A2.2
DATE: APRIL 7, 2016

**DOOR SCHEDULE
FIRST FLOOR**

No.	ROOM NAME	DOOR					FRAME			HARDWARE SET	REMARKS	
		SIZE	TYPE	MATERIAL	RATING	GLASS	TYPE	HEAD	JAMB			THRESH.
101	LOBBY (EXIT DOOR)	PR. 3'-0" x 7'-0" x 1-3/4"	D	ALUM	0 HR.	2	F2	1/A2.6	2/A2.6	3/A2.6	HDW-2	
102	JANITOR	3'-0" x 7'-0" x 1-3/4"	A	SCW			F2	10/A2.6.1	11/A2.6.1	12/A2.6.1	HDW-3	
103	NOT USED	NOT USED										
104	NOT USED	NOT USED										
105	KITCHEN	3'-0" x 7'-0" x 1-3/4"	A	SCW			F2	10/A2.6.1	11/A2.6.1	12/A2.6.1	HDW-5	6
106	STORAGE	3'-0" x 7'-0" x 1-3/4"	A	SCW			F2	10/A2.6.1	11/A2.6.1	12/A2.6.1	HDW-6	
106A	STORAGE	3'-0" x 7'-0" x 1-3/4"	A	SCW	20 MIN.		F2	7/A2.6.1	8/A2.6.1	12/A2.6.1	HDW-7	
107	DINING (EMERGENCY EXIT DOOR)	3'-0" x 7'-0" x 1-3/4"	C	ALUM		2		1/A2.6	2/A2.6	3/A2.6	HDW-8	
108	ENTRY LOBBY (EXIT DOOR)	3'-0" x 7'-0" x 1-3/4"	C	ALUM		2		1/A2.6	2/A2.6	3/A2.6	HDW-9	
109	TOILET ROOM	3'-0" x 7'-0" x 1-3/4"	A	SCW			F1	4/A2.6	5/A2.6	12/A2.6.1	HDW-10	
110	TOILET ROOM	3'-0" x 7'-0" x 1-3/4"	A	SCW			F1	4/A2.6	5/A2.6	12/A2.6.1	HDW-10	
111	OFFICE	3'-0" x 7'-0" x 1-3/4"	A	SCW				1/A2.6.1	2/A2.6.1	3/A2.6.1	HDW-11	
112	MECHANICAL	PR. 3'-0" x 7'-0" x 1-3/4"	E	HM			F3	4/A2.6	5/A2.6	6/A2.6	HDW-12	
113	STORAGE	3'-0" x 7'-0" x 1-3/4"	A	SCW			F1	10/A2.6	11/A2.6	12/A2.6.1	HDW-11	6
114	CORRIDOR	3'-0" x 7'-0" x 1-3/4"	A	ALUM				1/A2.6.1	2/A2.6.1	12/A2.6.1	HDW-13	
115	WARMING KITCHEN	12'-0" x 4'-0" ROLL-UP DOOR	F	METAL			N/A				HDW-14	
116	WARMING KITCHEN	3'-0" x 7'-0" x 1-3/4"	A	SCW			F1	10/A2.6	11/A2.6	12/A2.6.1	HDW-15	6
117	CORRIDOR	3'-0" x 7'-0" x 1-3/4"	C	SCW		2					HDW-8	
118	OFFICE	3'-0" x 7'-0" x 1-3/4"	A	SCW				1/A2.6.1	2/A2.6.1	12/A2.6.1	HDW-7	
118A	OFFICE	3'-0" x 7'-0" x 1-3/4"	A	SCW				1/A2.6.1	2/A2.6.1	12/A2.6.1		
119	NOT USED	NOT USED									HDW-7	
120	ELEVATOR	NOT USED										
121	IDF	3'-0" x 7'-0" x 1-3/4"	A	SCW			F2	7/A2.6	8/A2.6	12/A2.6	HDW-16	
122	CONFERENCE ROOM	3'-0" x 7'-0" x 1-3/4"	A	SCW				1/A2.6.1	2/A2.6.1	3/A2.6.1	HDW-11	6
125	MEN'S TOILET ROOM	3'-0" x 7'-0" x 1-3/4"	A	SCW			F1	10/A2.6	11/A2.6	12/A2.6.1	HDW-10	6
126	WOMEN'S TOILET ROOM	3'-0" x 7'-0" x 1-3/4"	A	SCW			F1	10/A2.6	11/A2.6	12/A2.6.1	HDW-10	
127	ENTRY LOBBY	3'-0" x 7'-0" x 1-3/4"	C	ALUM		2		1/A2.6	2/A2.6	3/A2.6	HDW-17	
128	OFFICE	3'-0" x 7'-10" x 1-3/4"	A	SCW				1/A2.6.1	2/A2.6.1	12/A2.6.1	HDW-11	7
129	OFFICE	3'-0" x 7'-10" x 1-3/4"	A	SCW				1/A2.6.1	2/A2.6.1	12/A2.6.1	HDW-11	7
130	INTAKE	3'-0" x 7'-0" x 1-3/4"	A	SCW				1/A2.6.1	2/A2.6.1	12/A2.6.1	HDW-11	
131	INTAKE	3'-0" x 7'-0" x 1-3/4"	A	SCW				1/A2.6.1	2/A2.6.1	12/A2.6.1	HDW-11	
132	NOT USED	NOT USED										
133	NOT USED	NOT USED										
134	OFFICE	3'-0" x 7'-10" x 1-3/4"	A	SCW				1/A2.6.1	2/A2.6.1	12/A2.6.1	HDW-11	7
135	TOILET ROOM	3'-0" x 7'-0" x 1-3/4"	A	SCW			F1	10/A2.6	11/A2.6	12/A2.6.1	HDW-10	
136	LAUNDRY	3'-0" x 7'-0" x 1-3/4"	A	SCW			F1	10/A2.6	11/A2.6	12/A2.6.1	HDW-11	
137	FIRE RISER ROOM	3'-0" x 7'-0" x 1-3/4"	B	HM	20 MIN.		F2	4/A2.6	5/A2.6	6/A2.6	HDW-18-23	
138	STORAGE	3'-0" x 7'-0" x 1-3/4"	A	SCW			F1	10/A2.6	11/A2.6	12/A2.6.1	HDW-11	
139	CORRIDOR (EXIT DOOR)	3'-0" x 7'-0" x 1-3/4"	B	HM			F2	4/A2.6	5/A2.6	6/A2.6	HDW-19	
140	MECHANICAL	3'-0" x 7'-0" x 1-3/4"	B	HM	20 MIN.		F2	7/A2.6	8/A2.6	12/A2.6.1	HDW-20	

**DOOR SCHEDULE
SECOND FLOOR**

No.	ROOM NAME	DOOR					FRAME			HARDWARE SET	REMARKS	
		SIZE	TYPE	MATERIAL	RATING	GLASS	TYPE	HEAD	JAMB			THRESH.
203	LIVING ROOM	3'-0" x 7'-0" x 1-3/4"	A	SCW				1/A2.6.1	2/A2.6.1	12/A2.6.1		
203A	LIVING ROOM	3'-0" x 7'-0" x 1-3/4"	A	SCW				1/A2.6.1	2/A2.6.1	12/A2.6.1		
203	ELECTRICAL/MECHANICAL	3'-0" x 7'-0" x 1-3/4"	B	HM			F2	7/A2.6	8/A2.6	12/A2.6.1	HDW-16	
204	STUDY ROOM	3'-0" x 7'-10" x 1-3/4"	A	SCW				1/A2.6.1	2/A2.6.1	12/A2.6.1	HDW-11	7
209	STORAGE	3'-0" x 7'-0" x 1-3/4"	A	SCW			F2	10/A2.6	11/A2.6	12/A2.6.1	HDW-7	
210	NURSE STATION	3'-0" x 7'-0" x 1-3/4"	A	SCW			F2	10/A2.6	11/A2.6	12/A2.6.1	HDW-7	
211	TOILET ROOM/SHOWERS	3'-0" x 7'-0" x 1-3/4"	A	SCW			F2	10/A2.6	11/A2.6	12/A2.6.1	HDW-21	6
213	DORM ROOM 213	3'-0" x 7'-0" x 1-3/4"	A	SCW	20 MIN.		F2	10/A2.6	11/A2.6	12/A2.6.1	HDW-7	8
214	DORM ROOM 214	3'-0" x 7'-0" x 1-3/4"	A	SCW	20 MIN.		F2	10/A2.6	11/A2.6	12/A2.6.1	HDW-7	8
215	CORRIDOR (EXIT DOOR)	3'-0" x 7'-0" x 1-3/4"	B	HM			F2	4/A2.6	5/A2.6	6/A2.6	HDW-22	
216	DORM ROOM 216	3'-0" x 7'-0" x 1-3/4"	A	SCW	20 MIN.		F2	10/A2.6	11/A2.6	12/A2.6.1	HDW-7	8
217	DORM ROOM 217	3'-0" x 7'-0" x 1-3/4"	A	SCW	20 MIN.		F2	10/A2.6	11/A2.6	12/A2.6.1	HDW-7	8
218	DORM ROOM 218	3'-0" x 7'-0" x 1-3/4"	A	SCW	20 MIN.		F2	10/A2.6	11/A2.6	12/A2.6.1	HDW-7	8
219	DORM ROOM 219	3'-0" x 7'-0" x 1-3/4"	A	SCW	20 MIN.		F2	10/A2.6	11/A2.6	12/A2.6.1	HDW-7	8
220	DORM ROOM 220	3'-0" x 7'-0" x 1-3/4"	A	SCW	20 MIN.		F2	10/A2.6	11/A2.6	12/A2.6.1	HDW-7	8
221	DORM ROOM 221	3'-0" x 7'-0" x 1-3/4"	A	SCW	20 MIN.		F2	10/A2.6	11/A2.6	12/A2.6.1	HDW-7	8
222	MECHANICAL	3'-0" x 7'-0" x 1-3/4"	B	HM	20 MIN.		F2	10/A2.6	11/A2.6	12/A2.6.1	HDW-16	

GENERAL NOTES

- REFER TO SPECIFICATIONS FOR DOOR ASSEMBLIES AND HARDWARE ALLOWANCE. ALL DOOR ASSEMBLIES TO BE COMPLETED IN EVERY WAY.
- WHERE A COLOR IS INDICATED FOR A DOOR, THAT COLOR SHALL BE APPLIED TO BOTH SIDES AND ALL EDGES UNLESS NOTED OTHERWISE.
- PROVIDE FLOOR MOUNTED DOOR STOPS AND SILENCERS WHERE REQUIRED AT EACH DOOR.
- ALL HARDWARE AND DOOR INSTALLATIONS TO MEET THE REQUIREMENTS OF THE TEXAS ACCESSIBILITY STANDARDS FOR OPERATION, FORCE REQUIRED TO OPEN AND REQUIRED CLEARANCES.
- PROVIDE DRIP EDGES AS REQUIRED AT ALL EXTERIOR DOORS.
- PROVIDE (3) HINGES PER LEAF TO 7 FOOT 6 INCHES HEIGHT. ADD ONE FOR EACH ADDITIONAL 30 INCHES IN HEIGHT OR FRACTION THEREOF.

DOOR SCHEDULE REMARKS

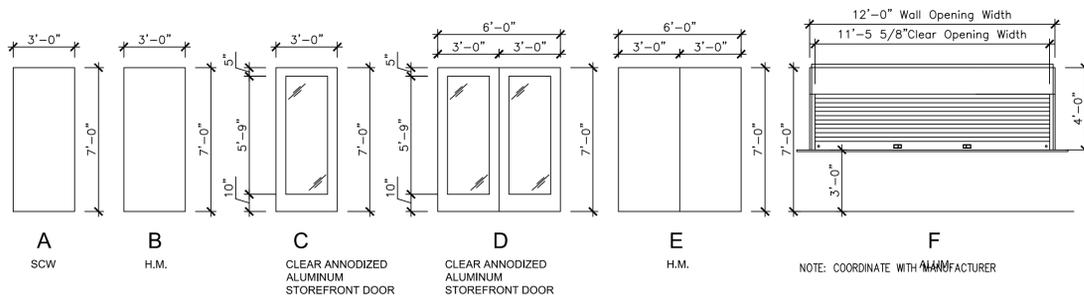
- PROVIDE CLOSER AND SMOKE SEAL.
- SOUND GASKETED DOOR.
- HARDWARE PER MANUFACTURER.
- PROVIDE CLOSER AND SMOKE SEAL.
- FRONTLOADED GLASS TO EXT. OF ROOM.
- ADD KICK PLATES BOTH SIDES.
- PROVIDE HINGES AS SPECIFIED.
- PROVIDE (2) COAT HANGERS AT DOOR.

DOOR MATERIAL LEGEND

- SCW = SOLID CORE WOOD
- H.M. = HOLLOW METAL
- ALUM = ALUMINUM
- AS = ALUMINUM STOREFRONT

HARDWARE LEGEND

- PB = PANIC BAR (EGRESS ONLY)
- HDW-1 = REFER TO SPECIFICATIONS



DOOR TYPES

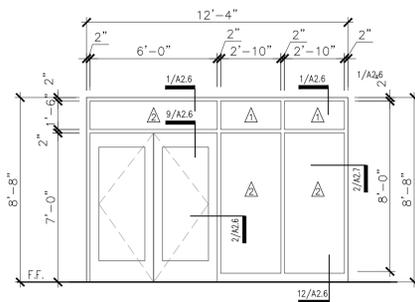
SCALE: 1/4" = 1'-0"

**INTERIOR FINISH SCHEDULE
FIRST FLOOR**

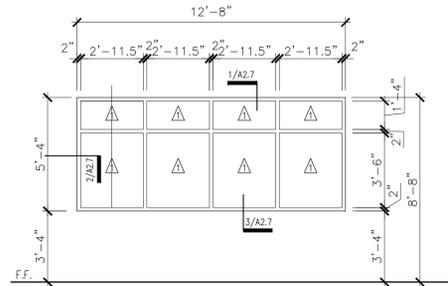
NO.	ROOM NAME	FLOOR	BASE	WALLS (PLAN NORTH)				CEILING	CLG. HT.	REMARKS	
				NORTH	EAST	SOUTH	WEST				
101	LOBBY	VCT-1	RB1	P		P	P	EXP.	10'-0"		
102	JANITOR	CONC.	RB1	EPX	EPX	EPX	EPX	GYP.	9'-0"		
103	WOMEN'S TOILET ROOM	PT	PT	CT	CT	CT	CT	GYP.	9'-0"	4	
104	MEN'S TOILET ROOM	PT	PT	CT	CT	CT	CT	GYP.	9'-0"	4	
105	KITCHEN	QT	QT	EPX	EPX	EPX	EPX	SAP-2	10' / 8'-8"		
106	STORAGE	VCT-1	RB1	P	P	P	P	GYP.	9'-0"		
107	DINING	VCT-1	RB1	P	P	P	P	EXP.	N/A		
108	ENTRY LOBBY	VCT-1	RB1	P	P	P	P	SAP-1	12'-0"		
109	WOMEN'S TOILET ROOM	PT	PT	CT	CT	CT	CT	GYP.	9'-0"	4	
110	MEN'S TOILET ROOM	PT	PT	CT	CT	CT	CT	GYP.	9'-0"	4	
111	OFFICE	CPT-1	RB1	P	P	P	P	SAP-1	9'-0"		
112	MECHANICAL ROOM	CONC.	RB1	P	P	P	P	EXP.	N/A		
113	STORAGE	VCT-1	RB1	P	P	P	P	GYP.	9'-0"		
114	CORRIDOR	VCT-1	RB1	P	P	P	P	SAP-1	12'-0"		
115	DINING	VCT-1	RB1	P	P	P	P	EXP.	VARIES		
116	WARMING KITCHEN	QT	QT	EPX	EPX	EPX	EPX	SAP-2	10'-0"		
117	CORRIDOR	VCT-1	RB1	P	P	P	P	GYP.	15'-0"	6	
118	OFFICE	CPT-1	RB1	P	P	P	P	SAP-1	9'-0"		
119	NOT USED	NOT USED									
120	ELEVATOR	VCT-1	RB1								
121	IDF	VCT-2	RB1	P	P	P	P	GYP.	9'-0"		
122	CONFERENCE ROOM	CPT-1	RB1	P	P	P	P	SAP-1	10'-0"		
123	LOBBY	VCT-1	RB1	P	P	P	P	GYP.	12'-0"		
124	RECEPTION DESK	VCT-1	RB1	P	P	P	P	GYP.	13'-0"		
125	MEN'S TOILET ROOM	PT	PT	CT	CT	CT	CT	GYP.	9'-0"		
126	WOMEN'S TOILET ROOM	PT	PT	CT	CT	CT	CT	GYP.	9'-0"		
127	ENTRY LOBBY	VCT-1	RB1	P	P	P	P	GYP.	12'-0"		
128	OFFICE	CPT-1	RB1	P	P	P	P	P-MP	SAP-1	9'-0"	3
129	OFFICE	CPT-1	RB1	P	P	P	P	P-MP	SAP-1	9'-0"	3
130	INTAKE	VCT-1	RB1	P		P		GYP.	9'-0"		
131	INTAKE	VCT-1	RB1	P		P		GYP.	9'-0"		
132	ADMISSION INTAKE	VCT-1	RB1	P	P	P	P	EXP.			
133	CONFERENCE	VCT-1	RB1	P	P	P	P	P-MP	EXP.	3	
134	OFFICE	CPT-1	RB1	P	P	P	P	SAP-1	9'-0"	3	
135	TOILET ROOM	PT	PT	CT	CT	CT	CT	P-MP	SAP-1	9'-0"	4
136	LAUNDRY	VCT-1	RB1	EPX	EPX	EPX	EPX	GYP.	9'-0"		
137	FIRE RISER ROOM	CONC.	RB1	P	P	P	P	EXP.			
138	STORAGE	VCT-1	RB1	P	P	P	P	GYP.	9'-0"		
139	CORRIDOR	VCT-1	RB1	P	P	P	P	GYP.	12'-0"		
140	MECHANICAL	CONC.	RB1	P	P	P	P	EXP.			

**INTERIOR FINISH SCHEDULE
SECOND FLOOR**

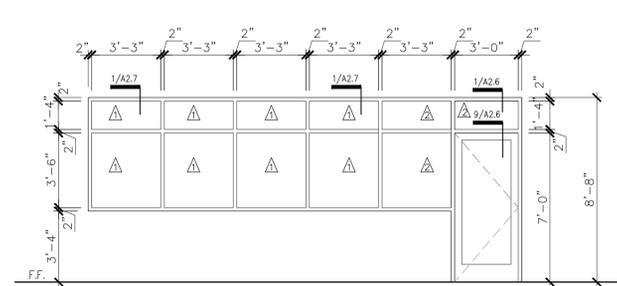
NO.	ROOM NAME	FLOOR	BASE	WALLS (PLAN NORTH)				CEILING	CLG. HT.	REMARKS
				NORTH	EAST	SOUTH	WEST			
201	SOCIAL AREA	CPT-1	RB1	P	P	P	P	GYP./EXP.	VARIES	
202	TV ROOM	CPT-1	RB1	P	P	P	P	GYP./EXP.	VARIES	
203	ELECTRICAL/MECHANICAL	CONC.	RB1	P	P	P	P	EXP.		
204	STUDY ROOM	CPT-1	RB1	P	P	P	P	SAP-1	9'-0"	
205	CORRIDOR	VCT-1	RB1		P		P	GYP.	11'-0"	
206	ELEVATOR	VCT-1	RB1							
207	LOBBY	VCT-1	RB1	P	P	P	P	GYP.	11'-0"	
208	CONTROL DESK	VCT-1	RB1	P	P			GYP.	VARIES	6
209	STORAGE	VCT-1	RB1	P	P	P	P	GYP.	9'-0"	
210	STATION-1	VCT-1	RB1	P	P	P	P	GYP.	9'-0"	4
211	TOILET ROOM									



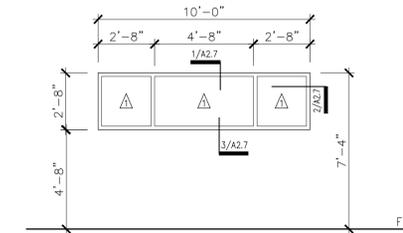
WA1 ANODIZED ALUMINUM STOREFRONT WINDOW SYSTEM



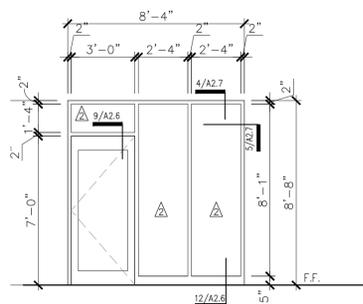
WA2 ANODIZED ALUMINUM STOREFRONT WINDOW SYSTEM



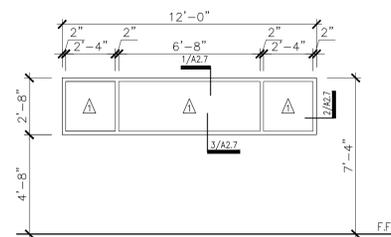
WA3 ANODIZED ALUMINUM STOREFRONT WINDOW SYSTEM



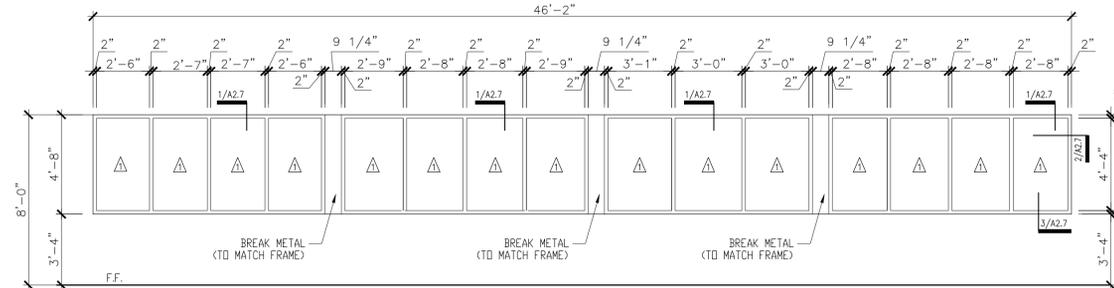
WA4 ANODIZED ALUMINUM STOREFRONT WINDOW SYSTEM



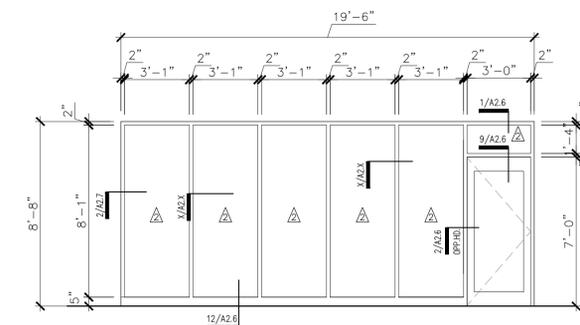
WA5 ANODIZED ALUMINUM STOREFRONT WINDOW SYSTEM



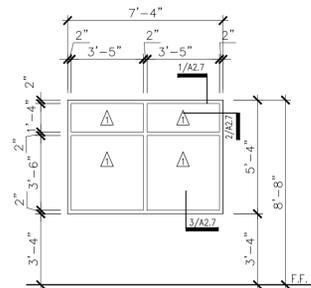
WA6 ANODIZED ALUMINUM STOREFRONT WINDOW SYSTEM



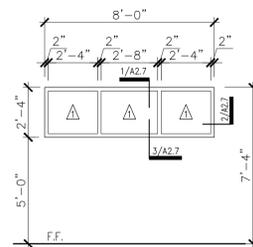
WA7 ANODIZED ALUMINUM STOREFRONT WINDOW SYSTEM



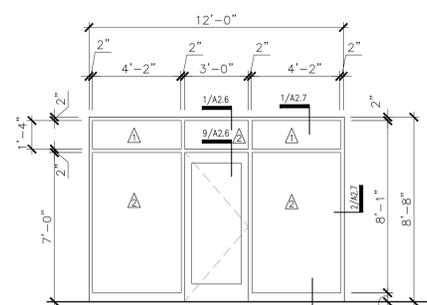
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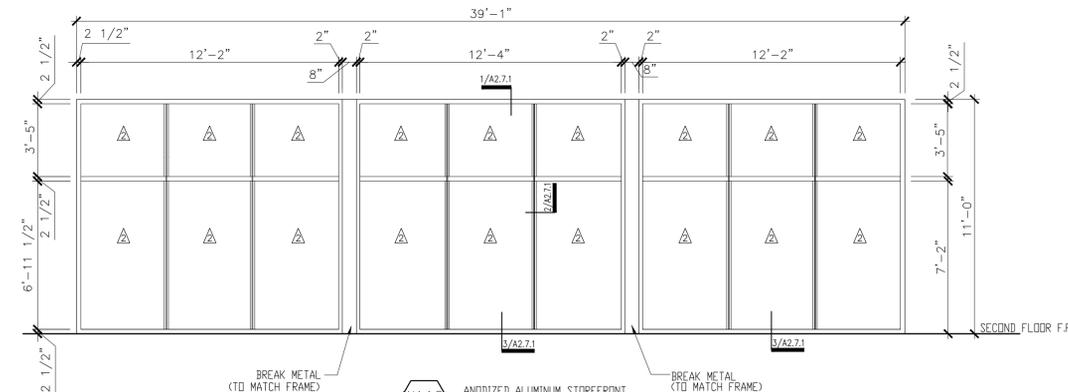
WA9 ANODIZED ALUMINUM STOREFRONT WINDOW SYSTEM



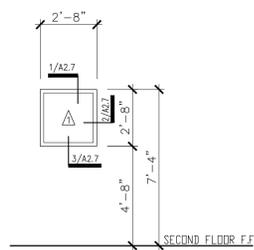
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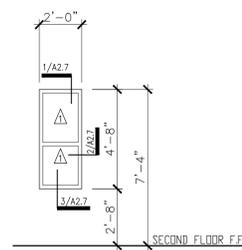
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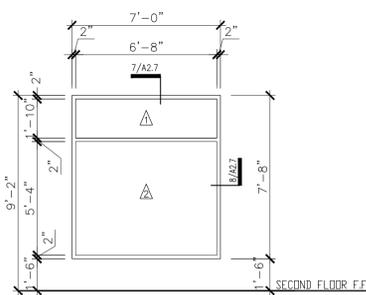
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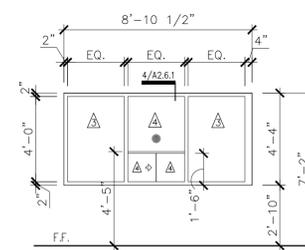
WA13 ANODIZED ALUMINUM STOREFRONT WINDOW SYSTEM



WA14 ANODIZED ALUMINUM STOREFRONT WINDOW SYSTEM



WA15 ANODIZED ALUMINUM STOREFRONT WINDOW SYSTEM



WA16 ANODIZED ALUMINUM STOREFRONT WINDOW SYSTEM

WINDOW SYMBOL LEGEND

- = HOLLOW METAL FRAME WINDOW
- = ALUMINUM FRAME WINDOW
- = ALUMINUM STOREFRONT

ABBREVIATIONS

- SCW = SOLID CORE WOOD
- H.M. = HOLLOW METAL
- ALUM. = ALUMINUM
- PR. = PAIR

GLAZING LEGEND

- 1 DOUBLE PANE INSULATED GLASS
- 2 DOUBLE PANE INSULATED TEMPERED GLASS
- 3 1/4" CLEAR GLASS
- 4 1/4" TEMPERED GLASS
- 5 1/2" TEMPERED GLASS

1 - WINDOW ELEVATIONS

SCALE: 1/4" = 1'-0"

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WEBB COUNTY YOUTH VILLAGE
 REHABILITATION CENTER
 111 CAMINO NUEVO ROAD, HWY 359
 LAREDO, TEXAS 78046

PROJECT NUMBER
1401

REVISIONS

FILENAME:

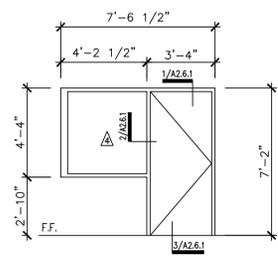
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WINDOW ELEVATIONS
SCALE: AS SHOWN

DRAWN BY: EQ

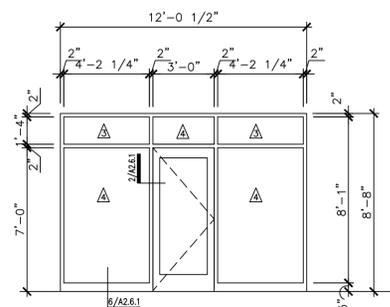
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A2.4

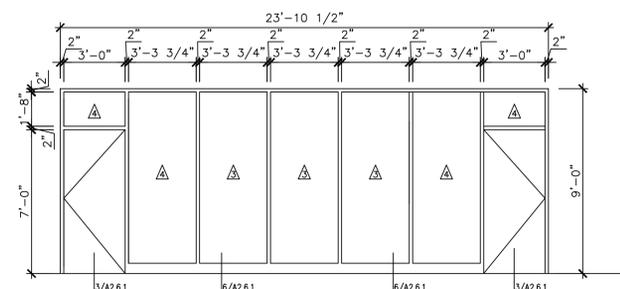
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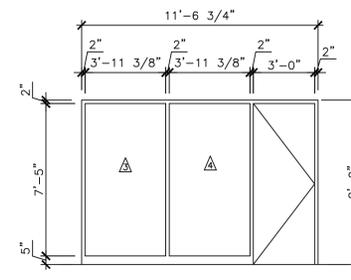
WA17 ANDDIZED ALUMINUM STOREFRONT WINDOW SYSTEM



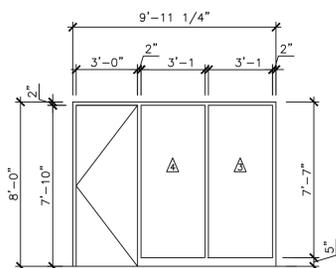
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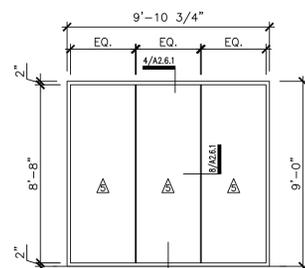
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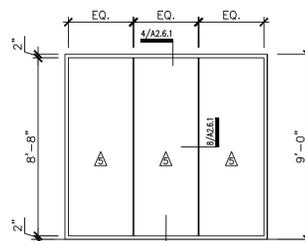
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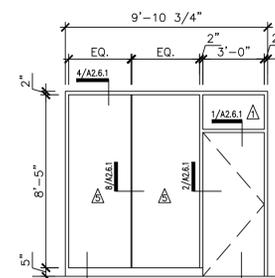
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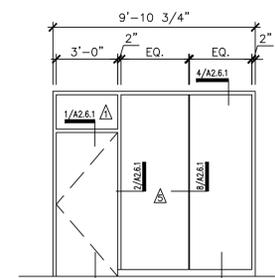
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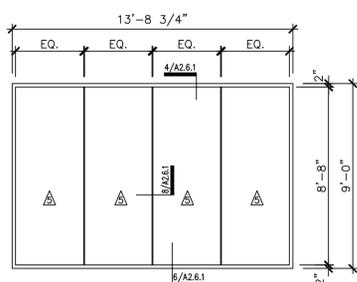
WA22A ANDDIZED ALUMINUM STOREFRONT WINDOW SYSTEM



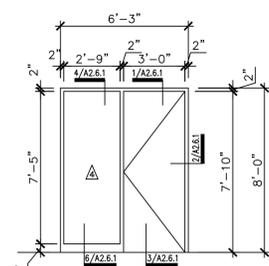
WA23 ANDDIZED ALUMINUM STOREFRONT WINDOW SYSTEM



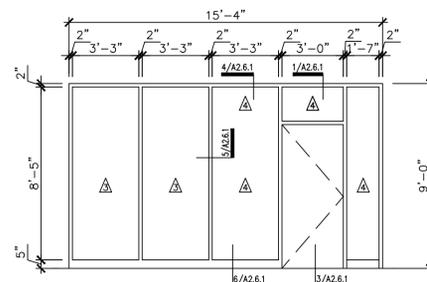
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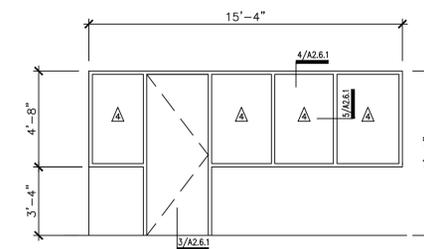
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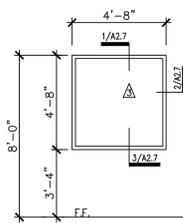
WA25 ANDDIZED ALUMINUM STOREFRONT WINDOW SYSTEM



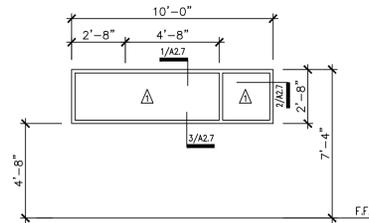
WA26 ANDDIZED ALUMINUM STOREFRONT WINDOW SYSTEM



WA27 ANDDIZED ALUMINUM STOREFRONT WINDOW SYSTEM



WA28 ANDDIZED ALUMINUM STOREFRONT WINDOW SYSTEM



WA29 ANDDIZED ALUMINUM STOREFRONT WINDOW SYSTEM

WINDOW SYMBOL LEGEND

- = HOLLOW METAL FRAME WINDOW
- = ALUMINUM FRAME WINDOW
- = ALUMINUM STOREFRONT

ABBREVIATIONS

- SCW = SOLID CORE WOOD
- H.M. = HOLLOW METAL
- ALUM. = ALUMINUM
- PR. = PAIR

GLAZING LEGEND

- DOUBLE PANE INSULATED GLASS
- DOUBLE PANE INSULATED TEMPERED GLASS
- 1/4" CLEAR GLASS
- 1/4" TEMPERED GLASS
- 1/2" TEMPERED GLASS

1 - WINDOW ELEVATIONS

SCALE: 1/4" = 1'-0"

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 LAREDO, TEXAS 78046

PROJECT NUMBER
1401

REVISIONS

FILENAME:

SHEET TITLE
WINDOW ELEVATIONS

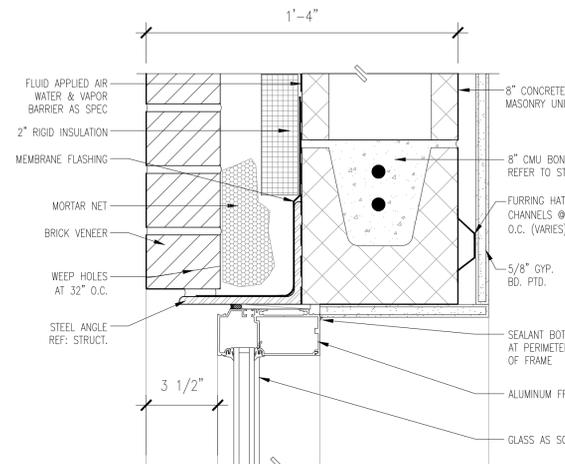
SCALE: AS SHOWN

DRAWN BY: EQ

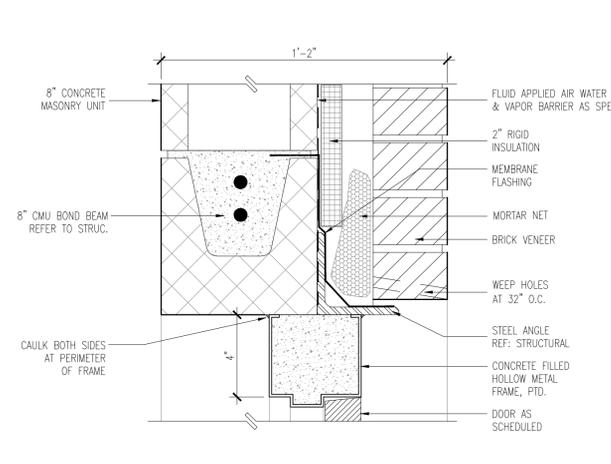
SHEET NO.

A2.5

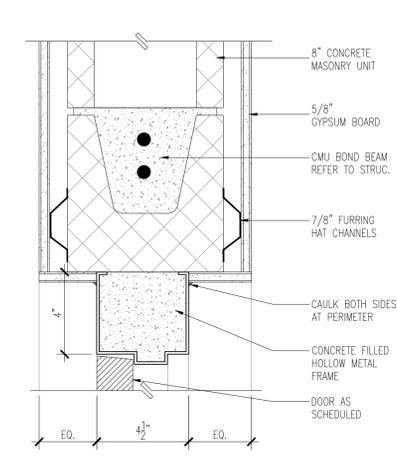
DATE: APRIL 7, 2016



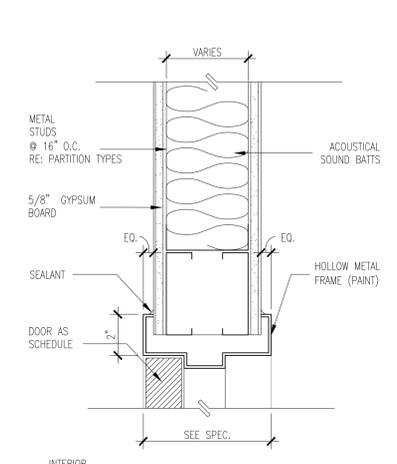
1 - EXT. ALUM. STOREFRONT HEAD / TRANSOM
SCALE: 3" = 1'-0"



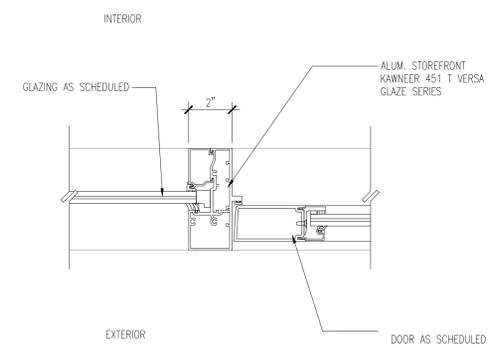
4 - EXT. H.M. DOOR HEAD
SCALE: 3" = 1'-0"



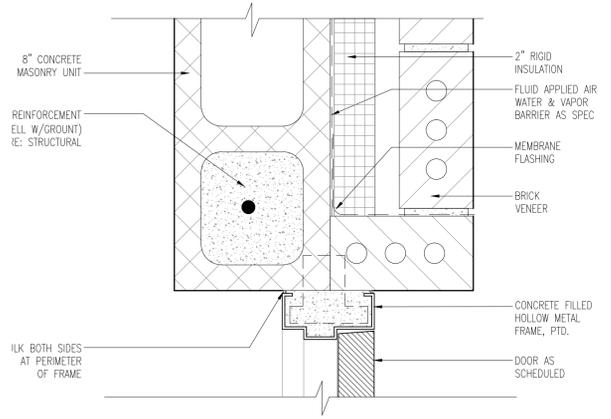
7 - INT. H.M. DOOR HEAD
SCALE: 3" = 1'-0"



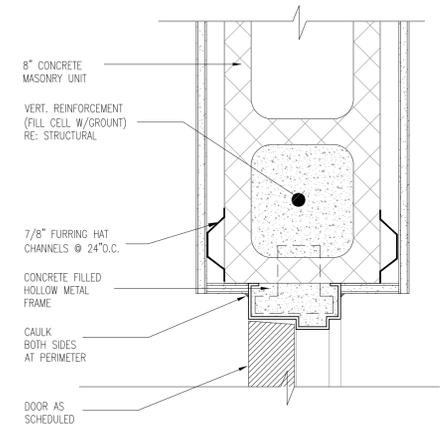
10 - INT. HM. DOOR HEAD
SCALE: 3" = 1'-0"



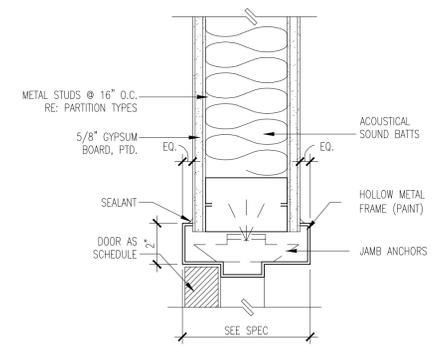
2 - EXT. ALUM. STOREFRONT JAMB
SCALE: 3" = 1'-0"



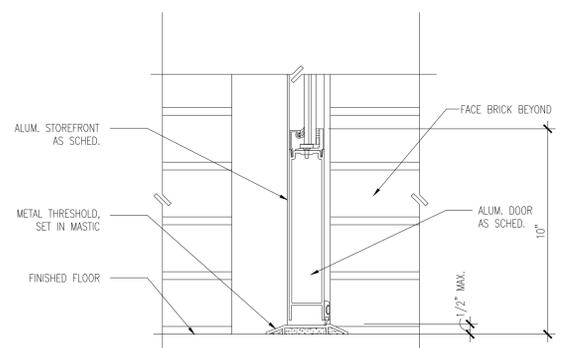
5 - EXT. H.M. DOOR JAMB
SCALE: 3" = 1'-0"



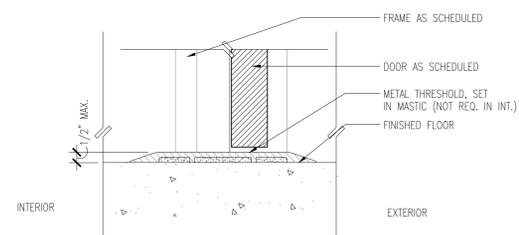
8 - INT. H.M. DOOR JAMB
SCALE: 3" = 1'-0"



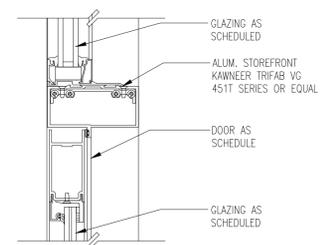
11 - INT. HM. DOOR JAMB
SCALE: 3" = 1'-0"



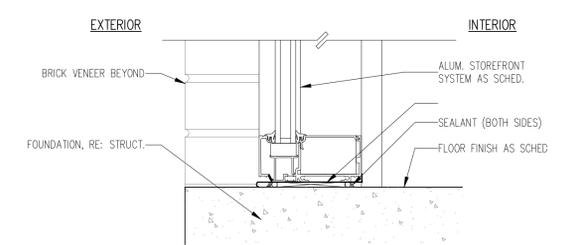
3 - EXT. ALUM. STOREFRONT THRESHOLD
SCALE: 3" = 1'-0"



6 - THRESHOLD (TYP.)
SCALE: 3" = 1'-0"

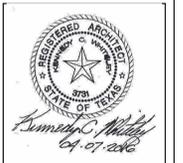


9 - EXT. ALUM. STOREFRONT TRANSOM
SCALE: 3" = 1'-0"



12 - EXT. ALUM. STOREFRONT SILL
SCALE: 3" = 1'-0"

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FILENAME: see A2.6 Door & Window Details.dwg

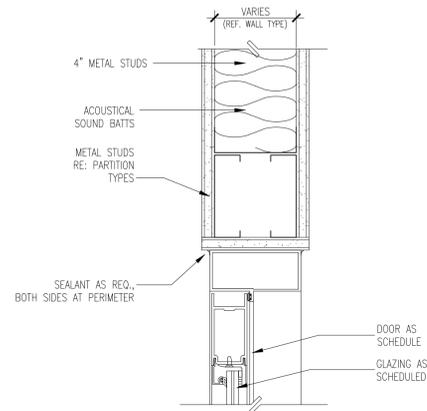
SHEET TITLE
DOOR DETAILS
SCALE: AS SHOWN

DRAWN BY: RP/EQ

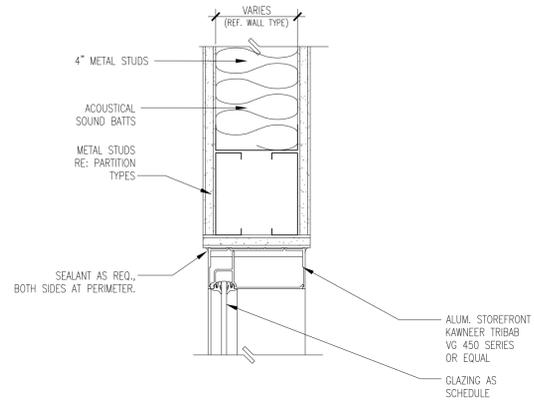
SHEET NO.

A2.6

DATE: APRIL 7, 2016

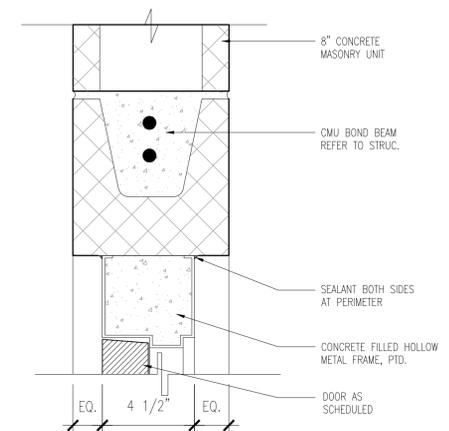


1 - INT. ALUM. STOREFRONT HEAD
SCALE: 3" = 1'-0"

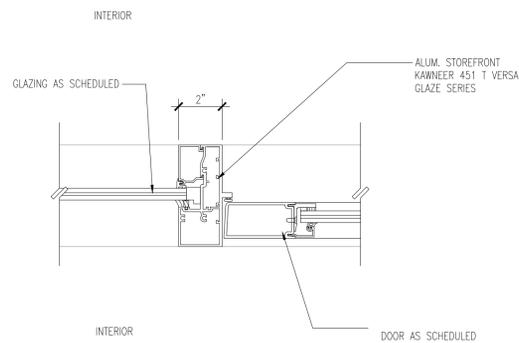


4 - INT. ALUM. STOREFRONT HEAD
SCALE: 3" = 1'-0"

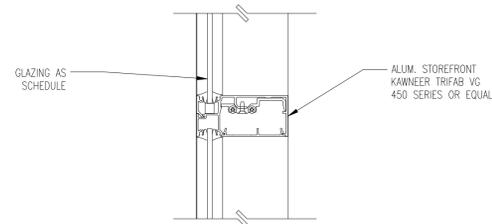
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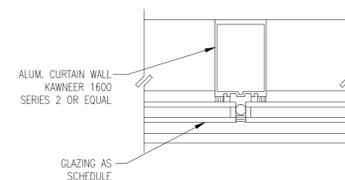
10 - INT. ALUM. STOREFRONT HEAD
SCALE



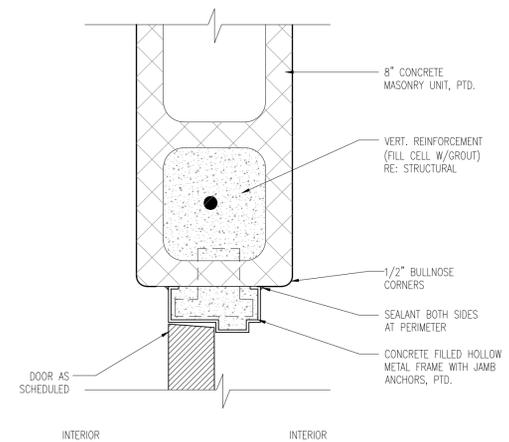
2 - INT. ALUM. STOREFRONT MULLION
SCALE: 3" = 1'-0"



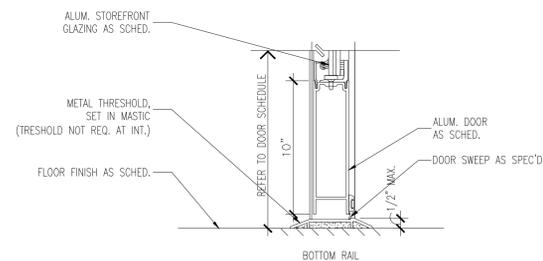
5 - INT. ALUM. STOREFRONT MULLION
SCALE: 3" = 1'-0"



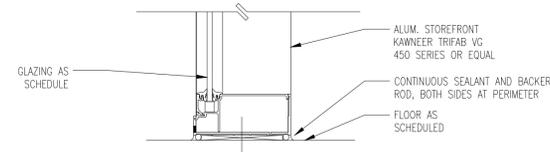
8 - INT. ALUM. STOREFRONT MULLION
SCALE



11 - INT. ALUM. STOREFRONT MULLION
SCALE

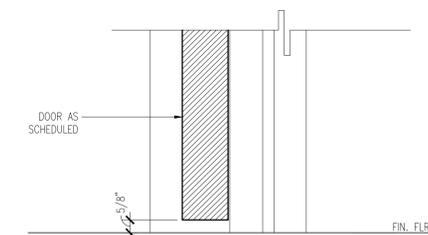


3 - INT. ALUM. STOREFRONT THRESHOLD
SCALE



6 - INT. ALUM. STOREFRONT SILL
SCALE

NOT USED



12 - INT. ALUM. STOREFRONT MULLION
SCALE

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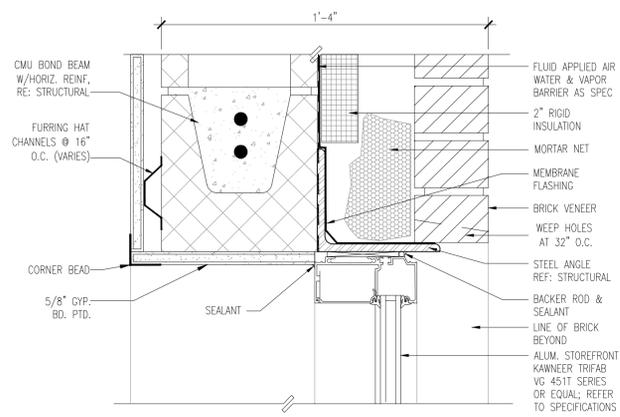
SHEET TITLE
INT. DOOR DETAILS
SCALE: AS SHOWN

DRAWN BY: RP/KW

SHEET NO.

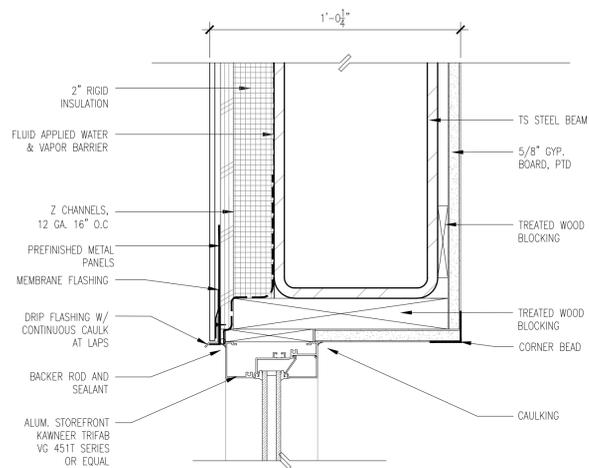
A2.6.1

DATE: APRIL 7, 2016



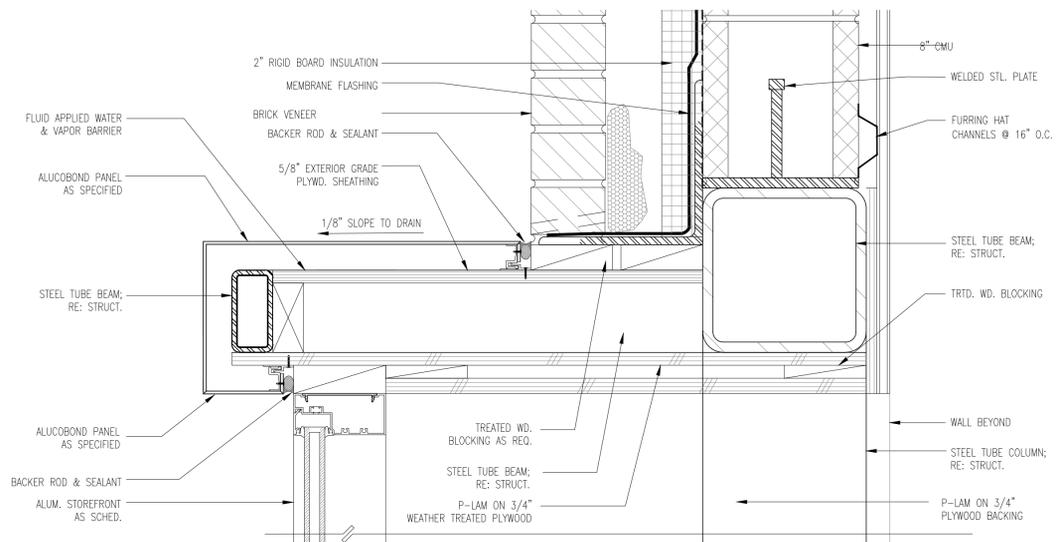
1 - EXT. ALUM. STOREFRONT HEAD

SCALE: 3" = 1'-0"



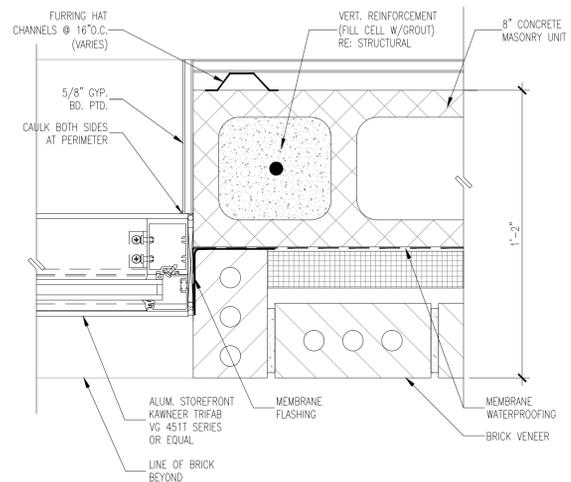
4 - EXT. ALUM. STOREFRONT HEAD

SCALE: 3" = 1'-0"



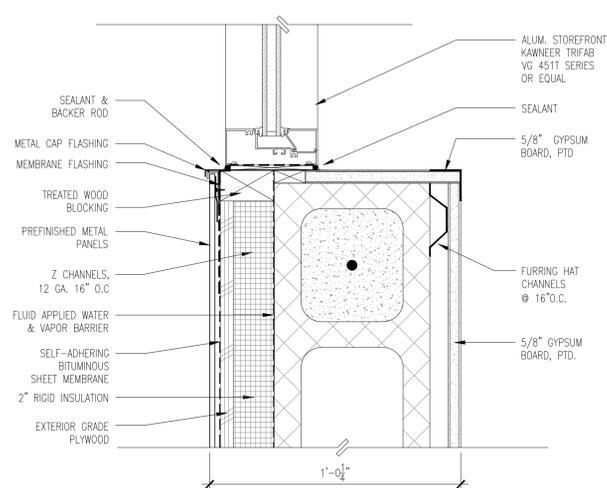
7 - EXT. ALUM. STOREFRONT HEAD

SCALE: 3" = 1'-0"



2 - EXT. ALUM. STOREFRONT JAMB

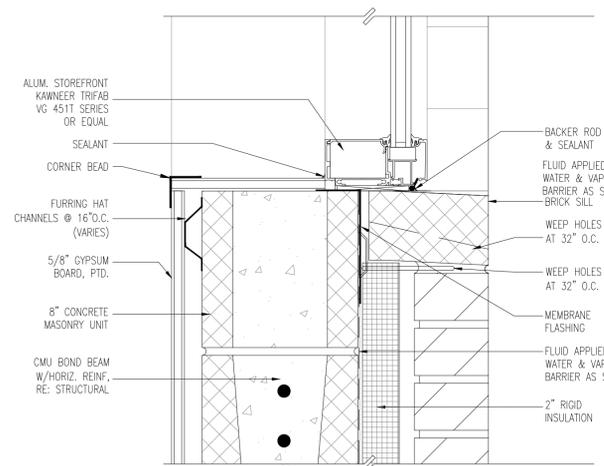
SCALE: 3" = 1'-0"



5 - EXT. ALUM. STOREFRONT JAMB

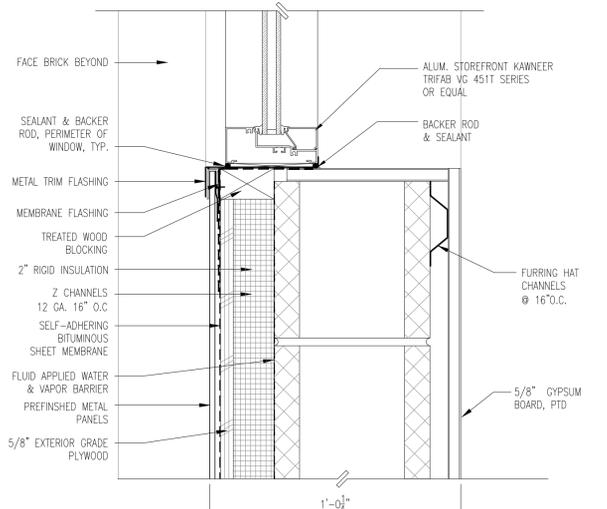
SCALE: 3" = 1'-0"

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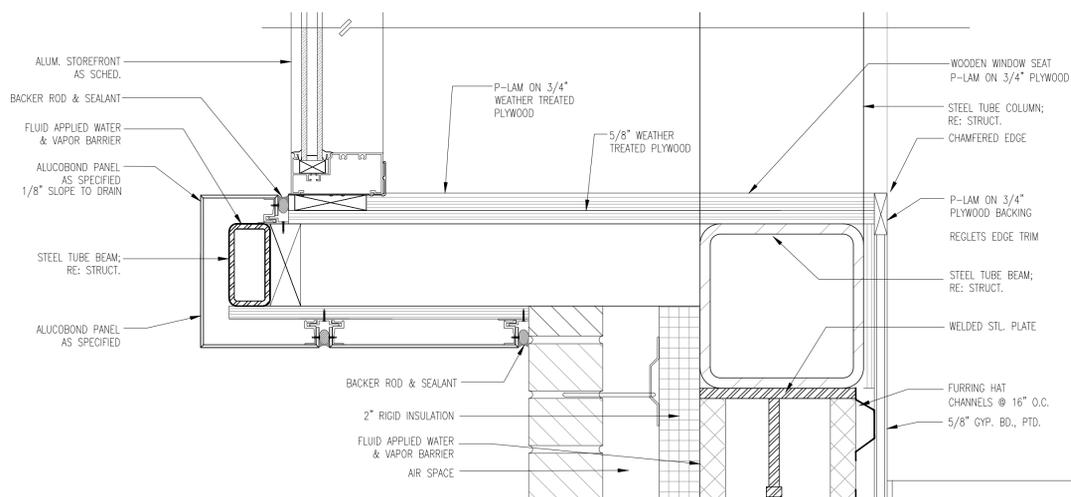
3 - EXT. ALUM. STOREFRONT SILL

SCALE



6 - EXT. ALUM. STOREFRONT SILL

SCALE: 3" = 1'-0"



9 - EXT. ALUM. STOREFRONT SILL

SCALE: 3" = 1'-0"

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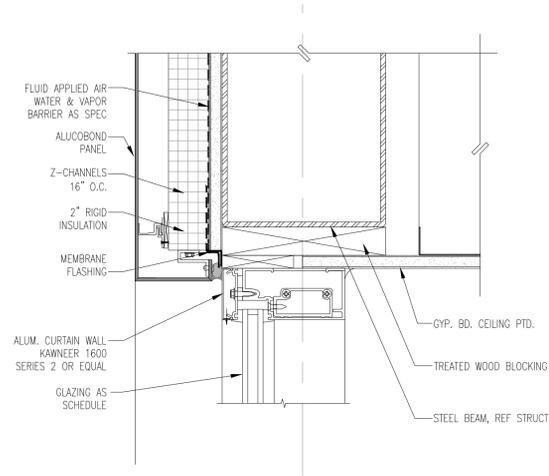
SHEET TITLE
STOREFRONT DETAILS
SCALE: AS SHOWN

100% CD
DRAWN BY: ED/RP

SHEET NO.

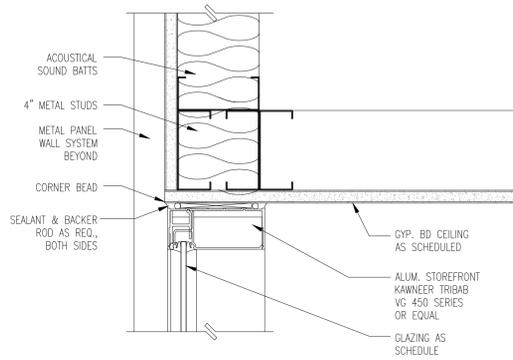
A2.7

DATE: APRIL 7, 2016



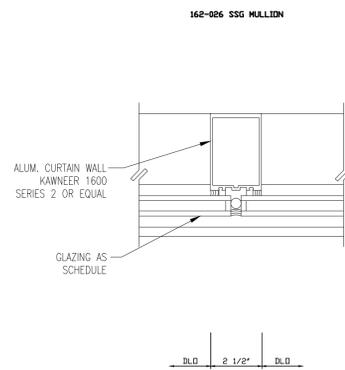
1 - EXT. ALUM. STOREFRONT HEAD
SCALE: 3" = 1'-0"

NOT USED



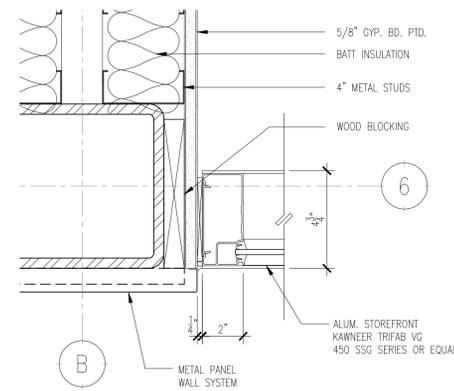
7 - INT. ALUM. STOREFRONT - HEAD
SCALE: 3" = 1'-0"

NOT USED



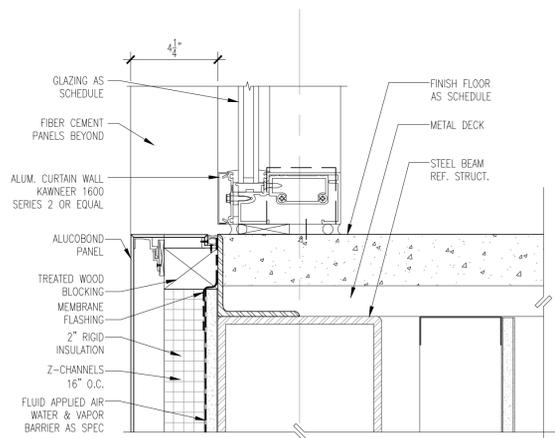
2 - EXT. ALUM. STOREFRONT JAMB
SCALE: 3" = 1'-0"

NOT USED



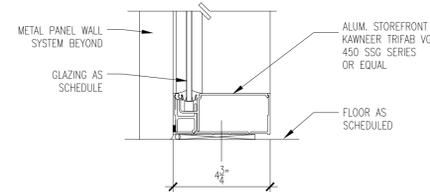
8 - INT. ALUM. STOREFRONT - JAMB
SCALE: 3" = 1'-0"

NOT USED



3 - EXT. ALUM. STOREFRONT SILL
SCALE: 3" = 1'-0"

NOT USED



9 - INT. ALUM. STOREFRONT - SILL
SCALE: 3" = 1'-0"

NOT USED

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FILENAME:

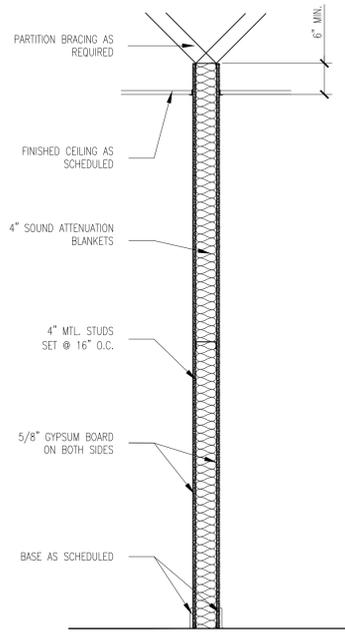
SHEET TITLE
DOOR & WINDOW
DETAILS
SCALE: AS SHOWN

DRAWN BY: eq/kw

SHEET NO.

A2.7.1

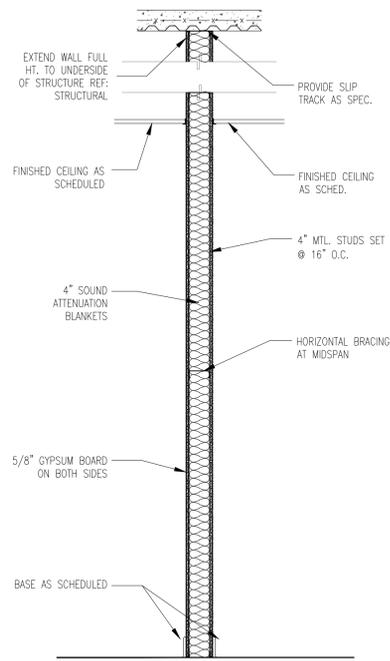
DATE: APRIL 7, 2016



TYPE "A"
 TYPE "A1" INSIDE FACE MOISTURE RESISTANT
 TYPE "A2" MOISTURE RESISTANT ON BOTH SIDES

1 - PARTITION TYPE A

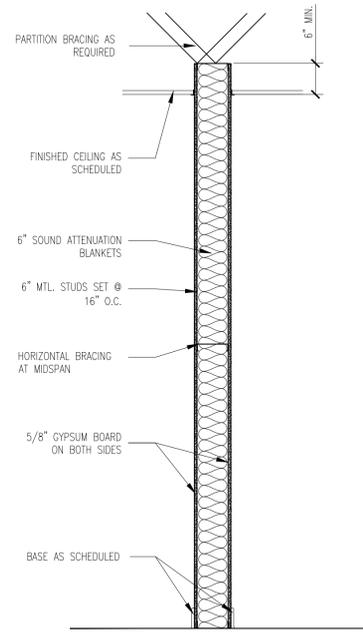
SCALE: 3/4" = 1'-0"



TYPE "B"
 TYPE "B1" 5/8" MOISTURE RESISTANT GYP. BD. ON INSIDE FACE
 TYPE "B2" 5/8" MOISTURE RESISTANT GYPSUM BOARD ON BOTH SIDES
 TYPE "B3" 5/8" TYPE "X" GYPSUM BOARD ON BOTH SIDES
 TYPE "B4" 5/8" TYPE "X" GYP. BD. ON BOTH SIDES PLUS ONE LAYER OF 5/8" MOISTURE RESISTANT GYPSUM BOARD ON INSIDE FACE

2 - PARTITION TYPE B

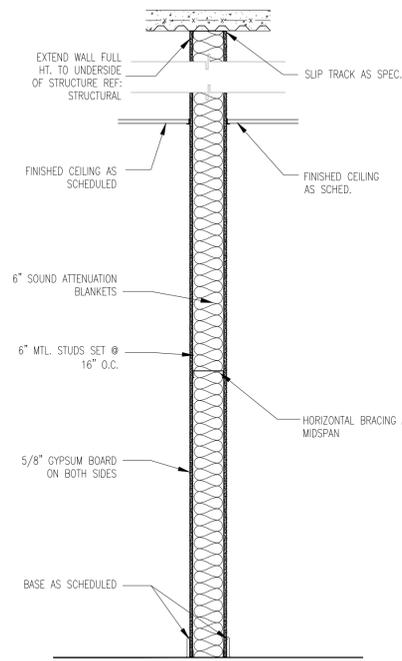
SCALE: 3/4" = 1'-0"



TYPE "C"
 TYPE "C1" 5/8" MOISTURE RESISTANT GYP. BD. ON INSIDE FACE
 TYPE "C2" 5/8" MOISTURE RESISTANT GYP. BD. ON BOTH SIDES
 TYPE "C3" 5/8" TYPE "X" GYP. BD. ON BOTH SIDES
 TYPE "C4" 5/8" TYPE "X" GYP. BD. HORIZONTAL CEILING.

3 - PARTITION TYPE C

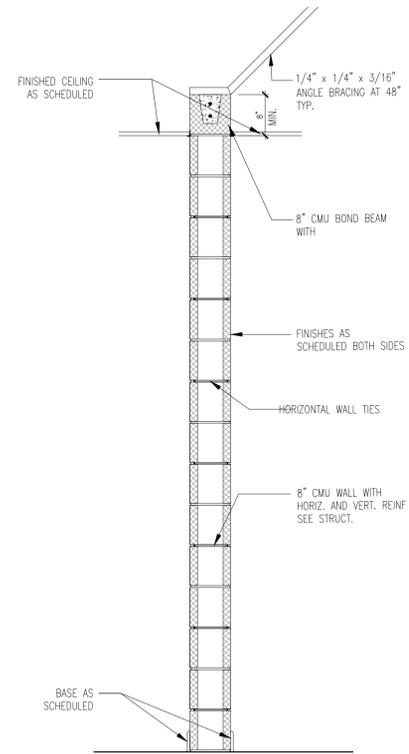
SCALE: 3/4" = 1'-0"



TYPE "D"
 TYPE "D1" 5/8" MOISTURE RESISTANT GYP. BD. ON INSIDE FACE
 TYPE "D2" 5/8" MOISTURE RESISTANT GYP. BD. ON BOTH SIDES
 TYPE "D3" 5/8" TYPE "X" GYPSUM BOARD ON BOTH SIDES
 TYPE "D4" 5/8" MOISTURE RESISTANT GYP. BRD. ON BOTH SIDES
 TYPE "D5" 5/8" TYPE "X" GYP. BD. ON OUTSIDE AND 5/8" MOISTURE RESISTANT GYP. BD. ON INSIDE.

4 - PARTITION TYPE D

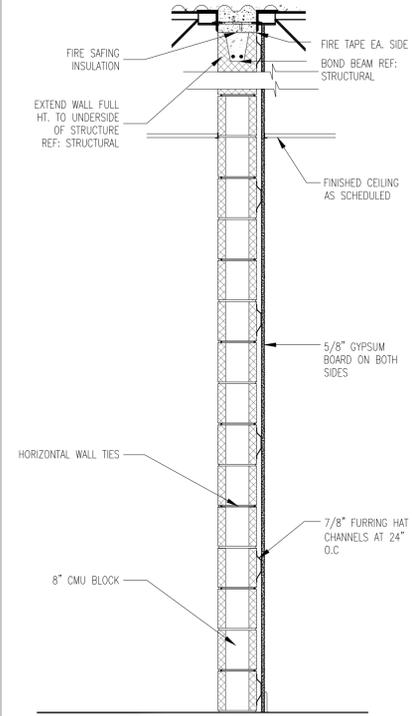
SCALE: 3/4" = 1'-0"



TYPE "E"
 TYPE "E1" 5/8" TYPE GYP. BD. ON 7/8" FURRING CHANNELS ON INSIDE.

5 - PARTITION TYPE E

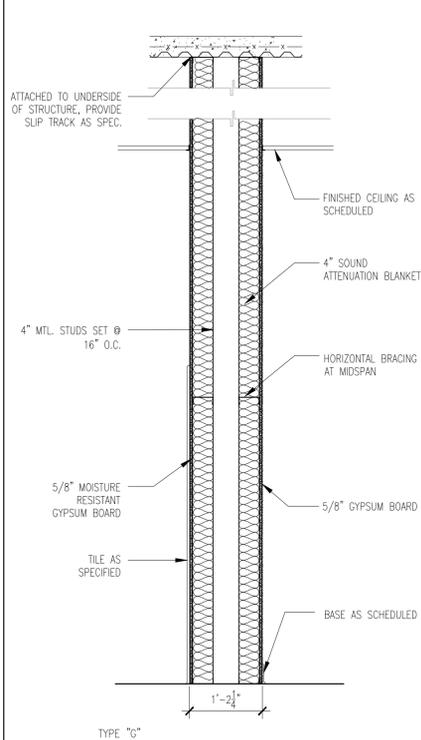
SCALE: 3/4" = 1'-0"



TYPE "F"
 TYPE "F1" 5/8" TYPE GYP. BD. ON 7/8" FURRING CHANNELS ON BOTH SIDES. EXTENDS TO UNDERSIDE OF STRUCTURE AS REQ. FOR 1HR. RATING.
 TYPE "F2" NO GYP. BD. ON EITHER SIDE. EXTEND WALL TO UNDERSIDE OF STRUCTURE AS REQ. FOR 1HR. RATING.

6 - PARTITION TYPE F

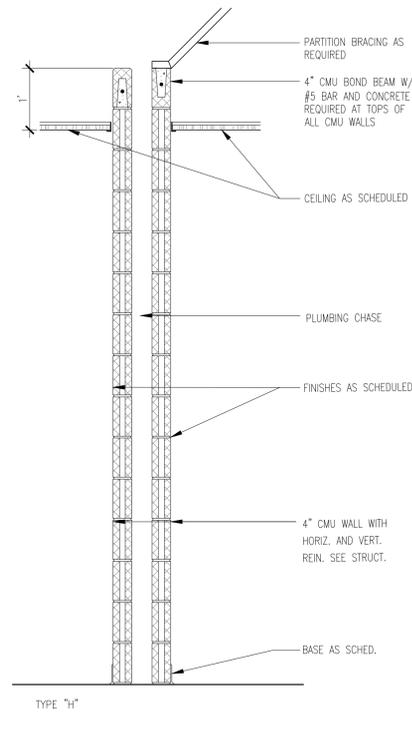
SCALE: 3/4" = 1'-0"



TYPE "G"

7 - PARTITION TYPE G

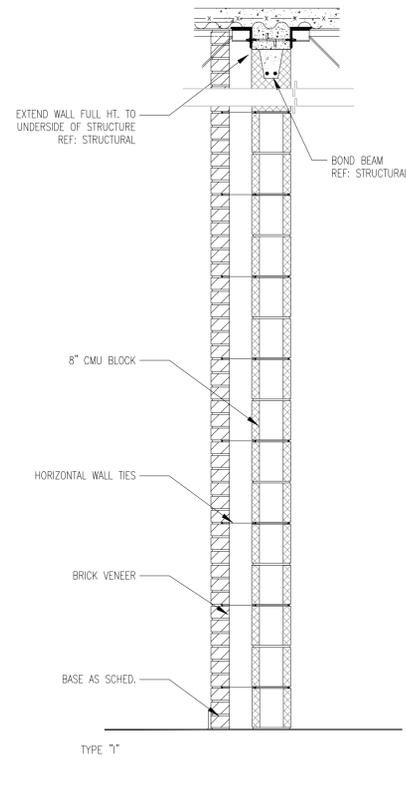
SCALE: 3/4" = 1'-0"



TYPE "H"

8 - PARTITION TYPE H

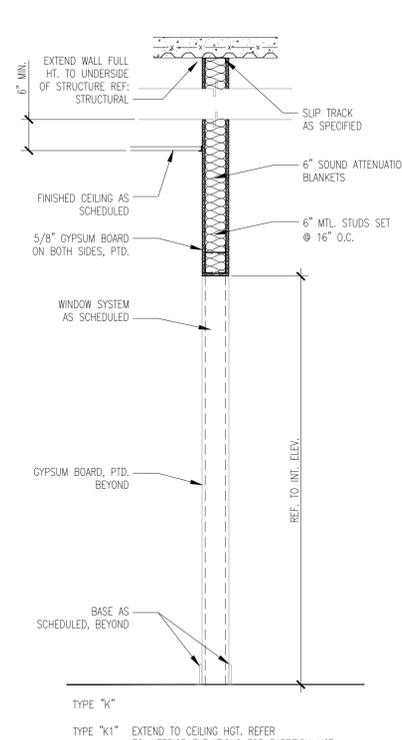
SCALE: 3/4" = 1'-0"



TYPE "J"

9 - PARTITION TYPE J

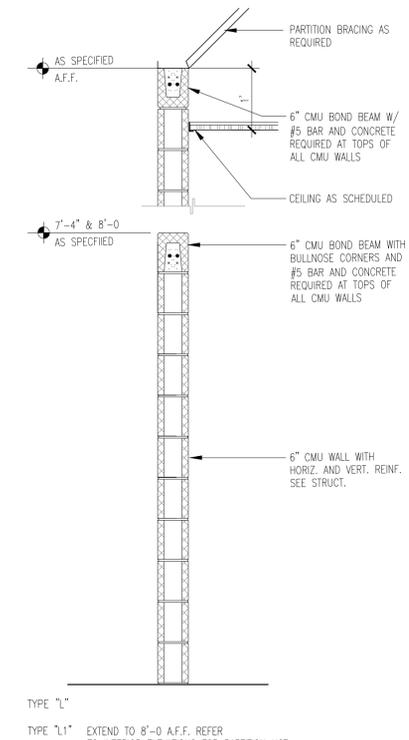
SCALE: 3/4" = 1'-0"



TYPE "K"

10 - PARTITION TYPE K

SCALE: 3/4" = 1'-0"



TYPE "L"

TYPE "L1" EXTEND TO 8'-0" A.F.F. REFER TO INTERIOR ELEVATIONS FOR PARTITION HGT.
 TYPE "L2" EXTEND TO CEILING HGT. REFER TO INTERIOR ELEVATIONS FOR PARTITION HGT.

11 - PARTITION TYPE L

SCALE: 3/4" = 1'-0"

PARTITION TYPE NOTES:

- FOR HEIGHTS OF WALLS SEE BLD'G SECTIONS OR ELEVATIONS.
- EVERY WALL SHOWN ON PLAN SHALL BE ONE OF THE WALL TYPES SHOWN WHETHER KEYED ON THE PLAN OR NOT. IF WALL DOES NOT HAVE KEY, PROVIDE WALL TYPE TO MATCH ADJACENT OR NEAREST KEY.
- SEE ROOM FINISH SCHEDULE FOR FINISHES.
- PENETRATIONS IN FIRE WALLS ARE TO BE FILLED & SEALED W/ FIRE RATED SEALANTS.
- ALL EXPOSED WALLS THAT ARE PERPENDICULAR TO ROOF DECK SHOULD BE SEALED TIGHT TO UNDERSIDE OF INSULATION. COPE SHEETROCK AROUND PLAN.
- ALL SOUND WALLS TO RECEIVE SEALANT AROUND CRACKS & GAPS OF EDGES @ FLOOR, CEILING AND JUNCTION BOXES.
- ALL FIRE RATED ROOF - CEILING ASSEMBLIES AT MECHANICAL PLATFORMS TO BE CONSTRUCTED EQUAL TO UNDERWRITERS LABORATORIES DESIGN NUMBER P516.
- ALL FIRE RATED FLOOR - CEILING ASSEMBLIES AT MECHANICAL PLATFORMS TO BE CONSTRUCTED EQUAL TO UNDERWRITERS LABORATORIES DESIGN NUMBER LS27.
- ALL LOAD BEARING STUDS TO BE 14 GAUGE OR AS SPECIFIED BY STRUCTURAL.
- SEE WALL TYPE SYMBOL LOGIN ON SHEET A2.1
- REFER TO REFLECTED CEILING PLANS FOR ALL CEILING HEIGHTS.

GENERAL NOTES RELATING TO CMU WALL CONSTRUCTION.

- PROVIDE CMU LINTELS AND CMU WALL CONSTRUCTION ABOVE ALL WALL OPENINGS IN CMU WALLS, UNLESS OTHERWISE NOTED.
- REFER TO STRUCTURAL PLANS FOR REINFORCEMENT.

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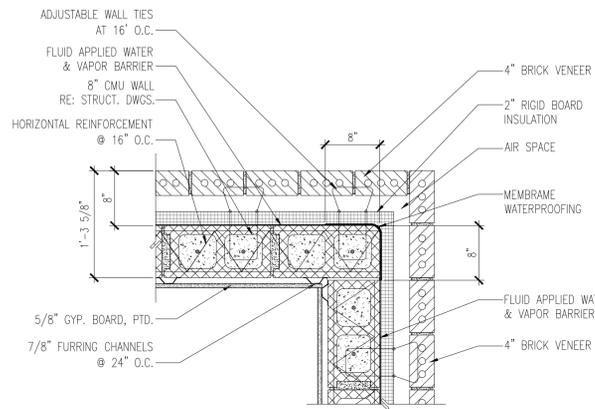
SHEET TITLE
 PARTITION TYPES

DRAWN BY: EQ

SHEET NO.

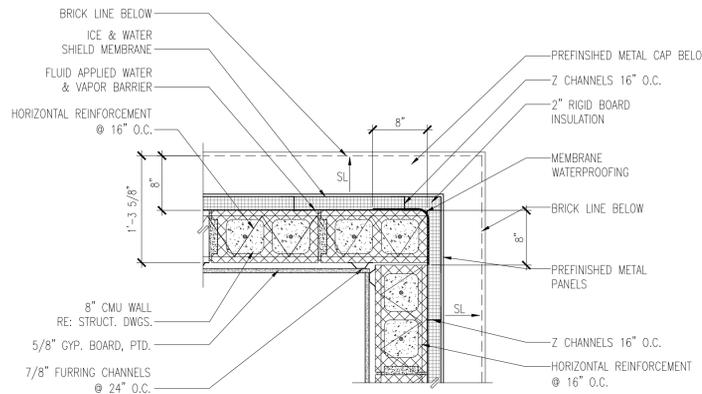
A2.8

DATE: APRIL 7, 2016



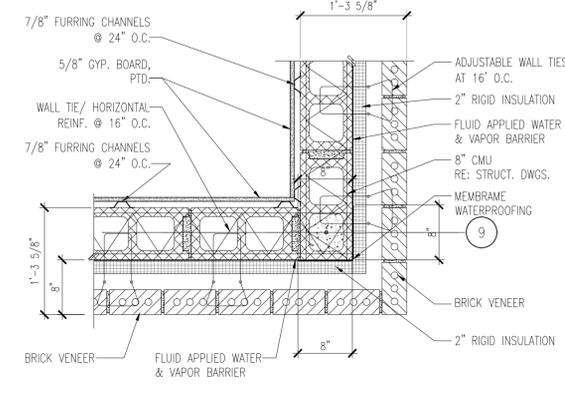
1 - PLAN DETAIL

SCALE: 1" = 1'-0"



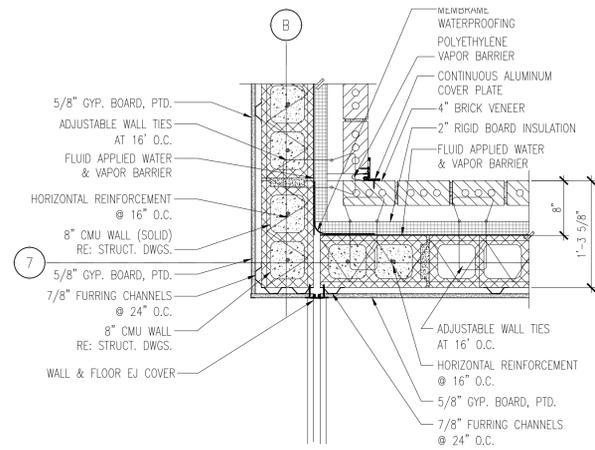
2 - PLAN DETAIL

SCALE: 1" = 1'-0"



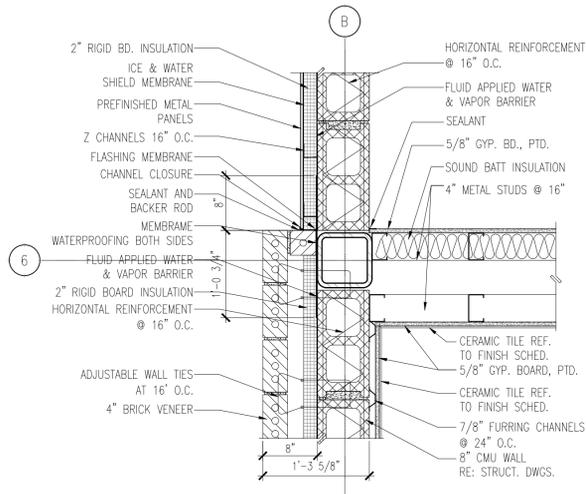
3 - PLAN DETAIL

SCALE: 1" = 1'-0"



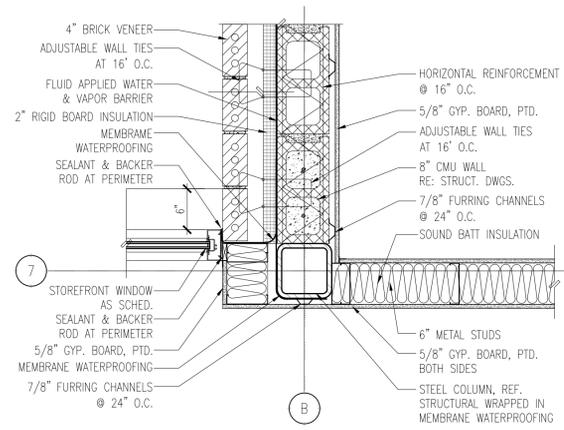
4 - PLAN DETAIL

SCALE: 1" = 1'-0"



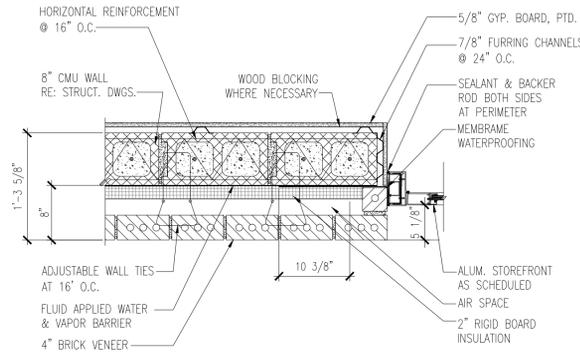
5 - PLAN DETAIL

SCALE: 1" = 1'-0"



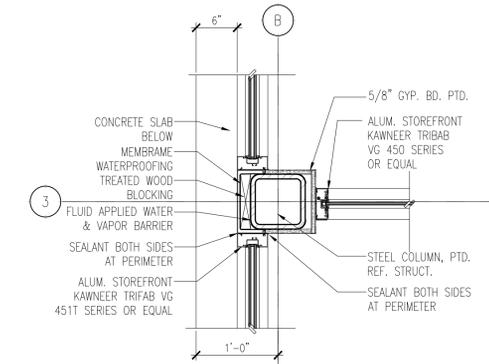
6 - PLAN DETAIL

SCALE: 1" = 1'-0"



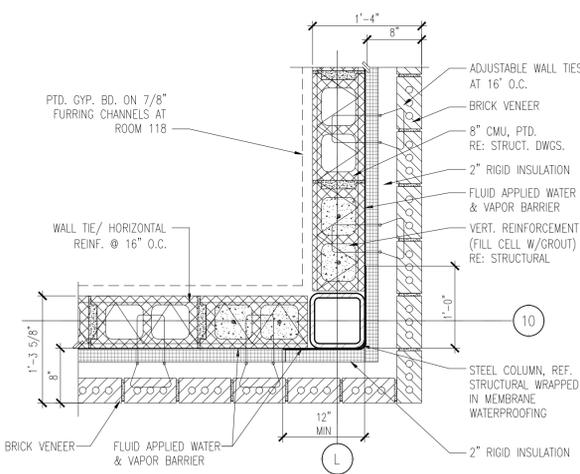
7 - PLAN DETAIL

SCALE: 1" = 1'-0"



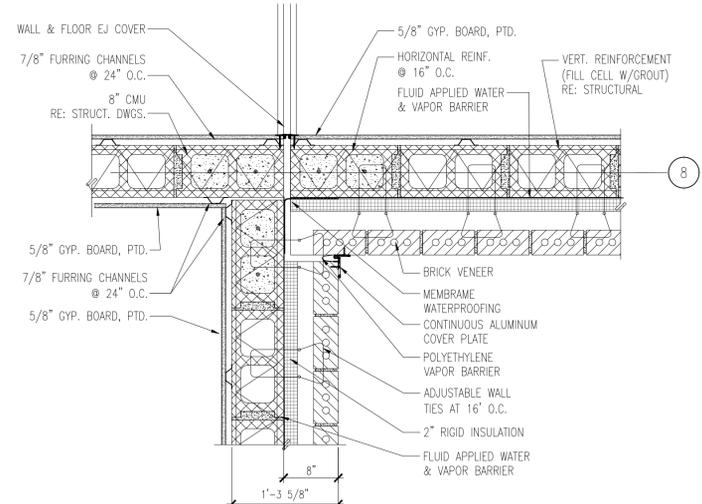
8 - PLAN DETAIL

SCALE: 1" = 1'-0"



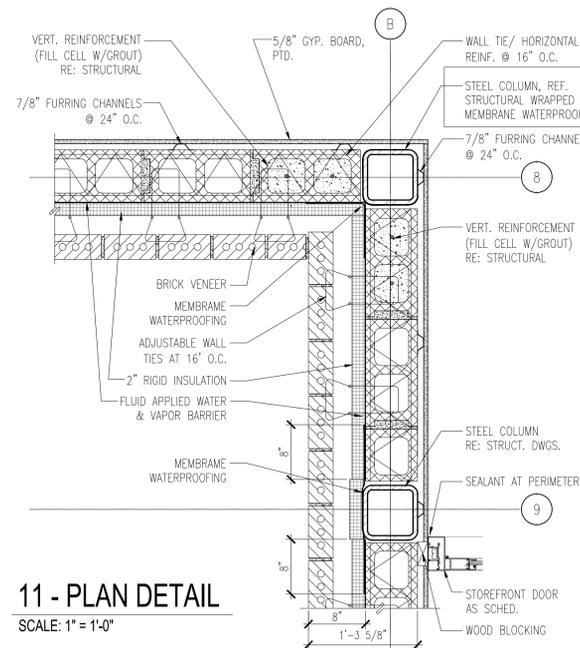
9 - PLAN DETAIL

SCALE: 1" = 1'-0"



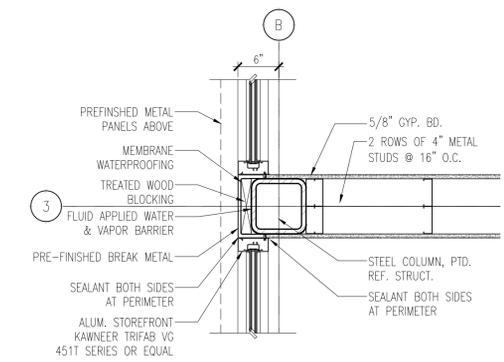
10 - PLAN DETAIL

SCALE: 1" = 1'-0"



11 - PLAN DETAIL

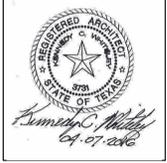
SCALE: 1" = 1'-0"



12 - PLAN DETAIL

SCALE: 1" = 1'-0"

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WEBB COUNTY YOUTH VILLAGE
 REHABILITATION CENTER
 111 CAMINO NUEVO ROAD, HWY 359
 LAREDO, TEXAS 78046

PROJECT NUMBER

REVISIONS

FILENAME:

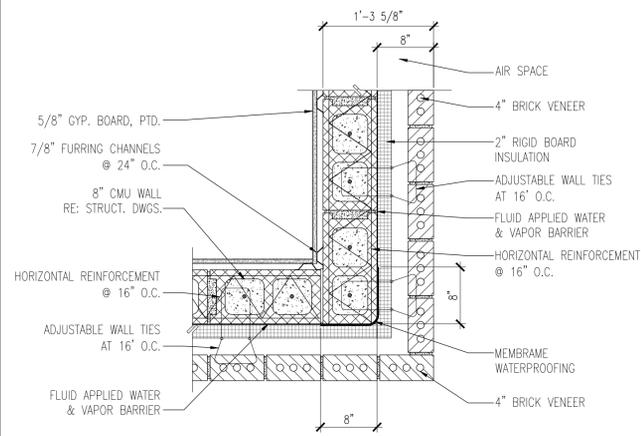
SHEET TITLE
 PLAN DETAILS

DRAWN BY: RP

SHEET NO.

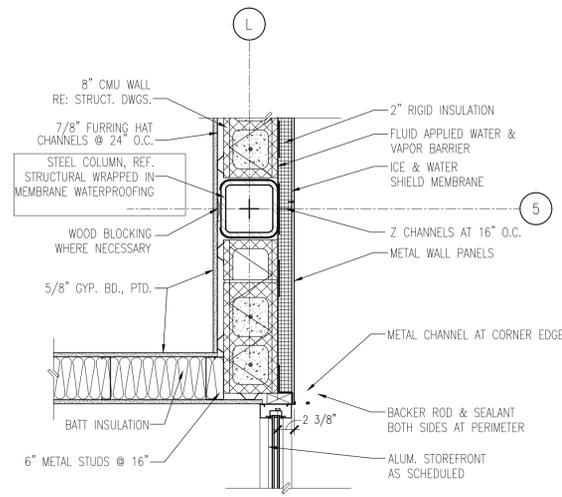
A2.9

DATE: APRIL 7, 2016



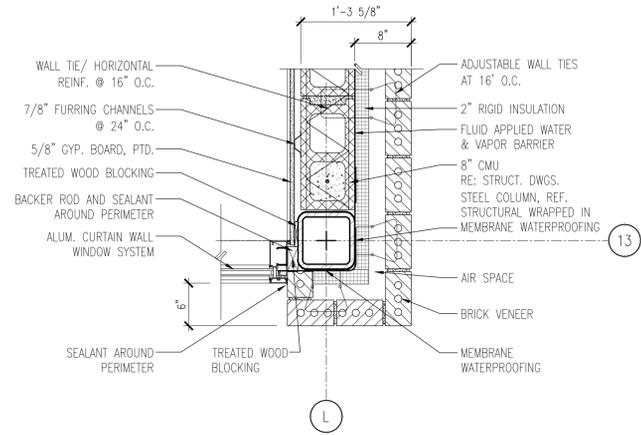
1 - PLAN DETAIL

SCALE: 1" = 1'-0"



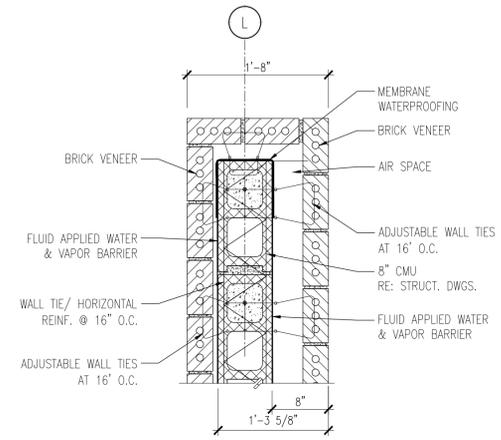
2 - PLAN DETAIL

SCALE: 1" = 1'-0"



3 - PLAN DETAIL

SCALE: 1" = 1'-0"



4 - PLAN DETAIL

SCALE: 1" = 1'-0"

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PROJECT NUMBER

REVISIONS

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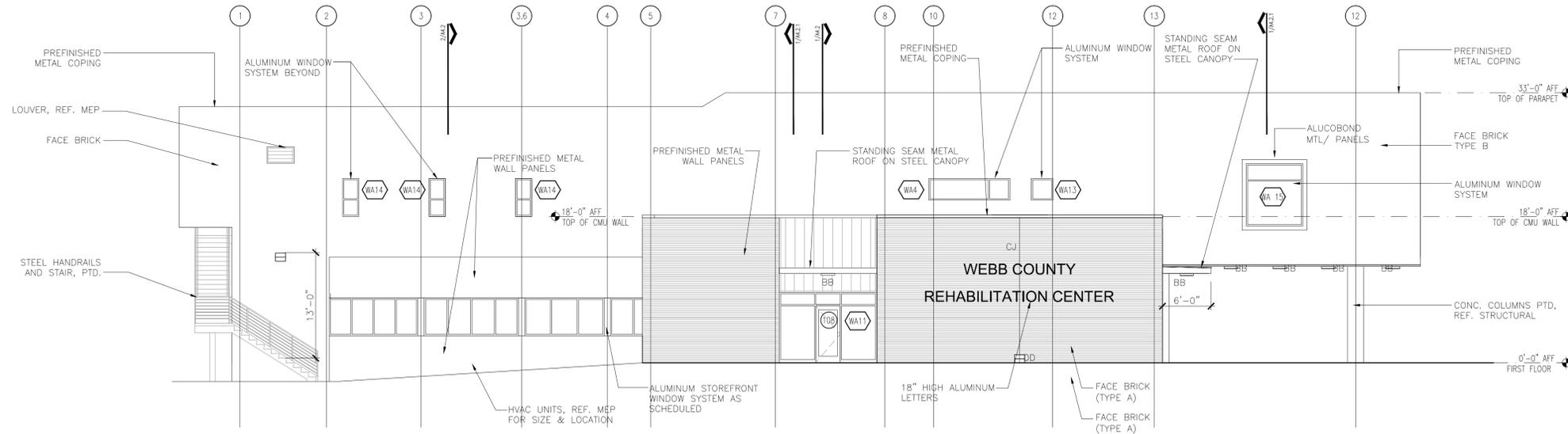
SHEET TITLE
 PLAN DETAILS

DRAWN BY: RP

SHEET NO.

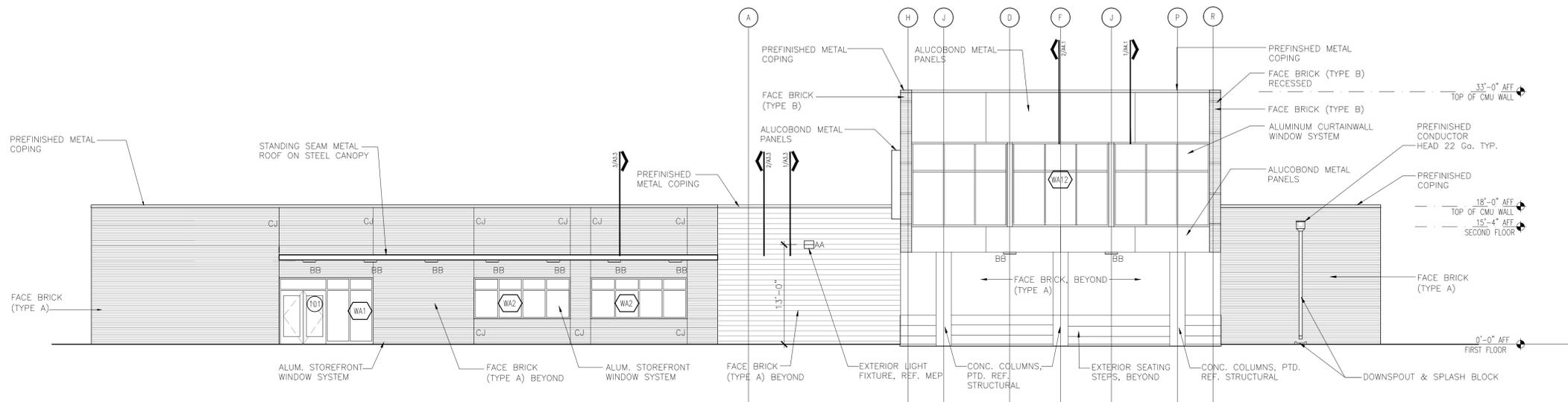
A2.10

DATE: APRIL 7, 2016



1 - WEST ELEVATION

SCALE: 1/8" = 1'-0"



2 - SOUTH ELEVATION

SCALE: 1/8" = 1'-0"

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PROJECT NUMBER
1401

REVISIONS

FILENAME:

SHEET TITLE
EXTERIOR
ELEVATIONS

DRAWN BY: JR/KW

SHEET NO.

A3.1

DATE: APRIL 7, 2016



PROJECT NUMBER
1401

REVISIONS

FILENAME:

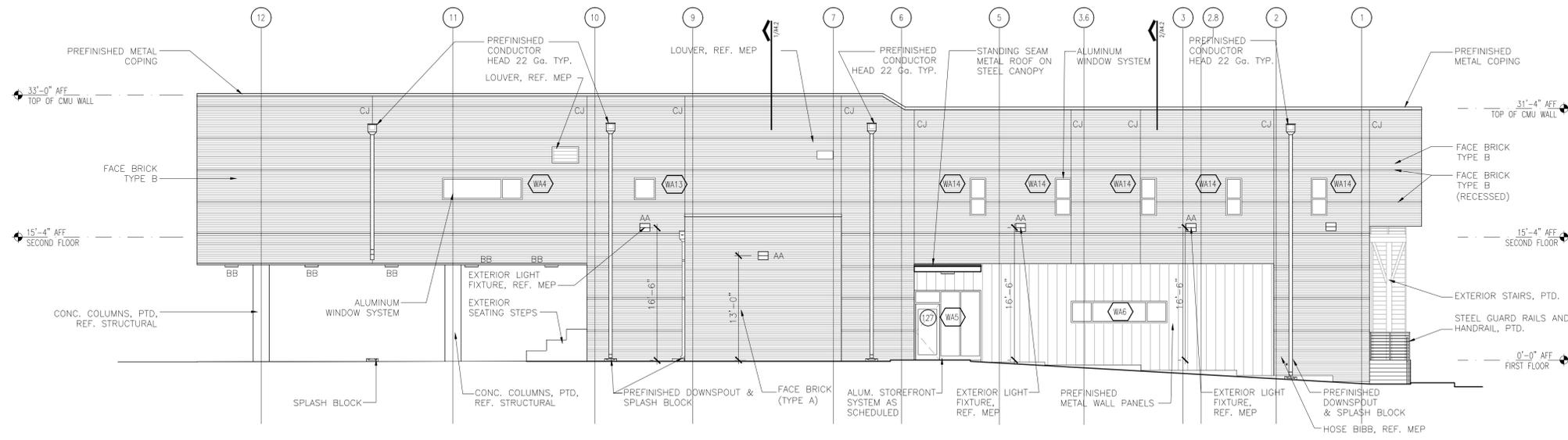
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EXTERIOR ELEVATIONS

DRAWN BY: JR/KW

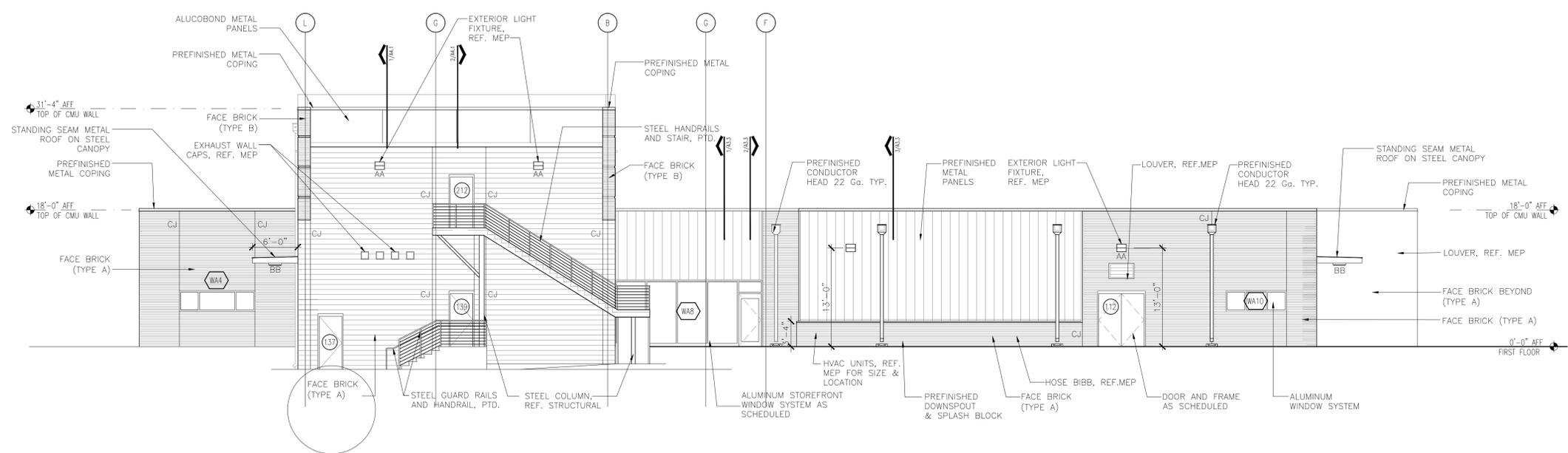
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A3.2

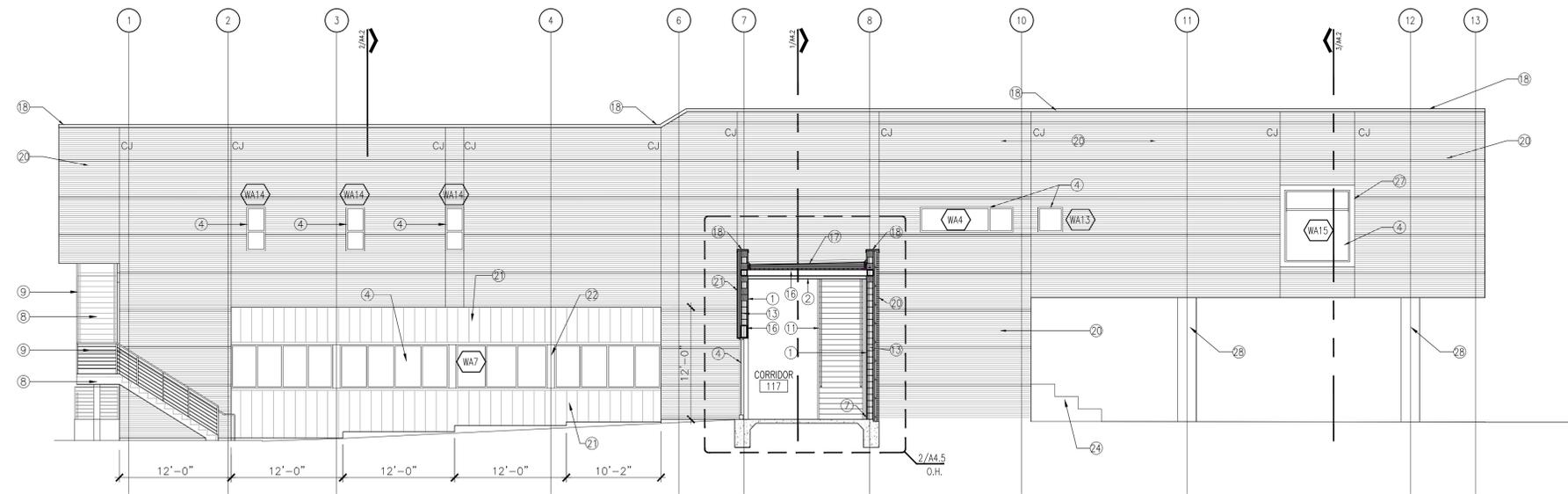
DATE: APRIL 7, 2016



1 - EAST ELEVATION
 SCALE: 1/8" = 1'-0"



2 - NORTH ELEVATION
 SCALE: 1/8" = 1'-0"

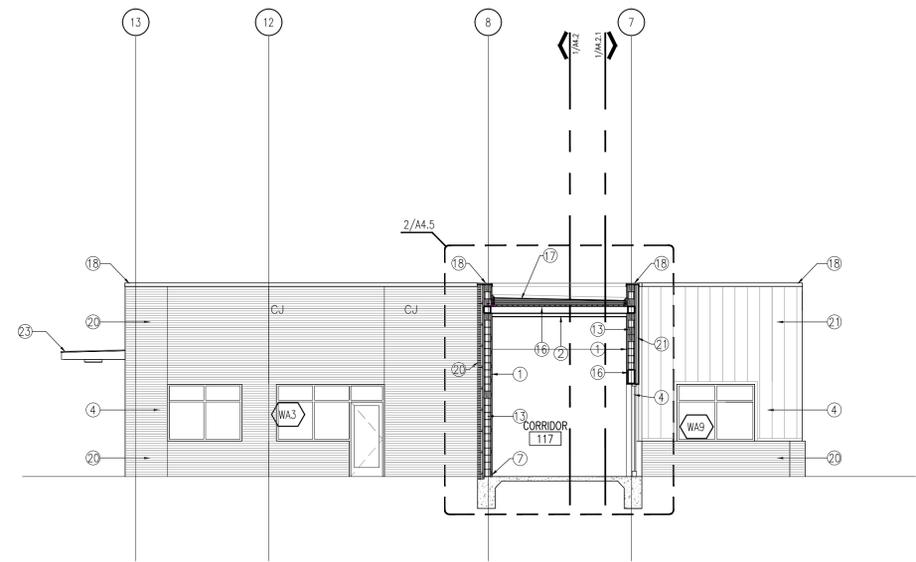


1 - EXTERIOR ELEVATION / BUILDING SECTION

SCALE: 1/8" = 1'-0"

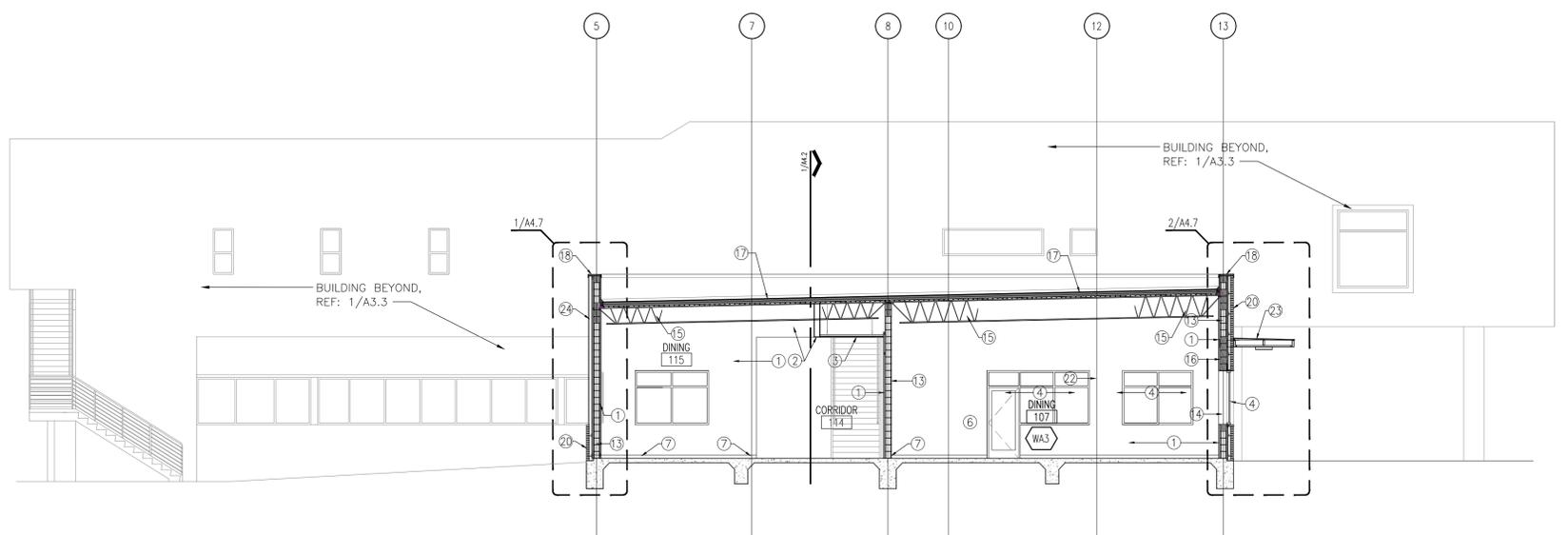
KEY LEGEND

- ① GYP. BOARD (PAINTED)
- ② GYP. BOARD CEILING/ FURR-DOWN, PAINTED
- ③ SUSPENDED CEILING REF: RCP.
- ④ ALUMINUM STOREFRONT AS SCHED.
- ⑤ GLASSWALL SYSTEM AS SPEC'D.
- ⑥ DOOR AND FRAME AS SCHEDULED
- ⑦ BASE AS SCHEDULED
- ⑧ EXTERIOR STEEL STAIRS, PAINTED
- ⑨ GUARDRAIL / HANDRAIL
- ⑩ MILLWORK
- ⑪ INTERIOR STEEL STAIRS, PAINTED
- ⑫ OVERHEAD SHUTTER DOOR
- ⑬ CMU BLOCK WALL REF: STRUCTURAL
- ⑬.1 CMU - STACK BOND
- ⑭ STEEL COLUMN. PAINTED, REF: STRUCTURAL
- ⑮ STEEL JOIST REF: STRUCTURAL
- ⑯ STEEL BEAM REF: STRUCTURAL
- ⑰ SBS MODIFIED BITUMEN ROOF SYS. AS SPEC'D.
- ⑱ PREFINISHED METAL COPING AS SPEC'D.
- ⑲ SOFFIT PANEL SYSTEM AS SPEC'D.
- ⑳ FACE BRICK
- ㉑ PREFINISHED METAL WALL PANELS
- ㉒ ALUMINUM STOREFRONT TUBE FRAMING
- ㉓ STANDING SEAM METAL ROOF ON STRUCTURAL FRAMING
- ㉔ STEPPED EXTERIOR SEATING
- ㉕ PREFINISHED CONDUCTOR HEAD
- ㉖ PREFINISHED DOWNSPOUT & SPLASH BLOCK
- ㉗ ALUCOBOND PANELS
- ㉘ ROUND STRUCTURAL COLUMN; RE: STRUCTURAL
- ㉙ BUILT-IN INTERIOR SEATING
- ㉚ GYP. BD. TO CONCRETE EDGE SEAL & CAULK AS REQUIRED
- ㉛ DAMP PROOF ALL WALLS BELOW 1ST FLOOR LEVEL



2 - EXTERIOR ELEVATION / BUILDING SECTION

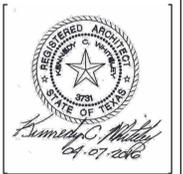
SCALE: 1/8" = 1'-0"



3 - BUILDING SECTION

SCALE: 1/8" = 1'-0"

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 REHABILITATION CENTER
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 LAREDO, TEXAS 78046

PROJECT NUMBER
 1401

REVISIONS

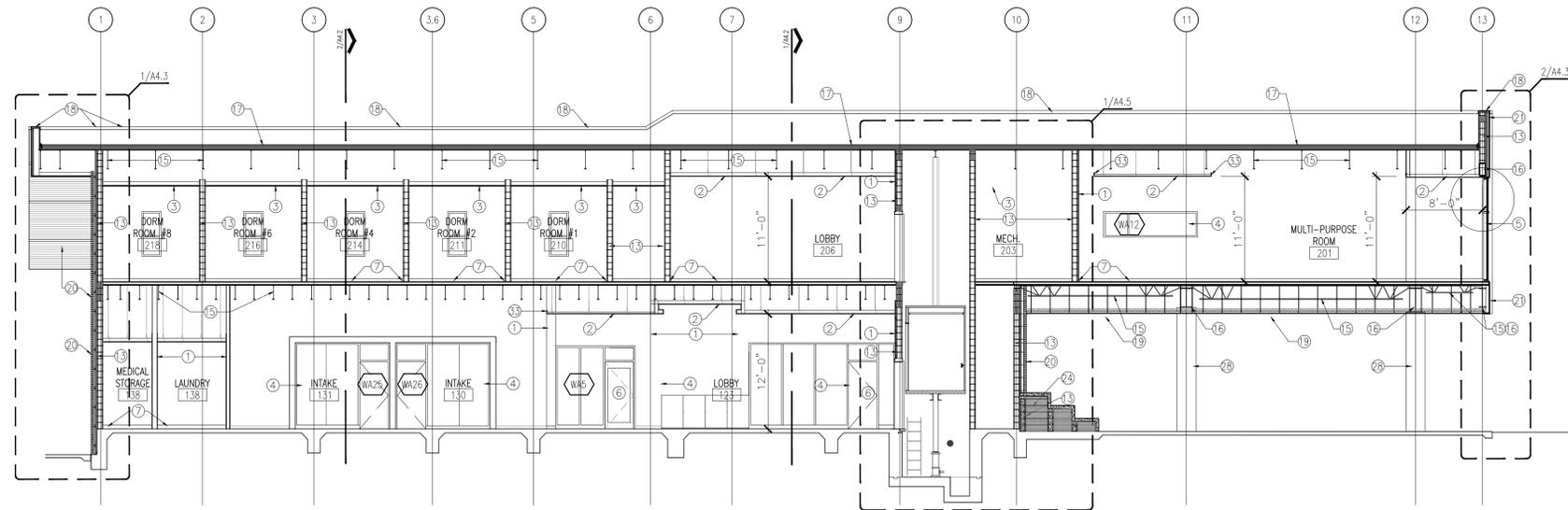
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SHEET TITLE
 EXTERIOR ELEVATIONS AND BUILDING SECTIONS

DRAWN BY: JR

SHEET NO.
 A3.3

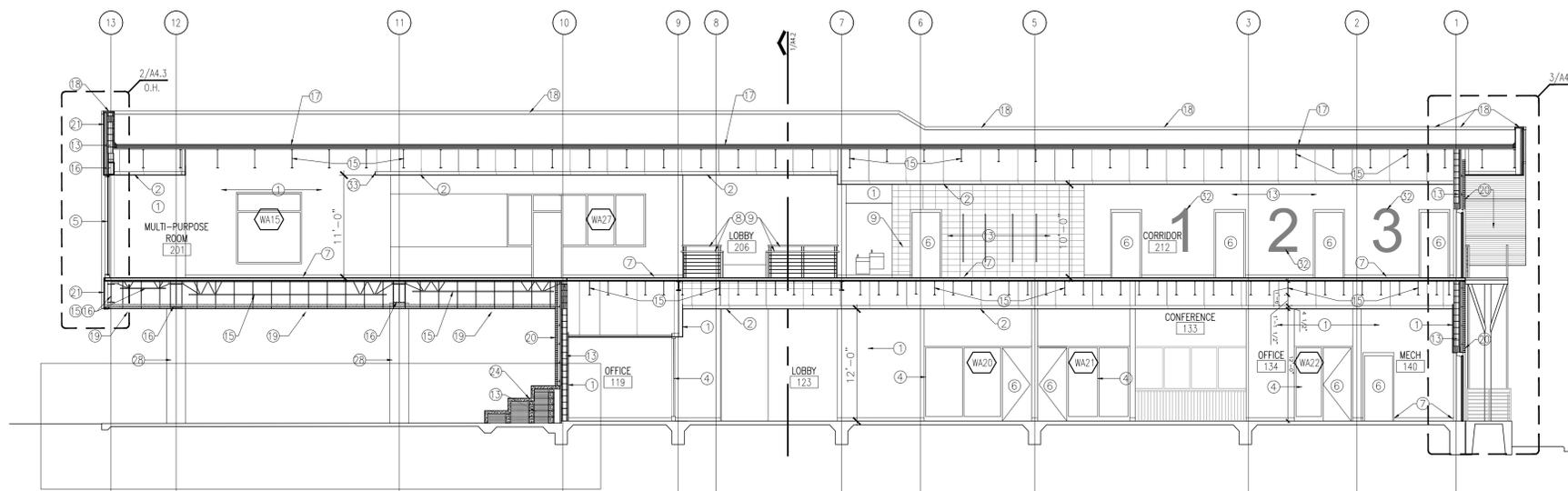
DATE: APRIL 7, 2016



1 - BUILDING SECTION

SCALE: 1/8" = 1'-0"

- KEY LEGEND**
- ① GYP. BOARD (PAINTED)
 - ② GYP. BOARD CEILING/ FURR-DOWN, PAINTED
 - ③ SUSPENDED CEILING REF: RCP.
 - ④ ALUMINUM STOREFRONT AS SCHED.
 - ⑤ GLASSWALL SYSTEM AS SPEC'D.
 - ⑥ DOOR AND FRAME AS SCHEDULED
 - ⑦ BASE AS SCHEDULED
 - ⑧ EXTERIOR STEEL STAIRS, PAINTED
 - ⑨ GUARDRAIL / HANDRAIL
 - ⑩ MILLWORK
 - ⑪ INTERIOR STEEL STAIRS, PAINTED
 - ⑫ OVERHEAD SHUTTER DOOR
 - ⑬ CMU BLOCK WALL REF: STRUCTURAL
 - ⑬.1 CMU - STACK BOND
 - ⑭ STEEL COLUMN, PAINTED, REF: STRUCTURAL
 - ⑮ STEEL JOIST REF: STRUCTURAL
 - ⑯ STEEL BEAM REF: STRUCTURAL
 - ⑰ SBS MODIFIED BITUMEN ROOF SYS. AS SPEC'D.
 - ⑱ PREFINISHED METAL COPING AS SPEC'D.
 - ⑲ SOFFIT PANEL SYSTEM AS SPEC'D.
 - ⑳ FACE BRICK
 - ㉑ PREFINISHED METAL WALL PANELS
 - ㉒ ALUMINUM STOREFRONT TUBE FRAMING
 - ㉓ STANDING SEAM METAL ROOF ON STRUCTURAL FRAMING
 - ㉔ STEPPED EXTERIOR SEATING
 - ㉕ PREFINISHED CONDUCTOR HEAD
 - ㉖ PREFINISHED DOWNSPOUT & SPLASH BLOCK
 - ㉗ ALUCOBOND PANELS
 - ㉘ ROUND STRUCTURAL COLUMN; RE: STRUCTURAL
 - ㉙ BUILT-IN INTERIOR SEATING
 - ㉚ GYP. BD. TO CONCRETE EDGE SEAL & CAULK AS REQUIRED
 - ㉛ DAMP PROOF ALL WALLS BELOW 1ST FLOOR LEVEL
 - ㉜ WALL COVERING/GRAPHICS
 - ㉝ ALUMINUM TRIM EDGE



2 - BUILDING SECTION

SCALE: 1/8" = 1'-0"

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WEBB COUNTY YOUTH VILLAGE
 REHABILITATION CENTER
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 LAREDO, TEXAS 78046

PROJECT NUMBER
1401

REVISIONS

FILENAME:

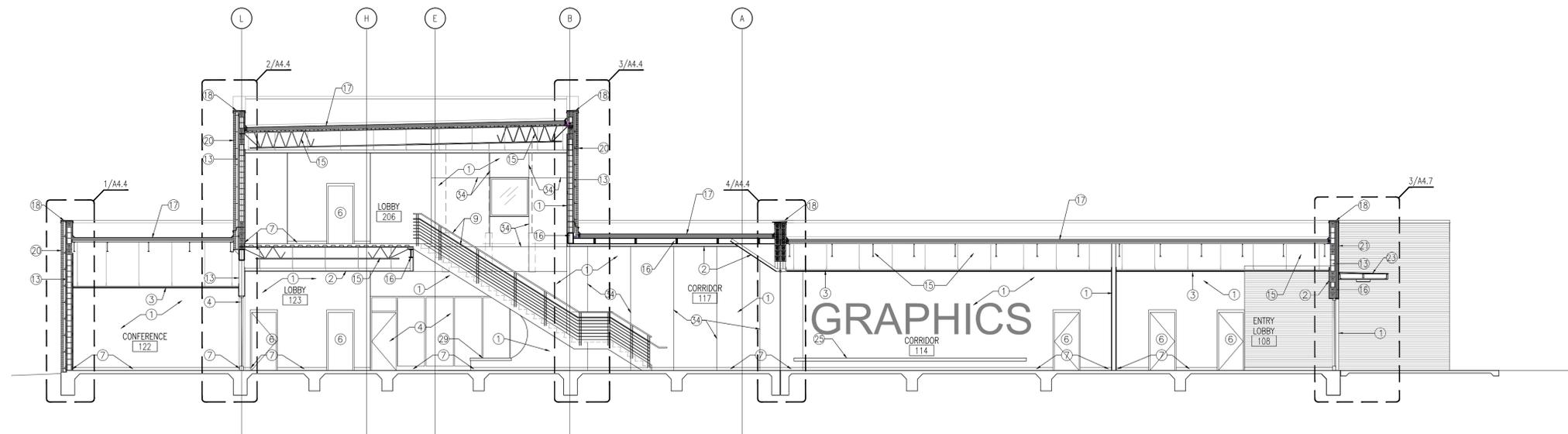
SHEET TITLE
BUILDING SECTIONS

DRAWN BY: JR

SHEET NO.

A4.1

DATE: APRIL 7, 2016

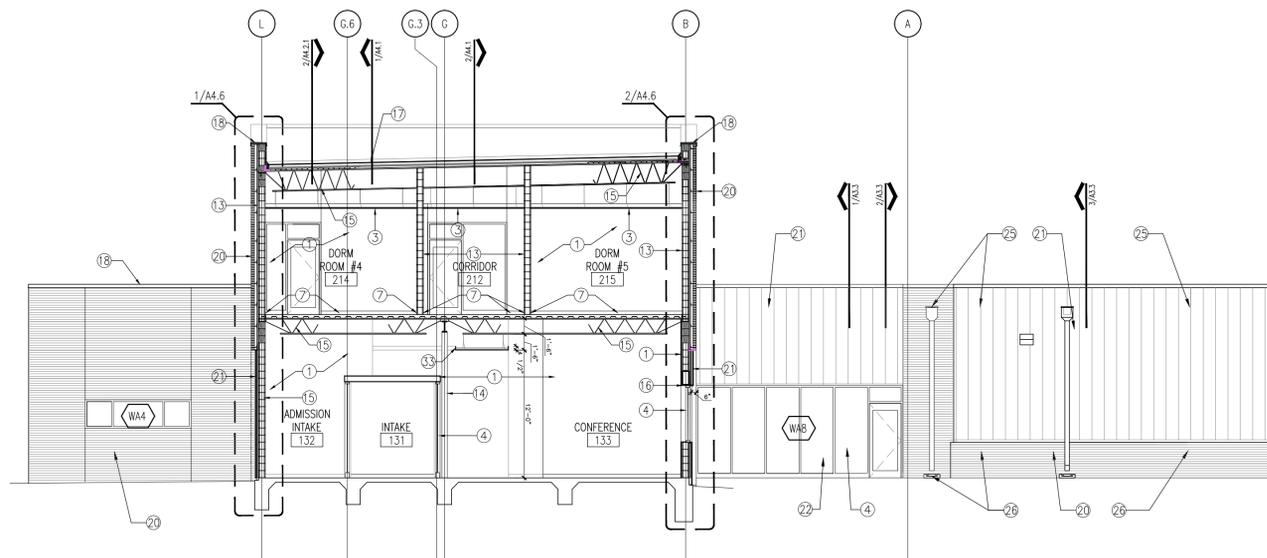


1 - BUILDING SECTION

SCALE: 1/8" = 1'-0"

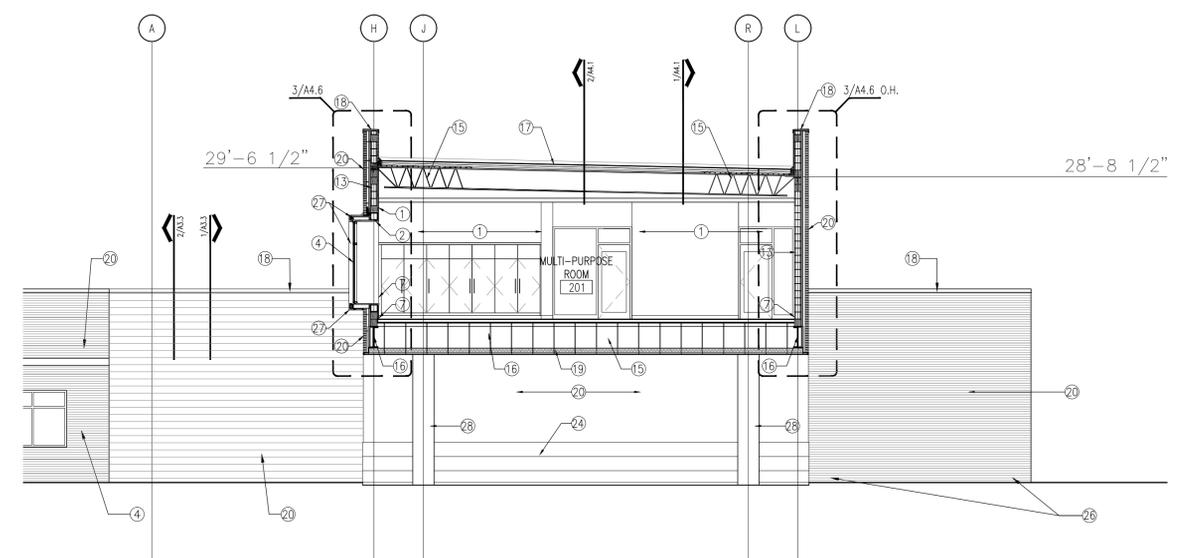
KEY LEGEND

- ① GYP. BOARD (PAINTED)
- ② GYP. BOARD CEILING/ FURR-DOWN, PAINTED
- ③ SUSPENDED CEILING REF: RCP.
- ④ ALUMINUM STOREFRONT AS SCHED.
- ⑤ GLASSWALL SYSTEM AS SPEC'D.
- ⑥ DOOR AND FRAME AS SCHEDULED
- ⑦ BASE AS SCHEDULED
- ⑧ EXTERIOR STEEL STAIRS, PAINTED
- ⑨ GUARDRAIL / HANDRAIL
- ⑩ MILLWORK
- ⑪ INTERIOR STEEL STAIRS, PAINTED
- ⑫ OVERHEAD SHUTTER DOOR
- ⑬ CMU BLOCK WALL REF: STRUCTURAL
- ⑭ 13.1 CMU - STACK BOND
- ⑮ STEEL COLUMN. PAINTED, REF: STRUCTURAL
- ⑯ STEEL JOIST REF: STRUCTURAL
- ⑰ STEEL BEAM REF: STRUCTURAL
- ⑱ SBS MODIFIED BITUMEN ROOF SYS. AS SPEC'D.
- ⑲ PREFINISHED METAL COPING AS SPEC'D.
- ⑳ SOFFIT PANEL SYSTEM AS SPEC'D.
- ㉑ FACE BRICK
- ㉒ PREFINISHED METAL WALL PANELS
- ㉓ ALUMINUM STOREFRONT METAL CLAD
- ㉔ STANDING SEAM METAL ROOF ON STRUCTURAL FRAMING
- ㉕ STEPPED EXTERIOR SEATING
- ㉖ PREFINISHED CONDUCTOR HEAD
- ㉗ PREFINISHED DOWNSPOUT & SPLASH BLOCK
- ㉘ ALUCOBOND PANELS
- ㉙ ROUND STRUCTURAL COLUMN; RE: STRUCTURAL
- ㉚ MILLWORK - UPHOLSTERED SEAT CUSHIONS
- ㉛ GYP. BD. TO CONCRETE EDGE SEAL & CAULK AS REQUIRED
- ㉜ DAMP PROOF ALL WALLS BELOW 1ST FLOOR LEVEL
- ㉝ WALL COVERING/GRAPHICS
- ㉞ ALUMINUM TRIM EDGE
- ㉟ 1/4" REGLETS REVEALS ON GYP. BD. COORDINATE WITH ARCHITECT



2 - BUILDING SECTION

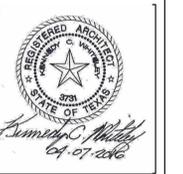
SCALE: 1/8" = 1'-0"



3 - BUILDING SECTION

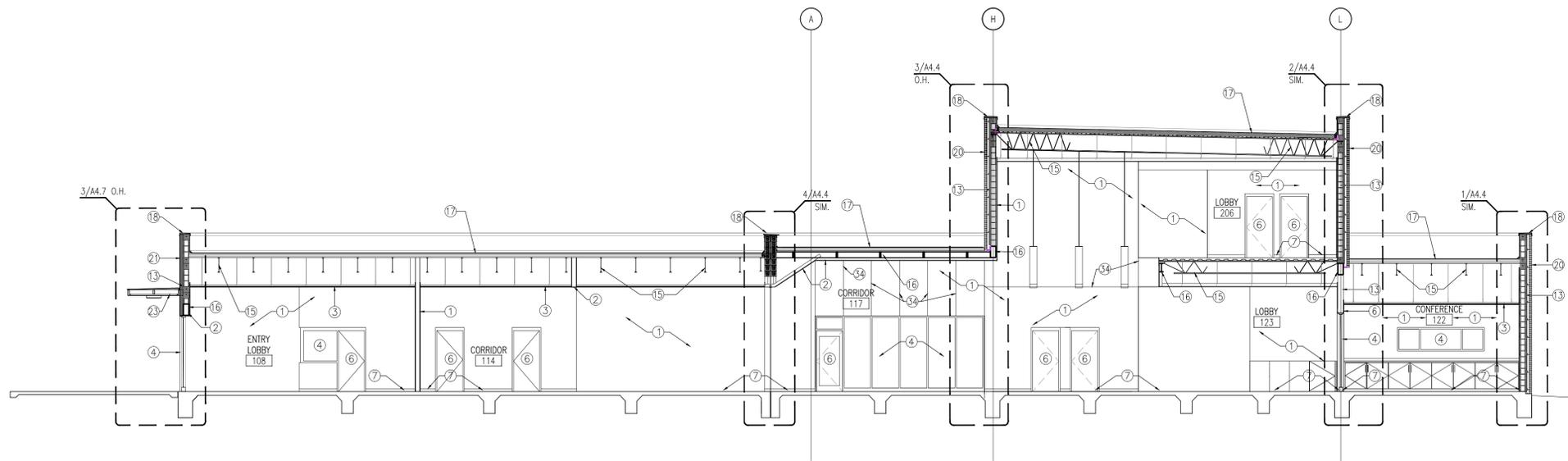
SCALE: 1/8" = 1'-0"

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WEBB COUNTY YOUTH VILLAGE
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 LAREDO, TEXAS 78046

PROJECT NUMBER	1401
REVISIONS	
FILENAME:	
SHEET TITLE	BUILDING SECTIONS
DRAWN BY:	JR
SHEET NO.	A4.2
DATE:	APRIL 7, 2016

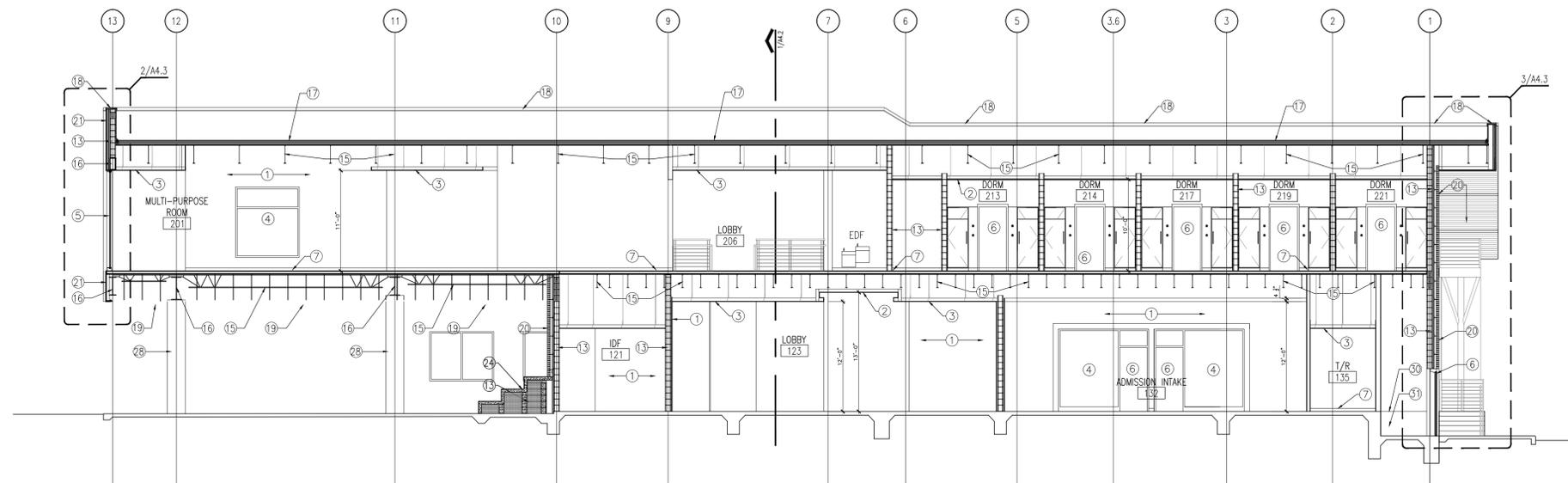


1 - BUILDING SECTION

SCALE: 1/8" = 1'-0"

KEY LEGEND

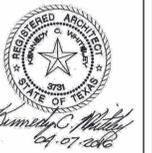
- ① GYP. BOARD (PAINTED)
- ② GYP. BOARD CEILING/ FURR-DOWN, PAINTED
- ③ SUSPENDED CEILING REF: RCP.
- ④ ALUMINUM STOREFRONT AS SCHED.
- ⑤ GLASSWALL SYSTEM AS SPEC'D.
- ⑥ DOOR AND FRAME AS SCHEDULED
- ⑦ BASE AS SCHEDULED
- ⑧ EXTERIOR STEEL STAIRS, PAINTED
- ⑨ GUARDRAIL / HANDRAIL
- ⑩ MILLWORK
- ⑪ INTERIOR STEEL STAIRS, PAINTED
- ⑫ OVERHEAD SHUTTER DOOR
- ⑬ CMU BLOCK WALL REF: STRUCTURAL
- ⑬.1 CMU - STACK BOND
- ⑭ STEEL COLUMN. PAINTED, REF: STRUCTURAL
- ⑮ STEEL JOIST REF: STRUCTURAL
- ⑯ STEEL BEAM REF: STRUCTURAL
- ⑰ SBS MODIFIED BITUMEN ROOF SYS. AS SPEC'D.
- ⑱ PREFINISHED METAL COPING AS SPEC'D.
- ⑲ SOFFIT PANEL SYSTEM AS SPEC'D.
- ⑳ FACE BRICK
- ㉑ PREFINISHED METAL WALL PANELS
- ㉒ ALUMINUM STOREFRONT TUBE FRAMING
- ㉓ STANDING SEAM METAL ROOF ON STRUCTURAL FRAMING
- ㉔ STEPPED EXTERIOR SEATING
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- ㉘ ROUND STRUCTURAL COLUMN; RE: STRUCTURAL
- ㉙ BUILT-IN INTERIOR SEATING
- ㉚ GYP. BD. TO CONCRETE EDGE SEAL & CAULK AS REQUIRED
- ㉛ DAMP PROOF ALL WALLS BELOW 1ST FLOOR LEVEL
- ㉜ WALL COVERING/GRAPHICS
- ㉝ ALUMINUM TRIM EDGE
- ㉞ 1/4" REGLETS REVEALS ON GYP. BD. COORDINATE WITH ARCHITECT



2 - BUILDING SECTION

SCALE: 1/8" = 1'-0"

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PROJECT NUMBER

1401

REVISIONS

FILENAME:

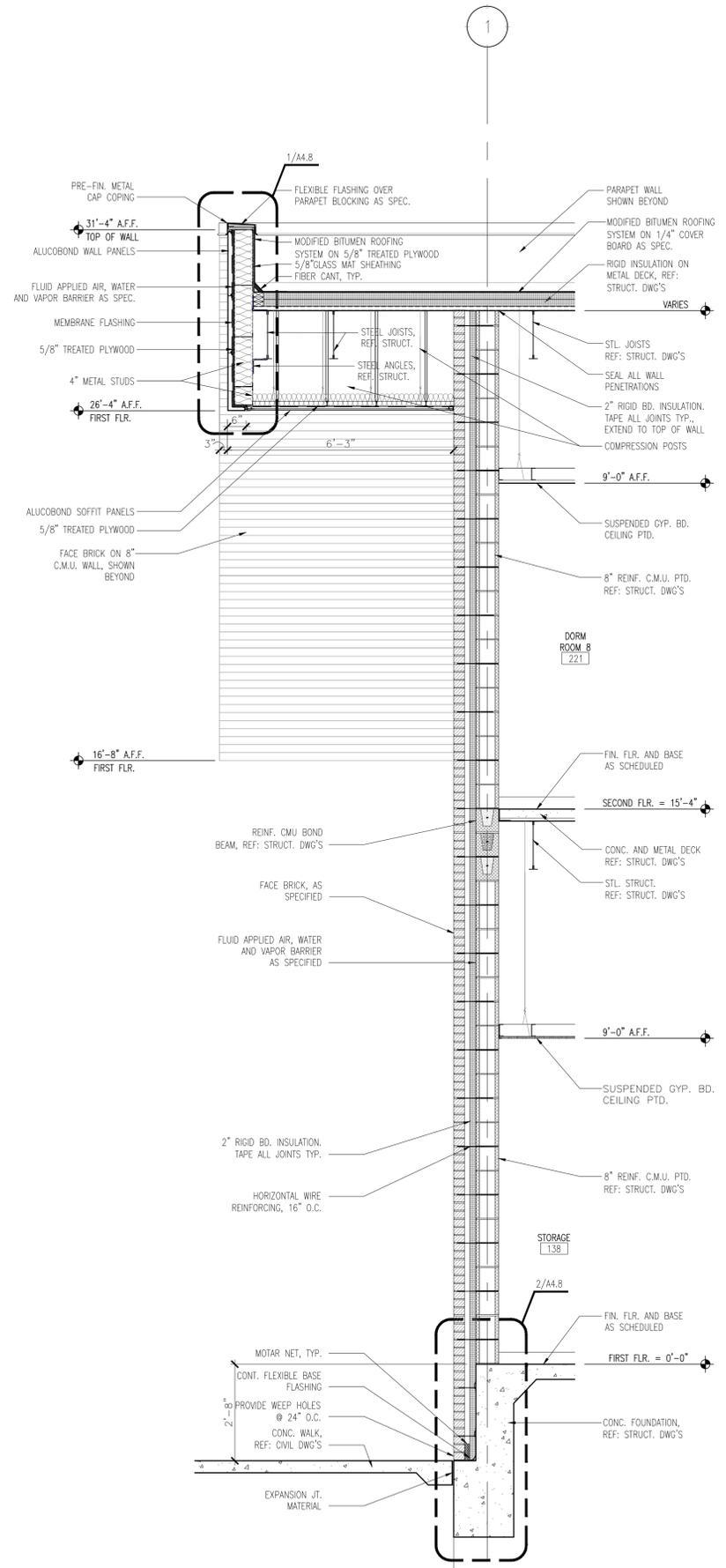
SHEET TITLE
BUILDING SECTION

DRAWN BY: JR

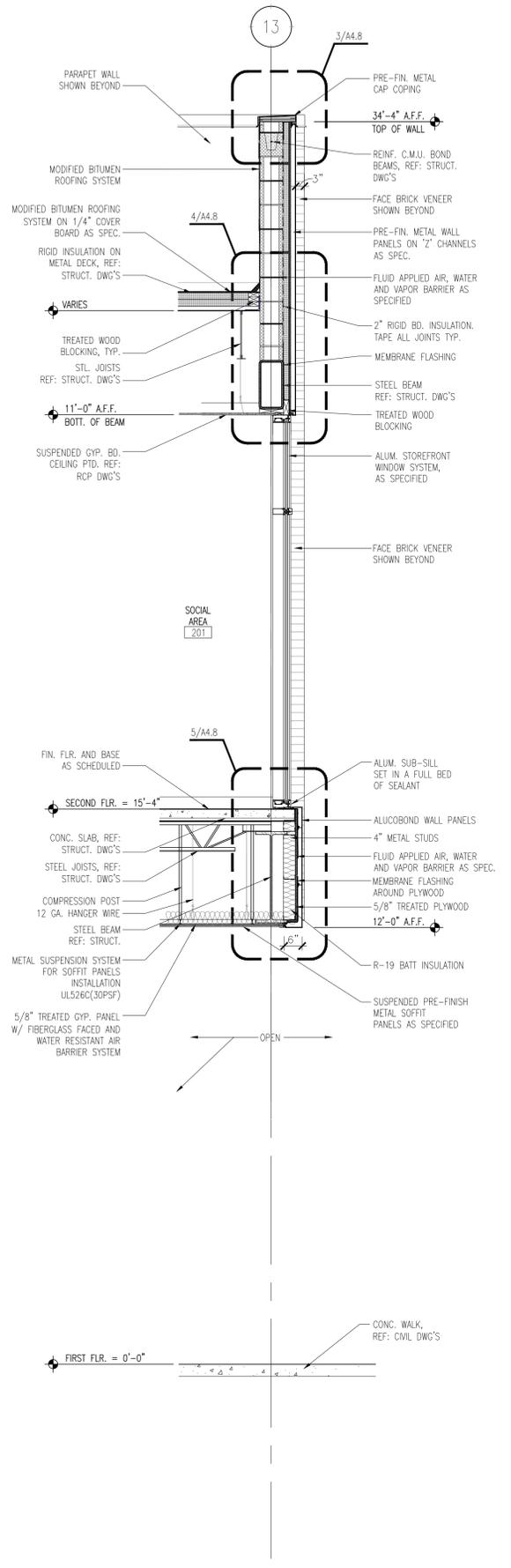
SHEET NO.

A4.2.1

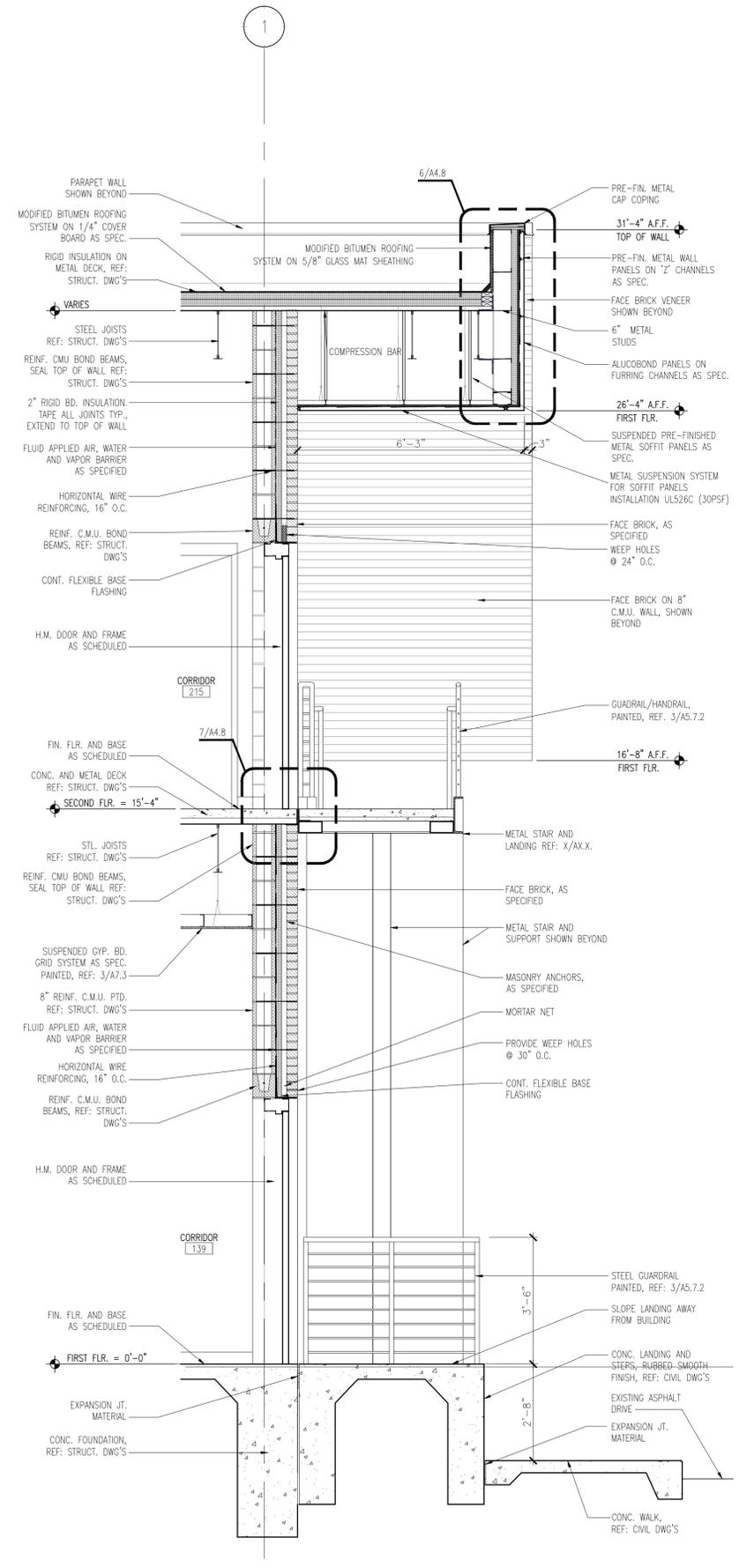
DATE: APRIL 7, 2016



1 - WALL SECTION
SCALE: 1/2" = 1'-0"

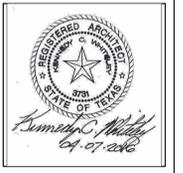


2 - WALL SECTION
SCALE: 1/2" = 1'-0"



3 - WALL SECTION
SCALE: 1/2" = 1'-0"

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LAREDO, TEXAS 78046

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REVISIONS

FILENAME:

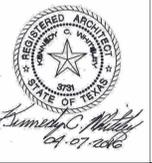
SHEET TITLE
WALL SECTIONS

DRAWN BY: JR

SHEET NO.

A4.3

DATE: APRIL 7, 2016



PROJECT NUMBER
1401

REVISIONS

FILENAME:

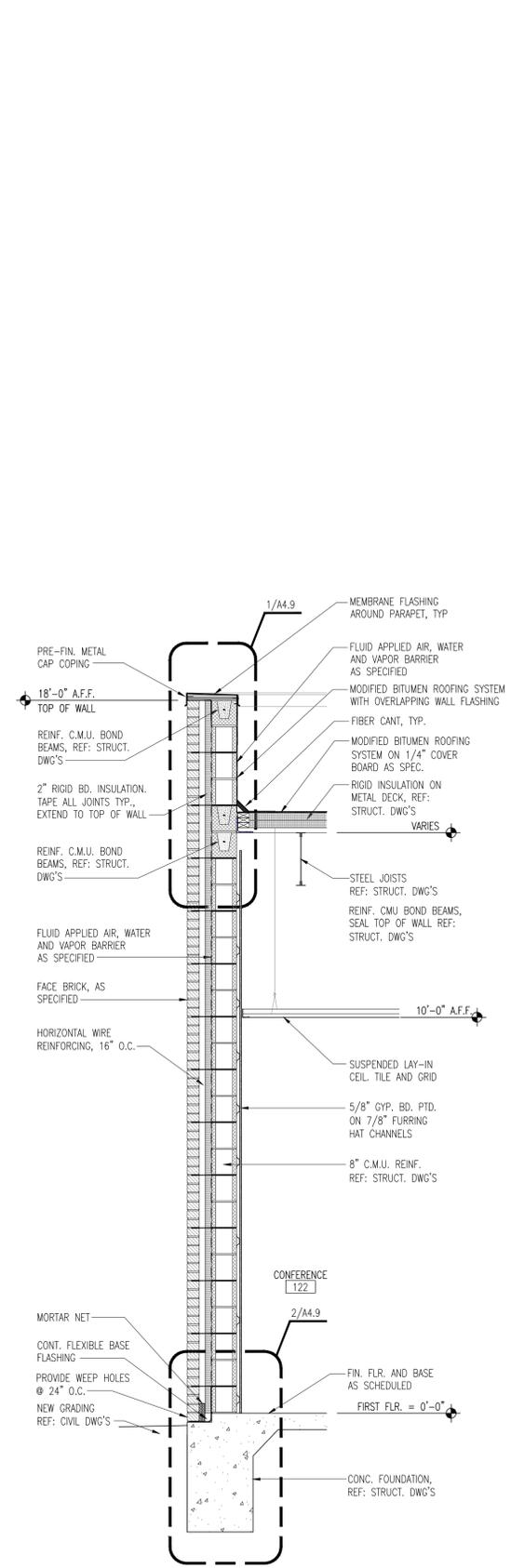
SHEET TITLE
WALL SECTIONS

DRAWN BY: JR

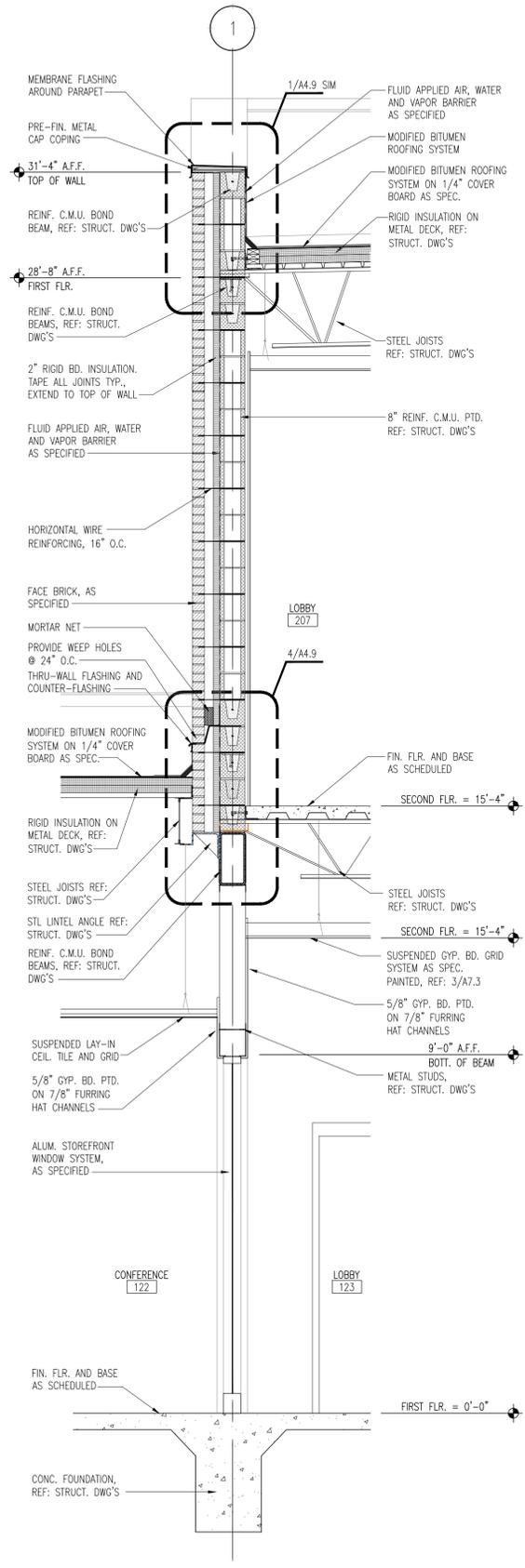
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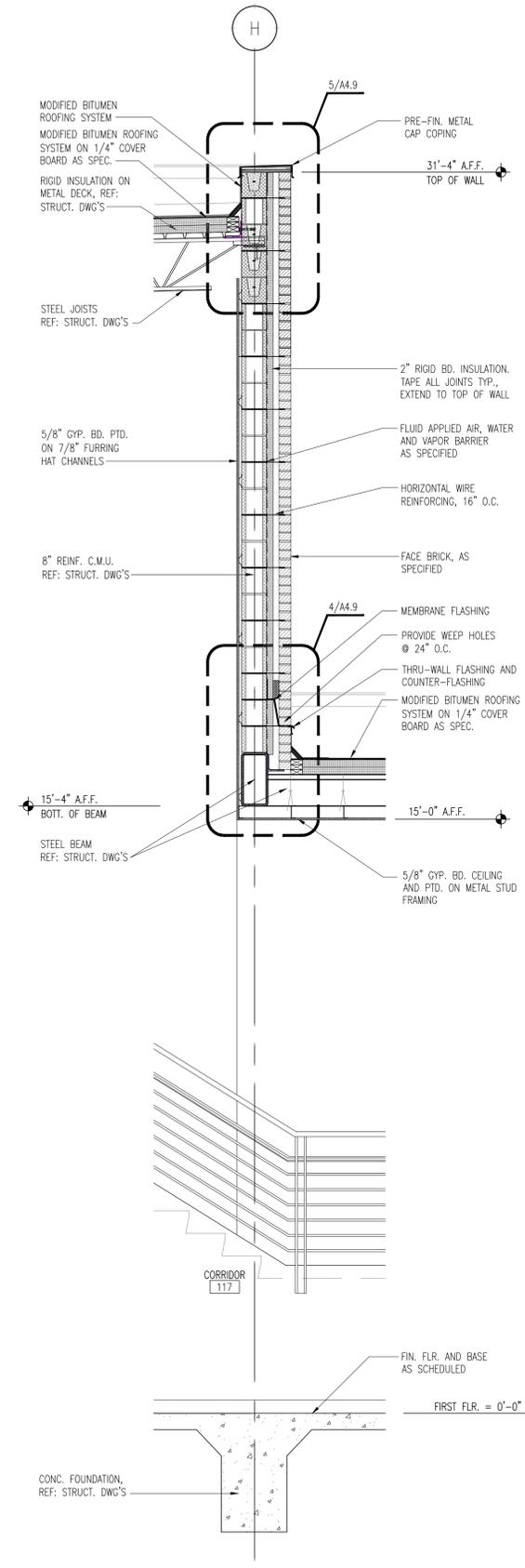
DATE: APRIL 7, 2016



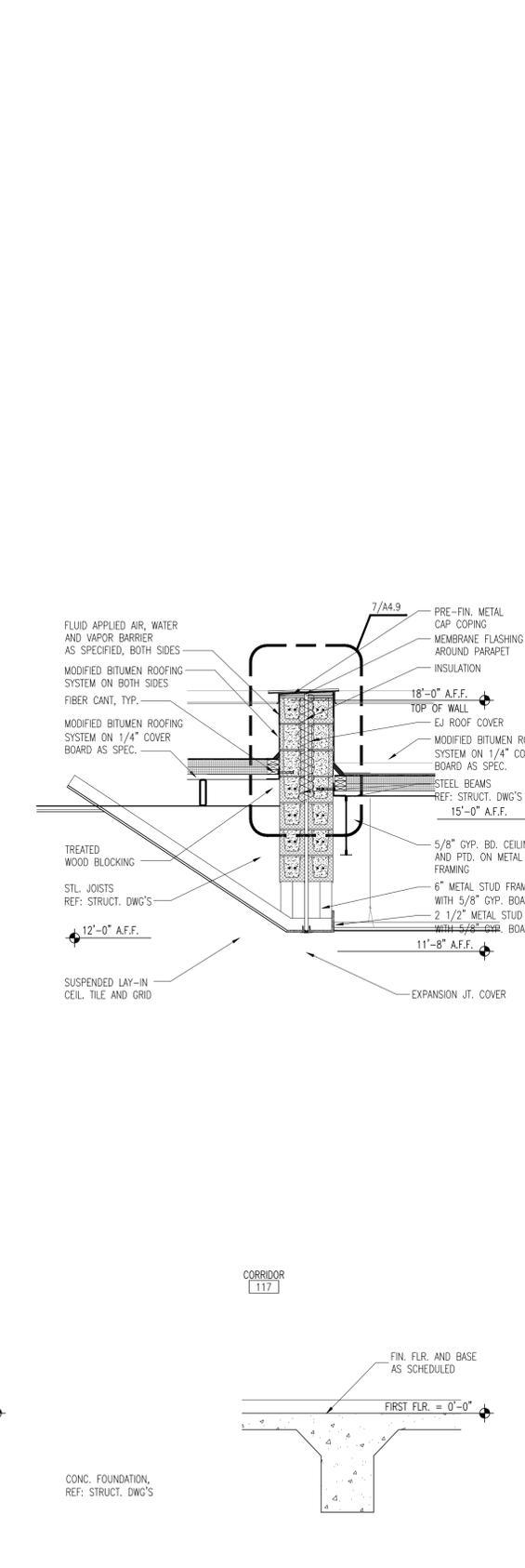
1 - WALL SECTION
 SCALE: 1/2" = 1'-0"



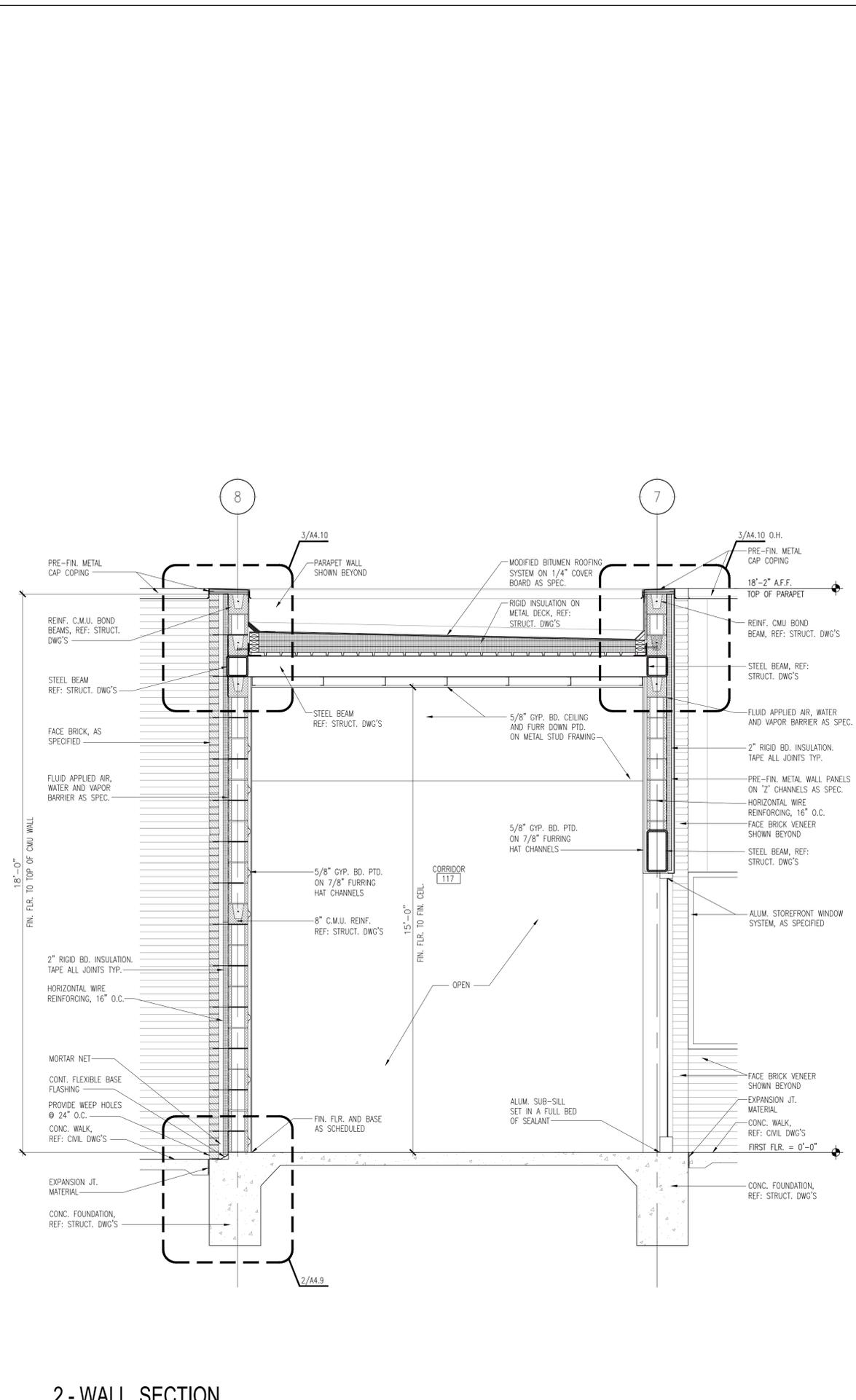
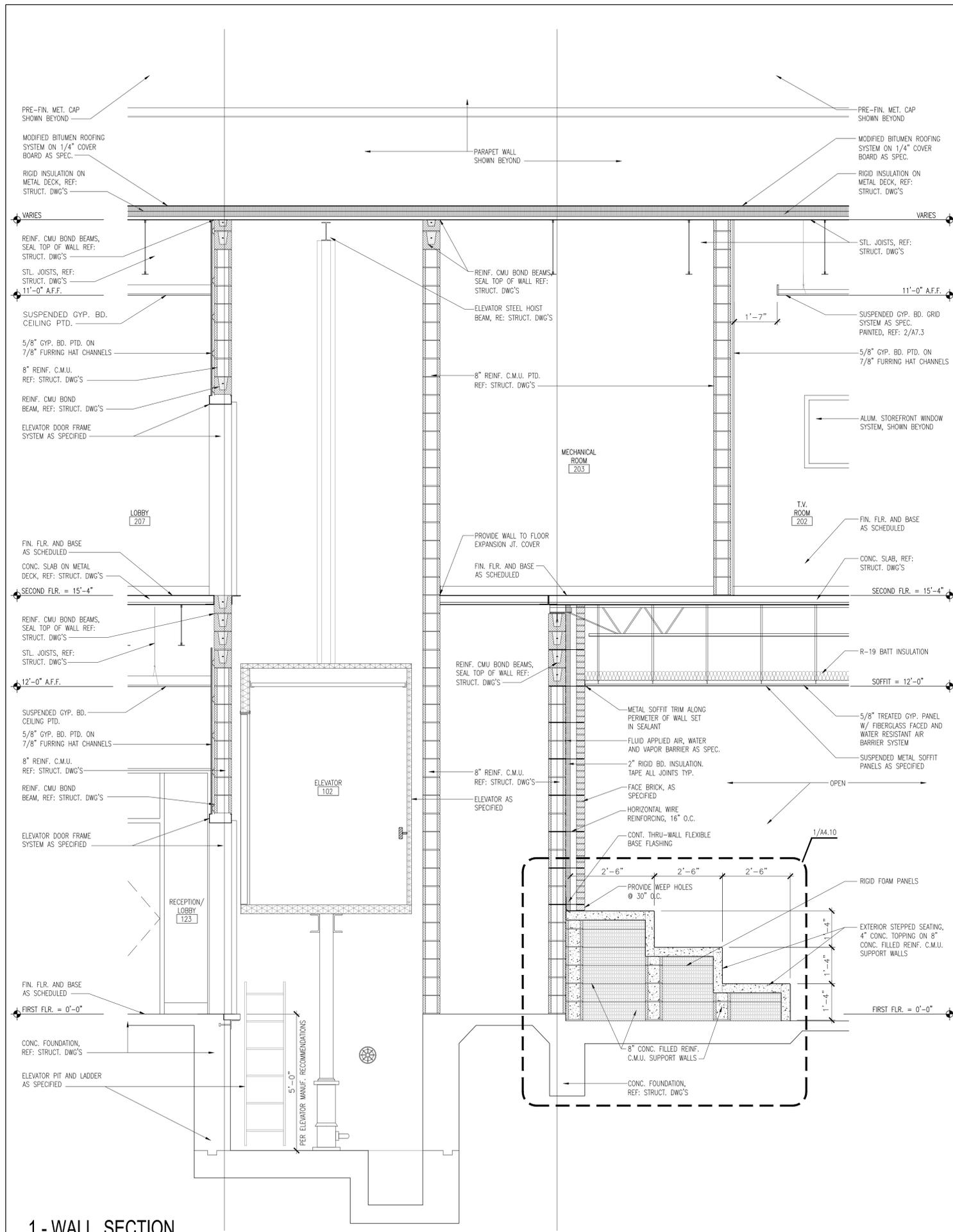
2 - WALL SECTION
 SCALE: 1/2" = 1'-0"



3 - WALL SECTION
 SCALE: 1/2" = 1'-0"



4 - WALL SECTION
 SCALE: 1/2" = 1'-0"



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WEBB COUNTY YOUTH VILLAGE
REHABILITATION CENTER
111 CAMINO NUEVO ROAD, HWY 359
LAREDO, TEXAS 78046

PROJECT NUMBER
1401

REVISIONS

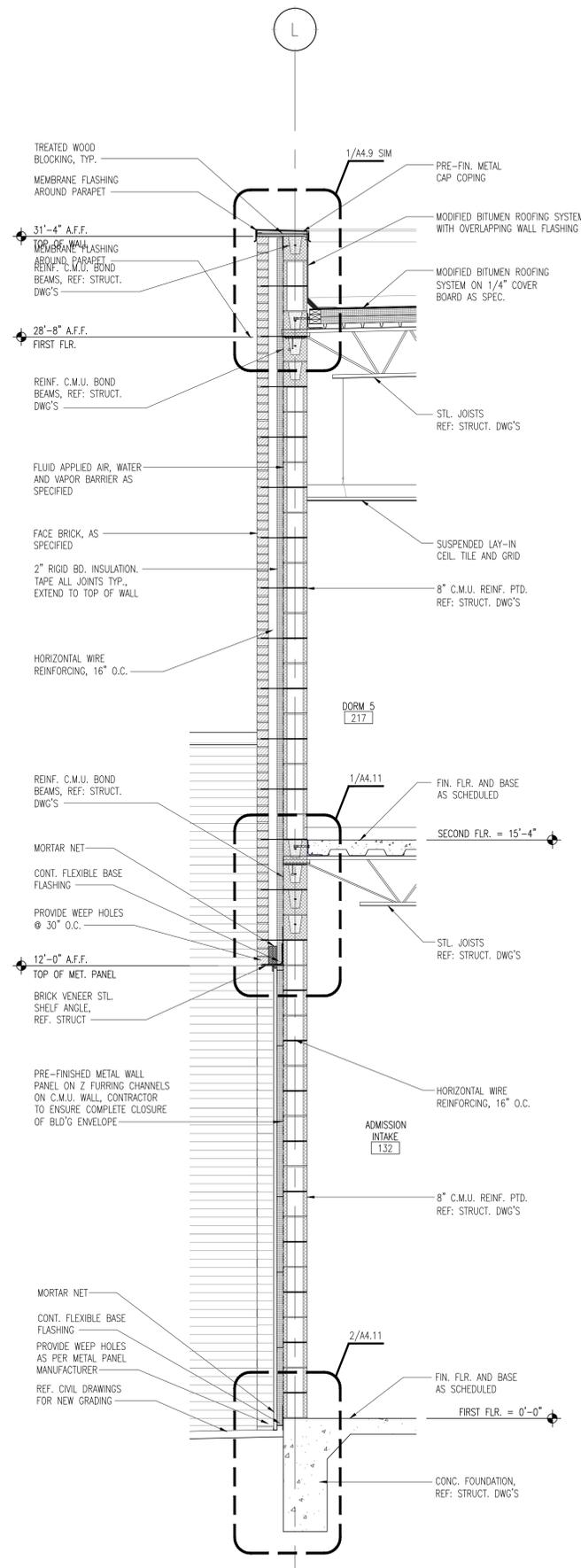
FILENAME:

SHEET TITLE
WALL SECTIONS

DRAWN BY: JR

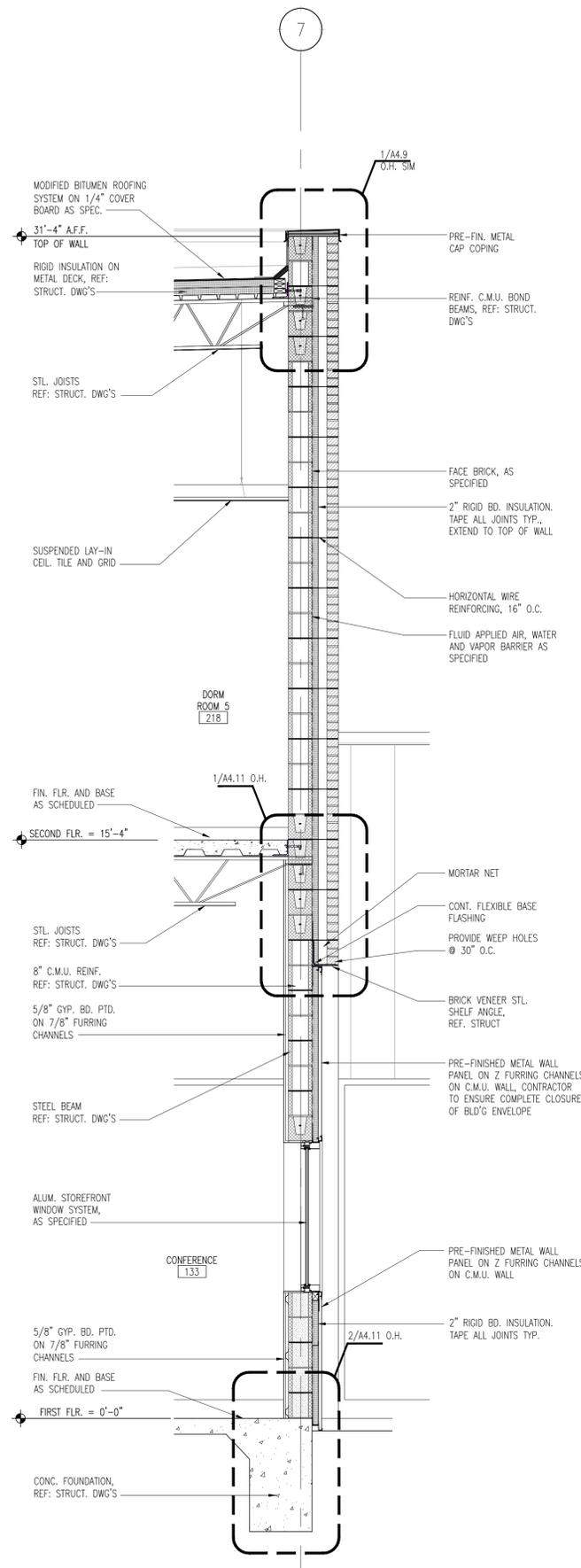
SHEET NO.
A4.5

DATE: APRIL 7, 2016



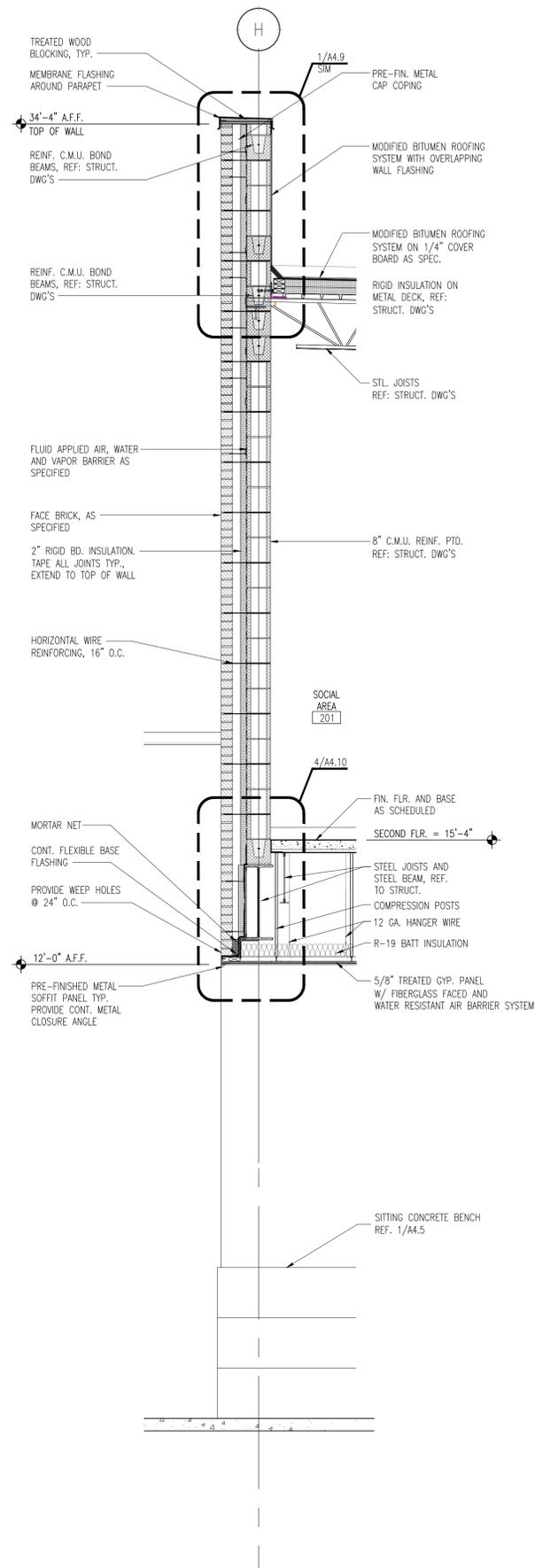
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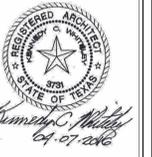
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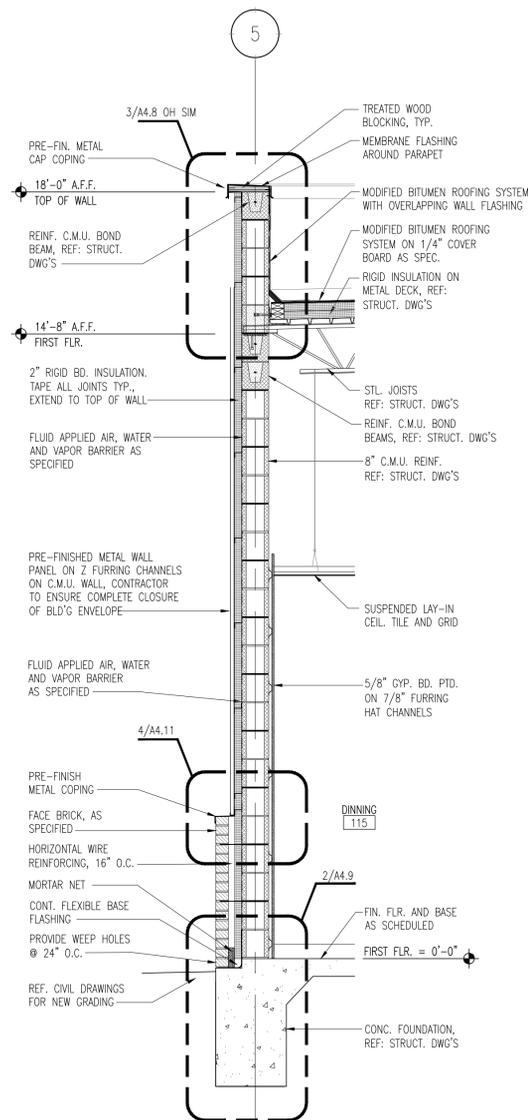
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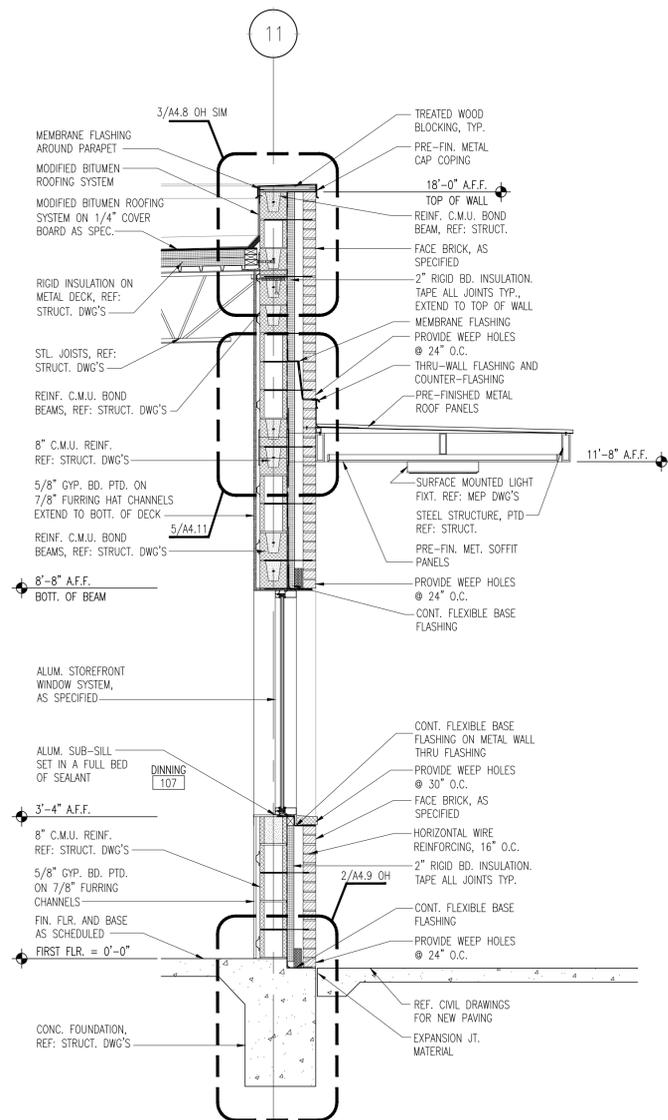
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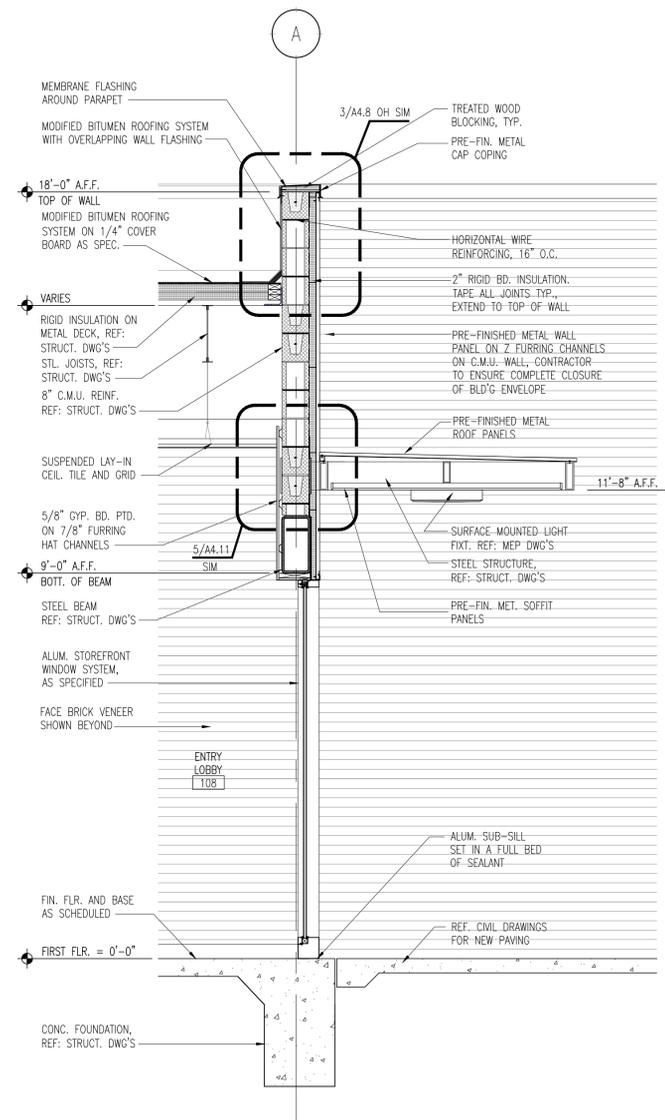
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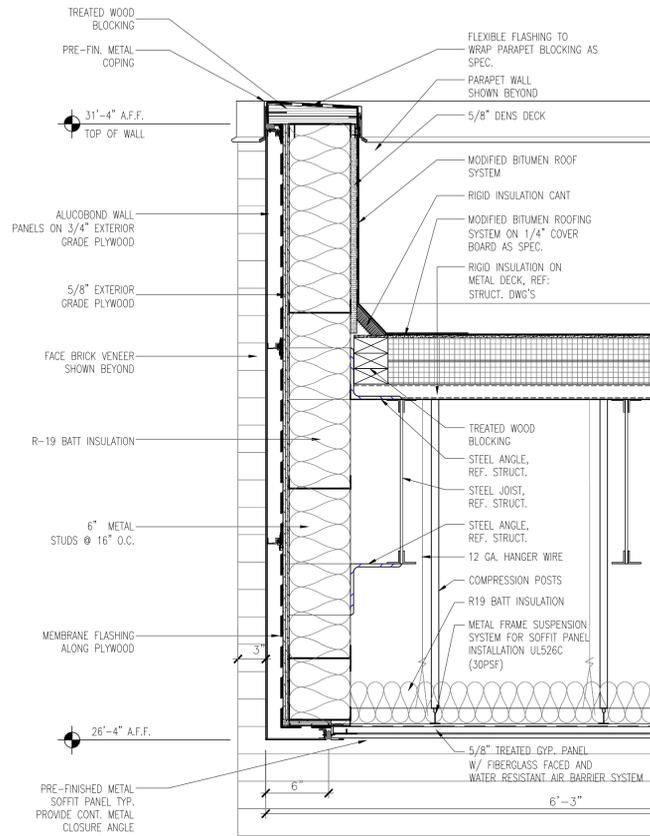
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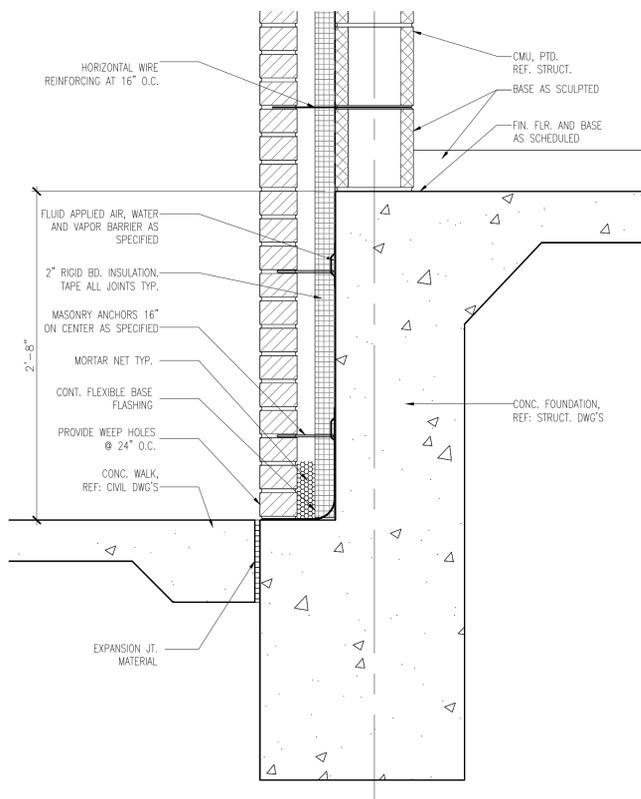
3 - WALL SECTION

SCALE: 1/2" = 1'-0"



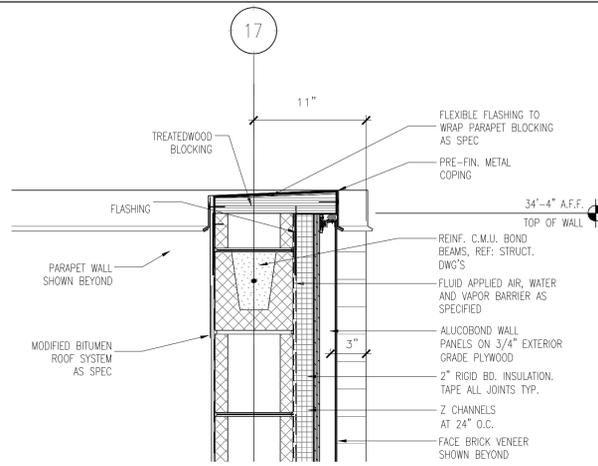
1 - SECTION DETAIL

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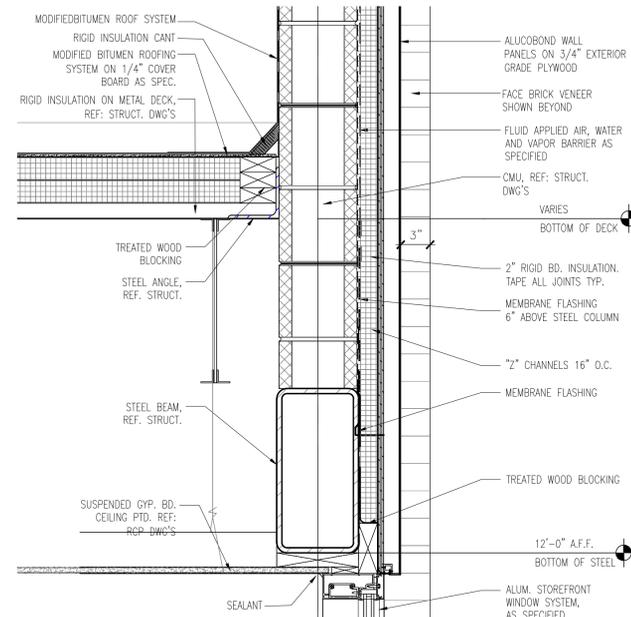
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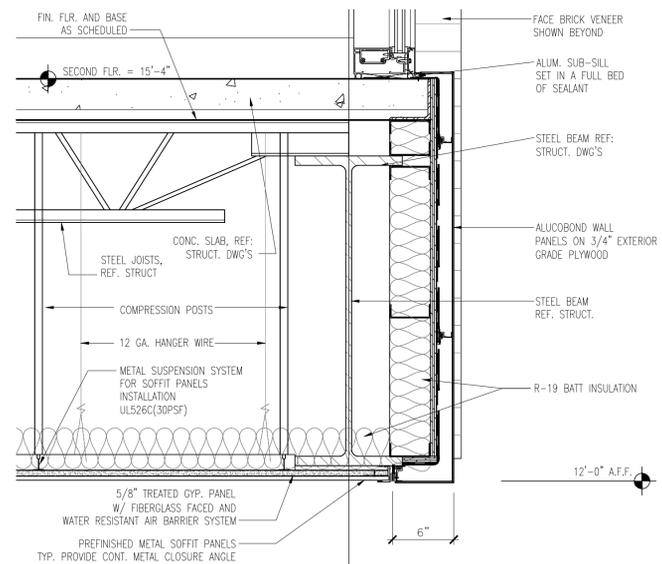
3 - WALL SECTION

SCALE: 1 1/2" = 1'-0"



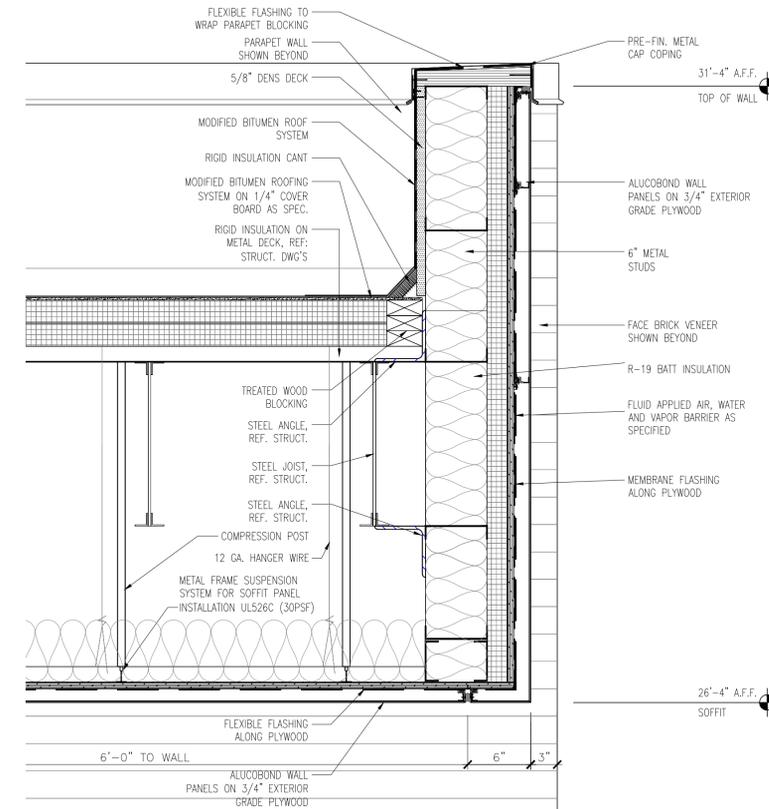
4 - WALL SECTION

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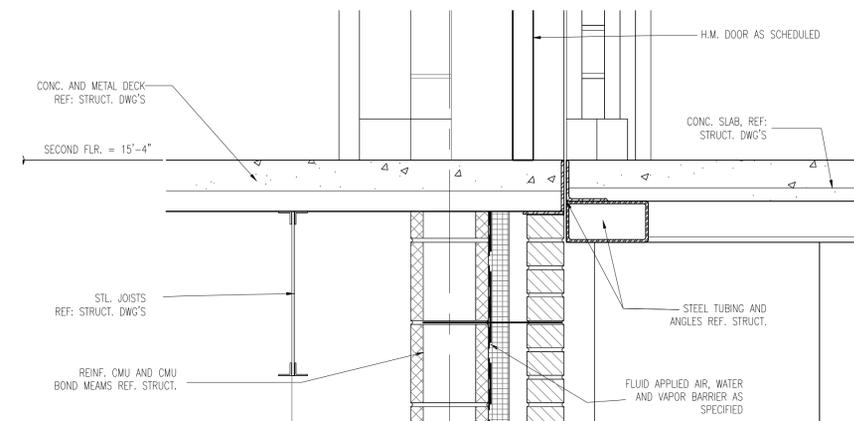
5 - SECTION DETAIL

SCALE: 1 1/2" = 1'-0"



6 - SECTION DETAIL

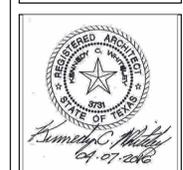
SCALE: 1 1/2" = 1'-0"



7 - SECTION DETAIL

SCALE: 1 1/2" = 1'-0"

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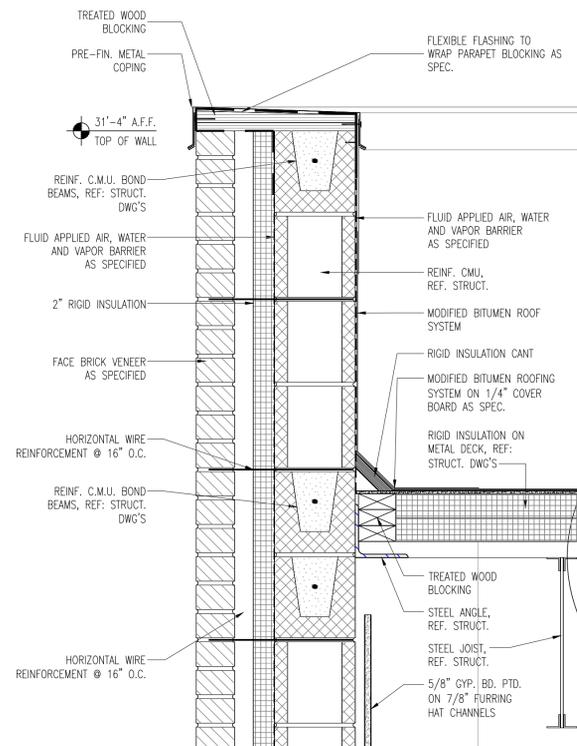
SHEET TITLE
 SECTION DETAILS

DRAWN BY: rp

SHEET NO.

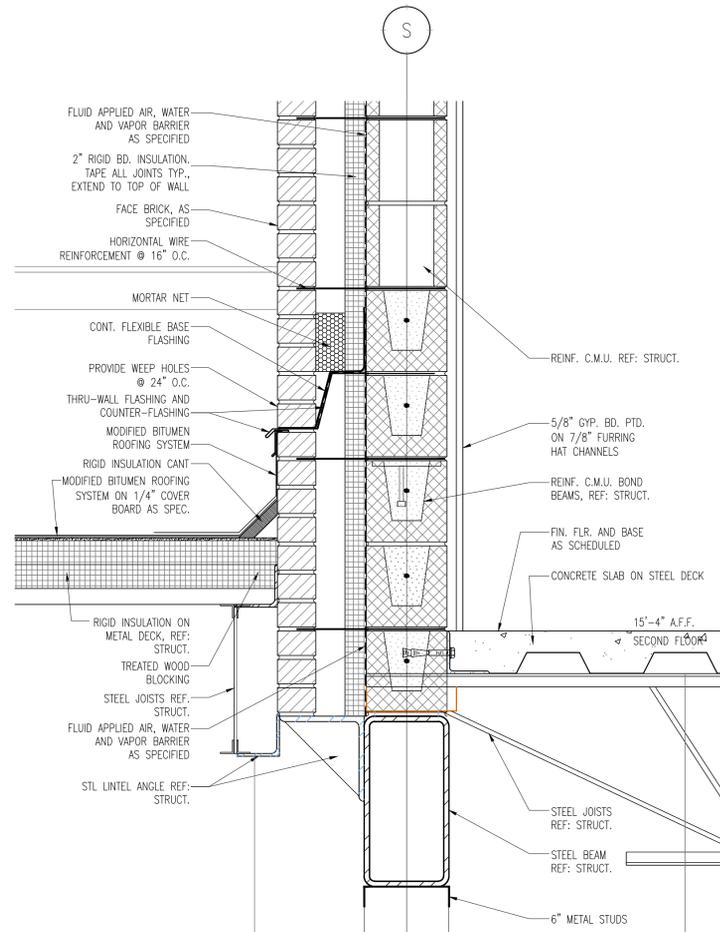
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DATE: APRIL 7, 2016



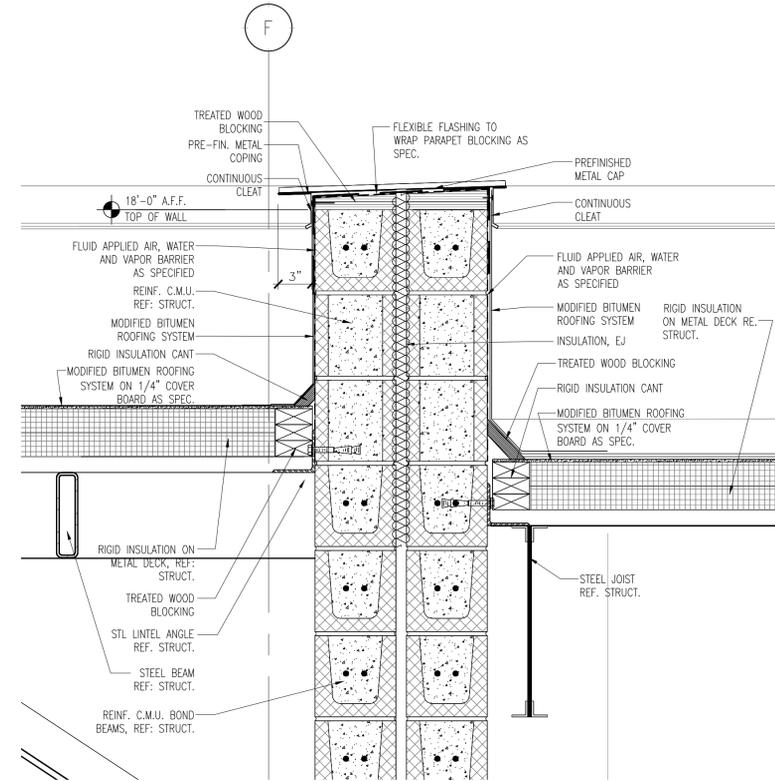
1 - SECTION DETAIL

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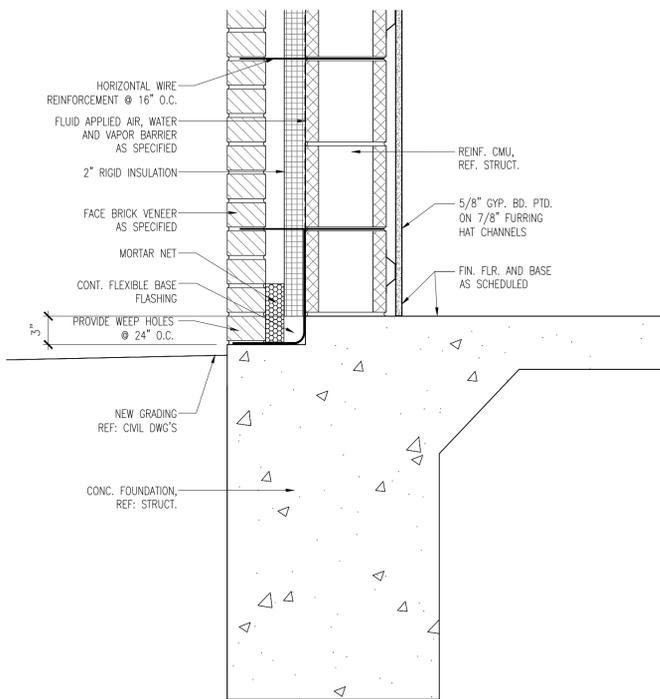
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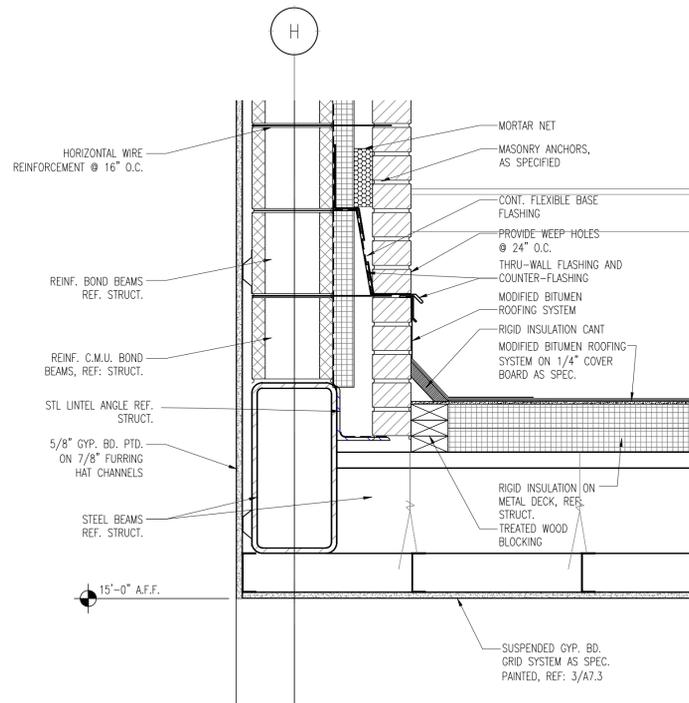
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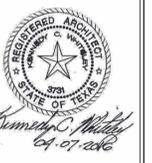
2 - SECTION DETAIL

SCALE: 1 1/2" = 1'-0"



4 - SECTION DETAIL

SCALE: 1 1/2" = 1'-0"



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FILENAME:

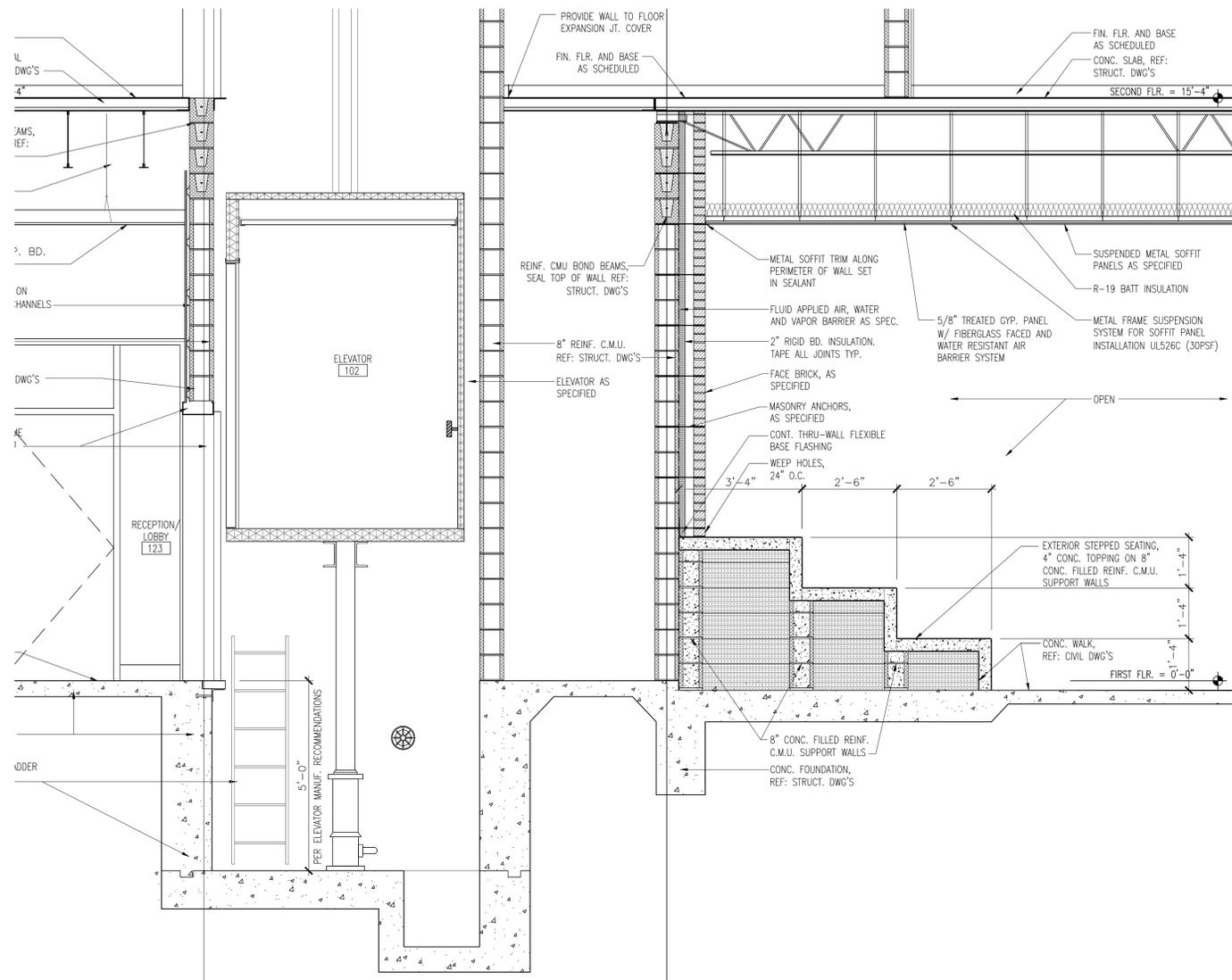
SHEET TITLE
WALL SECTIONS
DETAIL

DRAWN BY: JR/RP

SHEET NO.

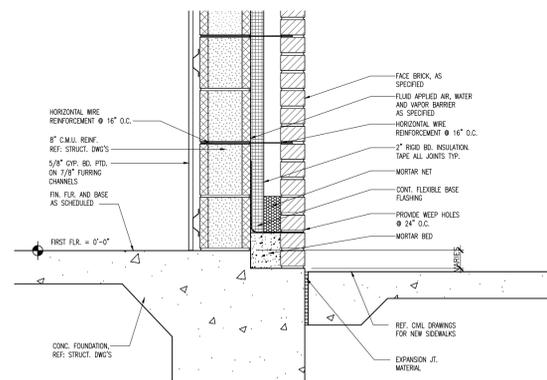
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DATE: APRIL 7, 2016



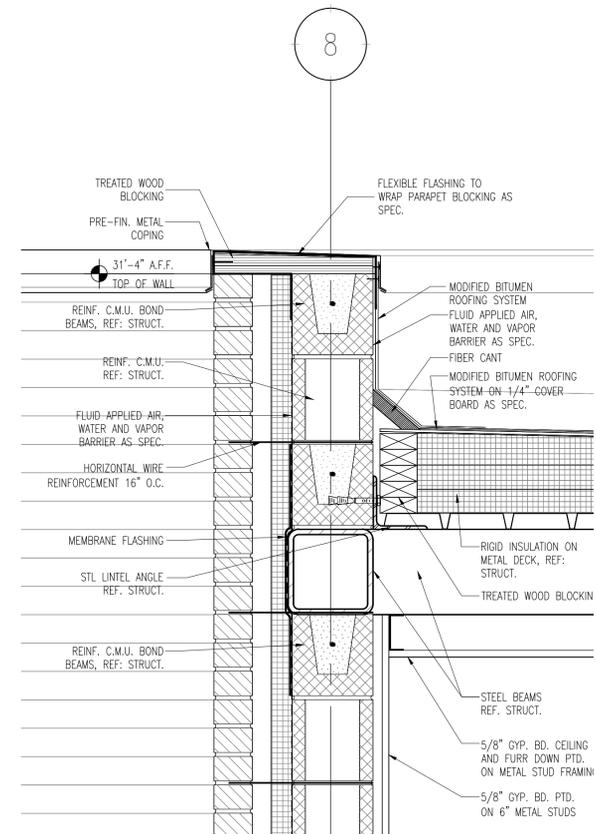
1 - SECTION DETAIL

SCALE: 1/2" = 1'-0"



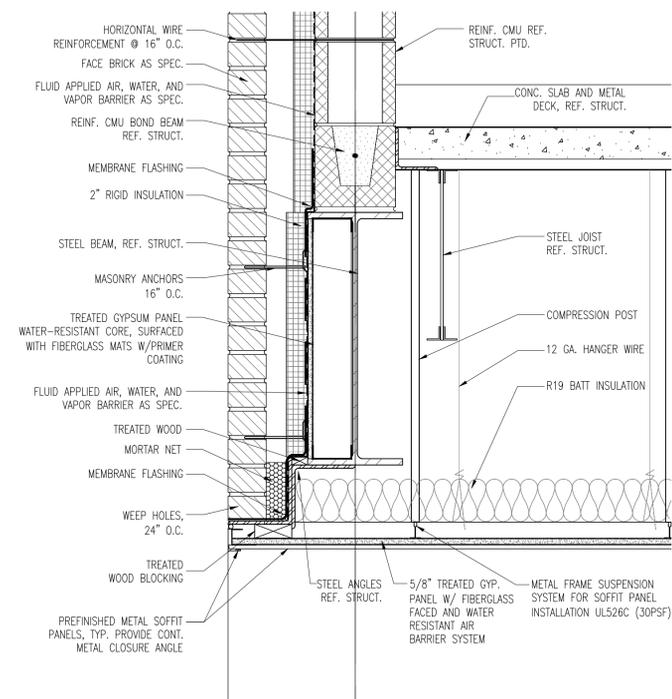
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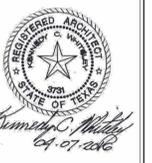
3 - SECTION DETAIL

SCALE: 1 1/2" = 1'-0"



4 - SECTION DETAIL

SCALE: 1 1/2" = 1'-0"



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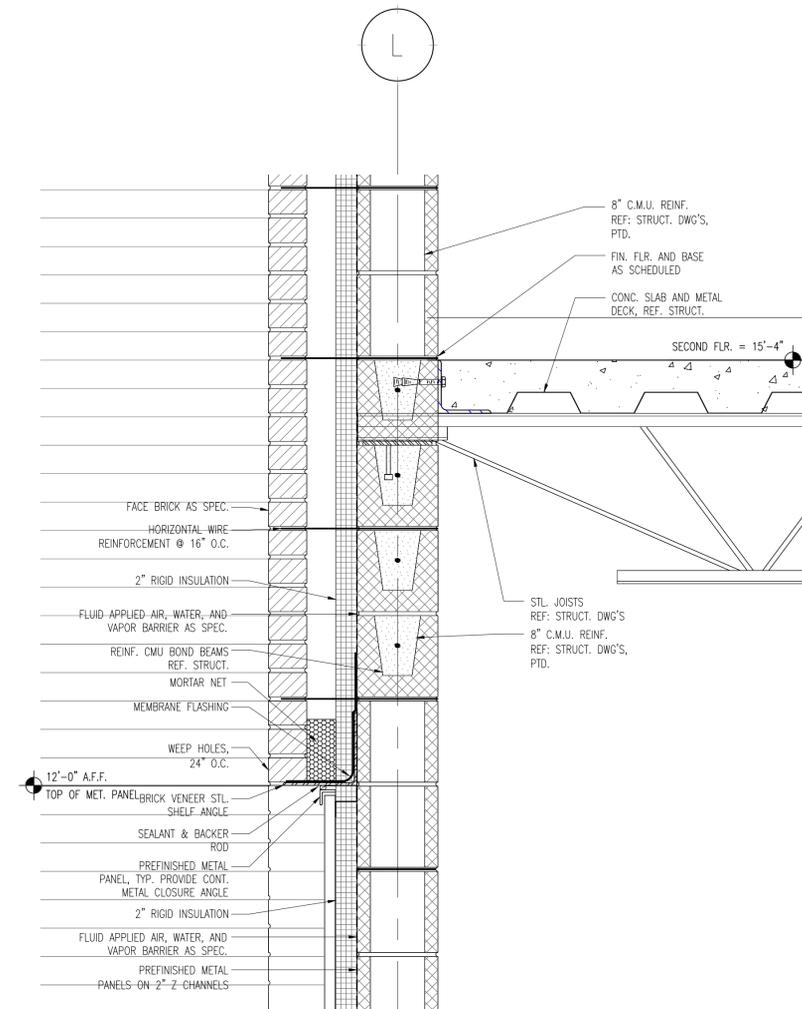
SHEET TITLE
WALL SECTIONS
DETAIL

DRAWN BY: JR

SHEET NO.

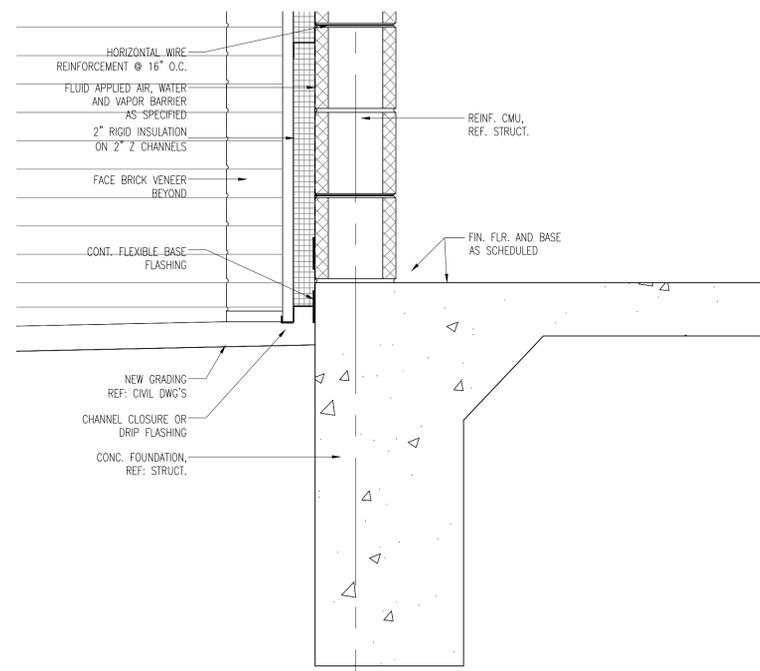
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DATE: APRIL 7, 2016



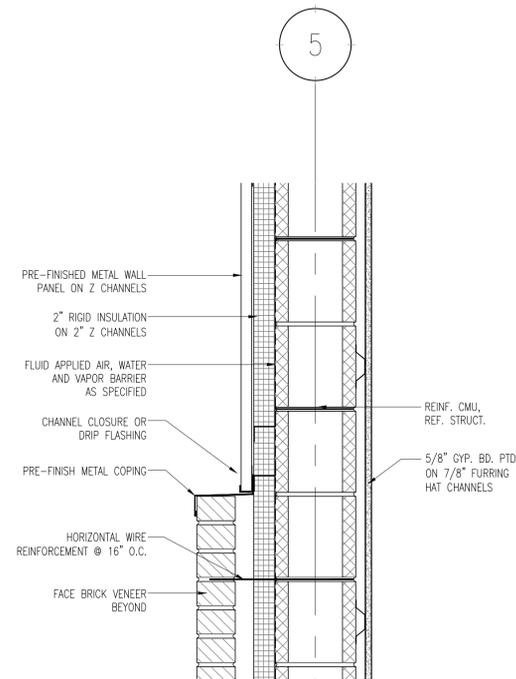
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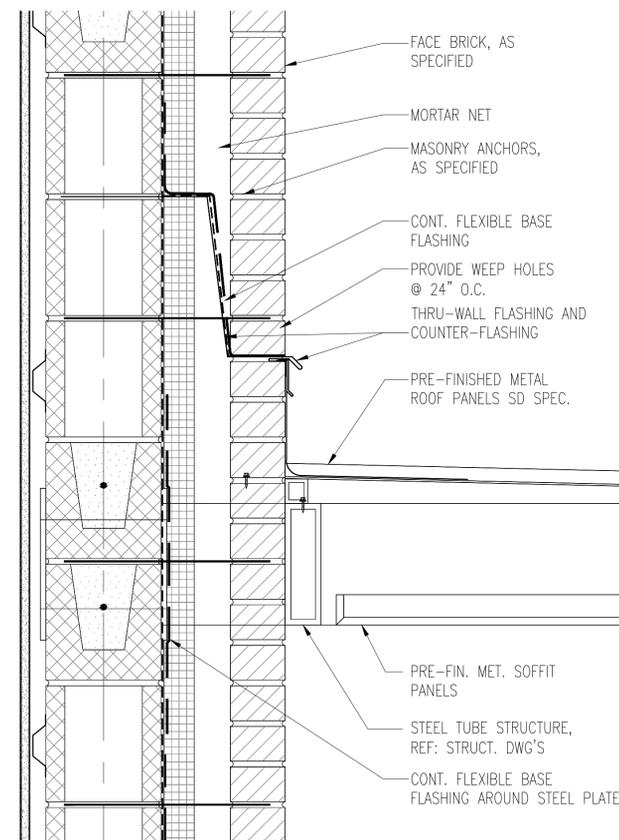
2 - SECTION DETAIL

SCALE: 1/2" = 1'-0"



3 - SECTION DETAIL

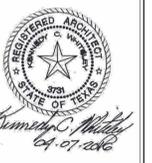
SCALE: 1/2" = 1'-0"



4 - SECTION DETAIL

SCALE: 1 1/2" = 1'-0"

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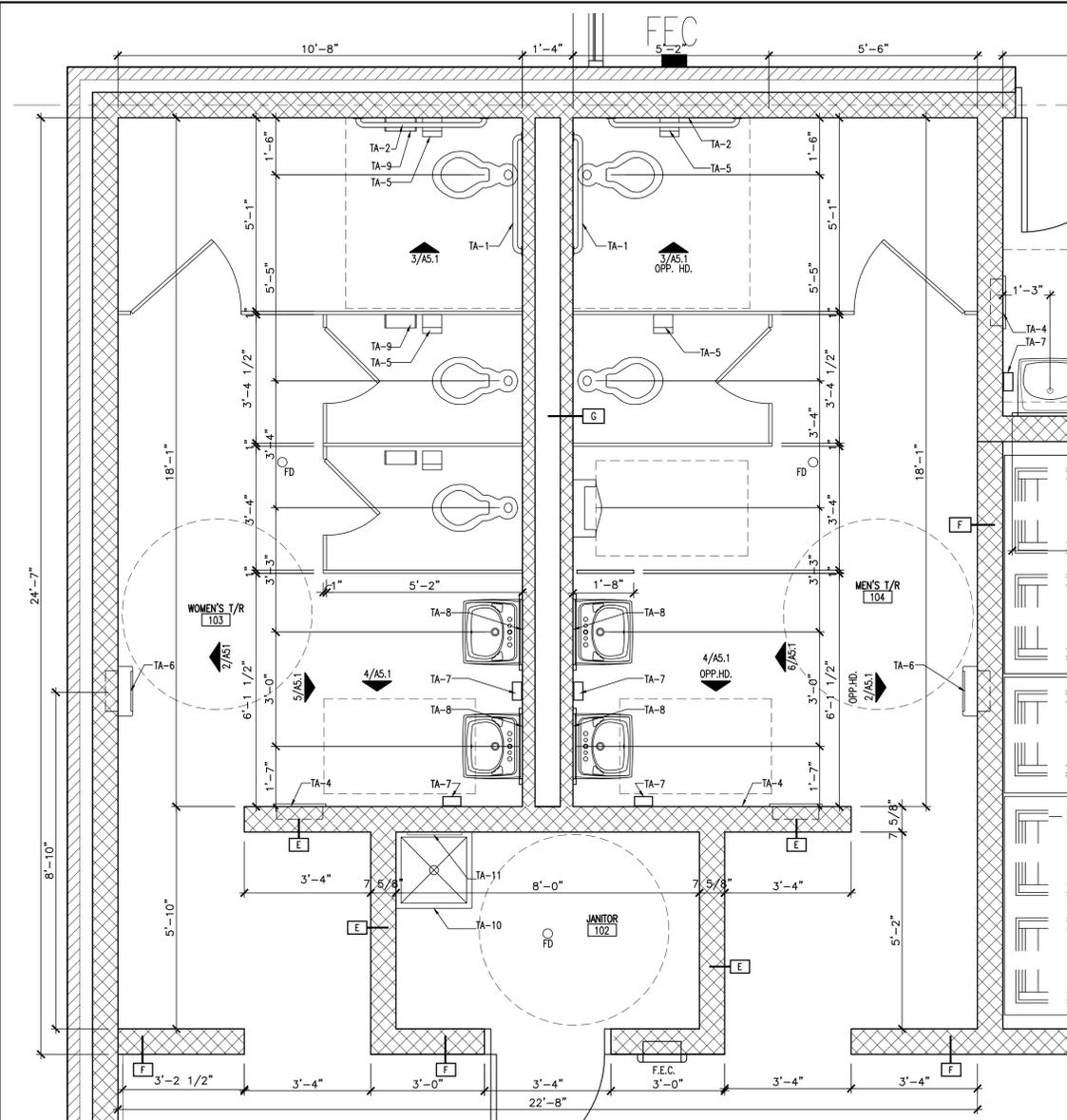
SHEET TITLE
WALL SECTIONS
DETAIL

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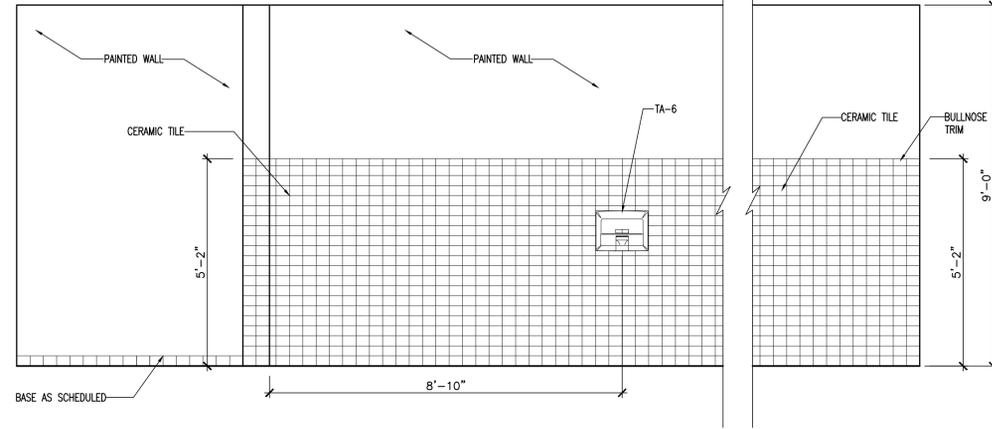
SHEET NO.

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DATE: APRIL 7, 2016



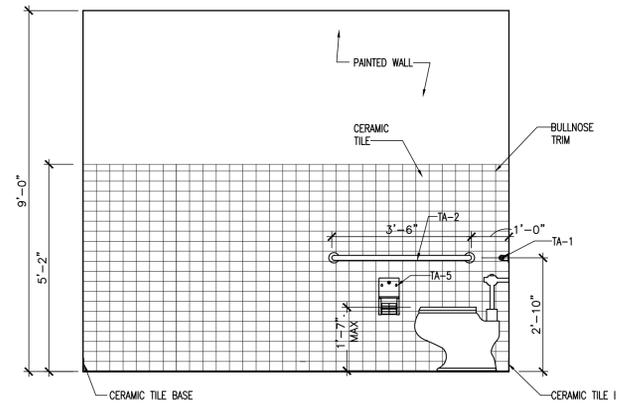
1 - ENLARGED TOILET ROOM (103, 104)
SCALE: 1/2" = 1'-0"



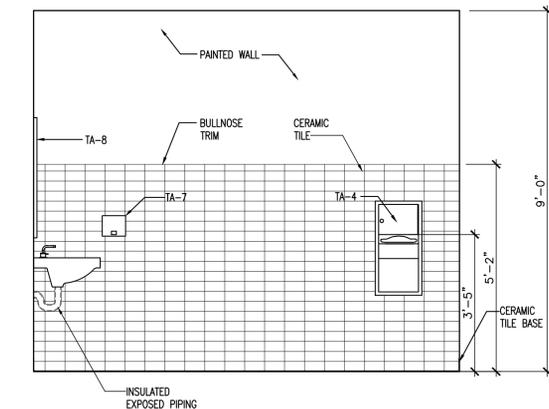
2 - TOILET ROOM ELEVATION - (103, 104)
SCALE: 1/2" = 1'-0"

TOILET ACCESSORY SCHEDULE	
TA-1	36" STAINLESS STEEL GRAB BAR
TA-2	42" STAINLESS STEEL GRAB BAR
TA-3	18" STAINLESS STEEL GRAB BAR
TA-4	PAPER TOWEL DISPENSER / RECEPTACLE
TA-5	TOILET TISSUE DISPENSER
TA-6	ELECTRIC HAND DRYER
TA-7	SOAP DISPENSER
TA-8	24x36 MIRROR
TA-9	FEMININE NAPKIN DISPOSAL
TA-10	MOP SINK
TA-11	MOP RACK
TA-12	WATER FOUNTAIN
TA-13	12" STAINLESS STEEL GRAB BAR
TA-14	3' X 5' CONTINUOUS GRAB BAR
TA-15	COAT HOOK
TA-16	TOWEL HOOK
TA-17	ADA COMPLIANT SHOWER CONTROLS
TA-18	ADA COMPLIANT SHOWER BENCH
TA-19	24" TOWEL ROD
TA-20	ADA COMPLIANT MIRROR
TA-21	SHOWER CURTAIN ROD

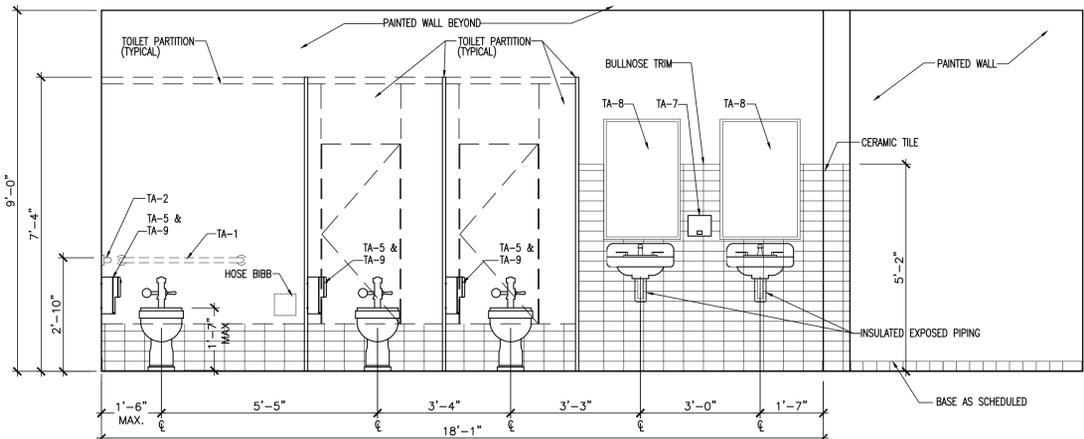
REFER TO SHEET AG.3 FOR MOUNTING HEIGHTS



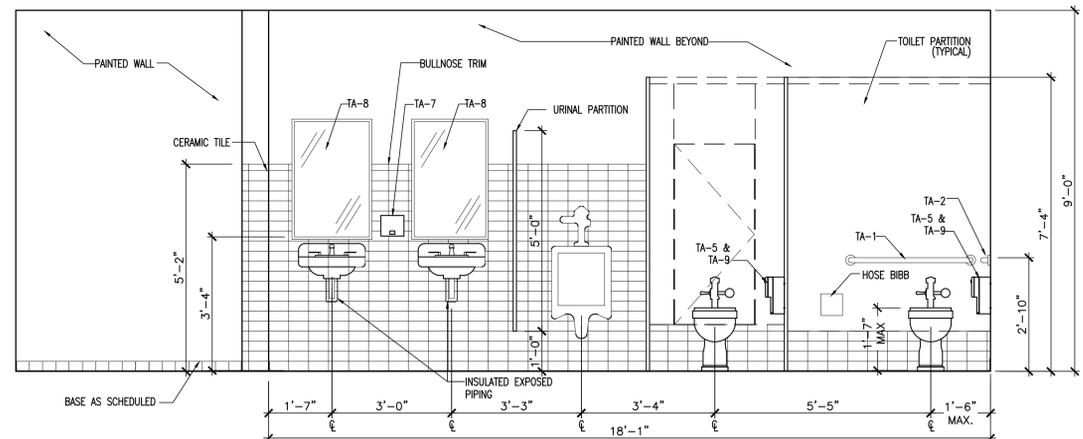
3 - TOILET ROOM ELEVATION - (103, 104)
SCALE: 1/2" = 1'-0"



4 - TOILET ROOM ELEVATION - (103, 104)
SCALE: 1/2" = 1'-0"



5 - TOILET ROOM (103) ELEVATION
SCALE: 1/2" = 1'-0"



6 - TOILET ROOM (104) ELEVATION
SCALE: 1/2" = 1'-0"

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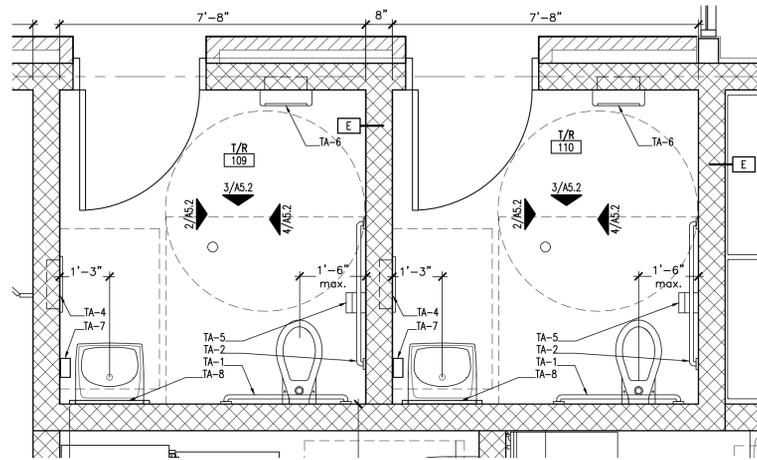
SHEET TITLE
ENLARGED TOILET
PLANS AND
ELEVATIONS

DRAWN BY: JR/RP

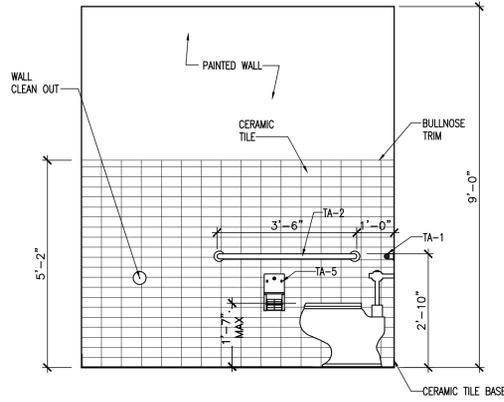
SHEET NO.

A5.1

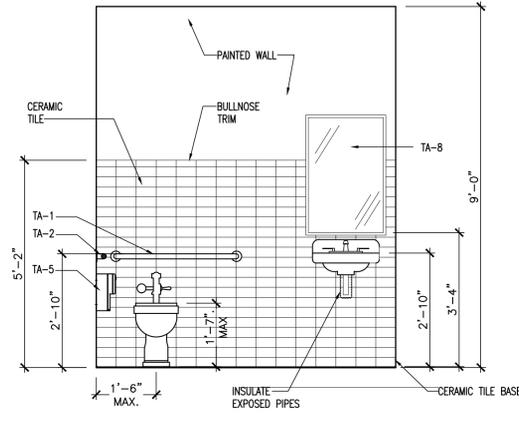
DATE: APRIL 7, 2016



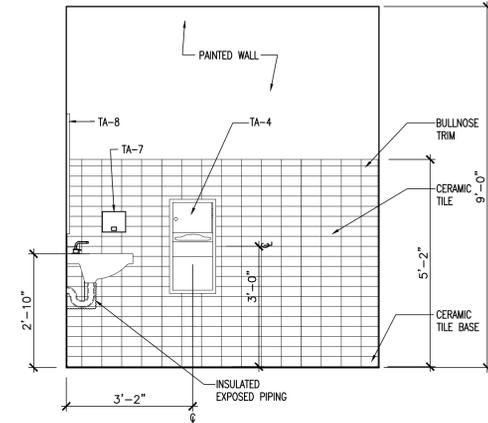
1 - ENLARGED TOILET ROOM (109, 110)
SCALE: 1/2" = 1'-0"



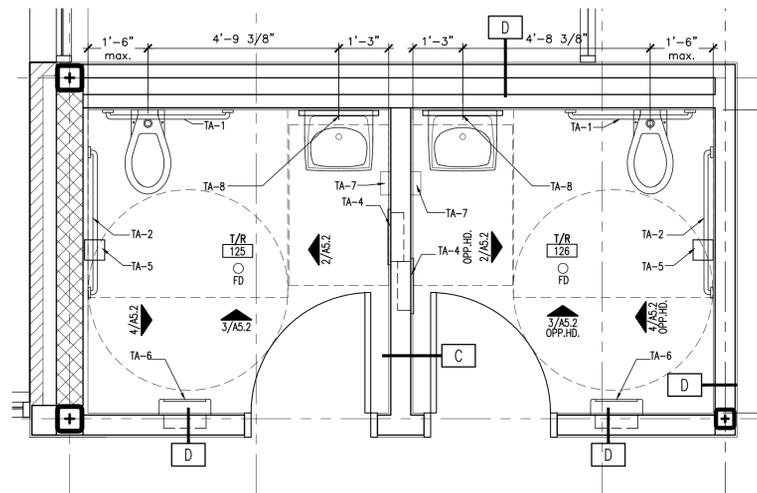
2 - TLT. RM. ELEV. 109, 110, 125, 126, 135
SCALE: 1/2" = 1'-0"



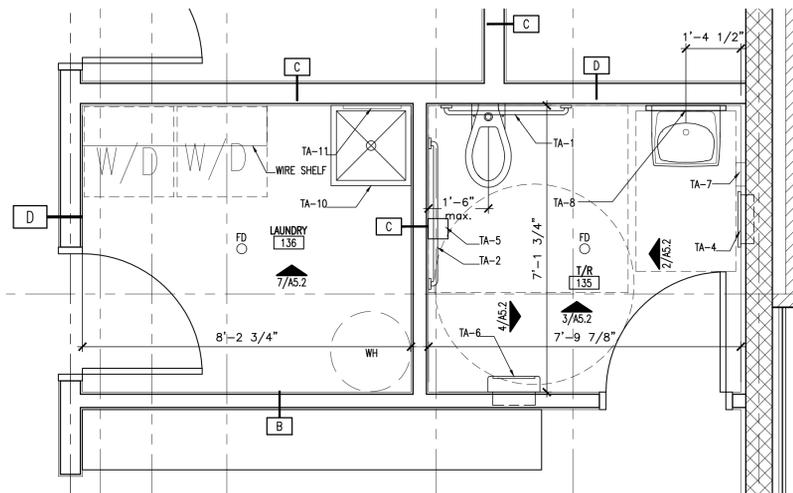
3 - TLT. RM. ELEV. 109, 110, 125, 126, 135
SCALE: 1/2" = 1'-0"



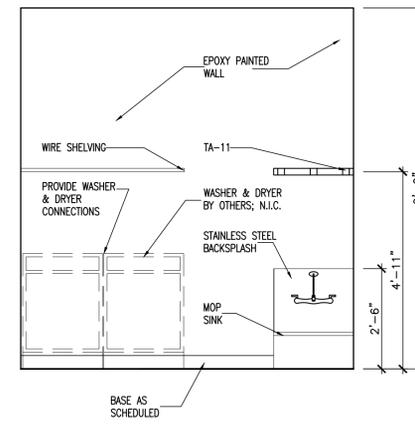
4 - TLT. RM. ELEV. 109, 110, 125, 126, 135
SCALE: 1/2" = 1'-0"



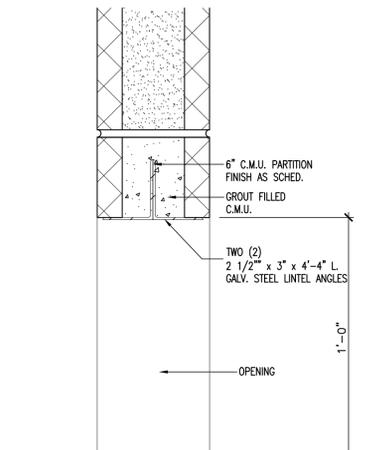
5 - ENLARGED TOILET ROOM (125, 126)
SCALE: 1/2" = 1'-0"



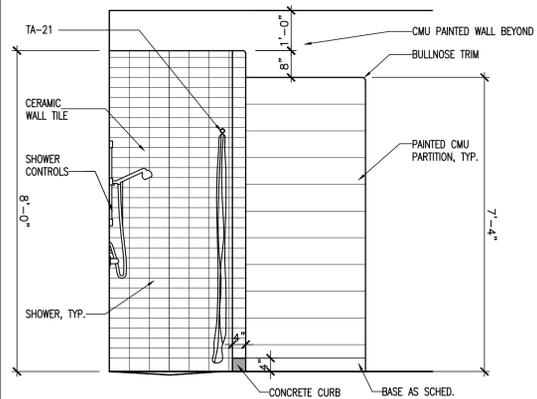
6 - ENLARGED TOILET ROOM (135) LAUNDRY (136)
SCALE: 1/2" = 1'-0"



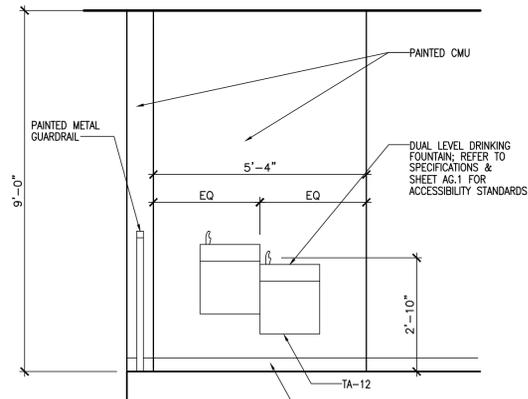
7 - LAUNDRY (136)
SCALE: 1/2" = 1'-0"



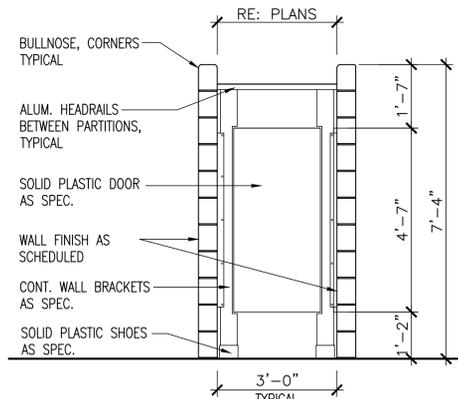
12 - TOILET PARTITION DETAIL
SCALE: 3" = 1'-0"



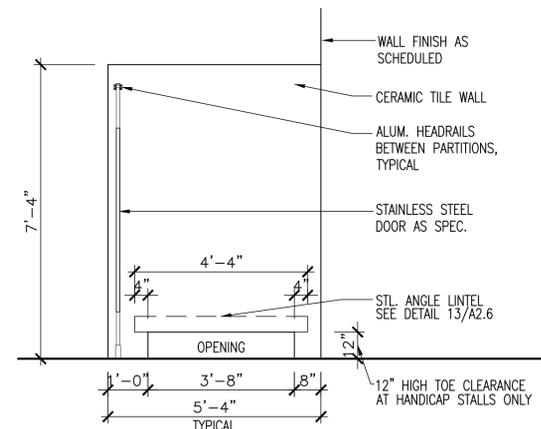
8 - SHOWER ROOM
SCALE: 1/2" = 1'-0"



9 - ELECTRIC DRINKING FOUNTAINS
SCALE: 1/2" = 1'-0"



10 - TOILET PARTITION
SCALE: 1/2" = 1'-0"



11 - TOILET PARTITION SIDE TYP.
SCALE: 1/2" = 1'-0"

TOILET ACCESSORY SCHEDULE	
TA-1	36" STAINLESS STEEL GRAB BAR
TA-2	42" STAINLESS STEEL GRAB BAR
TA-3	18" STAINLESS STEEL GRAB BAR
TA-4	PAPER TOWEL DISPENSER / RECEPTACLE
TA-5	TOILET TISSUE DISPENSER
TA-6	ELECTRIC HAND DRYER
TA-7	SOAP DISPENSER
TA-8	24x36 MIRROR
TA-9	FEMININE NAPKIN DISPOSAL
TA-10	MOP SINK
TA-11	MOP RACK
TA-12	WATER FOUNTAIN
TA-13	12" STAINLESS STEEL GRAB BAR
TA-14	3' X 5' CONTINUOUS GRAB BAR
TA-15	COAT HOOK
TA-16	TOWEL HOOK
TA-17	ADA COMPLIANT SHOWER CONTROLS
TA-18	ADA COMPLIANT SHOWER BENCH
TA-19	24" TOWEL ROD
TA-20	A.D.A COMPLIANT MIRROR
TA-21	SHOWER CURTAIN ROD

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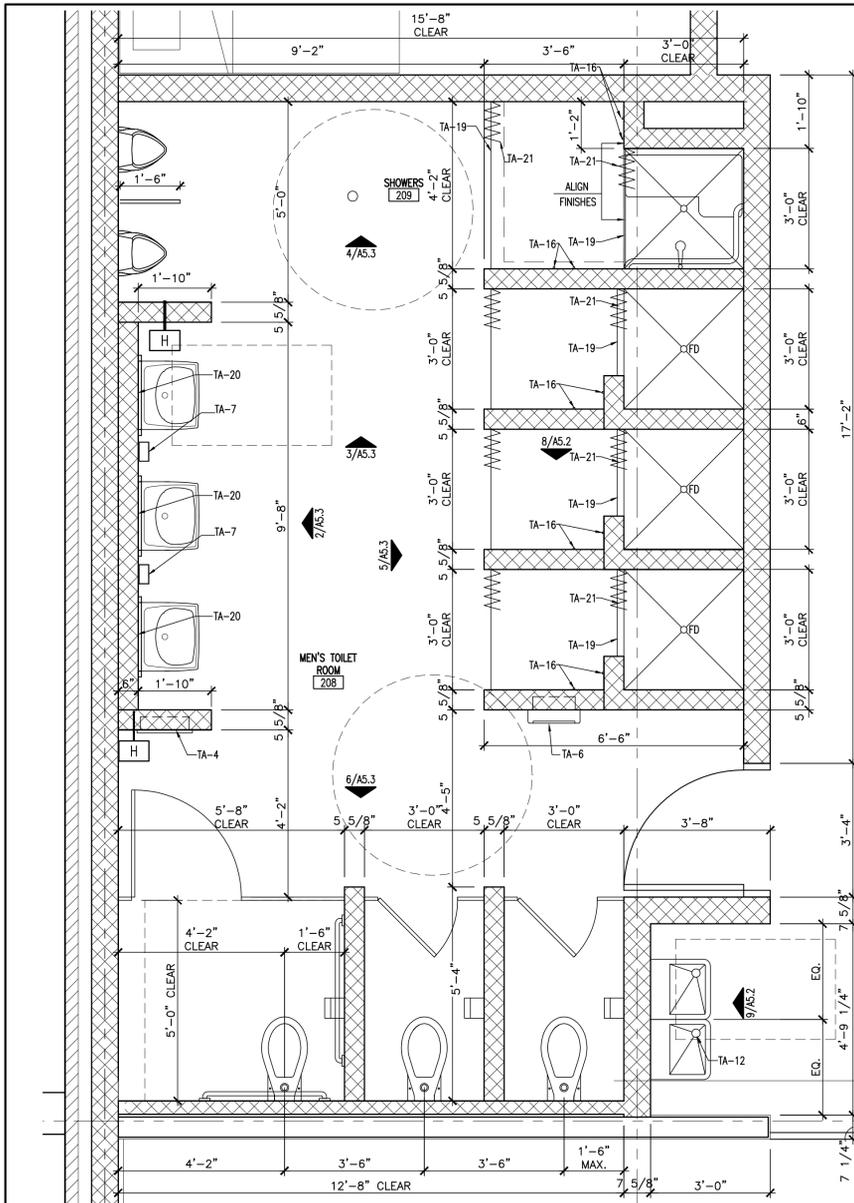
SHEET TITLE
ENLARGED TOILET
PLANS AND ELEVATIONS

DRAWN BY: JR

SHEET NO.

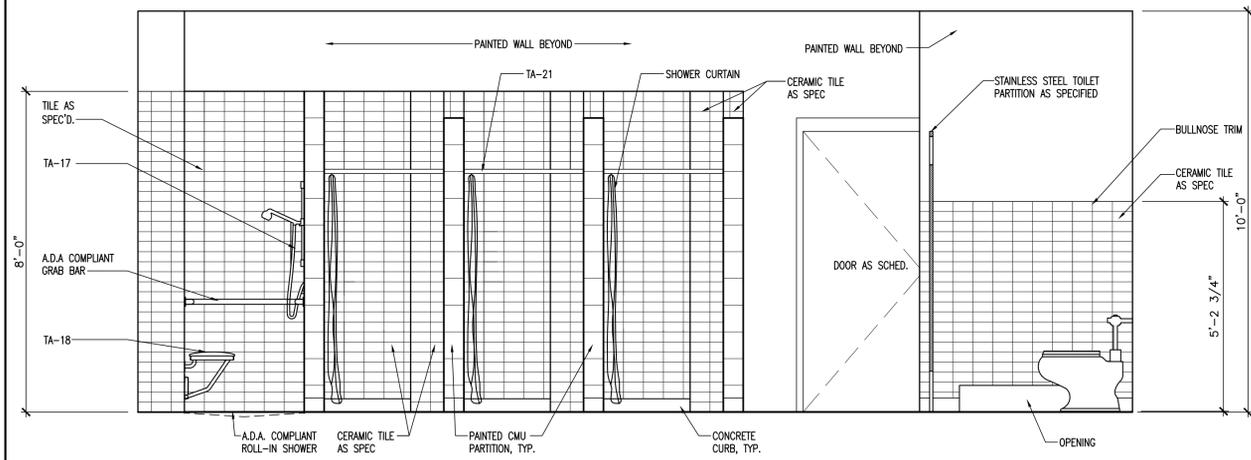
A5.2

DATE: APRIL 7, 2016



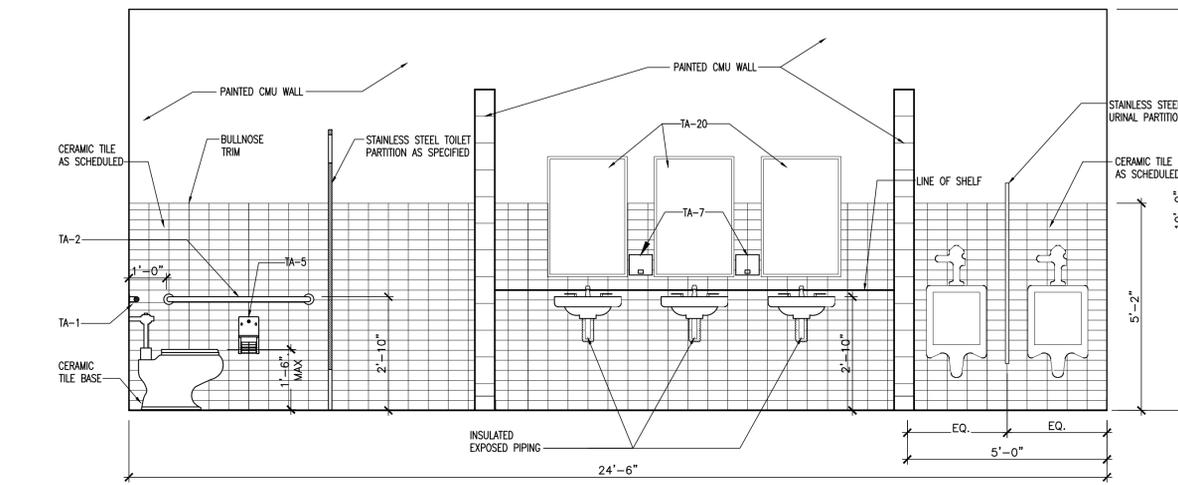
1- SECOND FLOOR - TOILET ROOMS & SHOWERS 208, 209

SCALE: 1/2" = 1'-0"



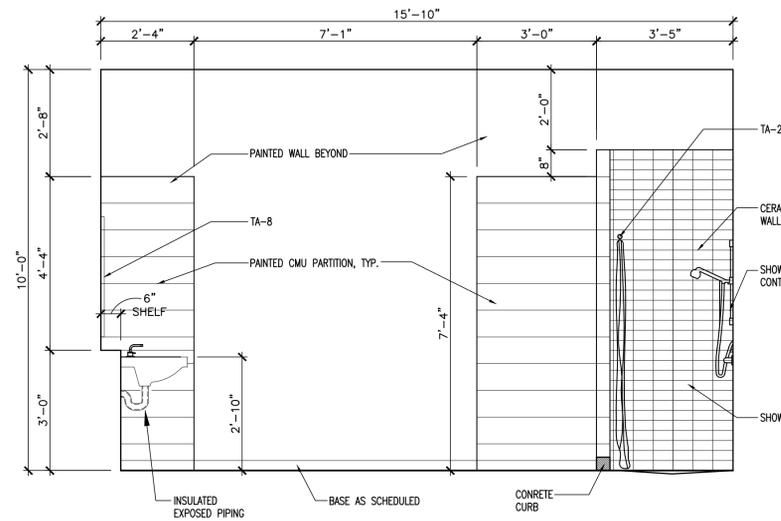
5 - TLT. RM. & SHOWERS ELEV 208, 209

SCALE: 1/2" = 1'-0"



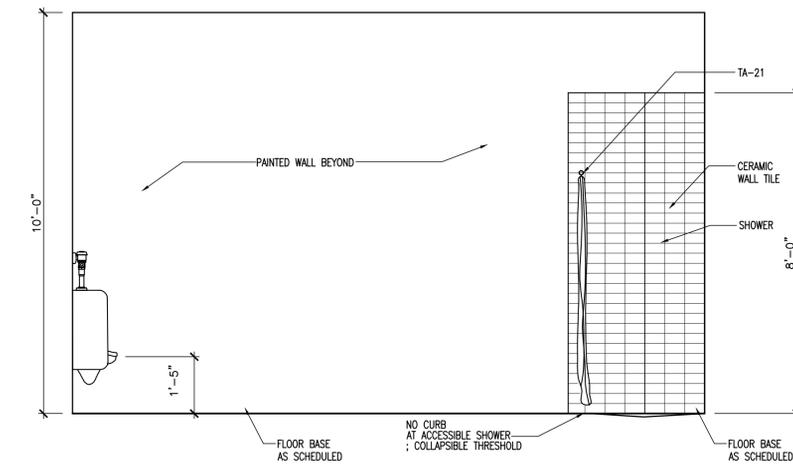
2 - TLT. RM. & SHOWERS ELEV 208, 209

SCALE: 1/2" = 1'-0"



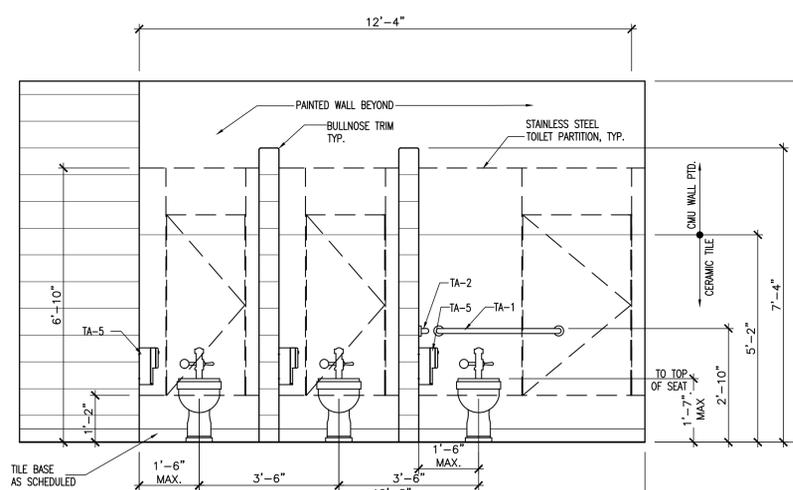
3 - TLT. RM. & SHOWERS ELEV 208, 209

SCALE: 1/2" = 1'-0"



4 - TLT. RM. & SHOWERS ELEV 208, 209

SCALE: 1/2" = 1'-0"



6 - TLT. RM. & SHOWERS ELEV 208, 209

SCALE: 1/2" = 1'-0"

TOILET ACCESSORY SCHEDULE	
TA-1	36" STAINLESS STEEL GRAB BAR
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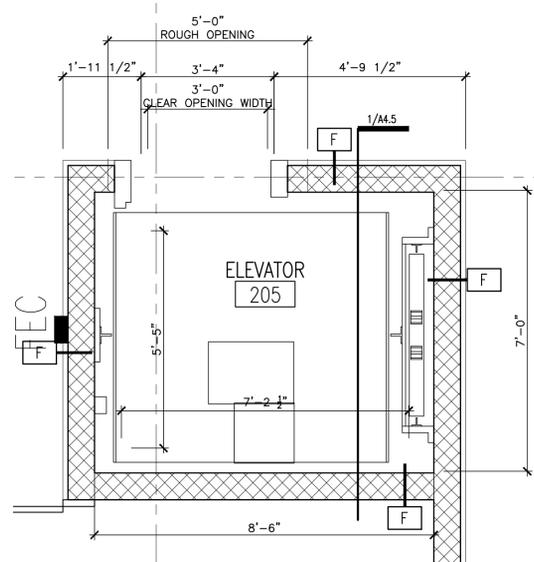
SHEET TITLE
 ENLARGED
 FLOOR PLANS

DRAWN BY: JR

SHEET NO.

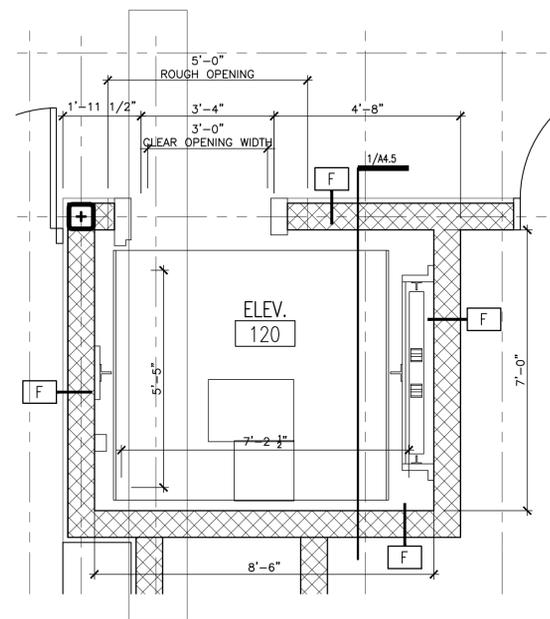
A5.3

DATE: APRIL 7, 2016



2 - ELEVATOR FLOOR PLAN - 2ND

SCALE: 1/2" = 1'-0"



1 - ELEVATOR FLOOR PLAN - 1ST

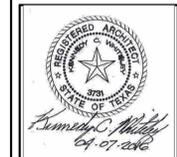
SCALE: 1/2" = 1'-0"



SYMBOL LEGEND

	ELEVATION RE: A3 SERIES
	ALUM. WINDOW TYPE RE: A2.5
	HOLLOW METAL WINDOW TYPE RE: A2.5
	DOOR TYPE RE: A2.4
	PARTITION TYPE RE: A2.8
	BUILDING SECTION RE: A4 SERIES
	WALL SECTION RE: A4 SERIES
	ENLARGED DETAIL/PLAN
	TACK BOARD (NIC)
	MARKER BOARD (NIC)
	DETAIL SECTION
	FIRE EXTINGUISHER CABINET
	FLOOR FINISH TRANSITION RE: AX-X

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WEBB COUNTY YOUTH VILLAGE
 REHABILITATION CENTER
 111 CAMINO NUEVO ROAD, HWY 359
 LAREDO, TEXAS 78046

PROJECT NUMBER
1401

REVISIONS

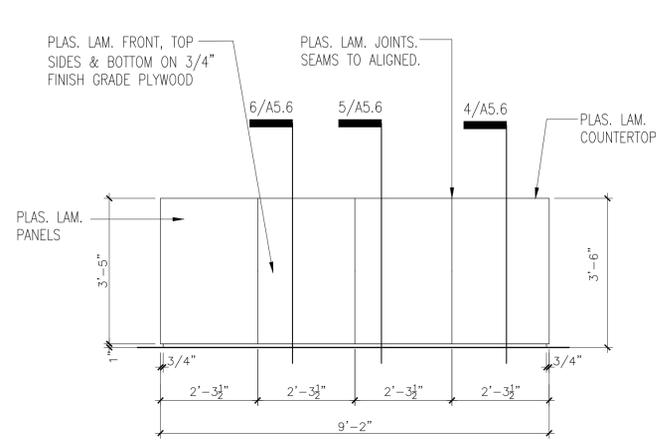
FILENAME:

SHEET TITLE
ENLARGED
ELEVATOR
FLOOR PLANS

DRAWN BY: JR

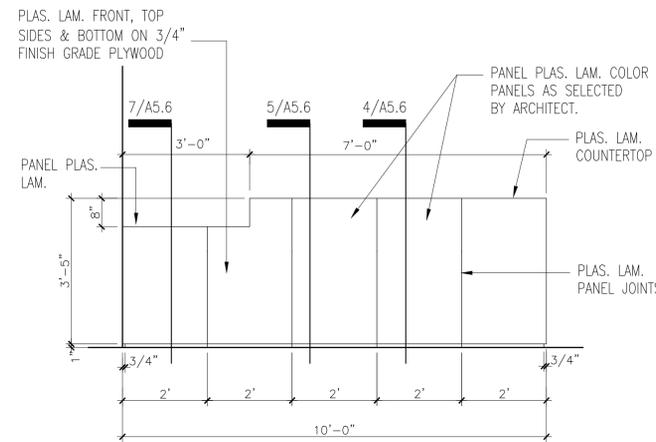
SHEET NO.
A5.4

DATE: APRIL 7, 2016



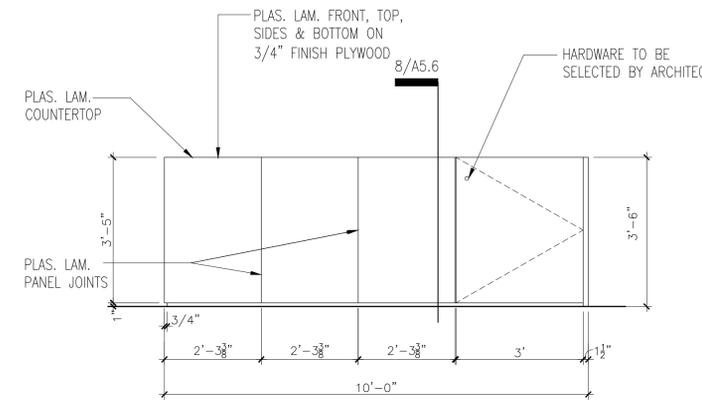
1 - RECEPTION DESK 124

SCALE: 1/2" = 1'-0"



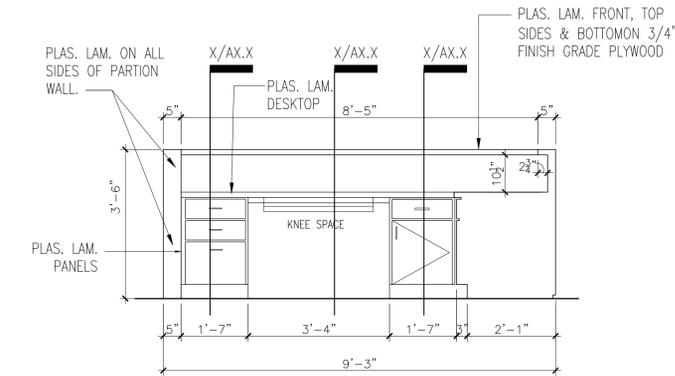
2 - RECEPTION DESK 124

SCALE: 1/2" = 1'-0"



3 - RECEPTION DESK 124

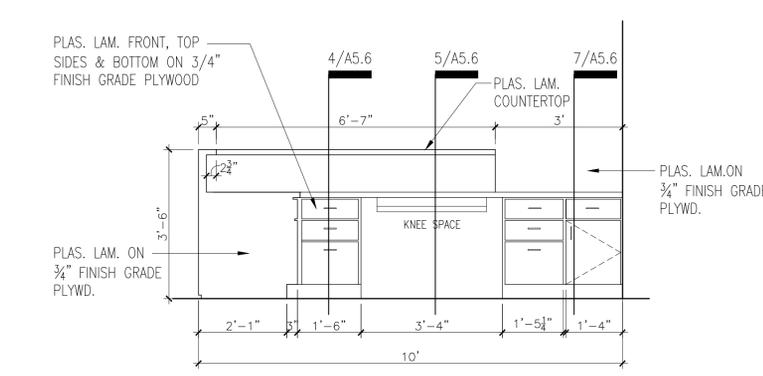
SCALE: 1/2" = 1'-0"



A1

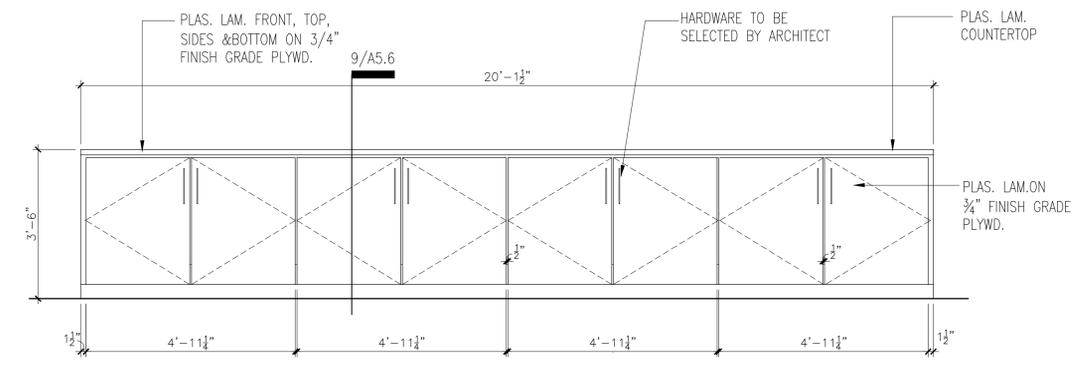
4 - RECEPTION 124

SCALE: 1/2" = 1'-0"



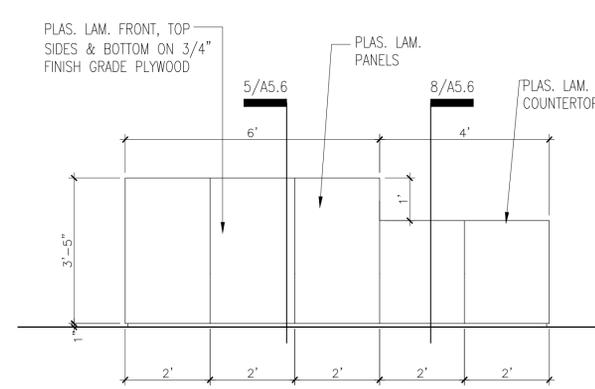
5 - RECEPTION 124

SCALE: 1/2" = 1'-0"



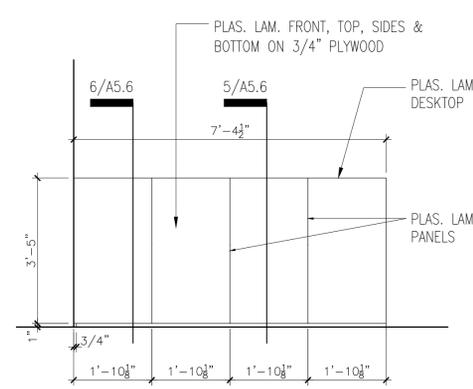
6 - CONFERENCE RM. 122

SCALE: 1/2" = 1'-0"



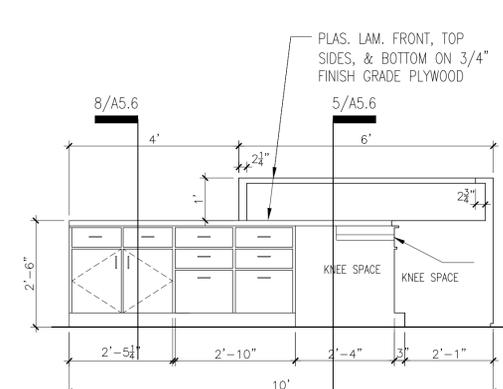
7 - RECPT. DESK 208

SCALE: 1/2" = 1'-0"



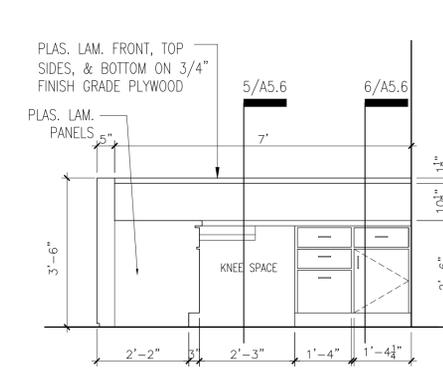
8 - RECPT. DESK @ 208

SCALE: 1/2" = 1'-0"



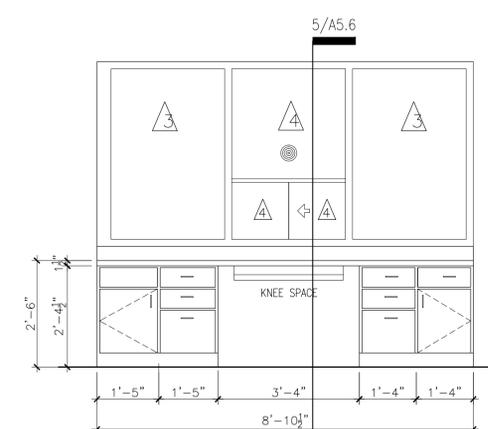
9 - RECPT. DESK @ 208

SCALE: 1/2" = 1'-0"



10 - RECPT. DESK @ 208

SCALE: 1/2" = 1'-0"



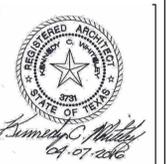
11 - RECPT. DESK @ 111

SCALE: 1/2" = 1'-0"

MILLWORK GENERAL NOTES:

1. CONTRACTOR SHALL PROVIDE SHOP DRAWINGS OF ALL MILLWORK TO BE REVIEWED BY THE ARCHITECT
2. CONTRACTOR SHALL VERIFY ALL FINISH TO FINISH DIMENSIONS PRIOR TO MANUFACTURING ANY MILLWORK.
3. REFER TO AG-1 FOR A.D.A. COMPLIANCE DETAILS, NOTES & MOUNTING HEIGHTS.
4. ALL SHELVING TO BE 3/4" PLYWOOD SHELVING, PAINTED OR STAINED WITH HARDWOOD EDGES AND 1/4" PLYWOOD BACKING. VERTICALS TO BE 3/4" PLYWOOD WITH HARDWOOD EDGING OR 3/4" PLYWOOD BACK TO BACK WITH 1" x 2" TRIM DEPENDING ON CONSTRUCTION METHOD PROPOSED. ALL ADJ. ALL STANDARDS FOR ADJ. SHELVING SHALL BE RECESSED WITH STANDARDS THAT ARE BACK TO BACK ON ONE PLYWOOD SHEET TO BE ALTERNATELY LAPPED BY 1". SHELF STANDARDS ARE KV 255 & 256
5. ALL FIXED SHELVING SHALL BE 3/4" PLYWOOD WITH HARDWOOD EDGES, PAINTED OR STAINED. ALL HORIZONTAL AND VERTICAL SURFACES SHOULD MEET IN CLEAN WELL CRAFTED DADO JOINTS. GLUE AND/OR INVISIBLE TOE NAIL AT ALL SPLICES.
6. PROVIDE LOCKS AT COUNTERS & CABINETS AS NOTED OR REF. TO IN SPECIFICATIONS.
7. PROVIDE ALL PULLS, HINGES, K-V STANDARDS, SLIDES & MISC. HARDWARE ON ALL MILLWORK & CASEWORK. REFER SPECS.
8. PROVIDE WD. BLOCKING IN WALLS AS REQUIRED TO SUPPORT MILLWORK.
9. ALL PRE-FORMED COUNTERTOPS TO HAVE PLASTIC LAMINATE ON ALL EXPOSED SURFACES UNLESS OTHERWISE NOTED. PLASTIC LAMINATE TO BE SELECTED BY THE ARCHITECT.
10. CONTRACTOR SHALL INSTALL MAXIMUM LAMINATE LENGTHS AVAILABLE BY MANUFACTURER. MINIMUM LAMINATE SIZE TO BE 5'x12'. ALL COLOR SELECTIONS BY ARCHITECT.

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PROJECT NUMBER
 1401

REVISIONS

FILENAME: A5.5-A5.6 Millwork Details.dwg

SHEET TITLE
 MILLWORK ELEV.
 INTERIOR ELEV.

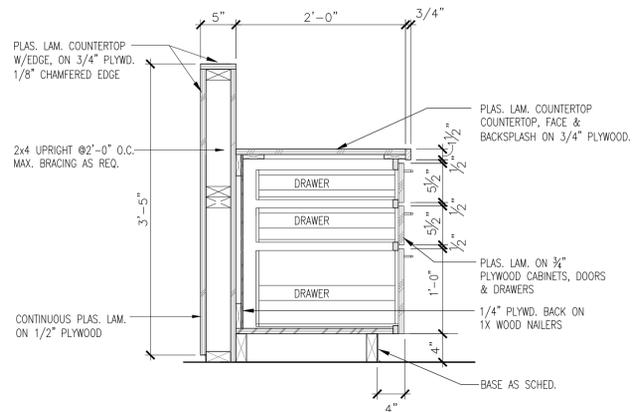
SCALE: AS SHOWN

DRAWN BY: EQ

SHEET NO.

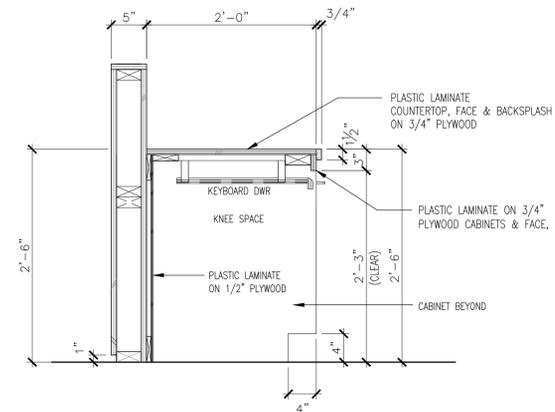
A5.5

DATE: APRIL 7, 2016



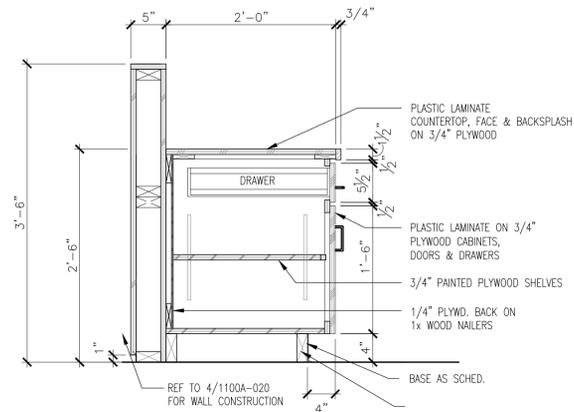
1 - MILLWORK SECTION

SCALE: 1" = 1'-0"



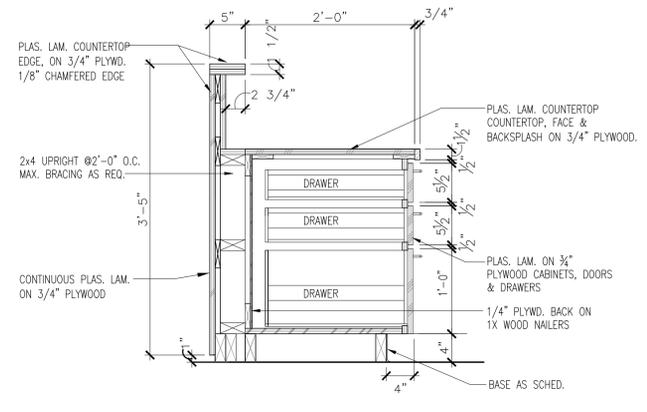
2 - MILLWORK SECTION

SCALE: 1" = 1'-0"



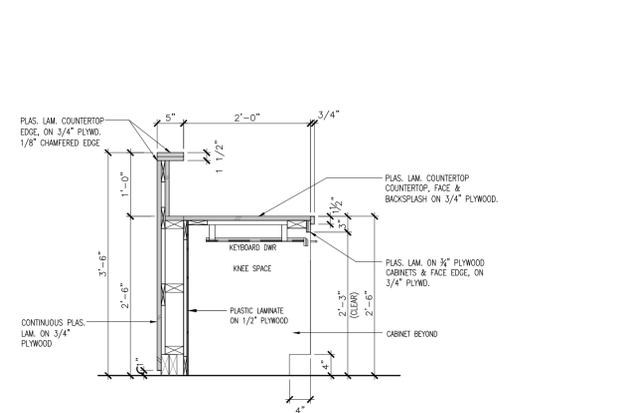
3 - MILLWORK SECTION

SCALE: 1" = 1'-0"



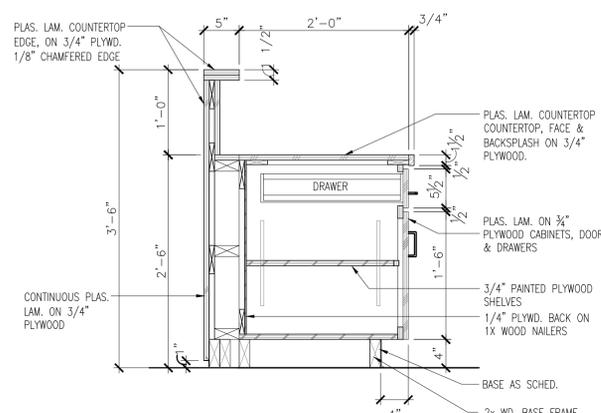
4 - MILLWORK SECTION

SCALE: 1" = 1'-0"



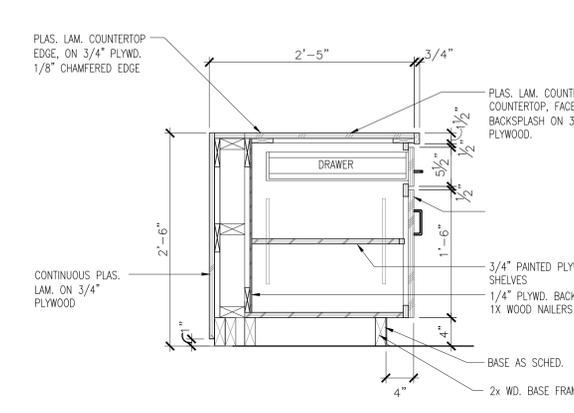
5 - MILLWORK SECTION

SCALE: 1" = 1'-0"



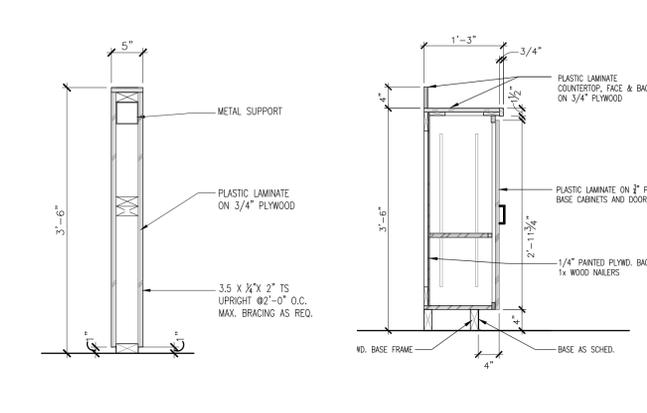
6 - MILLWORK SECTION

SCALE: 1" = 1'-0"



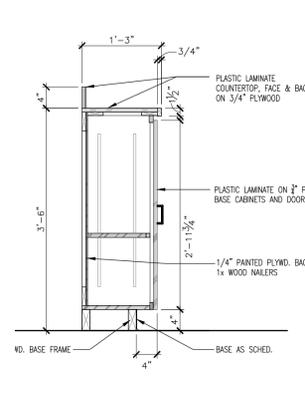
7 - MILLWORK SECTION

SCALE: 1" = 1'-0"



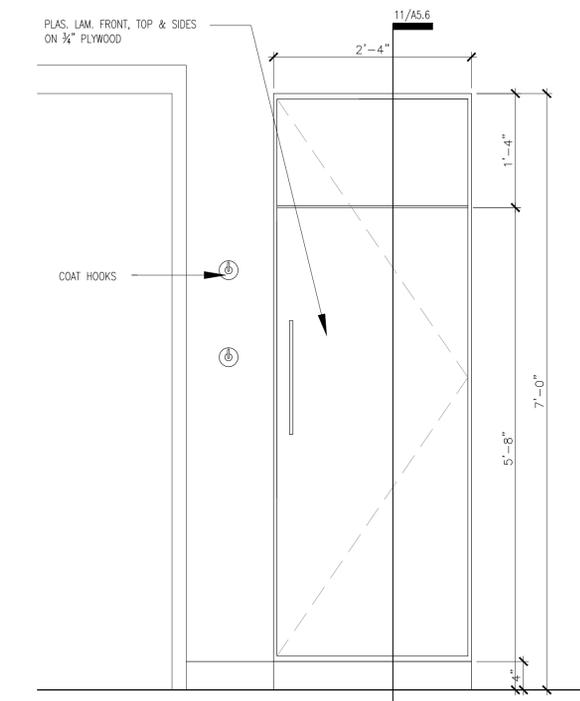
8 - MILLWORK SECTION

SCALE: 1" = 1'-0"



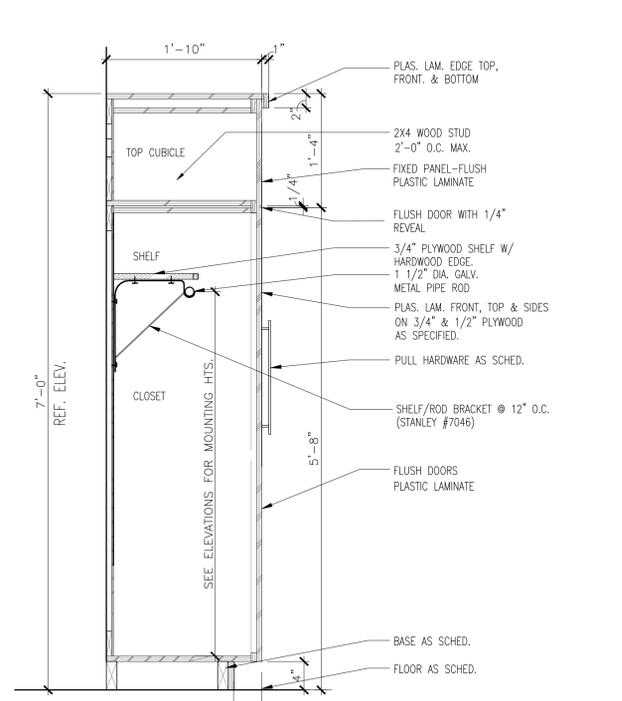
9 - MILLWORK SECTION

SCALE: 1" = 1'-0"



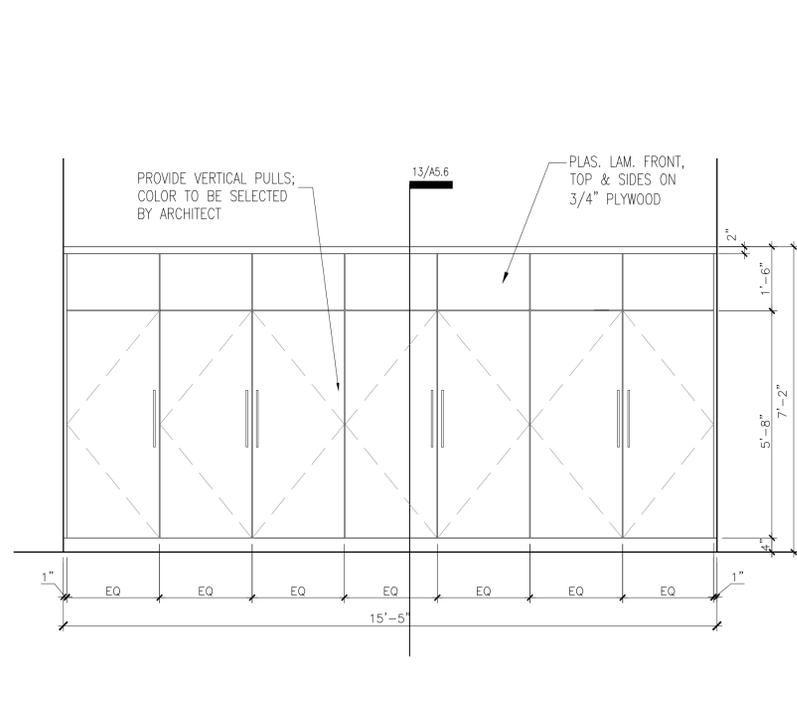
10 - MILLWORK @ DORM TYP.

SCALE: 1" = 1'-0"



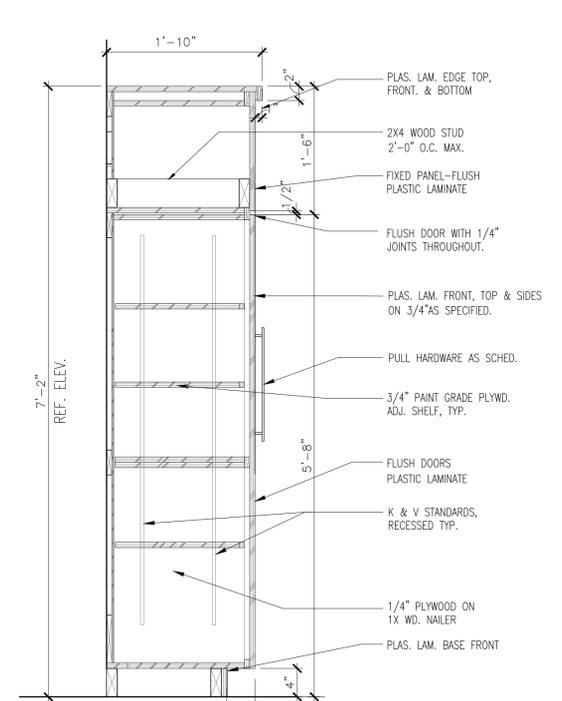
11 - MILLWORK SECTION - DORM ROOM

SCALE: 1" = 1'-0"



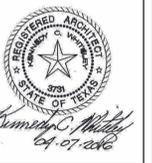
12 - MILLWORK ELEV. @201

SCALE: 1" = 1'-0"



13 - MILLWORK SECTION

SCALE: 1" = 1'-0"



PROJECT NUMBER
1401

REVISIONS

FILENAME: A5.5-A5.6 Millwork Details.dwg

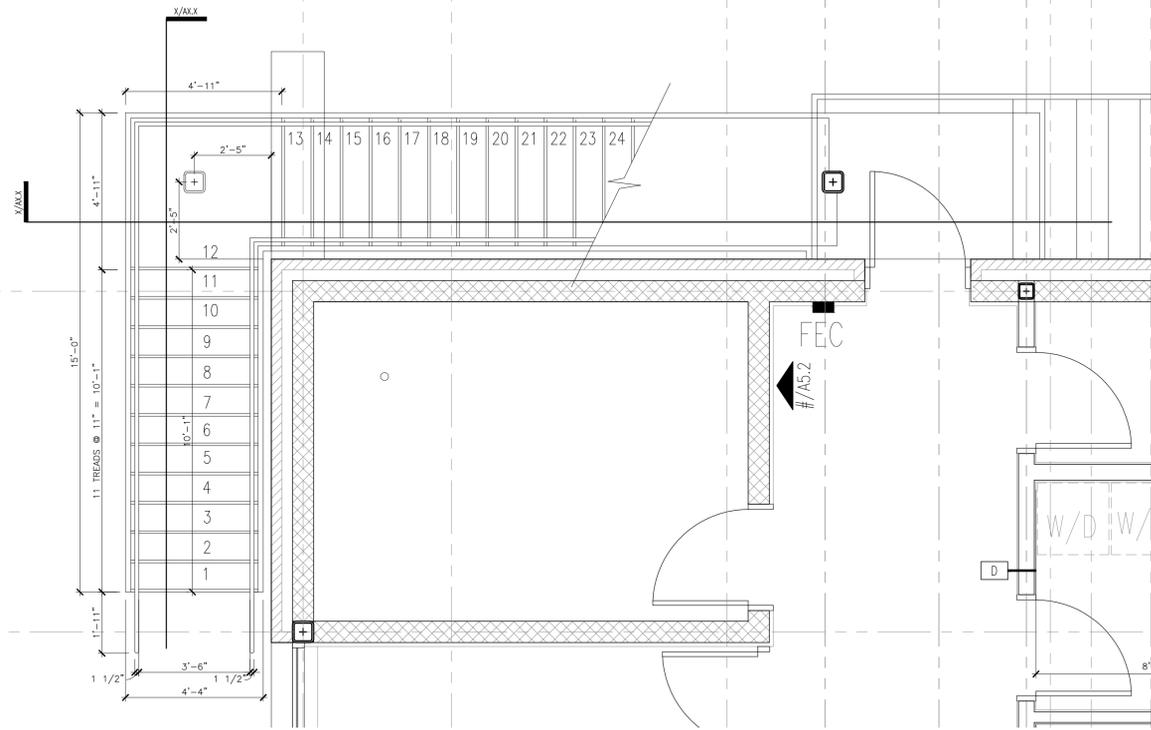
SHEET TITLE
MILLWORK DETAILS
SCALE: AS SHOWN

DRAWN BY: EQ

SHEET NO.

A5.6

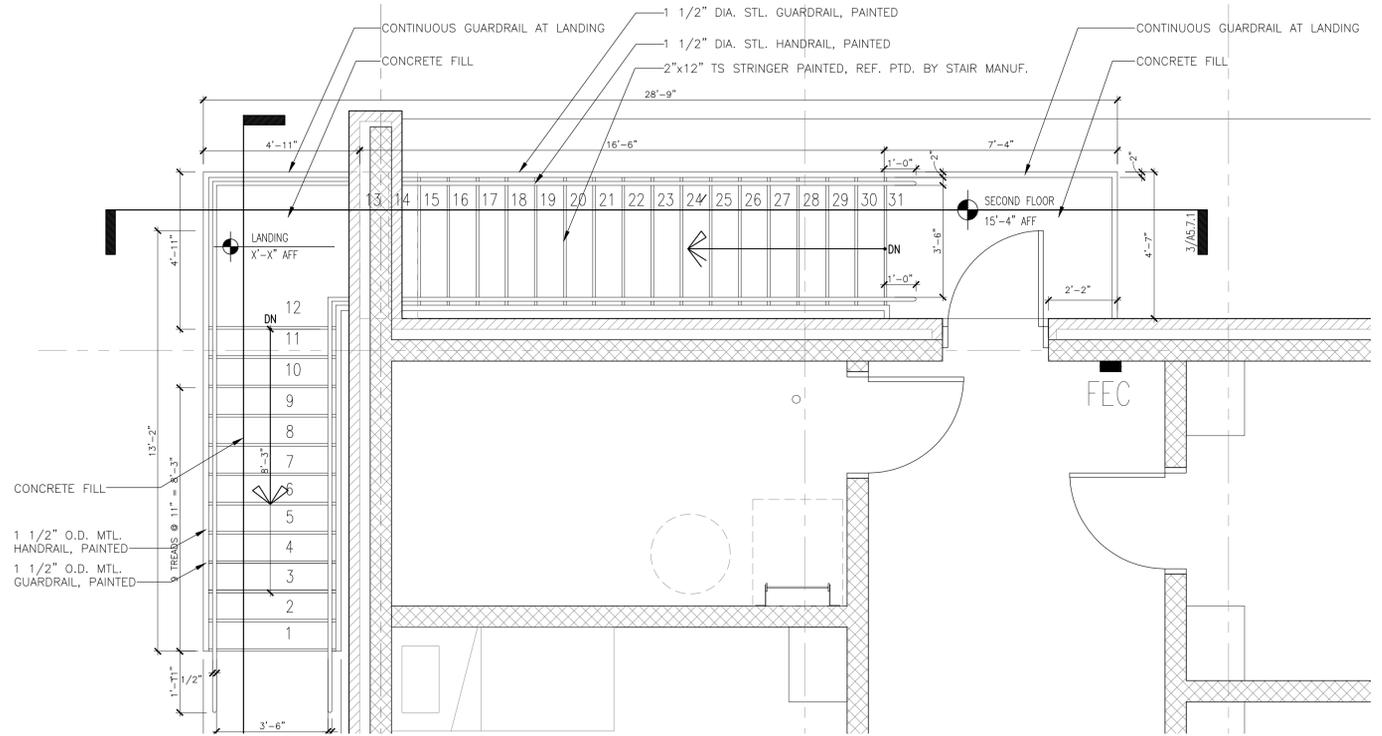
DATE: APRIL 7, 2016



1 - EXTERIOR STAIR PLAN - 1ST FLOOR

SCALE: 3/8" = 1'-0"

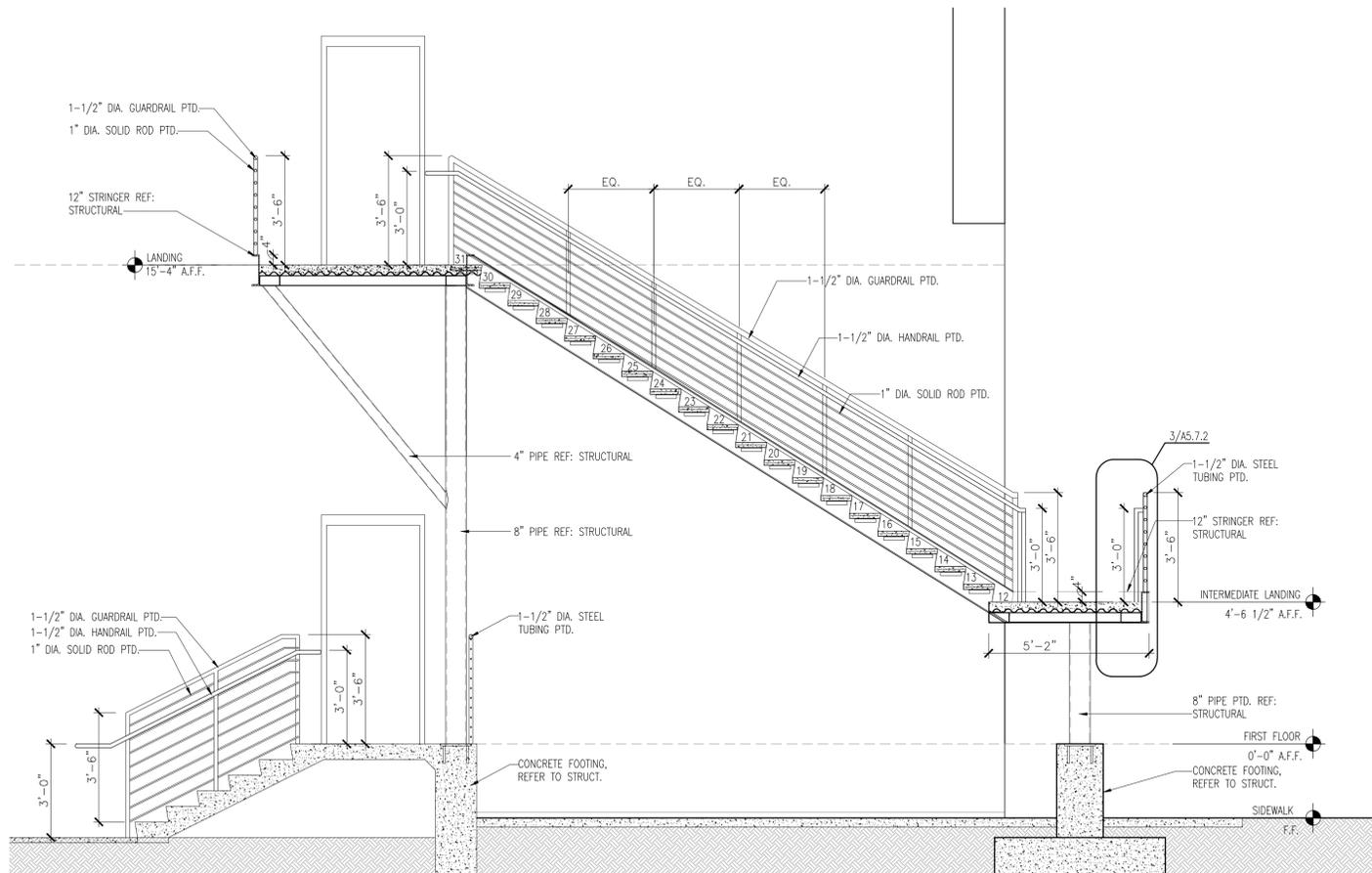
NOTE: CONTRACTOR TO PROVIDE SHOP DRAWINGS FOR STEEL STAIR



3 - EXTERIOR STAIR PLAN - 2nd FLOOR

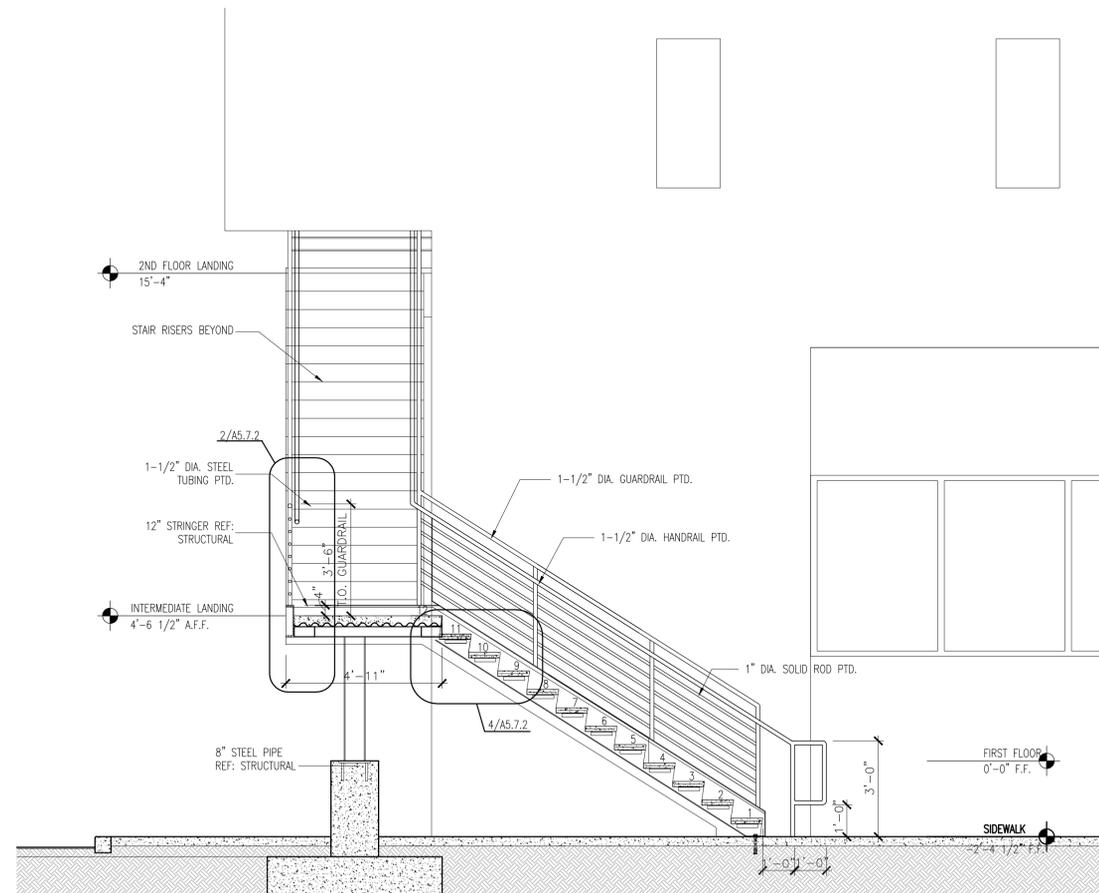
SCALE: 3/8" = 1'-0"

NOTE: CONTRACTOR TO PROVIDE SHOP DRAWINGS FOR STEEL STAIR



2 - STAIR SECTION

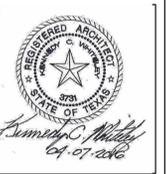
SCALE: 3/8" = 1'-0"



4 - STAIR SECTION

SCALE: 3/8" = 1'-0"

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PROJECT NUMBER
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FILENAME:

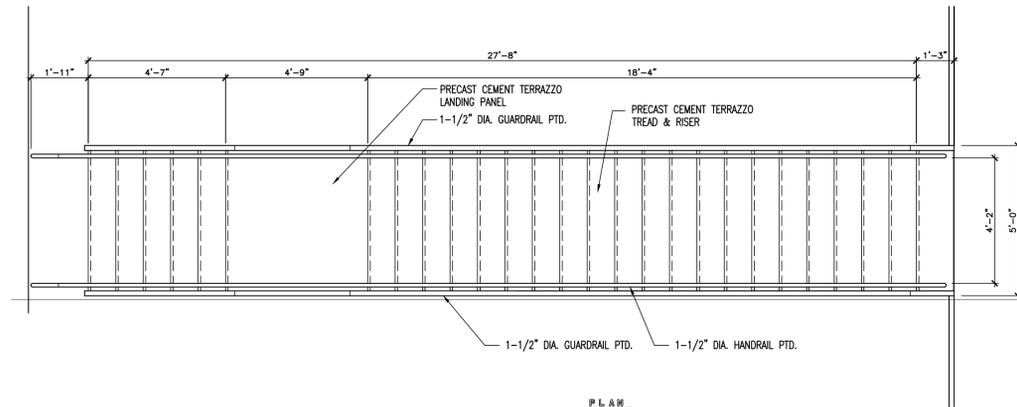
SHEET TITLE
 STAIR ELEVATIONS &
 STAIR SECTIONS

DRAWN BY: JR

SHEET NO.

A5.7.1

DATE: APRIL 7, 2016

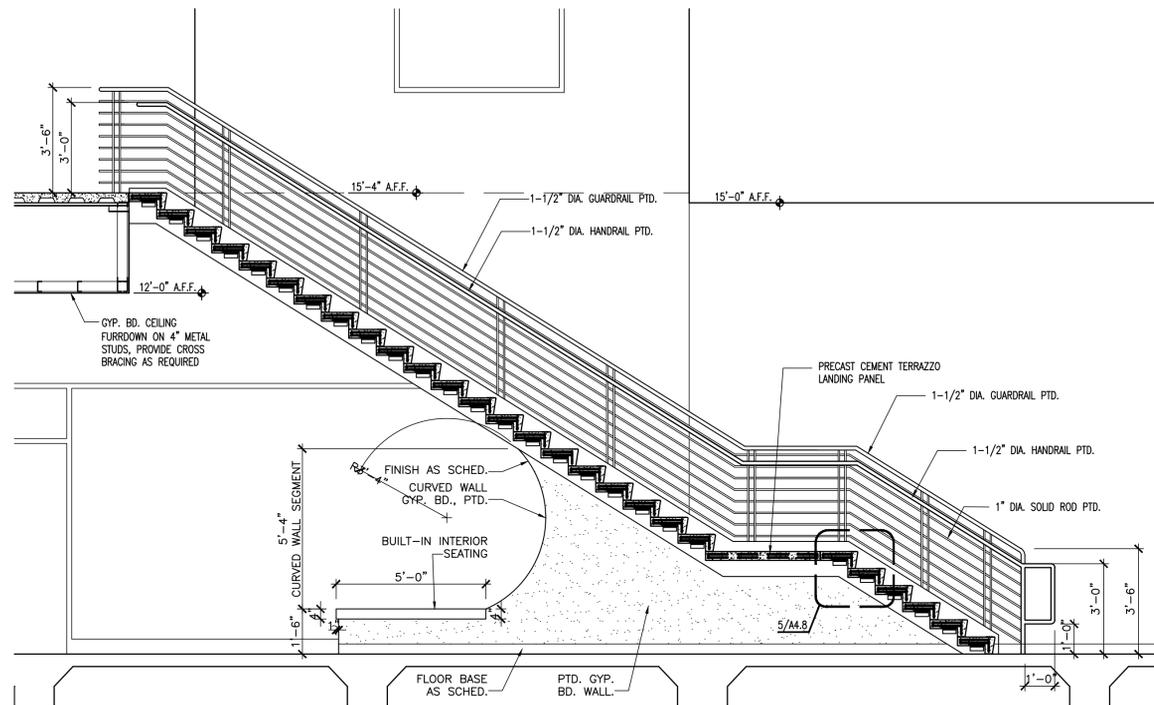


1 - INTERIOR STAIR PLAN - 1ST FLOOR

SCALE: 3/8" = 1'-0"

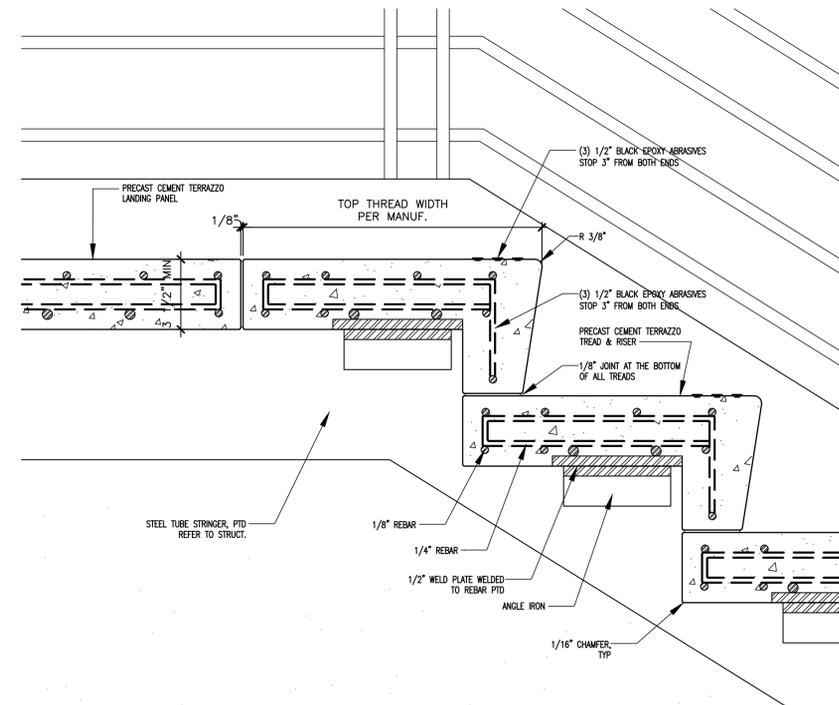


NOTE: CONTRACTOR TO PROVIDE SHOP DRAWINGS FOR STEEL STAIR



2 - INTERIOR STAIR SECTION

SCALE: 3/8" = 1'-0"



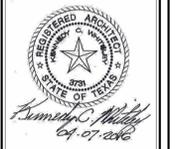
3 - PARTIAL STAIR SECTION

SCALE: 1 1/2" = 1'-0"

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3. REFER TO AG.1 FOR A.D.A. COMPLIANCE DETAILS, NOTES & MOUNTING HEIGHTS.
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8. PROVIDE WD. BLOCKING IN WALLS AS REQUIRED TO SUPPORT MILLWORK.
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FILENAME:

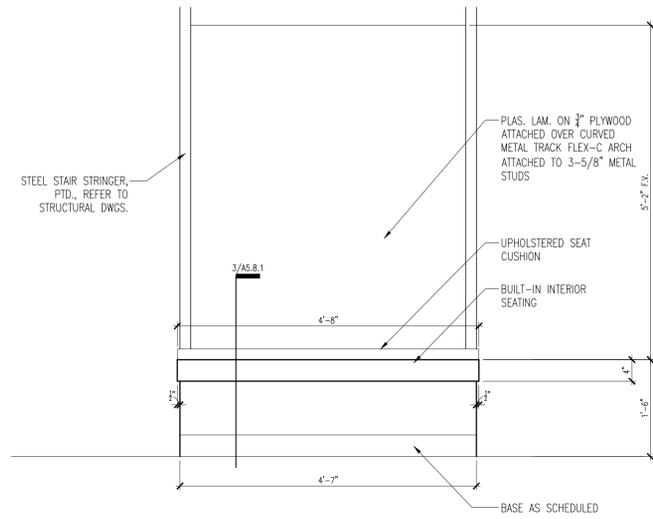
SHEET TITLE
 STAIR DETAILS

DRAWN BY: EQ

SHEET NO.

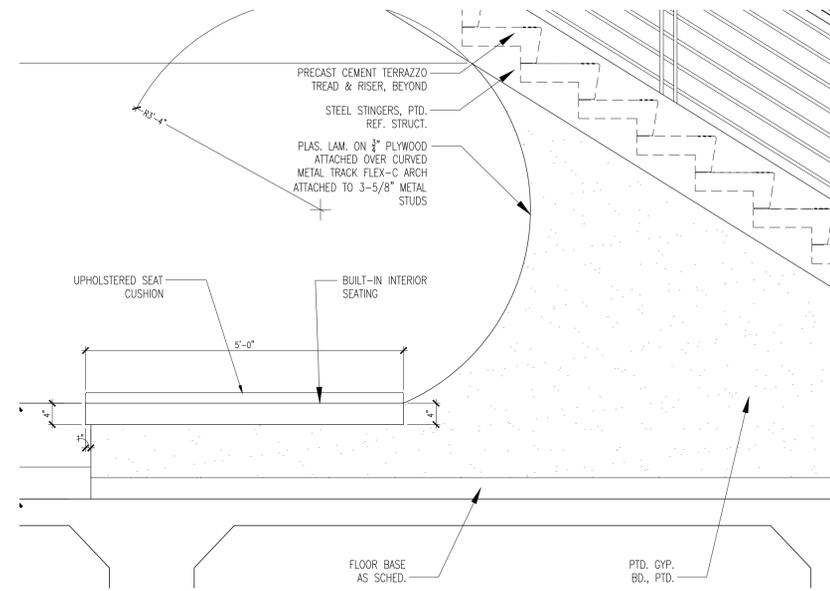
A5.8

DATE: APRIL 7, 2016



1 - BUILT-IN SEATING FRONT ELEVATION

SCALE: 3/4" = 1'-0"

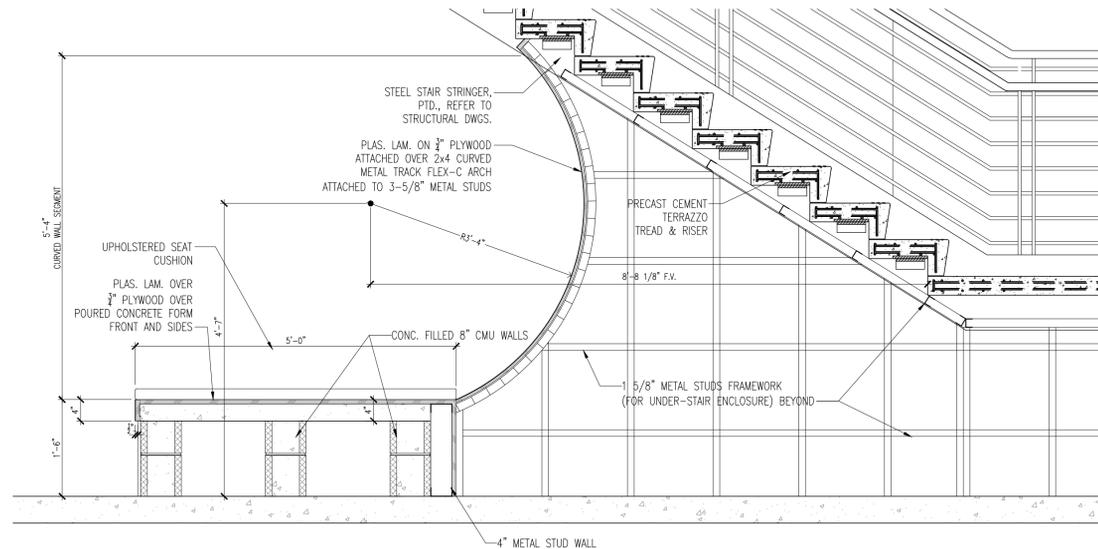


2 - BUILT-IN SEATING SIDE ELEVATION

SCALE: 3/4" = 1'-0"

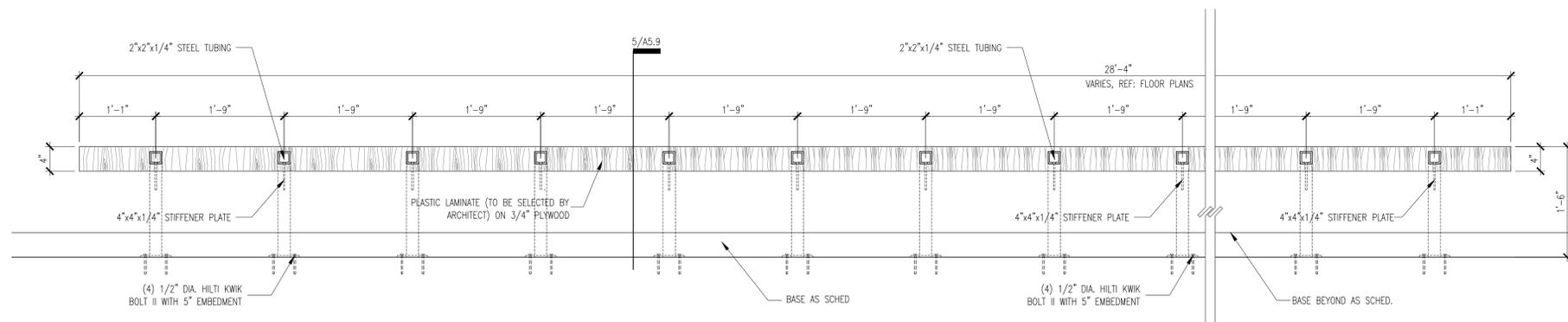
MILLWORK GENERAL NOTES:

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5. ALL FIXED SHELVING SHALL BE 3/4" PLYWOOD WITH HARDWOOD EDGES, PAINTED OR STAINED. ALL HORIZONTAL AND VERTICAL SURFACES SHOULD MEET IN CLEAN WELL CRAFTED DADO JOINTS. GLUE AND/OR INVISIBLE TOE NAIL AT ALL SPLICES.
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8. PROVIDE WD. BLOCKING IN WALLS AS REQUIRED TO SUPPORT MILLWORK.
9. ALL PRE-FORMED COUNTERTOPS TO HAVE PLASTIC LAMINATE ON ALL EXPOSED SURFACES UNLESS OTHERWISE NOTED. PLASTIC LAMINATE TO BE SELECTED BY THE ARCHITECT.



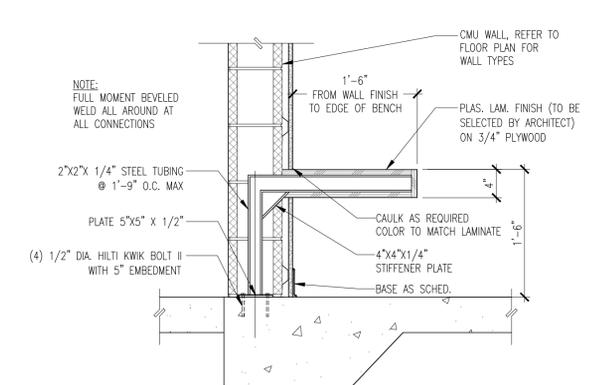
3 - BUILT-IN SEATING SECTION (UNDER INTERIOR STAIRCASE)

SCALE: 3/4" = 1'-0"



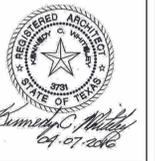
4 - BENCH SECTION / ELEVATION AT FIRST FLOOR CORRIDOR

SCALE: 1" = 1'-0"



5 - HALLWAY BENCH SECTION DETAIL

SCALE: 1" = 1'-0"



PROJECT NUMBER
1401

REVISIONS

FILENAME:

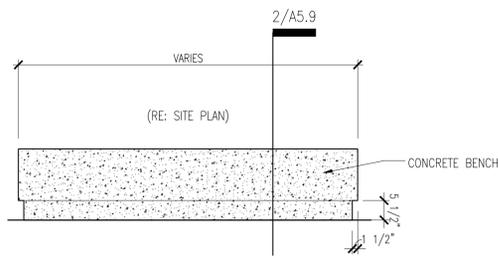
SHEET TITLE
STAIR DETAILS

DRAWN BY: RP

SHEET NO.

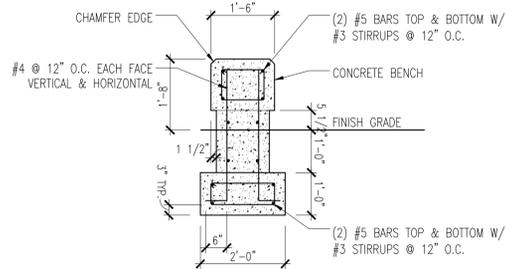
A5.8.1

DATE: APRIL 7, 2016



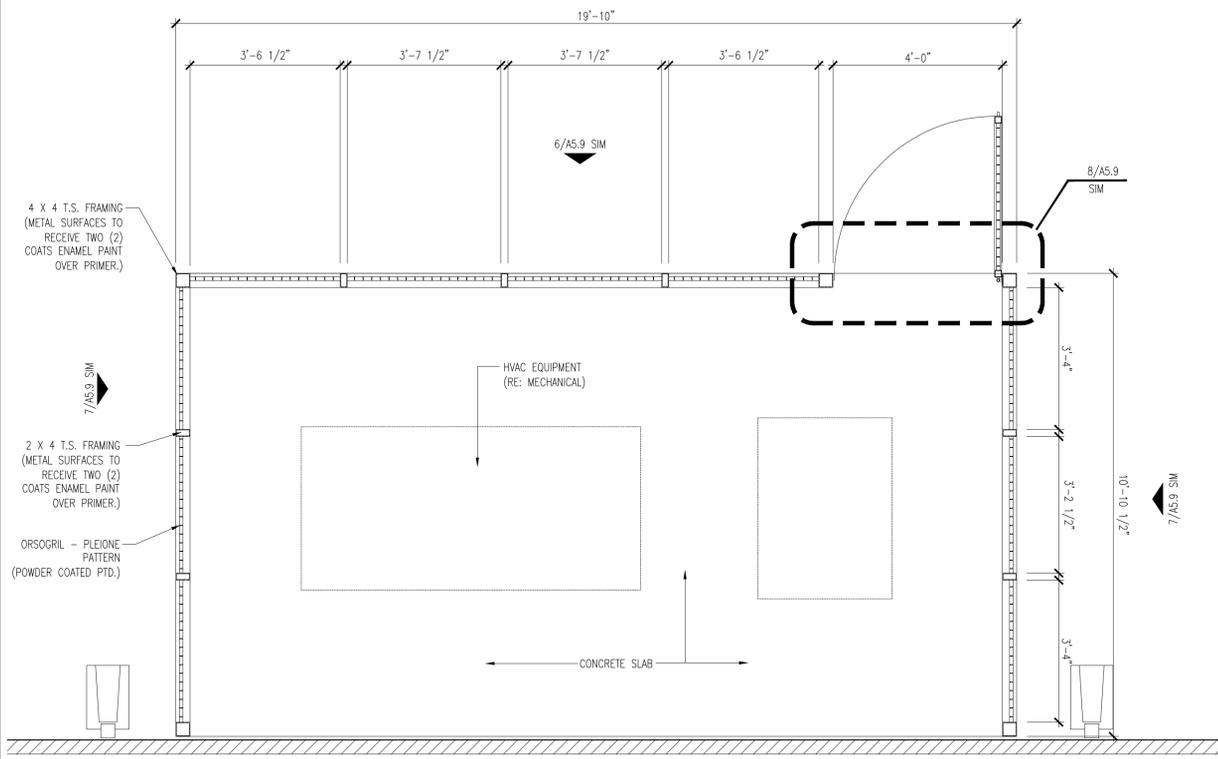
1 - CONCRETE BENCH ELEV.

SCALE: 1/2"=1'-0"



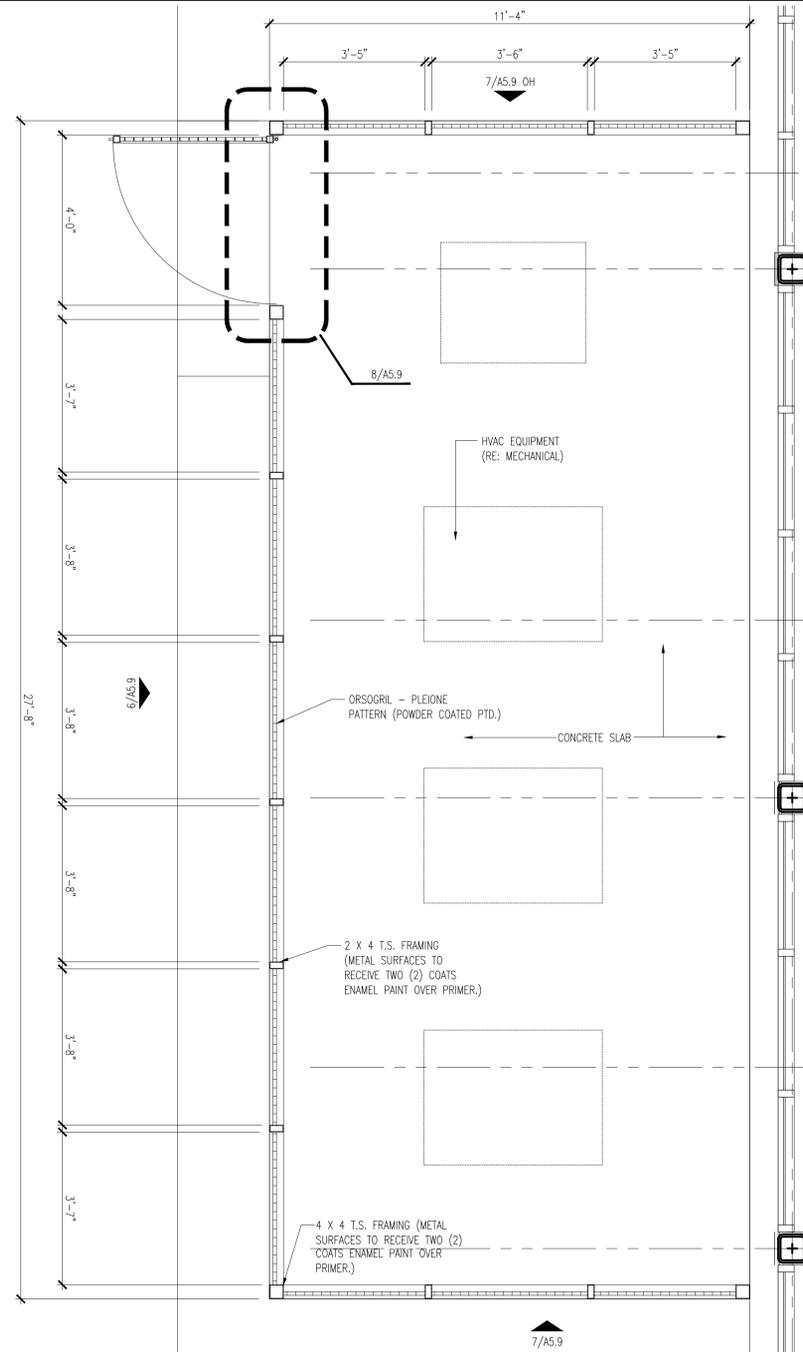
2 - CONCRETE BENCH DET.

SCALE: 1/2"=1'-0"



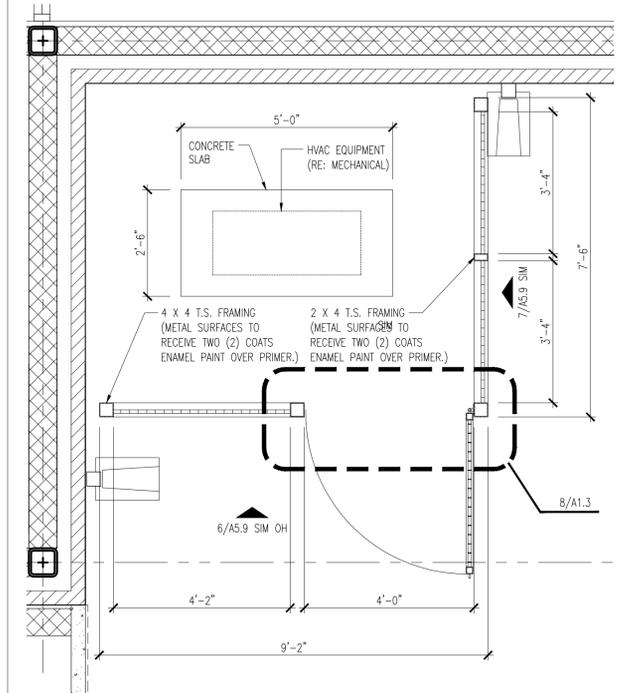
3 - ENLARGED FLOOR PLAN

SCALE: 1/2"=1'-0"



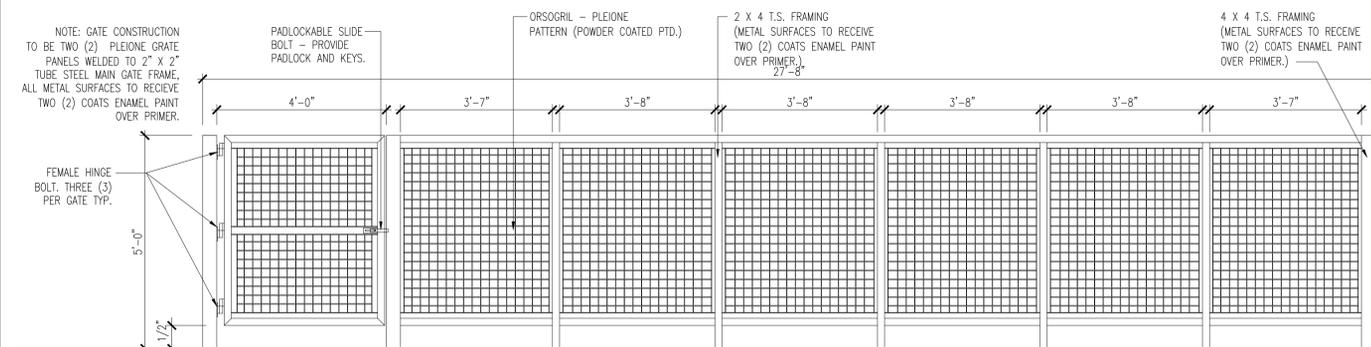
4 - ENLARGED FLOOR PLAN

SCALE: 1/2"=1'-0"



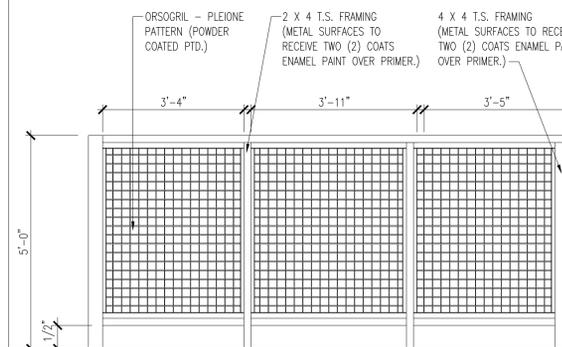
5 - ENLARGED FLOOR PLAN

SCALE: 1/2"=1'-0"



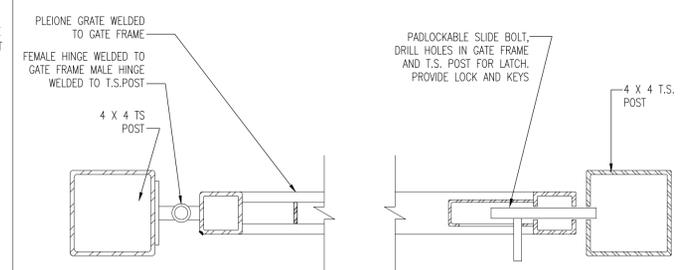
6 - GATE & SCREEN ELEVATION

SCALE: 1/2"=1'-0"



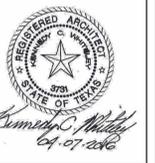
7 - SCREEN ELEVATION

SCALE: 1/2"=1'-0"



8 - DETAIL

SCALE: 3"=1'-0"



PROJECT NUMBER

1401

REVISIONS

FILENAME:

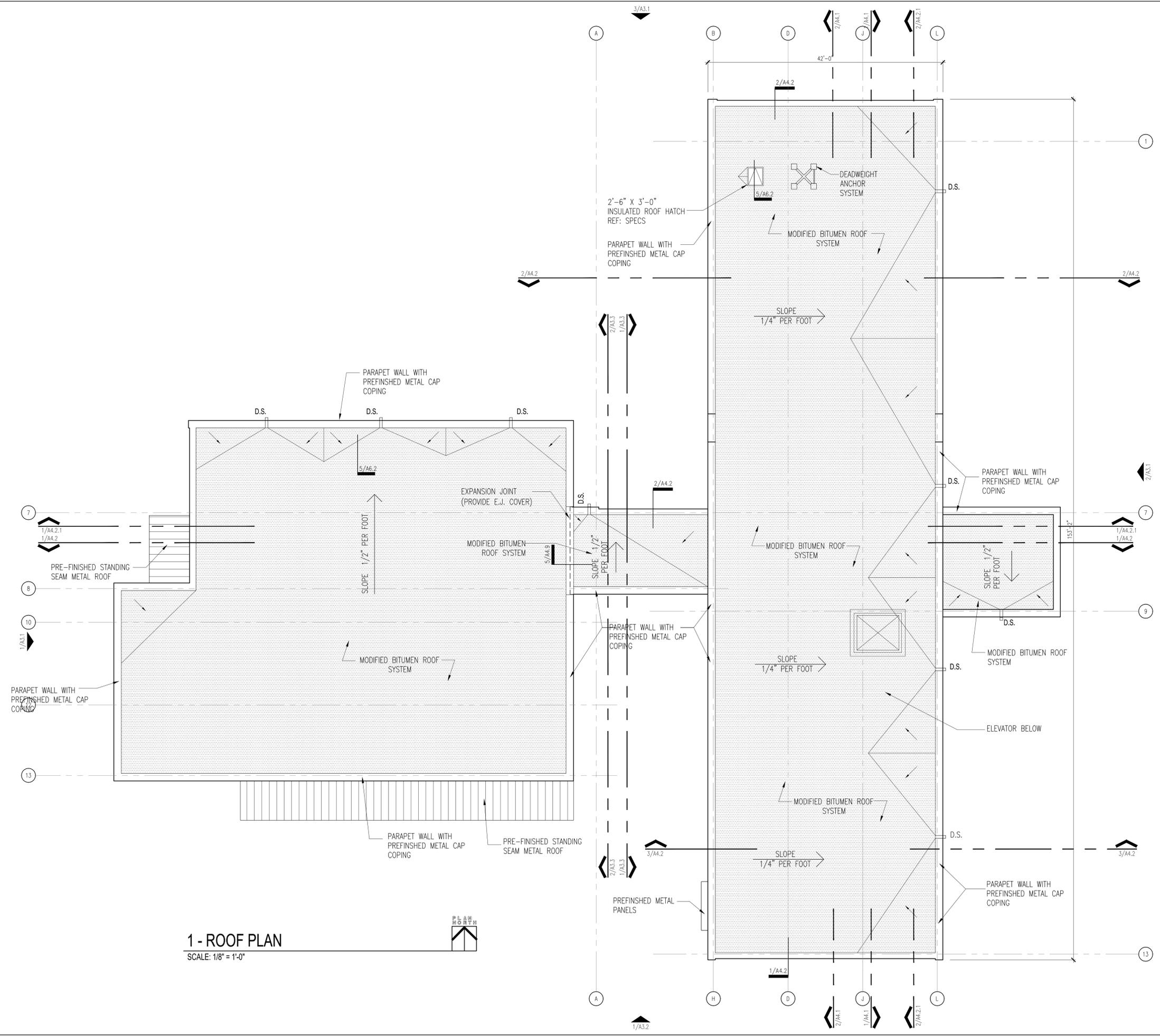
SHEET TITLE
 SITE DETAILS

DRAWN BY: RP

SHEET NO.

A5.9

DATE: APRIL 7, 2016



1 - ROOF PLAN
SCALE: 1/8" = 1'-0"

ROOF PLAN NOTES:

1. THE CONTRACTOR SHALL FIELD VERIFY ALL EXISTING AND PROPOSED DIMENSIONS, CONDITIONS, AND WORK, AND SHALL NOTIFY THE ARCHITECT OF ANY DISCREPANCIES BETWEEN THE DRAWINGS AND THE ACTUAL CONDITIONS BEFORE PROCEEDING WITH THE WORK.
2. USE THE DIMENSIONS THAT ARE ON THE DRAWINGS OR ARE PROVIDED BY THE ARCHITECT. FIELD VERIFY ALL DIMENSIONS. WRITTEN DIMENSIONS ON DRAWINGS TAKE PREFERENCE.
3. WHEN A MATERIAL OR PRODUCT IS IDENTIFIED ANYWHERE IN THE DRAWINGS BY REFERENCE TO MANUFACTURER'S BRAND OR TRADE NAME, IT IS FOR THE PURPOSE OF ESTABLISHING A STANDARD OR QUALITY. ANY MATERIAL OR PRODUCT FROM OTHER MANUFACTURER, WHICH IN THE OPINION OF THE ARCHITECT IS OF EQUAL SUBSTANCE, APPEARANCE, FUNCTION AND PERFORMANCE, WILL BE CONSIDERED.
4. VERIFY EXISTING LOCATIONS OF ALL UTILITIES PRIOR TO PROCEEDING WITH THE WORK AND RELOCATE EXISTING UTILITIES THAT WILL INTERFERE WITH THE NEW CONSTRUCTION.
5. THE CONTRACTOR IS TO PROTECT ALL WORK DURING DEMOLITION AND CONSTRUCTION AS NOT TO DAMAGE ANY AREAS WITHIN THE CONTRACT. ANY AREA DAMAGED SHALL IMMEDIATELY BE REPORTED TO THE ARCHITECT AND SHALL BE PROMPTLY REPAIRED TO THE SATISFACTION OF THE ARCHITECT AND OWNER.
6. JOB SITE OBSERVATIONS BY THE ARCHITECT/ ENGINEER OR THEIR AUTHORIZED REPRESENTATIVES SHALL CONSIST OF VISUAL OBSERVATION OF MATERIALS, EQUIPMENT OR CONSTRUCTION WORK FOR THE PURPOSE OF ASCERTAINING THAT THE WORK IS IN SUBSTANTIAL CONFORMANCE WITH THE CONTRACT DOCUMENTS.
7. THE CONTRACTOR SHALL TAKE POSITIVE STEPS TO PROTECT PROPERTY FROM DAMAGE THAT COULD BE CAUSED FROM THE CONSTRUCTION. IN ADDITION, HE/SHE SHALL ADOPT MEASURES TO INSURE THE SAFETY OR THE PEOPLE ASSOCIATED AS A RESULT OF THE CONSTRUCTION.
8. THE CONTRACTOR, IN SUBMITTING A BID FOR THE WORK, IS ASSUMED TO HAVE THOROUGHLY ACQUAINTED HIM/ HERSELF WITH ALL EXISTING CONDITIONS AT THE JOB SITE AND TO HAVE QUESTIONED THE ARCHITECT FOR CLARIFICATION ON ANY AMBIGUOUS ITEMS HE/SHE HAD ENCOUNTERED AFTER THOROUGHLY READING THE DRAWINGS AND SPECIFICATIONS. ADDITIONAL COMPENSATION WILL NOT BE AWARDED TO THE CONTRACTOR FOR FAILURE TO FAMILIARIZE THEMSELVES WITH THE SITE, EXISTING CONDITIONS, AND THE DRAWINGS AND SPECIFICATIONS.
9. ALL DETAILS AND NOTES MARKED "TYPICAL OR TYP." ON DRAWINGS APPLY TO ALL CONDITIONS IN THIS CONTRACT, WHERE APPLICABLE.
10. ALL DIMENSIONS ARE FROM COLUMN CENTER LINES, FACE OF STUD, FACE OF CMU OR FACE OF CONCRETE UNLESS NOTED OTHERWISE.
11. SEE SHEET A2.8 FOR ALL INTERIOR WALL TYPES. ALL INTERIOR WALLS ARE TO BE TYPE "A" UNLESS NOTED OTHERWISE.

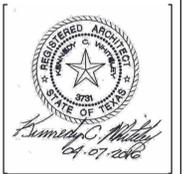
SYMBOL LEGEND

	ELEVATION RE: A3 SERIES
	ALUM. WINDOW TYPE RE: A2.5
	HOLLOW METAL WINDOW TYPE RE: A2.5
	DOOR TYPE RE: A2.4
	PARTITION TYPE RE: A2.8
	BUILDING SECTION RE: A4 SERIES
	WALL SECTION RE: A4 SERIES
	ENLARGED DETAIL/PLAN
	TACK BOARD (NIC)
	MARKER BOARD (NIC)
	DETAIL SECTION
	FIRE EXTINGUISHER CABINET
	FLOOR FINISH TRANSITION RE: AX-X

ROOF PLAN LEGEND

	PRE-FINISHED STANDING SEAM METAL ROOF
	MODIFIED BITUMEN
	DOWNSPOUT

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LAREDO, TEXAS 78046

PROJECT NUMBER
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REVISIONS

FILENAME:

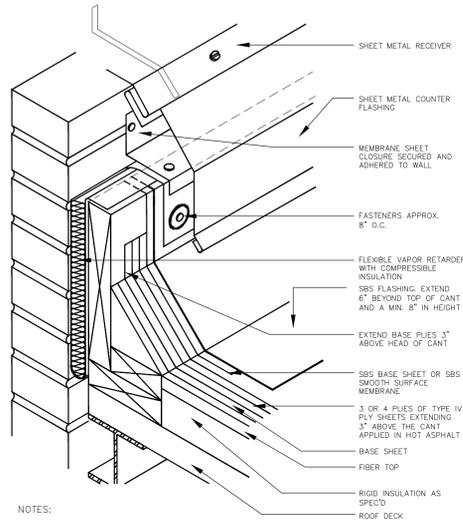
SHEET TITLE
ROOF PLAN

DRAWN BY: JR

SHEET NO.

A6.1

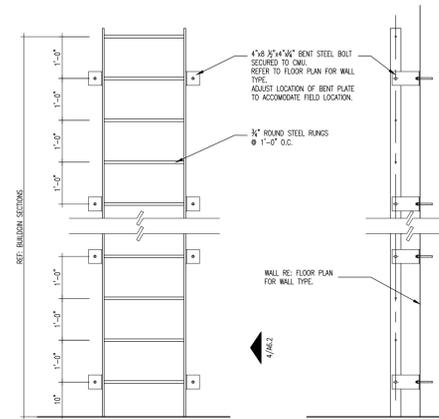
DATE: APRIL 7, 2016



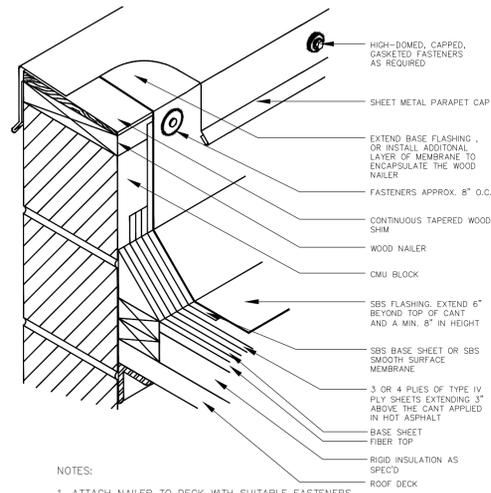
NOTES:
1. ALL SHEET METAL TO BE INSTALLED PER SMACNA GUIDELINES.

1 - ROOF DETAIL TYP.

SCALE: N.T.S.



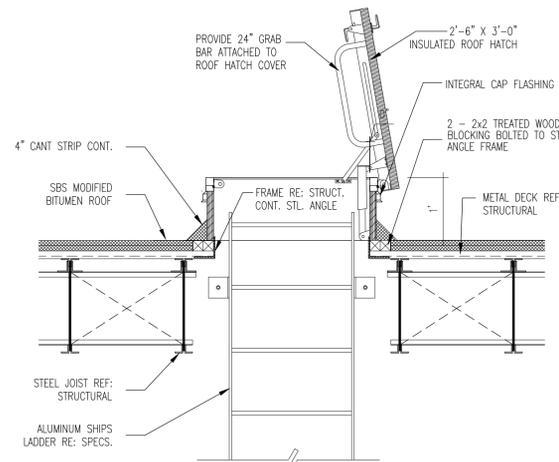
4 - WALL MOUNT LADDER DTL.



NOTES:
1. ATTACH NAILER TO DECK WITH SUITABLE FASTENERS.
2. ALL SHEET METAL TO BE INSTALLED PER SMACNA GUIDELINES.

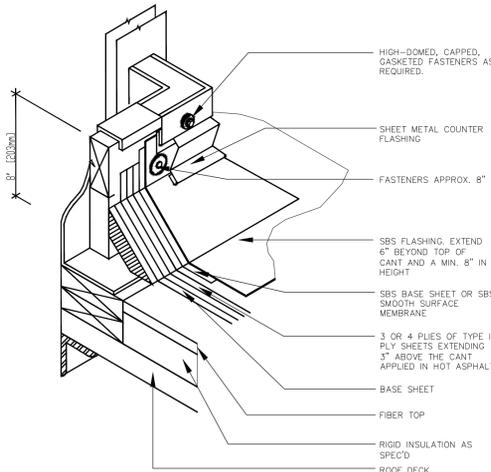
2 - ROOF DETAIL TYP.

SCALE: N.T.S.



5 - ROOF HATCH

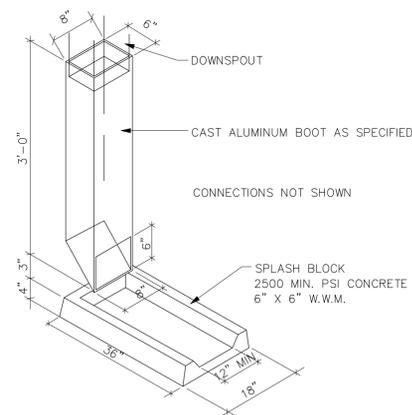
SCALE: 3/4" = 1'-0"



NOTES:
1. WHEN POSSIBLE, THE MECHANICAL UNITS MUST NOT BE SET UNTIL THE ROOF MEMBRANE AND FLASHING HAVE BEEN INSTALLED.
2. ALL SHEET METAL TO BE INSTALLED PER SMACNA GUIDELINES.

3 - ROOF DETAIL TYP.

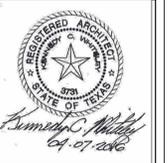
SCALE: N.T.S.



6 - DOWNSPOUT BOOT and SPLASH BLOCK

SCALE: N.T.S.

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PROJECT NUMBER
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FILENAME:

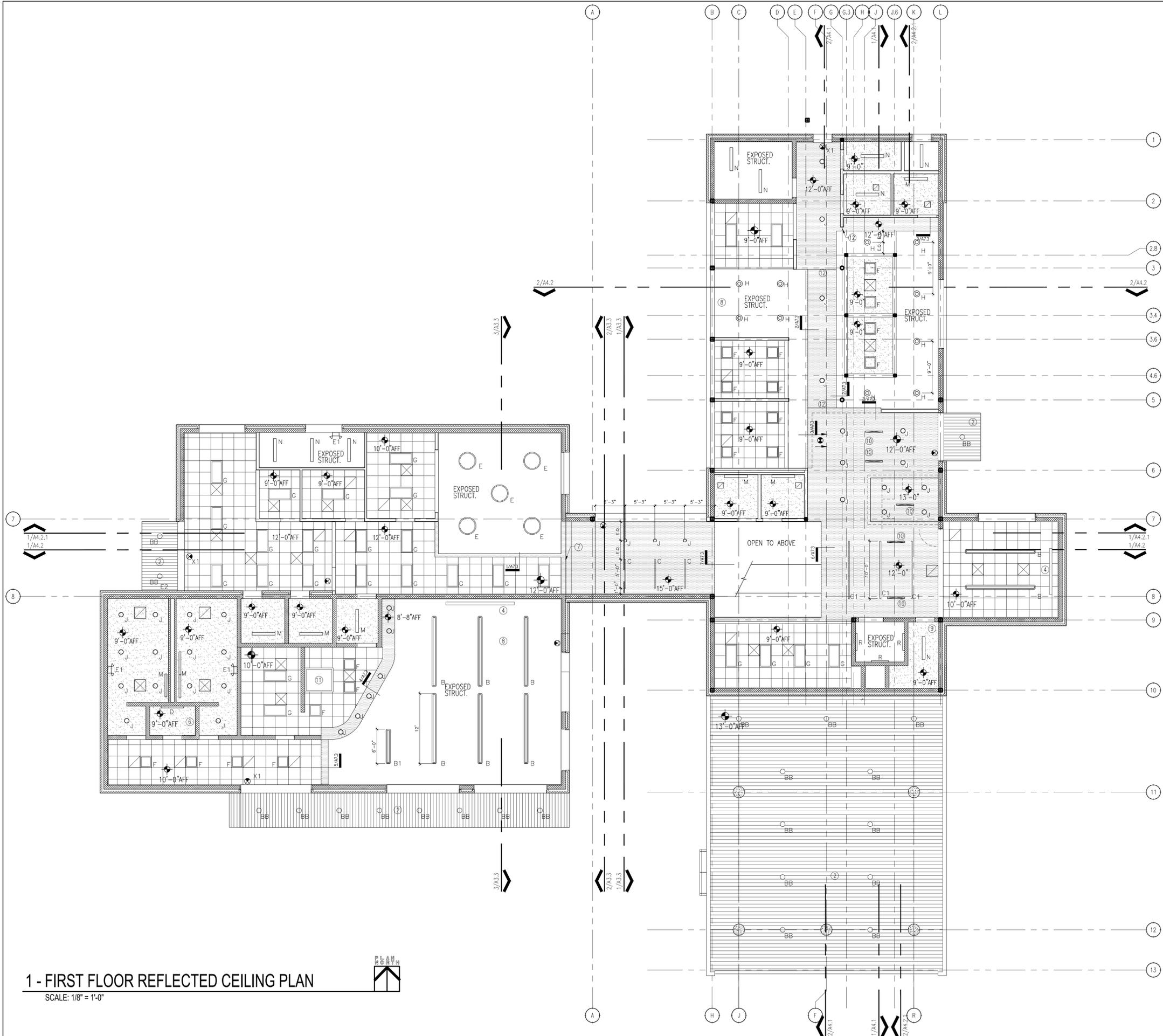
SHEET TITLE
ROOF DETAILS

DRAWN BY: rp

SHEET NO.

A6.2

DATE: APRIL 7, 2016



1 - FIRST FLOOR REFLECTED CEILING PLAN
 SCALE: 1/8" = 1'-0"

REFLECTED CEILING NOTES

1. REFER TO ELECTRICAL PLAN FOR SWITCH AND CIRCUITING REQUIREMENTS.
2. REFER TO ELECTRICAL LIGHTING PLAN & SPECS. FOR ADDITIONAL LIGHTING INFORMATION.
3. PROVIDE METAL BRACING AS REQUIRED.
4. REFER TO INTERIOR AND EXTERIOR ELEVATIONS FOR LIGHT FIXTURE MOUNTING HEIGHTS.
5. TAPE AND FLOAT ALL FIRE RATED GYPSUM BOARD SEAL ALL PENETRATIONS WITH FIRE CAULK.
6. ALL CONDUIT SERVING LIGHTING IS TO BE CONCEALED.
7. ALL EXPOSED STRUCTURE TO BE PAINTED BLACK.

KEYED NOTES

- | | |
|---|---------------------|
| ① CENTER PENDANT LIGHT FIXTURES BETWEEN EXPOSED CEILING JOISTS. | ⑦ EXPANSION JOINT |
| ② METAL SOFFIT PANEL AS SPECIFIED. | ⑧ EXPOSED HVAC DUCT |
| ③ ROLL DOWN SHADE | ⑨ HVAC UNIT |
| ④ PROJECTION SCREEN | ⑩ LINEAR DIFFUSER |
| ⑤ ACCESS PANEL | ⑪ KITCHEN HOOD |
| ⑥ ROOF HATCH | ⑫ CONTROL JOINT |

SYMBOLS LEGEND

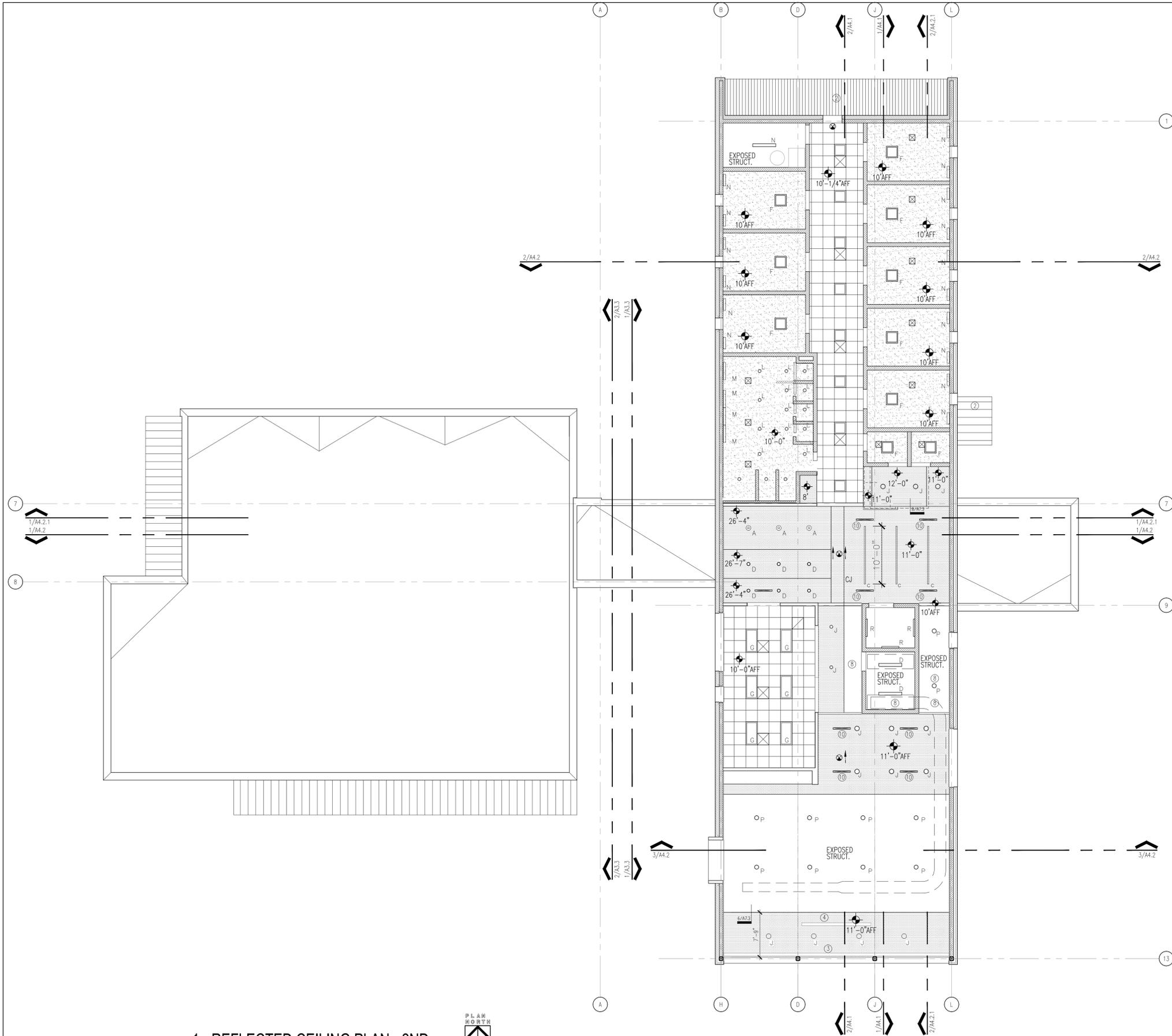
	2' x 2' FLUORESCENT LIGHT FIXTURE		SUPPLY AIR GRILLE
	ILLUMINATED EXIT SIGN		RETURN AIR GRILLE
	RECESSED LIGHT FIXTURE		EXHAUST AIR
	DECORATIVE PENDANT LIGHT FIXTURE		LINEAR SUPPLY AIR DEVICE
	PENDANT LIGHT FIXTURE		GYPSUM BOARD CEILING
	DECORATIVE PENDANT LIGHT FIXTURE SURFACE (COORD. MOUNTING HGTS)		SUSPENDED ACOUSTICAL CEILING
	SUSPENDED LIGHT FIXTURE (SIZE VARIES)		EXPOSED STRUCTURE
	SUSPENDED LIGHT FIXTURES (SIZE VARIES)		METAL SOFFIT ALUCOBOND PANELS
	WALL MOUNTED LIGHT FIXTURES		METAL SOFFIT PANELS
	WALLPACK AT STAIRS		

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PROJECT NUMBER 1401
REVISIONS
FILENAME:
SHEET TITLE REFLECTED CEILING PLAN - 1ST FLOOR
DRAWN BY:RP
SHEET NO. A7.1
DATE: APRIL 7, 2016



REFLECTED CEILING NOTES

1. REFER TO ELECTRICAL PLAN FOR SWITCH AND CIRCUITING REQUIREMENTS.
2. REFER TO ELECTRICAL LIGHTING PLAN & SPECS. FOR ADDITIONAL LIGHTING INFORMATION.
3. PROVIDE METAL BRACING AS REQUIRED.
4. REFER TO INTERIOR AND EXTERIOR ELEVATIONS FOR LIGHT FIXTURE MOUNTING HEIGHTS.
5. TAPE AND FLOAT ALL FIRE RATED GYPSUM BOARD SEAL ALL PENETRATIONS WITH FIRE CAULK.
6. ALL CONDUIT SERVING LIGHTING IS TO BE CONCEALED.
7. ALL EXPOSED STRUCTURE TO BE PAINTED BLACK.

KEYED NOTES

- | | |
|---|---------------------|
| ① CENTER PENDANT LIGHT FIXTURES BETWEEN EXPOSED CEILING JOISTS. | ⑦ EXPANSION JOINT |
| ② METAL SOFFIT PANEL AS SPECIFIED. | ⑧ EXPOSED HVAC DUCT |
| ③ ROLL DOWN SHADE | ⑨ HVAC UNIT |
| ④ PROJECTION SCREEN | ⑩ LINEAR DIFFUSER |
| ⑤ ACCESS PANEL | ⑪ KITCHEN HOOD |
| ⑥ ROOF HATCH | ⑫ CONTROL JOINT |

SYMBOLS LEGEND

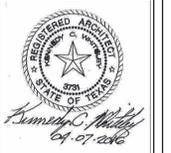
	2' x 2' FLUORESCENT LIGHT FIXTURE		SUPPLY AIR GRILLE
	ILLUMINATED EXIT SIGN		RETURN AIR GRILLE
	RECESSED LIGHT FIXTURE		EXHAUST AIR
	DECORATIVE PENDANT LIGHT FIXTURE		LINEAR SUPPLY AIR DEVICE
	PENDANT LIGHT FIXTURE		GYPSUM BOARD CEILING
	DECORATIVE PENDANT LIGHT FIXTURE SURFACE (COORD. MOUNTING HGTS)		SUSPENDED ACOUSTICAL CEILING
	SUSPENDED LIGHT FIXTURE SIZE VARIES		EXPOSED STRUCTURE
	SUSPENDED LIGHT FIXTURES SIZE VARIES		METAL SOFFIT ALUMINUM PANELS
	WALL MOUNTED LIGHT FIXTURES		METAL SOFFIT PANELS
	WALLPACK AT STAIRS		

1 - REFLECTED CEILING PLAN - 2ND

SCALE: 1/8" = 1'-0"



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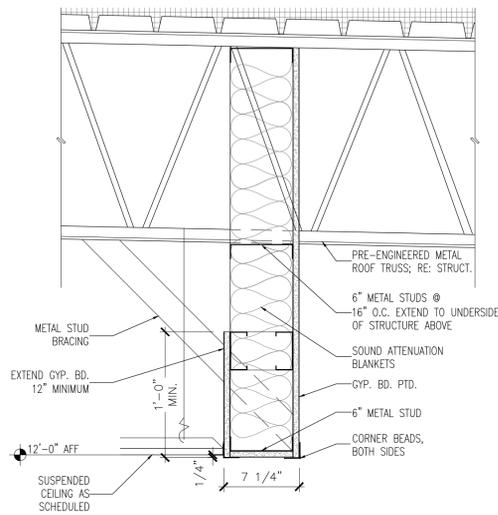
SHEET TITLE
 REFLECTED CEILING PLAN

DRAWN BY: JR/EQ

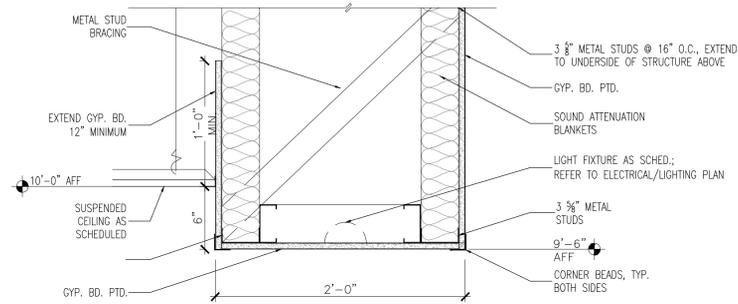
SHEET NO.

A7.2

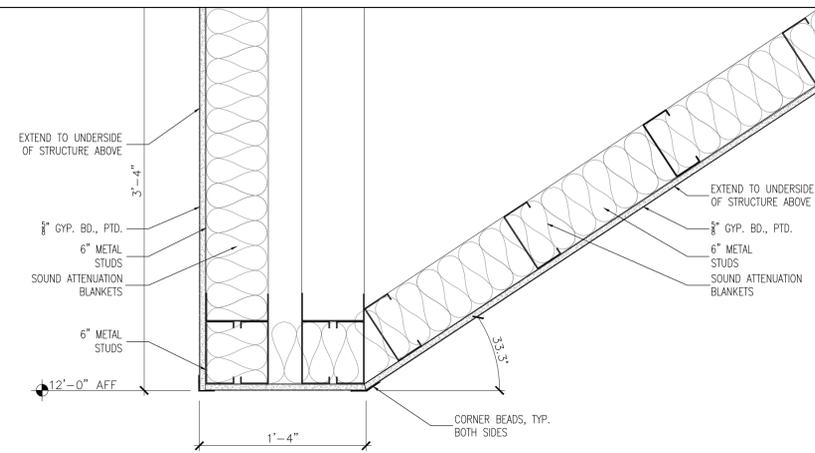
DATE: APRIL 7, 2016



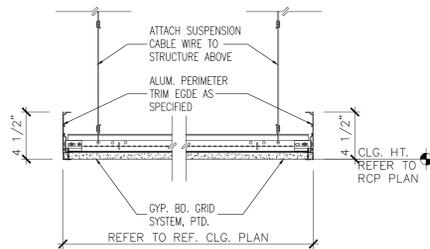
1 - CEILING DETAIL
SCALE: 1 1/2" = 1'-0"



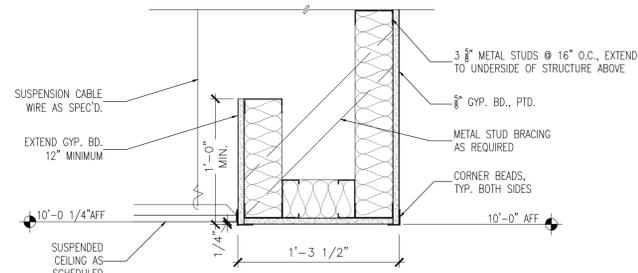
4 - FURR DOWN DETAIL
SCALE: 1 1/2" = 1'-0"



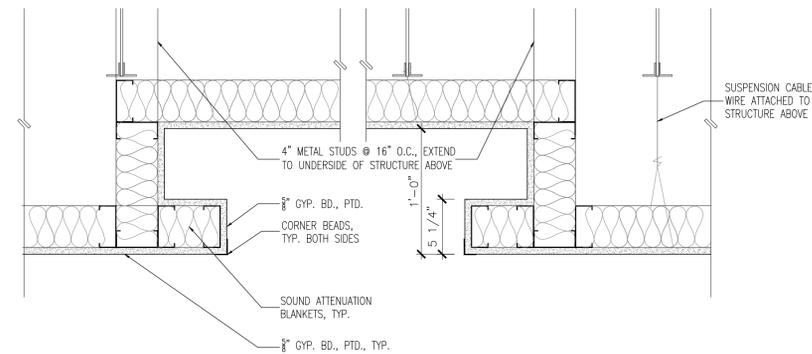
7- CEILING FURR DOWN DETAIL
SCALE: 1 1/2" = 1'-0"



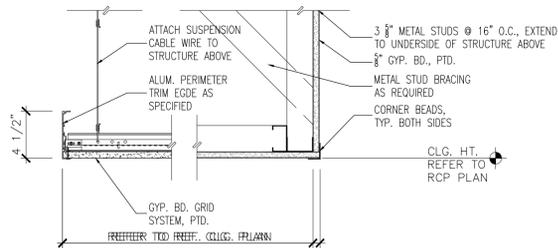
2 - CEILING DETAIL
SCALE: 1 1/2" = 1'-0"



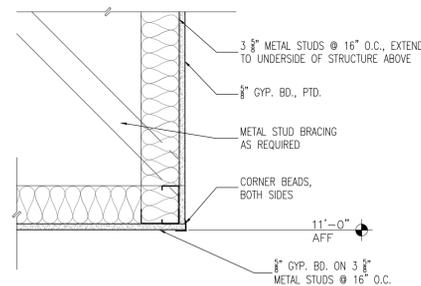
5 - CEILING DETAIL
SCALE: 1 1/2" = 1'-0"



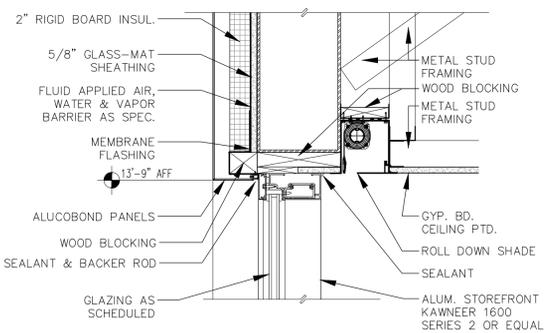
8 - CEILING DETAIL
SCALE: 1 1/2" = 1'-0"



3 - CEILING DETAIL
SCALE: 1 1/2" = 1'-0"



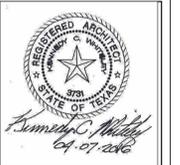
6 - CEILING DETAIL
SCALE: 1 1/2" = 1'-0"



9 - CEILING DETAIL
SCALE: 1 1/2" = 1'-0"

10 - NOT USED
SCALE:

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PROJECT NUMBER
1401
REVISIONS

FILENAME: A7.3 RCP Details.dwg

SHEET TITLE
CEILING DETAILS

SCALE AS NOTED

DRAWN BY: VFR/eq

SHEET NO.

A7.3

DATE: APRIL 7, 2016

1. DO NOT ROUGH-IN FROM THIS DRAWING. REFER TO FOODSERVICE EQUIPMENT SUPPLIER'S DIMENSIONED SHOP DRAWINGS.
2. DIMENSIONS INDICATED ARE TO BE VERIFIED BY FOODSERVICE EQUIPMENT SUPPLIER AND ADJUSTED AS REQUIRED BY EQUIPMENT OR FIELD CONDITIONS.
3. ACCESSORIES AND FITTINGS PROVIDED LOOSE WITH FOODSERVICE EQUIPMENT BY SECTION 11 40 00 FIELD INSTALLED BY DIVISION 22.
4. DRAINAGE AND PIPING SYSTEMS TO BE CLEANED PRIOR TO FINAL CONNECTION WITH FOODSERVICE EQUIPMENT.
5. HAND LAVATORY PROVIDED AND INSTALLED BY DIVISION 22. SOAP AND TOWEL DISPENSER BY OWNER.
6. JANITOR SINK PROVIDED AND INSTALLED BY DIVISION 22.
7. NUMBER NOT USED
8. NUMBER NOT USED
9. ALL EXPOSED PIPING TO BE CHROME PLATED OR STAINLESS STEEL.
10. ALL PIPING WITHIN COUNTER BODY OR UNDER FABRICATED COUNTERS, TO BE RUN TO SINGLE POINT OF CONNECTION - BY SECTION 11 40 00. FINAL CONNECTION BY DIVISION 22.
11. SECTION 11 40 00 TO VERIFY UTILITY REQUIREMENTS OF PURVEYOR FURNISHED EQUIPMENT.
12. PROTECTIVE DEVICES TO PROTECT AGAINST BACK FLOW, BACK SYPHONAGE SHALL BE INSTALLED AT ALL FIXTURES AND EQUIPMENT WHERE BACKFLOW AND/OR BACKSYPHONAGE MAY OCCUR AND WHERE A MINIMUM AIR GAP CANNOT BE PROVIDED BETWEEN THE WATER TO THE FIXTURE OR EQUIPMENT AND ITS FLOOD/LEVEL RIM BY DIV. 22
13. INTERCONNECT THRU WATER FILTER TO EQUIPMENT BY DIVISION 22.

PLUMBING GENERAL NOTES NOT TO SCALE 01

1. DO NOT ROUGH-IN FROM THIS DRAWING. REFER TO THE CONTRACTOR'S DIMENSIONED DRAWINGS.
2. VERIFY ALL ELECTRICAL CHARACTERISTICS WITH ARCHITECT'S ENGINEERING DRAWINGS.
3. DIMENSIONS INDICATED ARE TO BE VERIFIED BY CONTRACTOR AND ADJUSTED AS REQUIRED BY FOODSERVICE EQUIPMENT AND/OR FIELD CONDITIONS.
4. ACCESSORIES AND FITTINGS PROVIDED LOOSE WITH FOODSERVICE EQUIPMENT BY DIVISION 11 40 00. FIELD INSTALLED BY DIVISION 26.
5. STAINLESS STEEL DISCONNECT SWITCH PROVIDED AND INSTALLED BY DIV. 26.
6. ALL ELECTRICAL CONNECTIONS BENEATH EXHAUST HOOD TO EXTEND TO SHUNT TRIP BREAKERS WITHIN ELECTRICAL PANEL BOX FOR SHUT-DOWN DURING FIRE MODE - BY DIVISION 26.
7. DOOR HEATER(S), LIGHT(S) AND PRESSURE RELIEF PORT(S) PRE-WIRED TO JUNCTION BOX AT TOP OF COLD STORAGE ASSEMBLY BY SECTION 11 40 00. FINAL CONNECTION BY DIVISION 26.
8. (7) WIRES AND CONDUIT FROM CONDENSOR JUNCTION BOX AT COLD STORAGE REFRIGERATION RACK TO EVAPORATOR COIL JUNCTION BOX BY DIVISION 26.
9. INTERCONNECT TO EXHAUST HOOD FANS AND SWITCH BY DIVISION 26.
10. INTERCONNECT TO EXHAUST HOOD LIGHT(S) AND SWITCH BY DIVISION 26.
11. INTERCONNECT FIRE PROTECTION SYSTEM TO PANEL BOX SHUNT TRIP(S) AND BUILDING ALARM - BY DIVISION 26.
12. RECEPTACLE(S) TO BE PRE-WIRED TO JUNCTION BOX OR LOAD CENTER FOR FINAL CONNECTION BY DIVISION 26.
13. UTILITIES FOR EQUIPMENT SCHEDULED FOR FUTURE TO BE CAPPED FOR FUTURE USE.
14. EMPTY CONDUIT RUN FROM CASHIER STATION TO MANAGERS OFFICE FOR POS SYSTEM BY DIVISION 26. LOCATION OF MANAGER'S OFFICE TO BE VERIFIED.
15. SECTION 11 40 00 TO VERIFY ALL UTILITY REQUIREMENTS OF EXISTING EQUIPMENT.

ELECTRICAL GENERAL NOTES NOT TO SCALE 03

NOTE:
REFER TO ELECTRICAL/MECHANICAL DRAWINGS FOR REQUIREMENTS OF EXHAUST FANS AND MAKE-UP AIR HANDLERS AND LOCATION OF FAN INTERLOCK AND START/STOP CONTROLS TO BE LOCATED WITHIN FOODSERVICE AREA BY DIVISION 26.

PLUMBING SCHEDULE

NO.	SIZE	DESCRIPTION	LOCATION	A.F.F.	SERVICE TO	REMARKS
P101	---	FLOOR DRAIN	FLOOR	0"	GENERAL	
P102		NUMBER NOT USED				
P103		NUMBER NOT USED				
P104	12"	SQ. FLOOR SINK	FLOOR	0"	EQUIPMENT DRAIN	BTC 3/4" GRATE
P105	2"	DIRECT DRAIN	WALL	9"	DISPOSER	BTC; RE: NOTE #3
P106	1-1/2"	DIRECT DRAIN	WALL	13"	HAND LAVATORY	BTC; RE: NOTE #5
P107	1/2"	HOT AND COLD	WALL	13"	HAND LAVATORY	BTC; RE: NOTE #5
P108		NUMBER NOT USED				
P109	3/4"	HOT & COLD WATER	WALL	13"	SINK FAUCET	BTC; RE: NOTE #8
P110		NUMBER NOT USED				
P111	3/4"	HOT & COLD WATER	FLOOR	6"	FAUCET	BTC; RE: NOTE #3
P112		NUMBER NOT USED				
P113		NUMBER NOT USED				
P114	1/2"	COLD WATER	WALL	72"	ICE MACHINE	BTC CONDENSER CONNECTION
P115	1/2"	COLD WATER	WALL	44"	BEVERAGE EQUIPMENT	
P116	1/2"	HOT & COLD WATER	WALL	13"	FAUCET	
P117		NUMBER NOT USED				
P118		NUMBER NOT USED				
P119		NUMBER NOT USED				

MECHANICAL SCHEDULE

NO.	SIZE	CONN.	LOCATION	CFM	FPM	S.P.	REMARKS
M101	10" x 11"	EVC	108" A.F.F.	1200	1571	0.65"	BTC HOOD COLLAR TYP.
M102	10" x 19"	SVC	108" A.F.F.	960	728	0.30"	BTC HOOD COLLAR TYP.
M103	10" x 11"	EVC	108" A.F.F.	1200	1571	0.65"	BTC HOOD COLLAR TYP.
M104	10" x 19"	SVC	108" A.F.F.	960	728	0.30"	BTC HOOD COLLAR TYP.

ELECTRICAL SCHEDULE

NO.	CONN.	SERVICE TO	RATING	VOLTS	PH	LOCATION	A.F.F.	REMARKS
E101	DR	CONVENIENCE OUTLET	16.0 A	120	1	WALL	18"	
E102	DR	CONVENIENCE OUTLET	16.0 A	120	1	WALL	46"	MOUNTED HORIZONTALLY
E103	WPR	CONVENIENCE OUTLET	16.0 A	120	1	WALL	46"	MOUNTED HORIZONTALLY
E104	DR	REFRIGERATOR	5.0A	120	1	WALL	48"	VERIFY PLUG CONFIG.
E105	SR	ICE MACHINE	15.0A	120	1	WALL	72"	20.0 AMP CIRCUIT
E106	JB	DISPOSER	1.5 HP	208	3	WALL	18"	VERIFY PLUG CONFIG.
E107	JB	EXHAUST HOOD	5.0A	120	1	CEILING	108"	BTC; RE: NOTES #4 & #5
E108	JB	FIRE PROTECTION SYSTEM	15.0A	120	1	WALL	90"	VERIFY PLUG CONFIG.
E109	S/JP	THERMAL SENSOR	10.0 A	120	1	CLNG	120"	BTC; RE: DETAIL 01, FS1.03
E110		NUMBER NOT USED						
E111	JB	LOAD CENTER	50.0A	120/208	3	WALL	12"	RE: NOTE #4
E112	JB	RANGE	40.0A	208	3	WALL	24"	
E113	DR	ROLL-IN REFRIGERATOR	10.1A	120	1	WALL	90"	RE: NOTE #6
E114	DR	ROLL-IN FREEZER	10.9A	120	1	WALL	90"	RE: NOTE #6
E115	SR	ROLL-IN HEATED CABINET	13.0A	208	1	WALL	90"	RE: NOTE #6 VERIFY PLUG CONFIG
E116		NUMBER NOT USED						
E117	DR	REFRIGERATED WORK TABLE	5.1A	120	1	WALL	24"	
E118	JB/DS	RANGE	59.0A	208	3	WALL	18"	36"
E119		NUMBER NOT USED						
E120		NUMBER NOT USED						
E121	JB	DISPOSER	2.0HP	208	3	WALL	13"	BTC
E122	CS	LOAD CENTER	50.0A	120/ 208	3	FLOOR	6"	BTC;
E123	JB	REMOTE FIRE PULL	---	---	---	WALL	44"	RE: FS1.04/02

EQUIPMENT SCHEDULE

NO.	QTY.	ITEM DESCRIPTION	MANUFACTURER	MODEL NO.	UTILITIES	REMARKS
101	1 LOT	DRY STORAGE SHELVING	METRO	METRO MAX	-	
102	1	REFRIGERATOR/FREEZER	GE	PWE23KSDSS	15.0A, 120/1	
103	2	CABINET	CUSTOM FABRICATED	-	-	
104	1	RANGE	GE	PHB930SHSS	40.0A, 208/1	
105	1	EXHAUST HOOD	MOD-U-SERVE	W-FM	5.0A, 120/1	
106	1	FIRE PROTECTION SYSTEM	ANSUL	R102/JUL300	15.0A, 120/1	
107	1	HAND LAVATORY	ADVANCE/TABCO	7-PS-79	-	
108	1	3 BASIN SINK	EAGLE	312-14-3-12	-	
109	1	DISPOSER	IN-SINK ERATOR	SS-150-5-CC101	1.5 HP, 208/3	
110		NUMBER NOT USED				
111	1	SERVING COUNTER	CUSTOM FABRICATED	----	20.0A, 120/1	
112	1	ROLL-DOWN DOOR	-	BY GENERAL CONTRACTOR	-	
113	1	TRAY/TRASH RETURN	CUSTOM FABRICATED	-	-	S/S TOP, MILLWORK BODY
114	1 LOT	DRY STORAGE SHELVING	METRO	METRO MAX	----	
115	1	ROLL-IN HEATED CABINET	VICTORY	HISA-2D-S1	12.5 A,208/1	
116	6	MOBILE RACKS	CRESCOR	207-UA-12-AD	-	
117	1	ROLL-IN FREEZER	VICTORY	FISA-1D-S1	10.9A, 120/1	
118	1	ROLL-IN REFRIGERATOR	VICTORY	RISA-2D-S1	11.9A, 120/1	
119	2	HAND LAVATORIES	ADVANCE TABCO	7-PS-79	-	
120	----	NUMBER NOT USED	----	----	----	
121	1	3 BASIN SINK	CUSTOM FABRICATED	-	-	
122	1	DISPOSER	IN-SINK ERATOR	SS-200-5-CC-101	2.0HP, 208/3	
123	1	RANGE	GARLAND	SS686	59.0A, 208/3	
124	1	EXHAUST HOOD	MOD-U-SERVE	W-FM	5.0A, 120/1	
125	1	FIRE PROTECTION SYSTEM	ANSUL	R102/JUL300	15.0A, 120/1	
126	1	WORK TABLE	ADVANCE TABCO	KMS-304	-	
127	1	SERVING COUNTER	CUSTOM FABRICATED	-	50.0A, 120/208/3	
128	1	TRAY/TRASH RETURN	CUSTOM FABRICATED	-	-	S/S TOP, MILLWORK BODY
129		NUMBER NOT USED				
130		NUMBER NOT USED				
131		NUMBER NOT USED				
132		NUMBER NOT USED				
133	1	MOBILE HOT CABINET	CRESCOR	H-137-SUA-5D	8.0A, 120/1	
134	1	ICE MACHINE	SCOTSMAN	CU0920	15.0A, 120/1	

PLUMBING SYMBOLS

HW	HOT WATER	IW	INDIRECT WASTE (EXTEND TO F.D)
CW	COLD WATER	FFD	FUNNEL FLOOR DRAIN
HTW	180 F HOT WATER	EVC	EXHAUST VENT CONNECTION
CWS	CHILLED WATER	SVC	SUPPLY VENT CONNECTION
G	GAS SUPPLY	FR	DIRECT-CONNECTED FLUE RISER
SS	STEAM SUPPLY	PS	PIPE SLEEVE
CR	CONDENSATE RETURN	AFF	ABOVE FINISHED FLOOR
DR	DRAIN	ST	STUB UP/OUT
FD	FLOOR DRAIN	BTC	BRANCH TO CONN. ON EQUIP
FS	FLOOR SINK	DFA	DROP FROM ABOVE

ELECTRICAL SYMBOLS

CSR	CONDUIT STUB BTC ON RECEPTACLE FURNISHED WITH EQUIPMENT	DS	DISCONNECT SWITCH FURNISHED AND INSTALLED BY DIV. 16
CS	CONDUIT STUB UP/OUT FOR DIRECT CONNECTION	WPR	20 AMP WEATHERPROOF RECEPTACLE (SPRING COVER)
DR	20 AMP GFI DUPLEX RECEPTACLE MOUNT HORIZONTAL	JB	JUNCTION BOX IN WALL
SR	SINGLE PURPOSE RECEPTACLE 1PH.	FPB	FIRE PROTECTION BUZZER
SR	SINGLE PURPOSE RECEPTACLE 3PH.	BSC	BEVERAGE SYSTEM CONDUIT
FR	FLUSH FLOOR RECEPTACLE	ST	STUB UP ABOVE FINISHED FLOOR
PMR	PEDESTAL MOUNT RECEPTACLE	AFF	ABOVE FINISHED FLOOR
DCR	DROP CORD RECEPTACLE	DFA	DROP FROM ABOVE
JB	JUNCTION BOX IN CEILING	BTC	BRANCH TO CONNECTION ON EQUIPMENT
JP	JUNCTION BOX ON PEDESTAL		



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10206 Five Oaks Lane
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(713) 705-0952, FAX (281) 778-8536
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LAREDO, TEXAS 78046

PROJECT NUMBER
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REVISIONS

FILENAME:

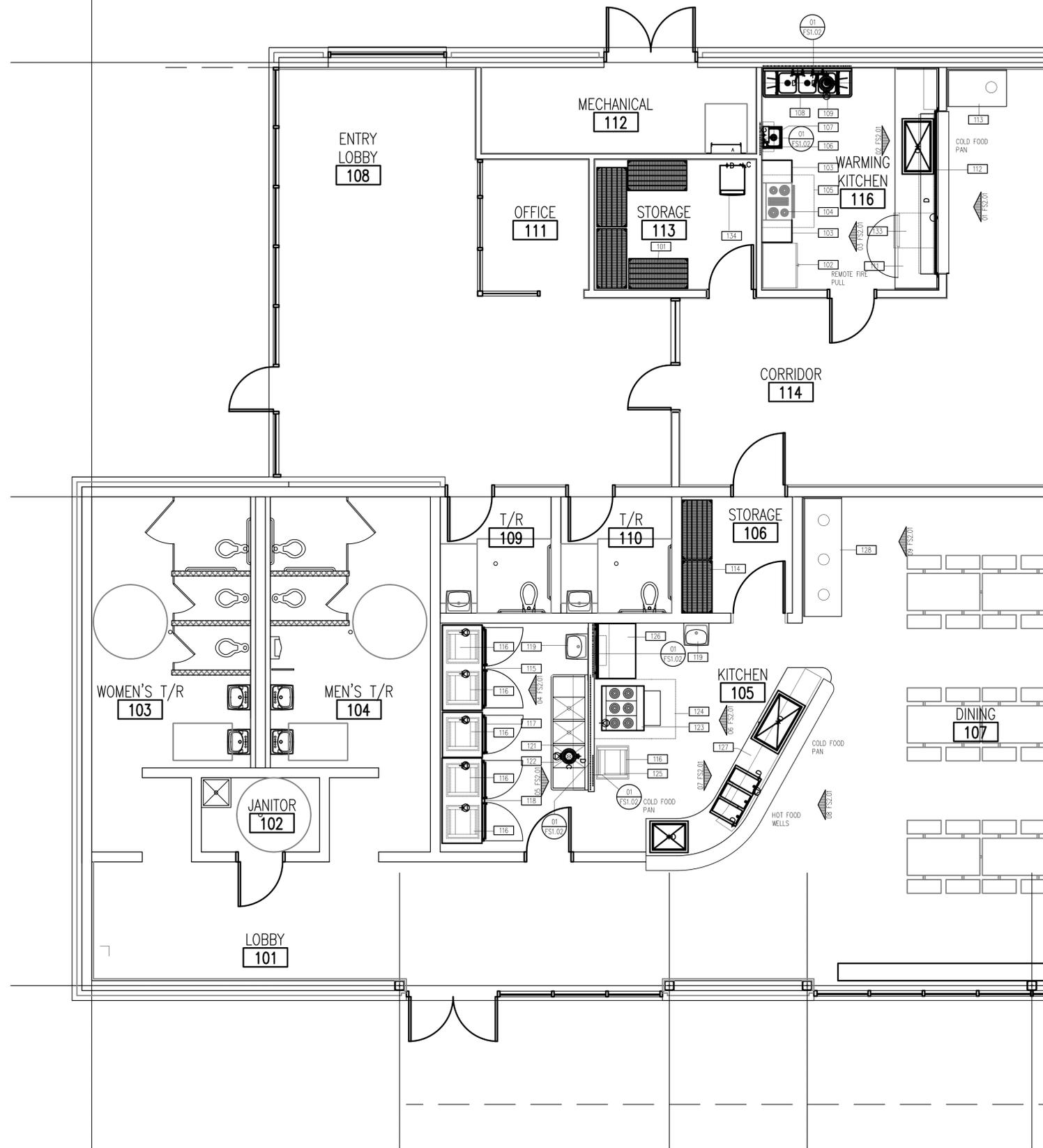
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FOODSERVICE
EQUIPMENT
SCHEDULES

DRAWN BY:R.A.P.

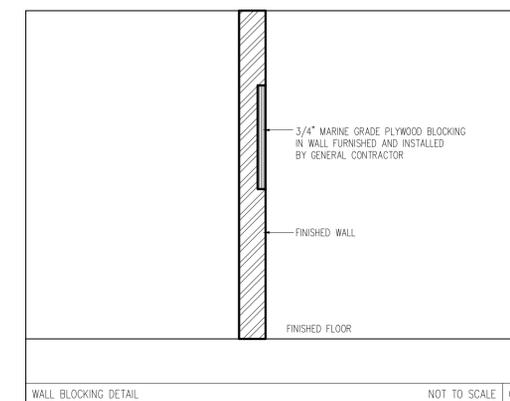
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FS-1.00

DATE: April 7, 2016



NOTE: REFER TO DRAWING FS1.00 FOR SCHEDULES



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 EQUIPMENT PLAN

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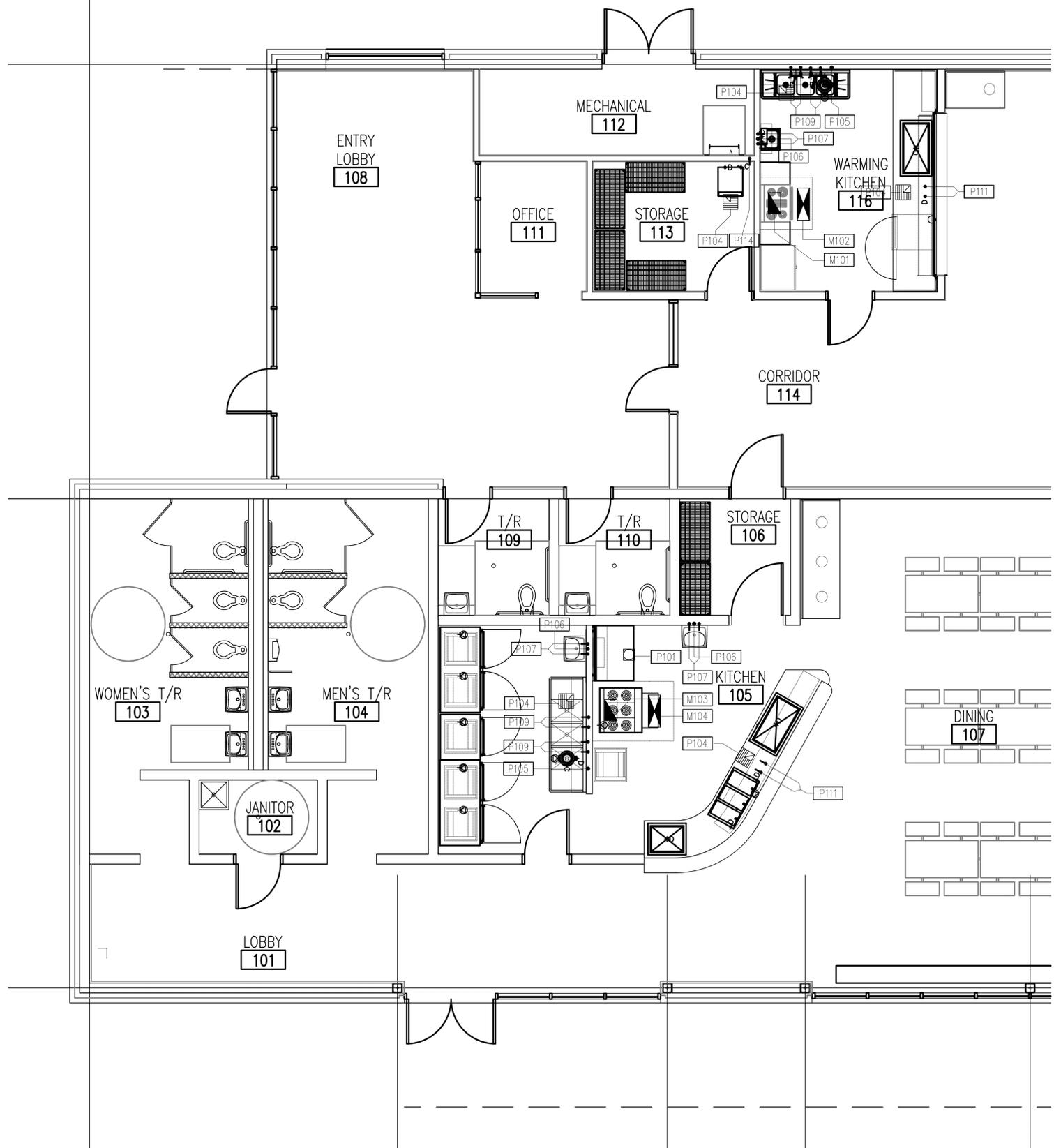
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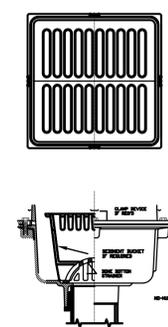


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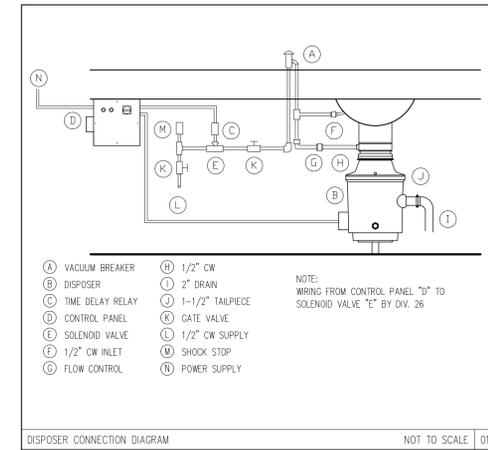


NOTE: REFER TO DRAWING FS1.00 FOR SCHEDULES

NOTE: REFER TO DRAWING FS1.04 FOR HOOD DETAILS



NOTE:
P104 FLOOR DRAIN
WADE 9144 -TY - 16-26-27
FURNISHED AND INSTALLED
BY DIV 22



- (A) VACUUM BREAKER
- (B) DISPOSER
- (C) TIME DELAY RELAY
- (D) CONTROL PANEL
- (E) SOLENOID VALVE
- (F) 1/2" CW INLET
- (G) FLOOR CONTROL
- (H) 1/2" CW
- (I) 2" DRAIN
- (J) 1-1/2" TAILPIECE
- (K) GATE VALVE
- (L) 1/2" CW SUPPLY
- (M) SHOCK STOP
- (N) POWER SUPPLY

NOTE:
WIRING FROM CONTROL PANEL "D" TO
SOLENOID VALVE "E" BY DIV. 26

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FOODSERVICE
PLUMBING CONN
PLAN

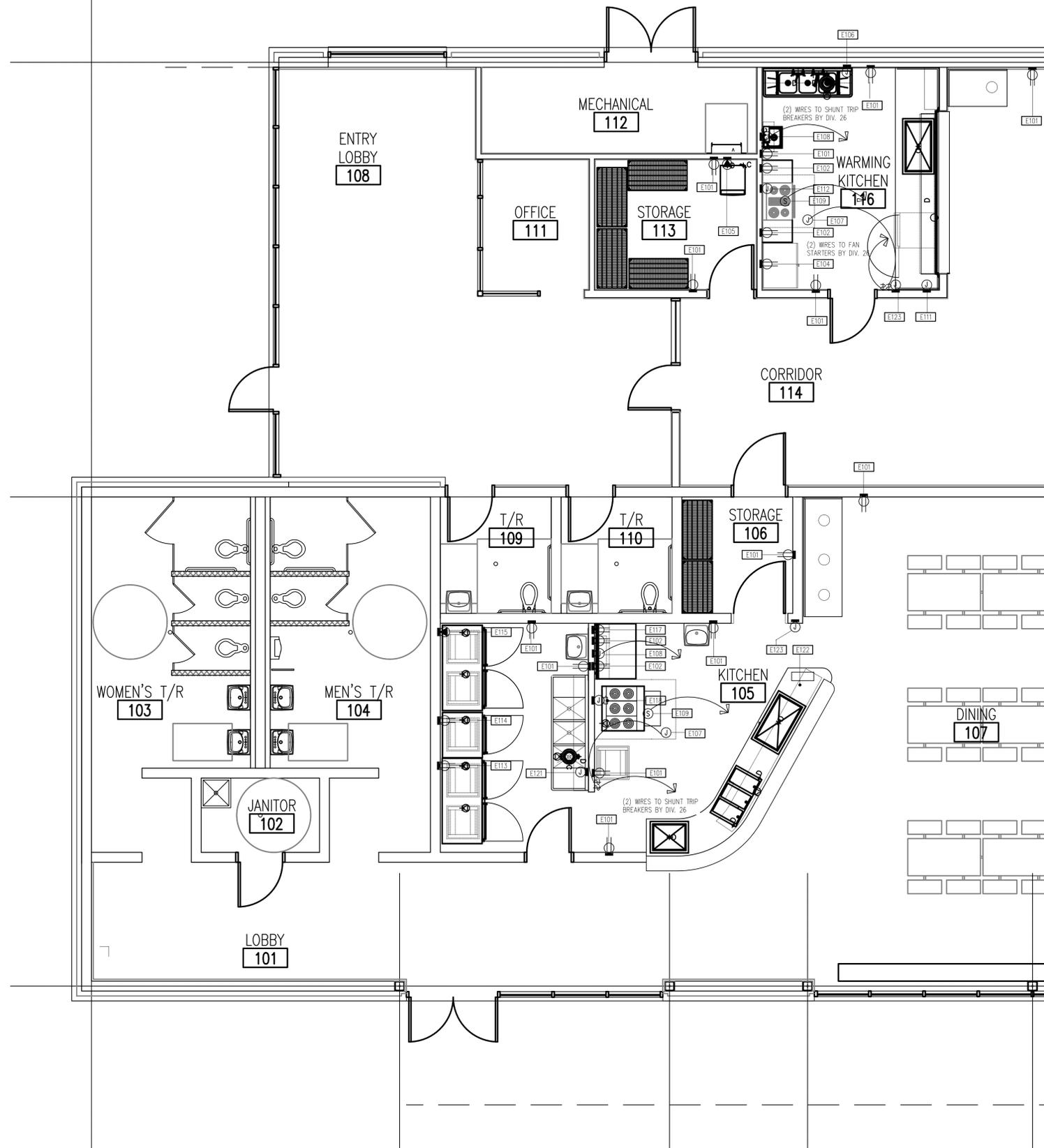
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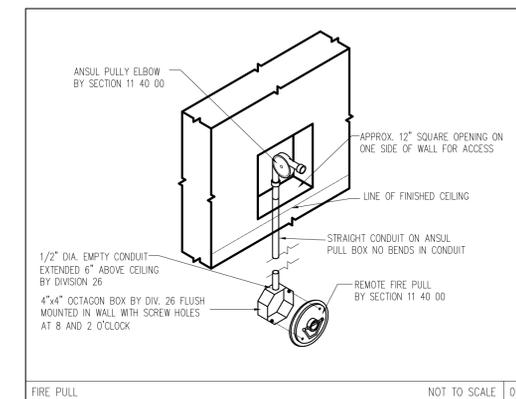
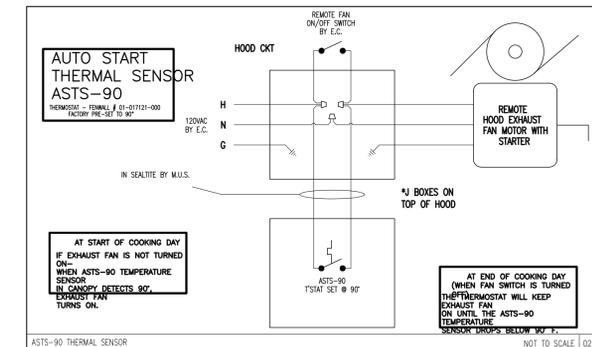
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SHEET TITLE
 FOODSERVICE
 ELECTRICAL CONN
 PLAN

DRAWN BY: R.A.P.

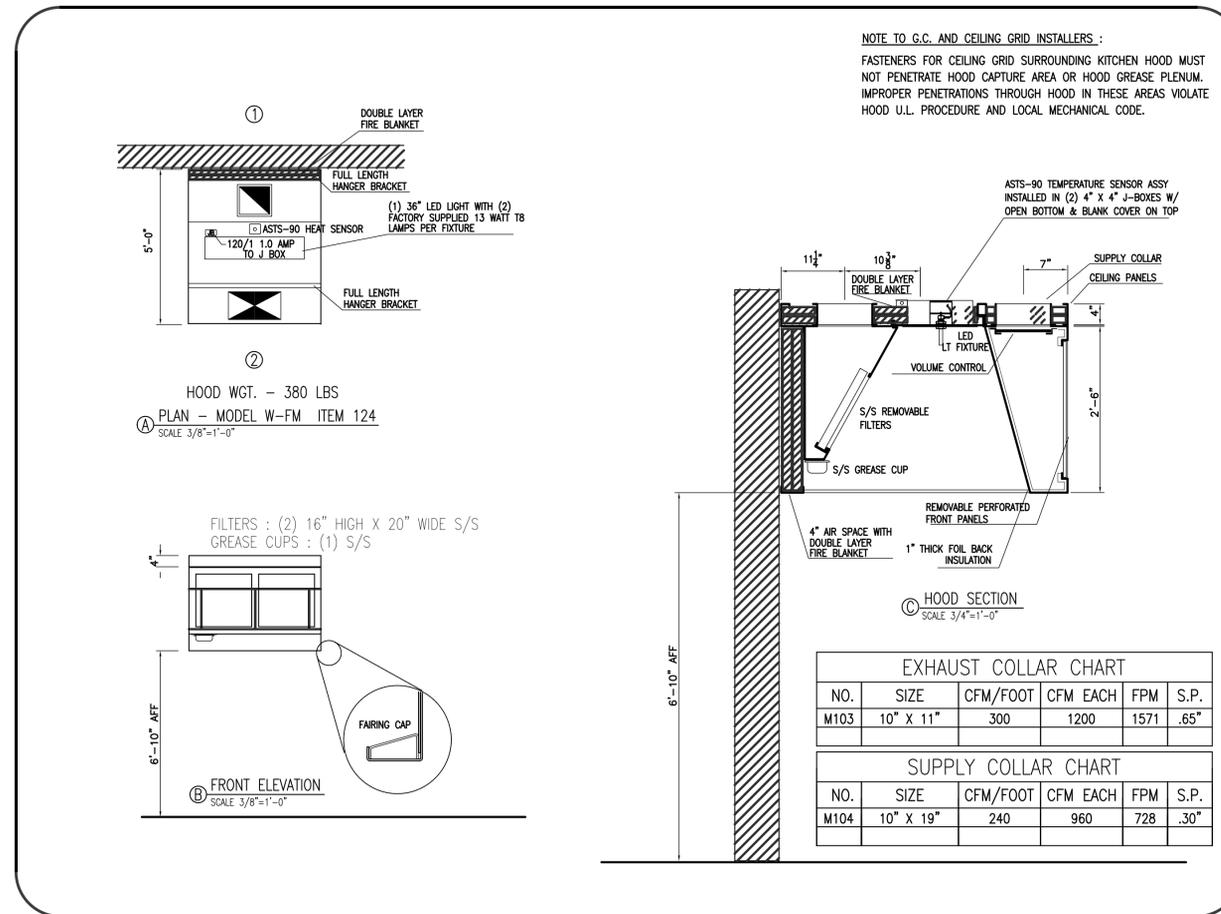
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FIVE OAKS KITCHEN DESIGN
 10206 Five Oaks Lane
 Missouri City, TX 77459
 (713) 705-0952, FAX (281) 778-8536
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FIVE OAKS DESIGN

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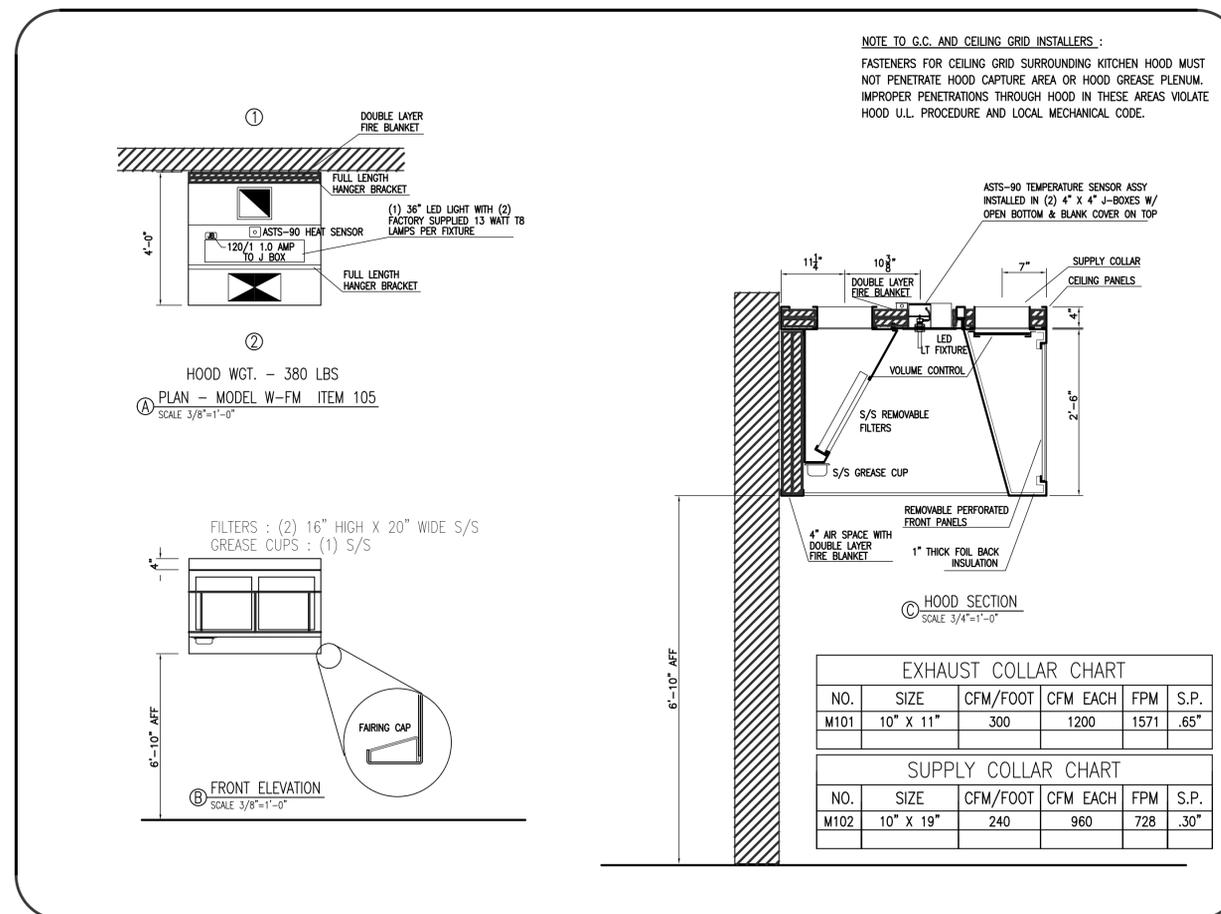
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August 11, 2015

SHEET 2 OF 2 SHEETS



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(512) 327-0444 FAX (512) 301-4909

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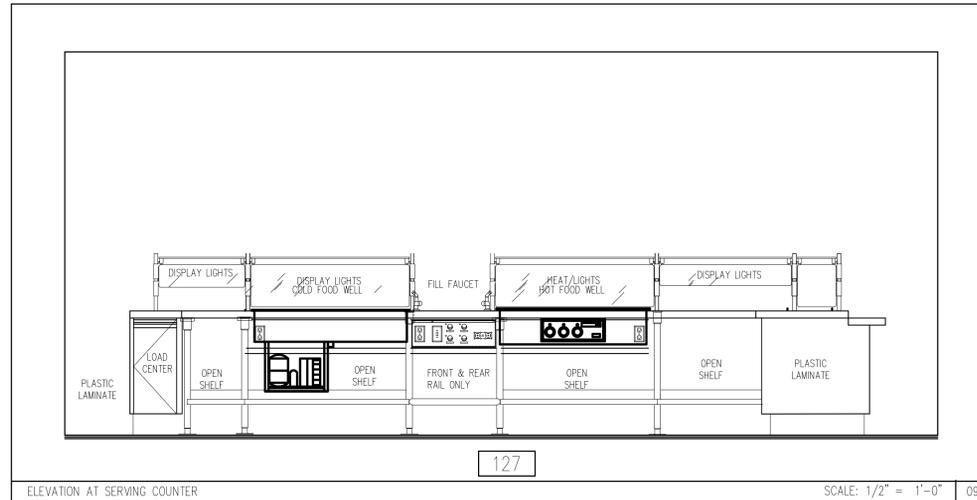
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FOODSERVICE
EXHAUST HOOD
PLAN

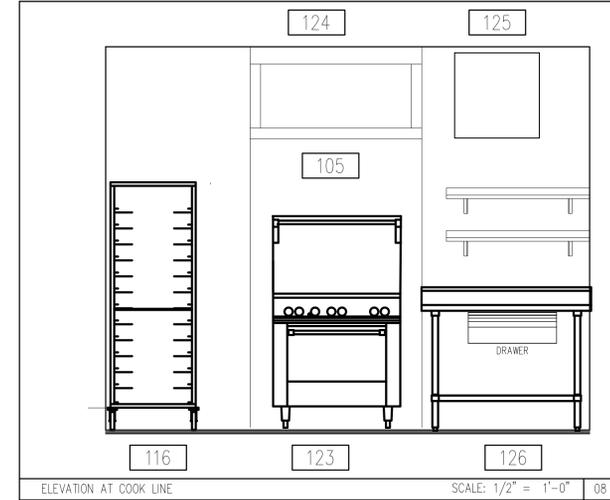
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FS-1.04

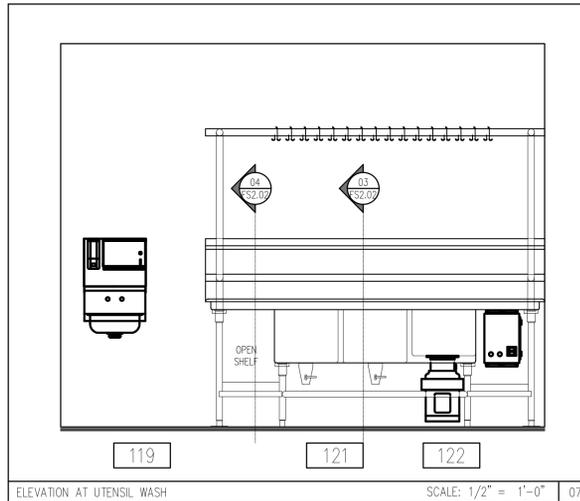
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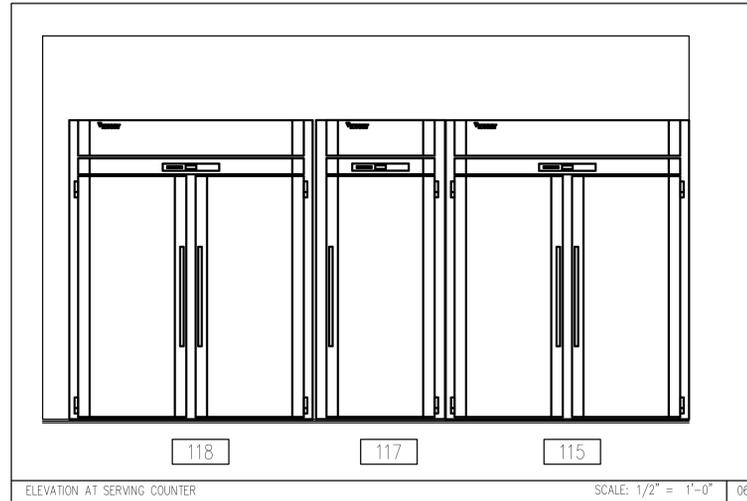
ELEVATION AT SERVING COUNTER SCALE: 1/2" = 1'-0" 09



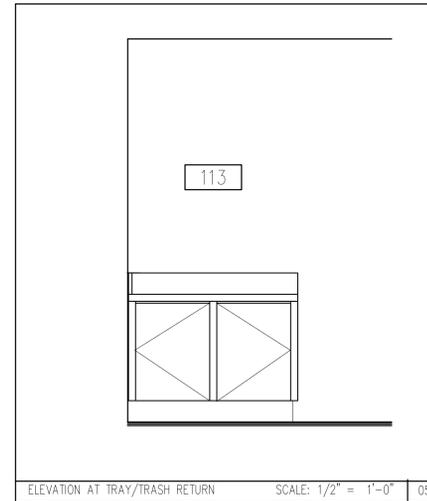
ELEVATION AT COOK LINE SCALE: 1/2" = 1'-0" 08



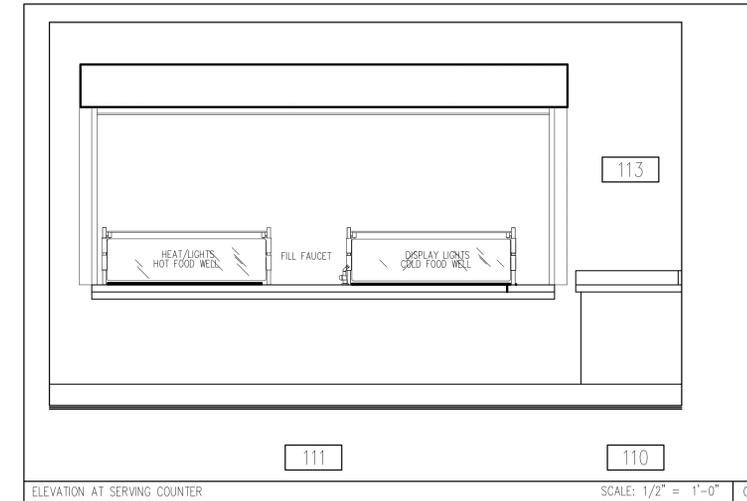
ELEVATION AT UTENSIL WASH SCALE: 1/2" = 1'-0" 07



ELEVATION AT SERVING COUNTER SCALE: 1/2" = 1'-0" 06



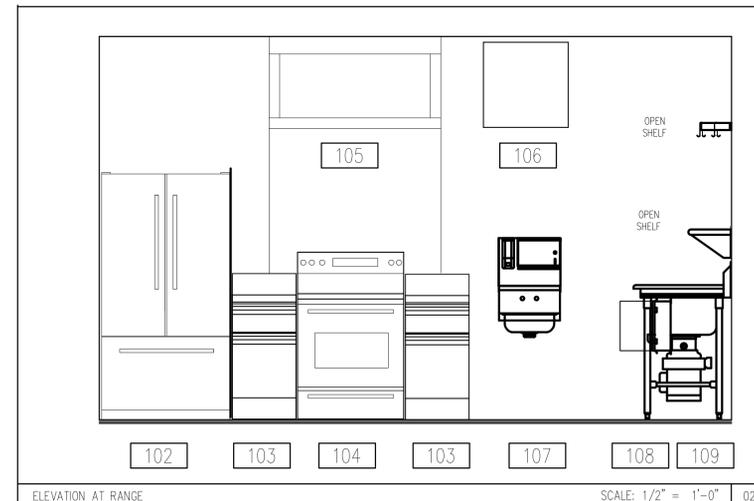
ELEVATION AT TRAY/TRASH RETURN SCALE: 1/2" = 1'-0" 05



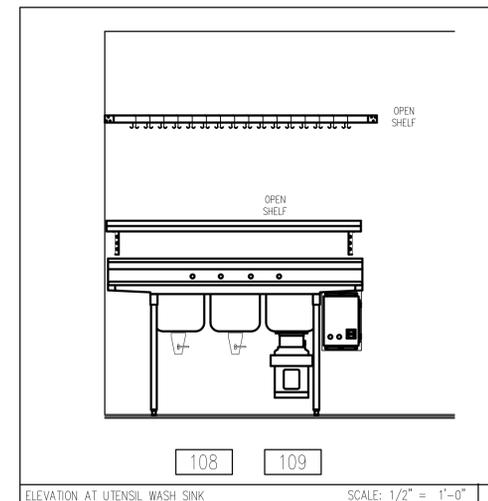
ELEVATION AT SERVING COUNTER SCALE: 1/2" = 1'-0" 04



ELEVATION AT SERVING COUNTER SCALE: 1/2" = 1'-0" 03



ELEVATION AT RANGE SCALE: 1/2" = 1'-0" 02



ELEVATION AT UTENSIL WASH SINK SCALE: 1/2" = 1'-0" 01

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 SHEET TITLE
 FOODSERVICE
 EQUIPMENT PLAN

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SHEET NO.

FS-2.01

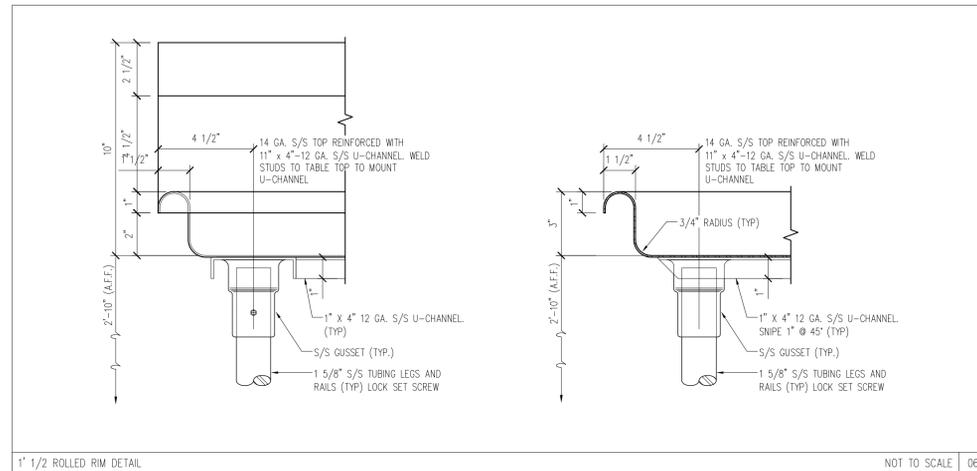
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1. 1 1/2" X 1 1/2" GALVANIZED ANGLE IRON.
2. 1" X 4" 14 GAUGE STAINLESS STEEL HAT CHANNEL.
3. 16 GAUGE STAINLESS STEEL REMOVABLE PANEL.
4. 14GA STAINLESS STEEL "C" CHANNEL.
5. 3/4" MARINE GRADE PLYWOOD WITH PLASTIC LAMINATE. VERIFY PATTERN/COLOR W/ARCHITECT.
6. COLD PAN - 2" RIGID INSULATION WITH 1" C.P. DRAIN - 16 GAUGE STAINLESS STEEL SECTION FALSE BOTTOM. PERFORATE FALSE BOTTOM WITH 1/4" DIA. HOLES AT 3" O.C..
7. 18 GAUGE STAINLESS STEEL INSULATED DOUBLE PAN DOOR WITH RECESSED PULL.
8. MANFOLD DRAINS AT HOT FOOD UNITS WITH 1" TYPE "K" COPPER AND EXTEND TO VALVE IN PLUMBING COMPARTMENT.
9. FINISHED TRUE AND LEVEL MASONRY BASE BY DIVISION 9. CLOSE COUNTER BODY AT BASE AND SEAL BY SECTION 11 40 00.
10. T&S B-390-01 DRAIN W/TAILPIECE AND OVERFLOW.
11. 14 GAUGE STAINLESS STEEL #24805 BRACKET W/ DRAIN HANDLE BUSHING.
12. 16 GAUGE STAINLESS STEEL 2" CLIP TO WALL AND SEAL.
13. 1 5/8" DIA. 16 GAUGE STAINLESS STEEL LEGS AND CROSS RAILS.
14. 1/2" S/S TUBING DRAIN LINE - STRAP TO SHELF AND WALL - EXTEND DOWN TO TOP OF SPLASH.
15. 1 5/8" DIA. 16 GAUGE STAINLESS STEEL TUBING - SUPPORT FRONT OF SHELF WITH 1/2" ALL-THREAD INSIDE TUBING EXTENDING TO STRUCTURE ABOVE.
16. 1/4" 2" BAR STOCK WELDED TO TOP OF EACH POST - POT HOOKS TO BE COMPONENT HARDWARE #177-4401 SPACED 8" O.C..
17. 1 5/8" 16 GAUGE STAINLESS STEEL TUBING - BOLT TO ANGLE IRON AND EXTEND UP THRU SPLASH TO 7"-0" A.F.T..
18. OVERSHELF - 16 GAUGE STAINLESS STEEL COVE UP REAR 2", TURN FRONT AND ENDS DOWN 1", ENDS TO BE CAPPED WITH EASED CORNERS WHERE ADJACENT TO WALL/FIXTURE.
19. OPAQUE CLOSURE PANNEL.
20. 18 GAUGE STAINLESS STEEL LOUVERED DOUBLE PAN DOOR WITH RECESSED PULL.
21. 18 GA. STAINLESS STEEL INSULATED DOUBLE PAN SLIDING DOOR WITH COMPONENT HARDWARE #B62-1010 RECESS PULLS; #B57-(VERIFY LENGTH) DOOR TRACK; #B58-5511 FRONT DOOR SHEAVE; #B58-5521 REAR DOOR SHEAVE.
22. 18 GA. STAINLESS STEEL INSULATED DOUBLE PAN SLIDING DOOR WITH COMPONENT HARDWARE COMPONENTS:
 - A. #B57-(VERIFY LENGTH) EXTRUDED ALUMINUM TRACK.
 - B. #B58-5511 & #B58-5521 FRONT & REAR DOOR SHEAVES
 - C. #B62-1093 DOOR GUIDE
 - D. #B60-1086 DOOR STOPS WHERE NEEDED
 - E. #P62-1010 RECESS PULLS
23. ALL EQUIPMENT ADJACENT TO BUILDING WALLS TO HAVE MAXIMUM 3/16" GAP. ALL GAPS TO BE CAULKED AND CLEANED WITH N.S.F. APPROVED SILICONE.

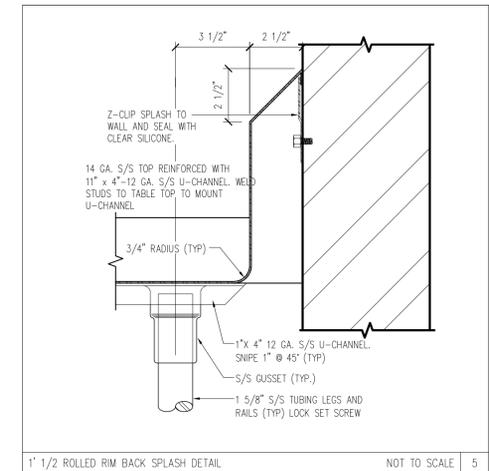
SECTION DETAIL NOTES

NOT TO SCALE 07



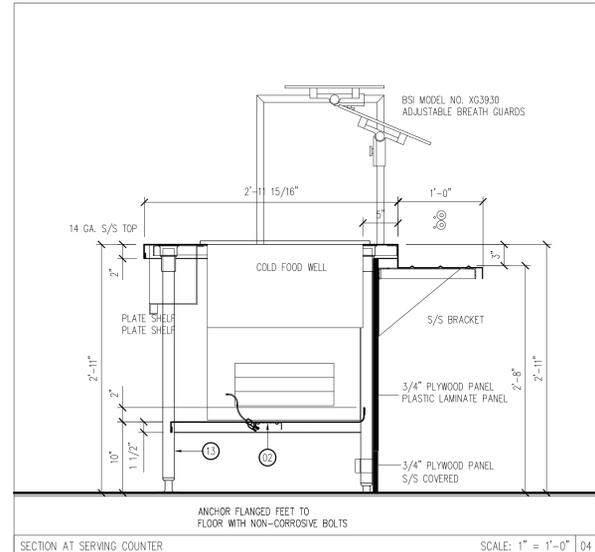
1 1/2 ROLLED RIM DETAIL

NOT TO SCALE 06



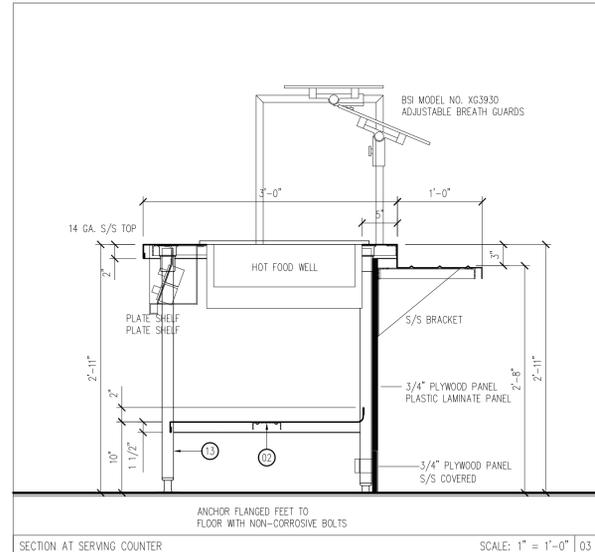
1 1/2 ROLLED RIM BACK SPLASH DETAIL

NOT TO SCALE 05



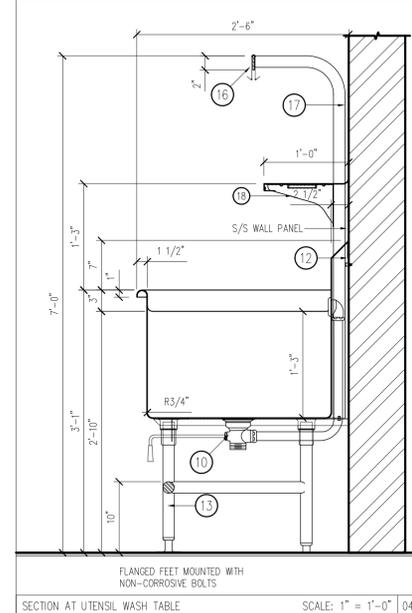
SECTION AT SERVING COUNTER

SCALE: 1" = 1'-0" 04



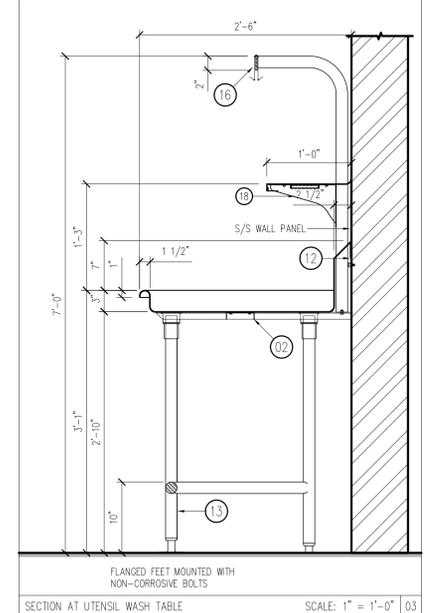
SECTION AT SERVING COUNTER

SCALE: 1" = 1'-0" 03



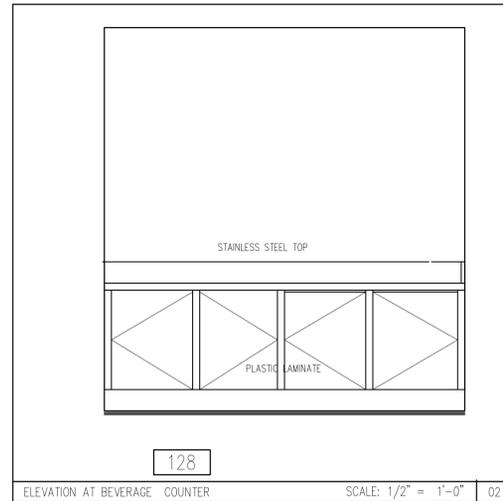
SECTION AT UTENSIL WASH TABLE

SCALE: 1" = 1'-0" 04



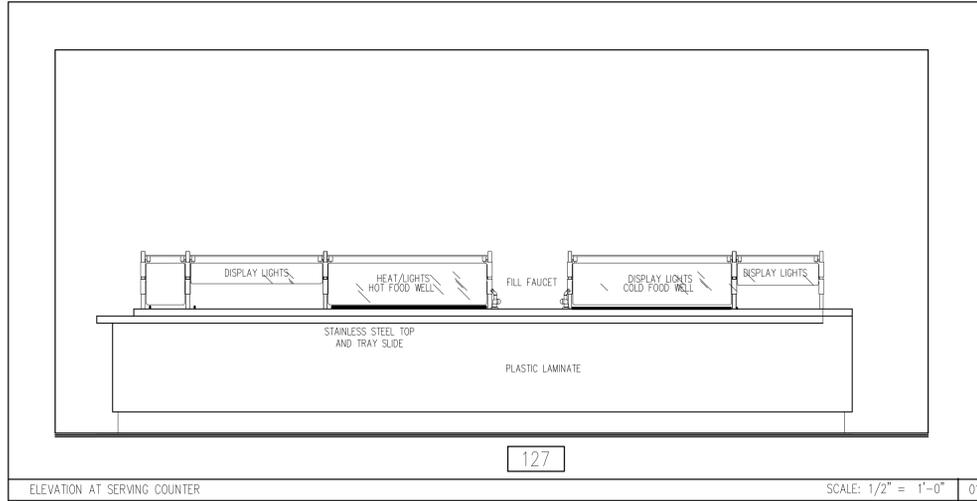
SECTION AT UTENSIL WASH TABLE

SCALE: 1" = 1'-0" 03



ELEVATION AT BEVERAGE COUNTER

SCALE: 1/2" = 1'-0" 02



ELEVATION AT SERVING COUNTER

SCALE: 1/2" = 1'-0" 01



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 10206 Five Oaks Lane
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SHEET TITLE
 FOODSERVICE
 EQUIPMENT PLAN

DRAWN BY: R.A.P.

SHEET NO.

FS-2.02

DATE: April 7, 2016

I. MASONRY

- MATERIALS:**
 - CONCRETE BLOCK: LIGHTWEIGHT ASTM C90 (HOLLOW) ASTM C145 (SOLID) $f_m=1,900$ PSI
 - MORTAR: ASTM C270 TYPE S, MINIMUM COMPRESSIVE STRENGTH: 1900 PSI (PROPERTY SPECIFICATIONS) MORTAR TITE AS MANUFACTURED BY ADMET.
 - BOND BEAM AND CORE FILL: ASTM C476, COARSE TYPE F_c=2,000 PSI.
 - JOINT REINFORCING: MILL GALVANIZED FINISH, 9 GAGE MINIMUM SIDE WIRES AND CROSS WIRES (LAGUR TYPE) (DUR-O-WALL).
 - BAR REINFORCING: ASTM A615, GRADE 60 (UNLESS NOTED OTHERWISE).
- REINFORCED MASONRY, WHERE VERTICAL BARS ARE TO BE GROUTED INTO CORES, THE FOLLOWING REQUIREMENTS APPLY:
 - PROVIDE DOWELS FROM WALL, SAME SIZE AND SPACING AS WALL BARS. LAP 48 DIAMETERS MINIMUM WITH WALL BAR.
 - PROVIDE A CONTINUOUS VERTICAL CAVITY, AT LEAST 2" X 3" IN SIZE, FREE OF MORTAR DROPPINGS.
 - PROVIDE REBAR ALIGNMENT DEVICES AT A MAXIMUM SPACING OF 96 BAR DIAMETERS (MINIMUM OF 2 PER BAR).
 - AT SPLICES IN VERTICAL BARS, PROVIDE MECHANICAL COUPLERS OR 48 DIAMETER LAP.
 - ALL REINFORCEMENT MUST BE INSTALLED AND SECURELY ANCHORED IN PLACE PRIOR TO PLACEMENT OF GROUT.
 - MAXIMUM HEIGHT OF GROUT LIFT = 4'-0", UNLESS HIGH LIFT GROUTING PROCEDURES ARE EMPLOYED IN ACCORDANCE WITH ASI 530-99.
- MISCELLANEOUS:**
 - FILL CORE SOLID AROUND ANCHOR BOLTS.
 - PROVIDE 100% SOLID BLOCKS OR SOLIDLY FILLED HOLLOW BLOCKS AT ALL EXPANSION JOINT LOCATIONS.
 - SET WELD PLATES IN BOND BEAMS AFTER THE GROUT IS PLACED, BUT WHILE IT IS STILL PLASTIC.
 - HOLLOW MASONRY UNITS TO BE LAID WITH FULL MORTAR COVERAGE ON HORIZONTAL AND VERTICAL FACE SHELLS. WEBS SHALL ALSO BE BEDDED IN ALL COURSES OF PIERS, COLUMNS, AND PILLASTERS, AND IN THE STARTING COURSE ON FOOTINGS, AND WHEN ADJACENT TO CELLS OR CAVITIES TO BE REINFORCED OR FILLED WITH CONCRETE OR GROUT. SOLID UNITS TO BE LAID WITH FULL HEAD AND BED JOINTS.
 - PROVIDE JOINT REINFORCING AT 16 INCHES, EXCEPT AS NOTED.
 - LAP JOINT REINFORCING 6 INCHES FOR STANDARD, 15 INCHES FOR HEAVY WEIGHT. VERTICAL CONTROL JOINTS SHALL BE PROVIDED FULL HEIGHT OF MASONRY WALLS AS LOCATED ON THE DRAWINGS. THE JOINT SHALL BE PROVIDED AS A CONTINUOUS HEAD JOINT WITH MORTAR RAKED BACK 3/4" AT BOTH FACES AND 50% OF THE HORIZONTAL JOINT REINFORCING CUT AT THE JOINT. BOND BEAM REINFORCING AND GROUT SHALL CONTINUE THROUGH THE JOINT. AFTER THE MORTAR IS SET, THE JOINT SHALL BE CAULKED WITH A FLEXIBLE MASTIC.
 - FILL ALL VOIDS AND CELLS WITHIN 12" EITHER SIDE OF CENTERLINE OF BEAM AND/OR COLUMN BEARING LOCATIONS WITH A #4 REINFORCING BAR AND GROUT U.N.O.

J. LINTELS:

- PROVIDE LINTELS OVER ALL OPENINGS IN WALLS. REFER TO ARCHITECTURAL AND HVAC DRAWINGS FOR LOCATION, NUMBER AND SIZES OF OPENINGS NOT SHOWN ON STRUCTURAL SHEETS.

K. STEEL STUDS/JOIST

- MATERIALS:**
- A. STUDS AND TRACKS:** 16 AND 18 GAGE STUDS: ASTM A446 GRADE D, $F_y = 50$ KSI. SPECIFICATIONS: WELDING PERSONNEL AND PROCEDURES ARE TO BE QUALIFIED PER AWS D1.1-BE - "STRUCTURAL WELDING CODE - STEEL".
18 GAGE STUDS: ASTM A446 GRADE D, $F_y = 50$ KSI. SPECIFICATIONS: WELDING PERSONNEL AND PROCEDURES ARE TO BE QUALIFIED PER AWS D1.3-B1 - "STRUCTURAL WELDING CODE - SHEET STEEL".
REVISIONS OF: A. AISC SPECIFICATION OF THE DESIGN OF COLD FORMED STEEL STRUCTURAL MEMBERS. B. STRUCTURAL WELDING CODE, AWS D1.3 OF THE AMERICAN WELDING SOCIETY. C. LIGHTGAGE FRAMING MEMBER SIZES INDICATED ON DRAWINGS SHALL MEET THE FOLLOWING MINIMUM REQUIREMENTS:

DESIGNATION	MEMBER DEPTH	FLANGE WIDTH	GAGE	K (IN4)	USE	SPACING OF STUDS	MAXIMUM HEIGHT
362S137-33	3-5/8"	1-3/8"	20	0.484	INTERIOR	16" O.C.	16'-10"
362S137-43	3-5/8"	1-3/8"	18	0.617	INTERIOR	16" O.C.	18'-3"
600S137-33	6"	1-3/8"	20	1.597	INTERIOR	16" O.C.	24'-10"
600S200-54	6"	2"	16	3.321	EXTERIOR	16" O.C.	15'-6"
600S200-68	6"	2"	14	4.099	EXTERIOR	16" O.C.	19'-9"
600S200-97	6"	2"	12	5.655	EXTERIOR	16" O.C.	22'-0"

ALL JOISTS TO BE MANUFACTURED BY DIETRICH INDUSTRIES OR EQUIVALENT EQUAL.

 - CONNECTIONS:**
 - ALL CONNECTIONS TO BE FIELD BOLTED.
 - FINISH:**
 - ALL MATERIALS TO BE GALVANIZED COATED IN ACCORDANCE WITH ASTM A525 G-60.
 - TOUCH UP FIELD WELDS WITH ZINC RICH PAINT.
 - MISCELLANEOUS:**
 - SUBMIT SHOP DRAWINGS FOR APPROVAL PRIOR TO FABRICATION.
 - ALL STUDS USED FOR EXTERIOR WALL FRAMING SHALL BE 6" STEEL STUDS, MINIMUM 16 GAGE AT 16" O.C. MAXIMUM, U.N.O. ON PLAN.
 - ALL STUD MEMBERS AND THEIR CONNECTIONS SHALL BE DESIGNED BY THE FABRICATOR FOR A HORIZONTAL WIND LOAD OF AS NOTED IN SECTION B. PROVIDE CALCULATIONS STAMPED BY A REGISTERED STRUCTURAL ENGINEER IN THE STATE OF TEXAS.
 - DEFLECTION LIMIT = $L/240$ (EXCEPT $L/360$ AT INTERIOR PLASTER APPLICATION).
 - OPENINGS 10'-0" OR LESS IN WIDTH SHALL BE FRAMED WITH LIGHTGAGE FRAMING MEMBERS. HEADS OR OPENINGS SHALL CONSIST OF STUD OR JOIST SECTIONS SUFFICIENT TO CARRY THE WEIGHT OF THE WALL ABOVE. JAMB SECTIONS SHALL CONSIST OF HEAVIER GAGE STUDS, MULTIPLE STUDS, OR BOTH.
 - ALL FIELD CUTTING TO BE PERFORMED WITH A SAW.
 - WELD SIZE TO BE 3/32" WITH AWS TYPE 6013 OR 7014 ROD.
 - TRACKS TO BE SECURELY ANCHORED TO SUPPORTING STRUCTURE WITH WELD AT EACH SIDE OF TRACKS OR POWER DRIVEN FASTENERS.
 - PROVIDE CONTINUOUS HORIZONTAL BRIDGING AT 4'-0" O.C. MAXIMUM FOR WALLS.
 - PROVIDE DOUBLE STUDS UNDER BEAM AND LINTEL BEARING, UNLESS SHOWN OTHERWISE.
 - BRIDGING FOR ROOF JOISTS SHALL BE AT 8'-0" OR MAXIMUM BETWEEN SUPPORTS.

E. STRUCTURAL STEEL

- MATERIALS:**
 - STRUCTURAL STEEL:
 - W SECTIONS: ASTM - A992
 - HSS SECTIONS: ASTM - A500 GRADE B
 - ALL OTHER SECTIONS: ASTM - A36
 - HIGH STRENGTH BOLTS: ASTM A325 OR A490
 - ANCHOR BOLTS: ASTM A307 OR A36
 - ELECTRODES: SERIES E70
 - WELDS: E70T-1 OR E70T-2
 - EXPANSION BOLTS: HILTI "KWIK BOLTS" OR APPROVED EQUAL
- SPECIFICATIONS:** WELDING PERSONNEL AND PROCEDURES ARE TO BE QUALIFIED PER AWS D1.1 - UNLESS SPECIFICALLY SHOWN OTHERWISE, DESIGN, FABRICATION AND ERECTION TO BE GOVERNED BY:
 - ASIS SPECIFICATION FOR STRUCTURAL STEEL BUILDINGS LATEST EDITION.
 - ASIS CODE OF STANDARD PRACTICE LATEST EDITION.
 - STRUCTURAL WELDING CODE, AWS D1.1-88 OF THE AMERICAN WELDING SOCIETY.
 - SPECIFICATIONS FOR STRUCTURAL JOINTS USING ASTM A325 OR A490 BOLTS.
- CONNECTIONS:**
 - CONNECTIONS TO BE DESIGNED BY THE FABRICATOR TO DEVELOP FULL STRENGTH OF MEMBER. FOLLOW INSTRUCTIONS ON DRAWINGS FOR GENERAL ARRANGEMENT OR PARTICULAR DETAILS. FIELD CONNECTIONS TO BE BOLTED. SHOP CONNECTIONS TO BE WELDED OR BOLTED.
 - FULL PENETRATION AND PARTIAL PENETRATION FIELD WELDS IN MATERIAL OVER 5/16 INCH THICK SHALL BE SUBJECT TO NON-DESTRUCTIVE TESTING (OTHER THAN VISUAL INSPECTION) BY AN INDEPENDENT LABORATORY.
 - ALL BOLTS IN BRACED FRAMES AND BOLTS IN SHEAR CONNECTIONS USED IN CONNECTION WITH FULL PENETRATION FLANGE WELDS SHALL BE SLIP CRITICAL (FRICTION) TYPE.
- PAINT:**
 - DO NOT PAINT ANY STEEL WHICH WILL BE CONCEALED FROM VIEW.
 - PAINT ALL VISIBLE STEEL GRAY.
- GALVANIZING:** ALL SHELF ANGLES, LINTELS IN EXTERIOR WALLS, AND ALL EXTERIOR PLATES TO THE ELEMENTS SHALL BE GALVANIZED.
- MISCELLANEOUS:**
 - PROVIDE HOLES FOR OTHERS IF OPENING IS NOT SHOWN ON THE STRUCTURAL DRAWING PRIOR APPROVAL.
 - STEEL SUPPORTING OR CONNECTED TO HVAC AND OTHER EQUIPMENT AND ROOF OPENINGS AS SHOWN ON THE DRAWINGS IS SHOWN FOR BRIDGING PURPOSES ONLY. CONTRACTOR SHALL PROVIDE EXACT SIZE AND LOCATION BEFORE PROCEEDING WITH HIS WORK.
 - GROUT UNDER BEARING PLATES, BASE PLATES, AND SETTING PLATES TO BE NON-SHRINKING TYPE.
 - STEEL BELOW GRADE TO BE PROTECTED BY A MINIMUM OF 3 INCHES OF CONCRETE.
 - PROVIDE 1/4" INCH THICK SETTING PLATES FOR ALL BEAMS BEARING ON MASONRY.
 - PROVIDE HEAVY WASHER AT ALL ANCHOR BOLTS.
 - FINISH ENDS OF ALL COLUMNS, STIFFENERS AND ALL OTHER MEMBERS IN DIRECT BEARING.
 - PROVIDE BOLT HOLES FOR JOISTS BOLTED TO BEAMS AND ATTACHMENT FOR JOINING EXTENDED JOIST BOTTOM CHORDS.
 - MINIMUM BEAM BEARING ON MASONRY = 8 INCHES UNLESS NOTED OTHERWISE.
 - EMBEDMENT LENGTH OF EXPANSION BOLTS INTO SOLID MASONRY OR CONCRETE SHALL BE AS FOLLOWS:
1/2 INCH DIAMETER BOLTS --- 3 1/2 INCHES EMBEDMENT
3/4 INCH DIAMETER BOLTS --- 5 INCHES EMBEDMENT

F. WELDING:

- REFERENCES:**
 - AWS D1.1-BE - "STRUCTURAL WELDING CODE - STEEL"
 - AWS D1.3-B1 - "STRUCTURAL WELDING CODE - SHEET STEEL"
- ALL WELDING BY AWS QUALIFIED OPERATORS.

G. OPEN WEB STEEL JOISTS

- SPECIFICATIONS:**
 - FABRICATION AND ERECTION PER SJI REQUIREMENTS.
 - MANUFACTURER TO BE A MEMBER OF SJI.
- BRIDGING:**
 - NUMBER OF ROWS AS SHOWN ON THE CONTRACT DRAWINGS, BUT NOT LESS THAN REQUIRED BY SJI. BASED ON NOTED PERMISSIVE HORIZONTAL BRIDGING FOR K-SERIES (EXCEPT USE A DIAGONAL ROW NEAREST THE MIDSPAN WHERE FOUR OR FIVE ROWS ARE SHOWN OR REQUIRED BY SJI).
 - HORIZONTAL BRIDGING MAY BE WELDED TO JOISTS.
 - DIAGONAL BRIDGING TO BE BOLTED TO THE JOISTS AND AT THEIR POINT OF INTERSECTION. ENDS OF DIAGONAL BRIDGING TO BE ANCHORED WITH HORIZONTAL BRIDGING UNLESS SHOWN OTHERWISE. HORIZONTAL BRIDGING IN NO MORE THAN TWO CONSECUTIVE BAYS MAY BE USED TO PROVIDE PASSAGE FOR DUCT WORK.
 - ANCHOR BRIDGING TO INTERSECTING STRUCTURAL STEEL OR MASONRY WALLS.
- WELDING:**
 - WELD ALL JOISTS TO SUPPORTING STEEL WITH 2 INCHES OF 1/8 INCH FILLET WELD FOR K-SERIES JOISTS EACH SIDE OF BEARING. JOISTS TO BE FIELD BOLTED AT ALL COLUMN LINES, OR IF THERE IS NO JOIST AT A COLUMN LINE, FIELD BOLT THE JOIST NEAREST THE COLUMN ON EACH SIDE. EXTEND BOTTOM CHORDS OF THE SAME JOISTS AND WELD THEM TO THE BEAM OR COLUMN.
 - EXTEND ALL JOISTS 1 INCH MINIMUM PAST CENTERLINE OF SUPPORTING MEMBER WHERE POSSIBLE. BEARINGS TO BE PER DRAWINGS, OR, WHERE SPECIAL INSTRUCTION IS NOT GIVEN, ACCORDING TO THE STANDARD SPECIFICATIONS OF SJI.
- SHOP DRAWINGS:**
 - FURNISH (1) SEPIA AND TWO (2) PRINTS EACH OF SHOP AND ERECTION DRAWINGS FOR REINFORCING STEEL, STRUCTURAL STEEL, STEEL JOISTS, AND MISC. STEEL TO STRUCTURAL ENGINEER FOR REVIEW PRIOR TO FABRICATION.
- MISCELLANEOUS:**
 - ADJACENT JOISTS OF THE SAME DEPTH ARE TO HAVE WEB MEMBERS IN LINE TO PERMIT PASSAGE OF HVAC DUCTS.
 - SEE DRAWINGS FOR SPECIAL BEARING SHOES, EXTENDED ENDS, RTU LOADS, ETC.
- ROOF JOISTS UPLIFT:**
 - DEAD LOAD = 12 PSF
 - COLLATERAL DEAD LOAD = 8 PSF
 - LIVE LOAD TOP CHORD = 20 PSF
 - WIND UPLIFT AT INTERIOR ZONE = -7.44 PSF (NET)
 - WIND UPLIFT AT END ZONE = -12.42 PSF (NET)
 - WIND UPLIFT AT CORNER ZONE = -16.38 PSF (NET)

H. STEEL ROOF DECK

- REFERENCE:** STEEL DECK INSTITUTE. "DESIGN MANUAL FOR COMPOSITE DECKS, FORM DECKS AND ROOF DECKS. LATEST EDITION."
- DECK SHALL AS NOTED ON PLANS WITH GALVANIZED FINISH.
- DECK ENDS MAY BE EITHER BUTTED OR LAPPED OVER SUPPORTS. ON JOIST FRAMING, APPROPRIATE END LAP SHALL OCCUR OVER A TOP CHORD ANGLE FOR PROPER ANCHORAGES.
- UNLESS NOTED OTHERWISE, ATTACH METAL DECK TO STRUCTURAL STEEL WITH #12 TEK SCREWS AT 6" O.C. AT PERIMETER AND 12" O.C. AT INTERMEDIATE SUPPORTS. FASTEN SIDE LAPS WITH #12 TEK SCREWS AT 6" O.C.

REINFORCEMENT TENSION LAPS AND EMBEDMENT ($f_y=60,000$ PSI $f_c=3,000$ PSI)									
BAR SIZE	BAR DIA. (IN)	EMBEDMENT AND CLASS A LAP (IN)						CLASS B LAP (IN)	
		TOP BAR		OTHER BARS		TOP BAR	OTHER BARS	CASE 1	CASE 2
		CASE 1	CASE 2	CASE 1	CASE 2	CASE 1	CASE 2		
#3	3/8	22	32	14	25	28	42	22	32
#4	1/2	29	43	22	33	37	56	29	43
#5	5/8	36	54	28	41	47	74	36	54
#6	3/4	44	64	33	50	56	84	43	64
#7	7/8	63	94	48	72	81	122	63	94
#8	1	72	107	55	82	93	134	72	107
#9	1-1/8	81	121	62	93	105	157	81	121
#10	1-1/4	91	136	70	105	118	177	91	136
#11	1-3/8	101	151	78	116	131	196	101	151

NOTES:
1. TABLE REPRESENTS LENGTHS OF TENSION DEVELOPMENT LENGTHS AND TENSION LAP SPLICES LENGTHS BASED ON ACI 318-08 SECTION 12.2.
2. CLASS A LAP LENGTHS APPLY WHEN BARS LAPS ARE STAGGERED TO LAP HALF THE BARS AT THE SAME LOCATION OR WHEN BARS ARE LAPPED AT A LOCATION WHERE THE REINFORCEMENT IS PROVIDED AT LEAST TWICE THAT REQUIRED.
3. CLASS B LAP LENGTHS APPLY WHEN ALL BARS ARE SPLICED AT A LOCATION OF MAXIMUM STRESS IN THE BARS.
4. CASE 1 LENGTHS APPLY TO BEAMS AND COLUMNS WITH CONCRETE COVER EQUAL OR GREATER THAN THE BAR DIAMETER, CLEAR BAR SPACING EQUAL OR GREATER THAN THE BAR DIAMETER AND WITH STIRRUPS OR TIES NOT LESS THAN THE CODE MINIMUM THROUGHOUT THE LENGTH IN THE TABLE, AND FOR OTHER ELEMENTS WITH CONCRETE COVER EQUAL OR GREATER THAN THE BAR DIAMETER AND CLEAR SPACING EQUAL OR GREATER THAN TWO TIMES THE BAR DIAMETER.
5. CASE 2 LENGTHS APPLY TO BEAMS AND COLUMNS WITH CONCRETE COVER LESS THAN THE BAR DIAMETER, AND CLEAR BAR SPACING LESS THAN THE BAR DIAMETER, AND FOR OTHER ELEMENTS WITH CONCRETE COVER LESS THAN THE BAR DIAMETER AND CLEAR BAR SPACING LESS THAN TWO TIMES THE BAR DIAMETER.
6. TOP BARS ARE HORIZONTAL REINFORCEMENT PLACED SO THAT MORE THAN 12 INCHES OF CONCRETE IS CAST BELOW THE REINFORCEMENT.
7. MULTIPLY LENGTHS SHOWN BY 0.87 FOR 4000 PSI CONCRETE.
8. MULTIPLY LENGTHS SHOWN BY 1.3 FOR LIGHTWEIGHT AGGREGATE CONCRETE.
9. MULTIPLY LENGTHS SHOWN BY 1.3 FOR EPOXY-COATED BARS.

GENERAL NOTES

A. GENERAL

- THE STRUCTURE IS DESIGNED TO BE SELF-SUPPORTING AND STABLE AFTER THE BUILDING IS FULLY COMPLETED. IT IS SOLELY THE CONTRACTOR'S RESPONSIBILITY TO DETERMINE ERECTION PROCEDURES AND SEQUENCE AND TO INSURE THE SAFETY OF THE BUILDING AND ITS COMPONENT PARTS DURING ERECTION. THIS INCLUDES THE ADDITION OF WHATEVER SHORING, SHEETING, TEMPORARY BRACING, GUYS OR CROSSES WHICH MIGHT BE NECESSARY. SUCH MATERIAL SHALL REMAIN THE CONTRACTOR'S PROPERTY AFTER THE COMPLETION OF THE PROJECT.
- IT IS SOLELY THE CONTRACTOR'S RESPONSIBILITY TO FOLLOW ALL APPLICABLE SAFETY CODES AND REGULATIONS DURING ALL PHASES OF CONSTRUCTION.
- EQUIPMENT FRAMING LOADS, OPENINGS AND STRUCTURE IN ANY WAY RELATED TO HVAC, PLUMBING, OR ELECTRICAL REQUIREMENTS ARE SHOWN FOR BIDDING PURPOSES ONLY. CONTRACTOR SHALL OBTAIN APPROVAL OF THE INVOLVED TRADES BEFORE PROCEEDING WITH SUCH PORTION OF THE WORK. EXCESS COST RELATED TO VARIATION IN THESE REQUIREMENTS TO BE BORNE BY THE CONTRACTOR.
- SHOULD ANY OF THE DETAILED INSTRUCTIONS SHOWN ON THE PLANS CONFLICT WITH THESE STRUCTURAL NOTES, THE SPECIFICATIONS, OR WITH EACH OTHER, THE STRICTEST PROVISION SHALL GOVERN.

B. ENGINEERING DESIGN CRITERIA

- BUILDING CODE: INTERNATIONAL BUILDING CODE (IBC) 2015.
SECTION 1603: CONSTRUCTION DOCUMENTS
- 1603.1.1 FLOOR LIVE LOAD:
A. LIGHT STORAGE: 125 PSF
B. PUBLIC AREAS: 100 PSF
C. OFFICES: 50 PSF
D. CORRIDORS: 100 PSF
E. STACK ROOMS: 150 PSF
F. STAIRS, STAIRS THREADS, LANDING & CORRIDORS: 100 PSF
- 1603.1.2 ROOF LIVE LOAD:
A. MINIMUM ROOF LIVE LOAD = 20 PSF
- 1603.1.3 ROOF SNOW LOAD:
A. FLAT ROOF SNOW LOAD, $P_f = 0$ PSF
B. SNOW OBSTRUCTION PRIOR APPROVAL
C. SNOW LOAD IMPORTANCE FACTOR, $I = 1.0$
D. THERMAL FACTOR, $C_t = 1.0$
- 1603.1.4 WIND DESIGN DATA:
A. ULTIMATE WIND SPEED (3-SECOND GUST), $V_{ult} = 120$ MPH
NOMINAL DESIGN WIND SPEED (3-SECOND GUST), $V_{sfd} = 90$ MPH
B. PLATES TO BE NON-SHRINKING TYPE
C. WIND EXPOSURE = C
D. INTERNAL PRESSURE COEFFICIENT, $G_{cpi} = +/- 0.18$
E. COMPONENTS AND CLADDING NET DESIGN WIND PRESSURE (PSF):
LOAD CASE 1: -21.7 -37.9 -56.0 -25.8 -39.9
LOAD CASE 2: 10.7 13.7 +13.7 +23.8 +21.7
- 1603.1.5 EARTHQUAKE DESIGN DATA:
A. RISK CATEGORY = III
B. SEISMIC IMPORTANCE FACTOR, $I_e = 1.25$
C. MAPPED SPECTRAL RESPONSE ACCELERATION, $S_s = 0.071g$ AND $S_1 = 0.018g$
D. SITE CLASS = C
E. SPECTRAL RESPONSE COEFFICIENTS, $S_{ds} = 0.073g$ AND $S_{d1} = 0.029g$
F. SEISMIC DESIGN CATEGORY = A
G. BASIC SEISMIC-FORCE-RESISTING SYSTEM(S) = ORDINARY REINFORCED MASONRY SHEAR WALLS
H. DESIGN BASE SHEAR:
I. SEISMIC RESPONSE COEFFICIENT(S), $C_s = 0.026g$
J. RESPONSE MODIFICATION FACTOR(S), $R = 2.0$
K. ANALYSIS PROCEDURE USED = EQUIVALENT LATERAL FORCE PROCEDURE
- 1603.1.6 GEOTECHNICAL INFORMATION:
A. ALLOWABLE SOIL BEARING CAPACITY = 2,000 PSF TOTAL LOAD ON SELECT FILL
- 1603.1.7 FLOOD HAZARD DATA:
A. NOT APPLICABLE.
- 1603.1.8 SPECIAL LOADS:
A. NOT APPLICABLE.
- 1603.1.9 SYSTEMS AND COMPONENTS REQUIRING SPECIAL INSPECTIONS FOR SEISMIC RESISTANCE:
A. NOT APPLICABLE.

C. GENERAL NOTES FOR SITE PREPARATION

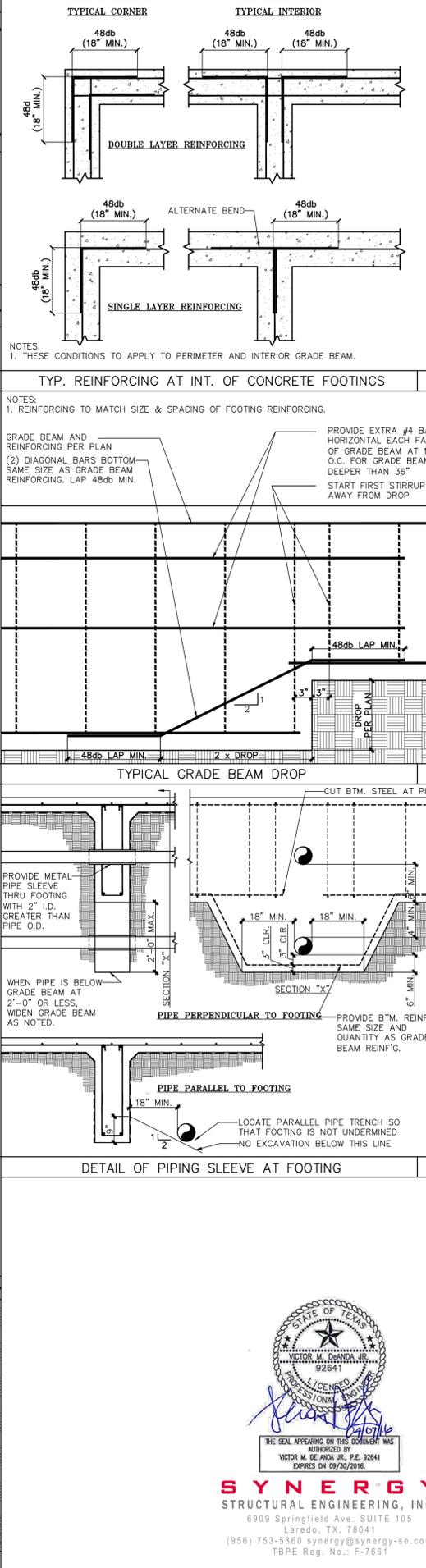
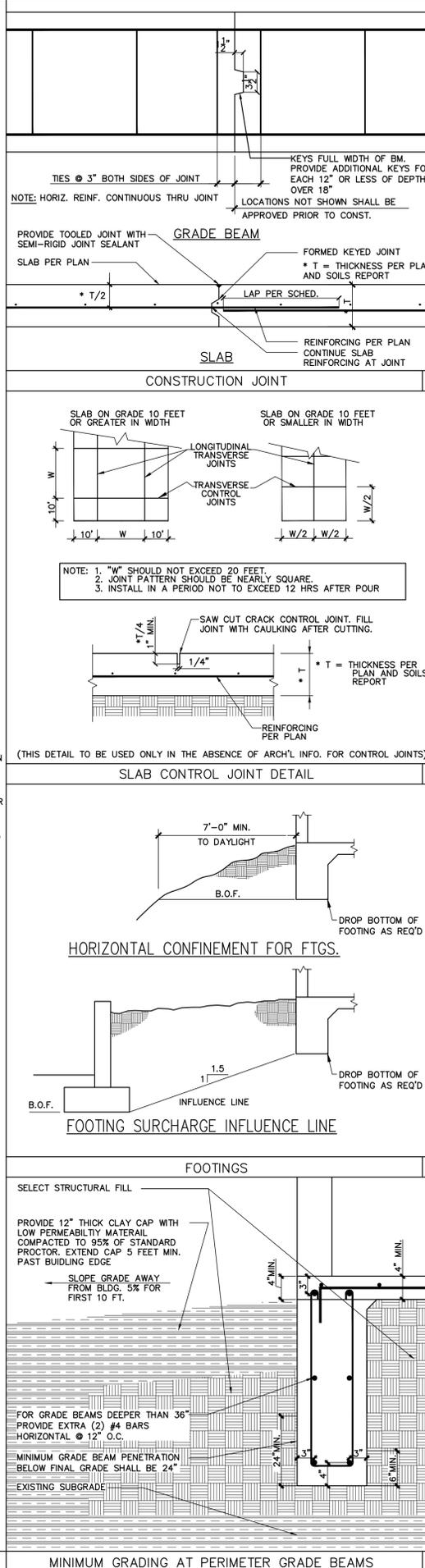
- REFER TO CIVIL AND ARCHITECTURAL PLANS FOR FINISH FLOOR ELEVATION.
- STRIP TOP SOIL A MINIMUM OF 6" AND EXTENDING AT LEAST 5 FT. BEYOND THE BUILDING PERIMETER. REMOVE ALL ORGANIC MATERIAL, ROOTS, GRASS ETC. FROM THE SITE PRIOR TO STAIRING FOUNDATION WORK. ANY SOIL NOT STRIPPED OR AFTER REMOVAL OF ANY EXISTING FOUNDATIONS SHALL BE REMOVED AND REPLACED WITH SUITABLE MATERIAL UNDER CONTROLLED CONDITIONS.
- OVER-EXCAVATE AND REMOVE FROM BUILDING FOOTPRINT AT LEAST 5'-0" OF THE EXISTING IN-SITU SOILS.
- EXPOSED SUBGRADE SHOULD BE SCARIFIED JUST PRIOR TO FILL PLACEMENT TO A MINIMUM DEPTH OF 6" AND COMPACTED TO 95% OF STANDARD (ASTM D998) COMPACTION, WITHIN THE RANGE OF MINUS TWO (-2) TO PLUS TWO (+2) PERCENT OF THE OPTIMUM VALUE.
- REMOVE EXISTING SOILS WITHIN AT LEAST 5'-0" OF SELECT FILL MATERIALS. ADDITIONAL SELECT FILL CAN BE IMPORTED TO FURTHER ELEVATE THE BUILDING PAD TO THE DESIRED BUILDING PAD ELEVATION.
- STRUCTURAL SELECT FILL SHALL CONSIST OF LOW PLASTICITY SANDY LEAN CLAY, CLAYEY SAND, OR GRAVELLY SAND MATERIAL WITH A PLASTICITY INDEX (PI) BETWEEN 7 AND 18 AND A LIQUID LIMIT OF LESS THAN 40.
- SELECT FILL SHALL BE FILL COMPACTED IN LIFTS OF 8" MAXIMUM IN LOOSE MEASUREMENT TO A MINIMUM OF 95% OF STANDARD (ASTM D998) COMPACTION, WITHIN THE RANGE OF MINUS TWO (-2) TO PLUS TWO (+2) PERCENTAGE POINTS ABOVE OPTIMUM MOISTURE CONTENT VALUE.
- REFER TO GEOTECHNICAL REPORT PREPARED BY HOMLAND ENGINEERING AND SURVEYING CO. REPORT NUMBER 39485 DATED DECEMBER 23, 2015.
- PROVIDE DENSITY TESTING ON THE SUBGRADE SOILS AND THE SELECT FILL AT EVERY LIFT AND FOR EACH 2,500 SF OF SLAB AREA, OR A MINIMUM OF 3 DENSITY TEST PER TESTING INTERVAL, WHICHEVER IS GREATER. ANY AREAS NOT MEETING THE REQUIRED COMPACTION SHOULD BE RECOMPACTED AND RETESTED UNTIL COMPLIANT IS MET.
- OBSERVATION OF REINFORCEMENT PLACEMENT WILL NEED TO BE PROVIDED BY SYNERGY STRUCTURAL ENGINEERING, INC. BEFORE CONCRETE POUR. THE FOLLOWING ITEMS WILL NEED TO BE PROVIDED BY CONTRACTOR AND/OR OWNER BEFORE REBAR OBSERVATION:
A. COMPACTION REPORTS OF SUBGRADE AND SUBSEQUENT LIFTS PERFORMED BY AN APPROVED TESTING LABORATORY.
B. COMPACTION AND INSPECTION REPORTS BY AN APPROVED TESTING LABORATORY FOR THE BACKFILLING OF THE TRENCHES OF PLUMBING OR ELECTRICAL LINES.
*FAILING TO PROVIDE COMPACTION REPORTS WILL VOID ANY WARRANTIES AND/OR LIABILITIES DESCRIBED IN THESE PLANS AND/OR PROPOSAL-AGREEMENT BETWEEN OWNER/CONTRACTOR AND SYNERGY STRUCTURAL ENGINEERING, INC.

D. REINFORCED CONCRETE

- MATERIALS:**
 - SPECIFICATIONS: IN GENERAL, COMPLY WITH ACI 301-LATEST EDITION
 - STRUCTURAL CONCRETE

CONCRETE TYPE	DESIGN STRENGTH	MAXIMUM SLUMP	MAXIMUM AGGREGATE	MAXIMUM AIR ENTR.	MAXIMUM W/C RATIO
GRADE BEAMS AND SLAB	3000 PSI	5"	1-1/2"	0.5	0.6
DECK FILL	3500 PSI	4"	3/4"	0.4	0.5
ELEVATED DECK & BEAMS	4000 PSI	5"	1"	0.5	0.6

 - ALL MIXES SHALL HAVE A MINIMUM OF 5 SACKS OF CEMENT PER CUBIC YARD REGARDLESS OF STRENGTH OBTAINED.
 - ALL DEFORMED REINFORCING BARS (ASTM A 615): $F_y = 60,000$
 - WELDED WIRE FABRIC SHALL CONFORM TO ASTM A165-85. (SHEET FORM, NOT ROLLED)
- FIELD MANUAL:** PROVIDE AT LEAST ONE COPY OF THE ACI FIELD REFERENCE MANUAL, SP-15, IN THE FIELD OFFICE AT ALL TIMES.
- CONTINGENCIES:**
 - PROVIDE SUPPORTS AS REQUIRED TO MAINTAIN ALIGNMENT OF SCHEDULED REINFORCING. SUCH SUPPORTS ARE TO BE REFLECTED IN THE BID.
- FOOTINGS:**
 - DOWELS IN FOOTINGS TO MATCH VERTICAL WALL REINFORCING.
 - BEAR LEAN CONCRETE (CLASS IV) UNDER FOUNDATIONS FOR ACCIDENTAL OVER-EXCAVATION, SOFT SPOTS AND TRENCHES.
 - SPLICES: UNLESS NOTED OTHERWISE, LAP SPLICES AND EMBEDMENTS SHALL BE AS SHOWN ON TABLE.
- CONSTRUCTION JOINTS:**
 - CONSTRUCTION JOINTS PERMITTED ONLY WHERE SHOWN OR AS APPROVED BY THE STRUCTURAL ENGINEER. ALL CONSTRUCTION JOINTS ARE TO BE KEPT. KEYS SHALL BE 1/2 INCHES DEEP.
- CONCRETE COVER:** UNLESS NOTED OTHERWISE, DETAIL REINFORCING TO PROVIDE CONCRETE COVER AS FOLLOWS:
 - CONCRETE CAST AGAINST AND PERMANENTLY EXPOSED TO EARTH: 3 IN.
 - CONCRETE EXPOSED TO EARTH OR WEATHER: #6 BARS AND SMALLER OTHERS: 1 1/2 IN.
 - CONCRETE NOT EXPOSED TO EARTH OR WEATHER: #6 BARS AND SMALLER OTHERS: 2 IN.
 - CONCRETE NOT EXPOSED TO EARTH OR WEATHER: #1 BARS & SMALLER OTHERS: 1 1/2 IN.
- CONCRETE COVER:** UNLESS NOTED OTHERWISE, DETAIL REINFORCING TO PROVIDE CONCRETE COVER AS FOLLOWS:
 - CONCRETE CAST AGAINST AND PERMANENTLY EXPOSED TO EARTH: 3 IN.
 - CONCRETE EXPOSED TO EARTH OR WEATHER: #6 BARS AND SMALLER OTHERS: 1 1/2 IN.
 - CONCRETE NOT EXPOSED TO EARTH OR WEATHER: #6 BARS AND SMALLER OTHERS: 2 IN.
 - CONCRETE NOT EXPOSED TO EARTH OR WEATHER: #1 BARS & SMALLER OTHERS: 1 1/2 IN.



AUSLAND ARCHITECTS—METAFORM STUDIO ARCHITECTS
ARCHITECTURE + PLANNING + INTERIORS
6626 SILVERMINE DRIVE, SUITE 100A
AUSTIN, TEXAS 78736
(512) 327-0444 FAX (512) 301-4909

CONSTRUCTION DOCUMENTS

WEBB COUNTY REHABILITATION CENTER
LAREDO, TEXAS

PROJECT NUMBER SSE-11-0-01

REVISIONS

FILENAME:

SHEET TITLE
GENERAL NOTES AND TYPICAL FOUNDATION DETAILS
DRAWN BY: LP-VDA

SHEET NO. S-1.1

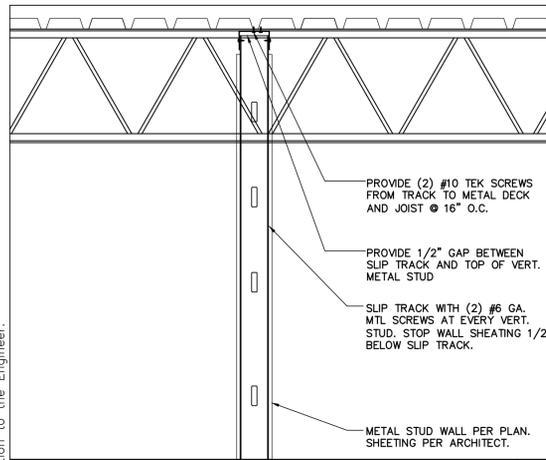
DATE: APRIL 7 2011

STATE OF TEXAS
VICTOR M. DE ANA JR.
REGISTERED PROFESSIONAL ENGINEER
92641

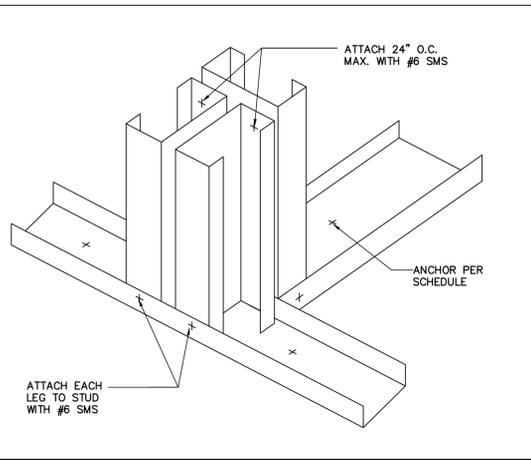
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Laredo, TX. 78041
(956) 753-5860 synergy@synergy-se.com
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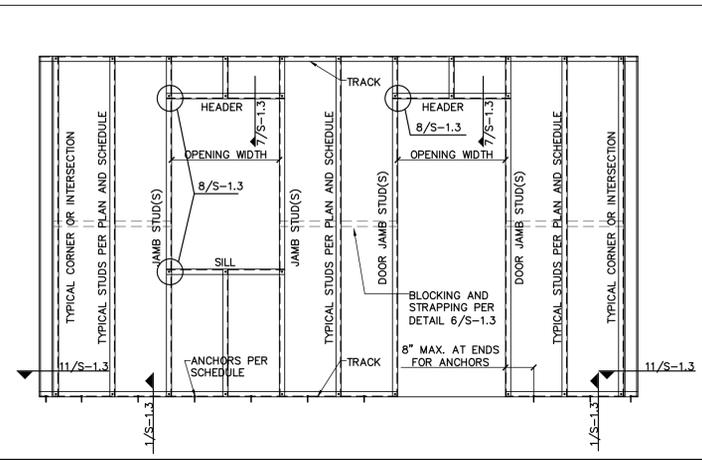
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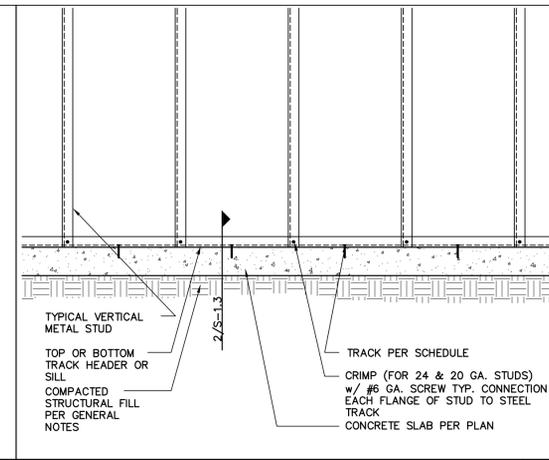
METAL STUD WALL CONNECTION TO JOISTS (PERP.) 17



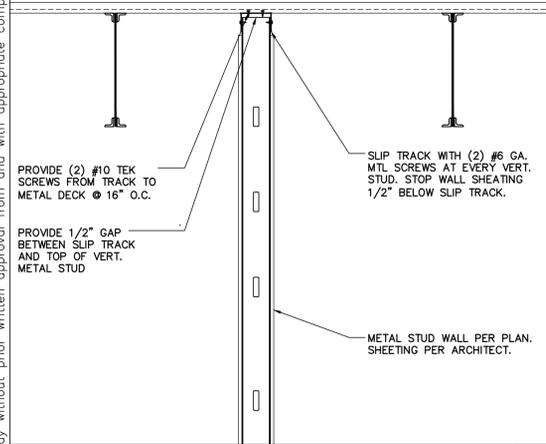
TYPICAL INTERSECTION 13



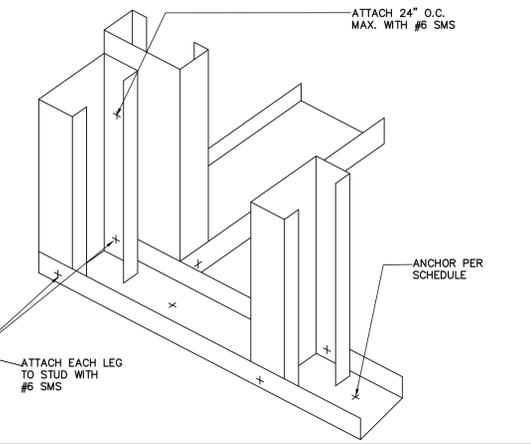
STEEL STUD BEARING AND NON-BEARING WALL ELEVATION 5



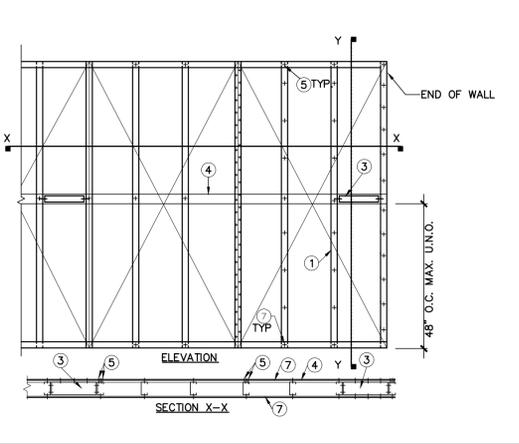
MTL STUD TO TRACK AT TOP OR BOTTOM OF WALL 1



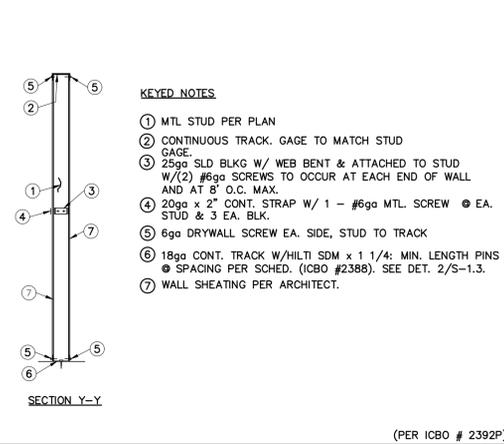
METAL STUD WALL CONNECTION TO JOISTS (PARALLEL) 18



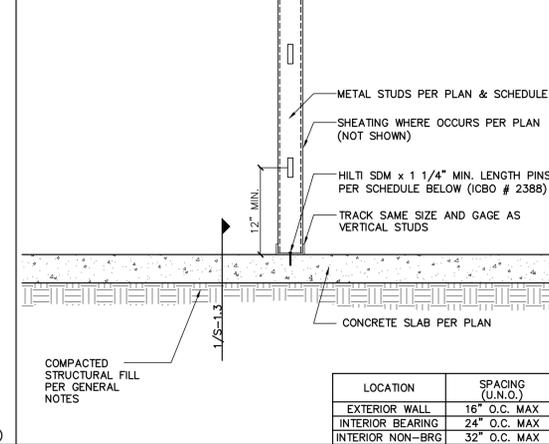
TYPICAL CORNER 14



TYPICAL PLYWOOD SHEARWALL ON METAL STUDS 6

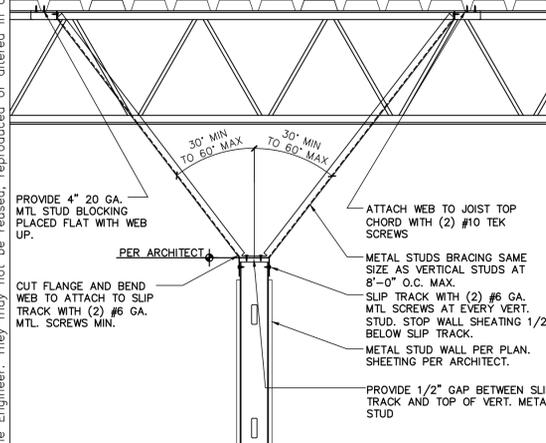


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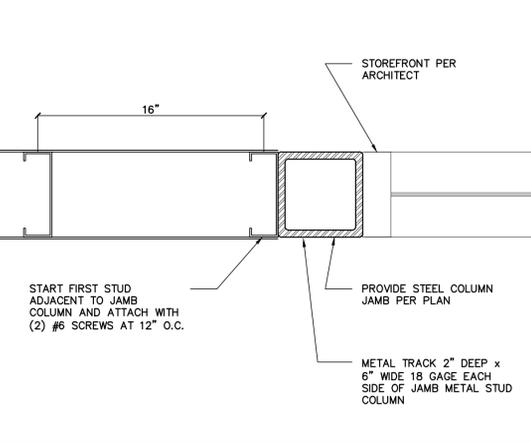


METAL STUD AT CONCRETE SLAB-ON-GRADE 2

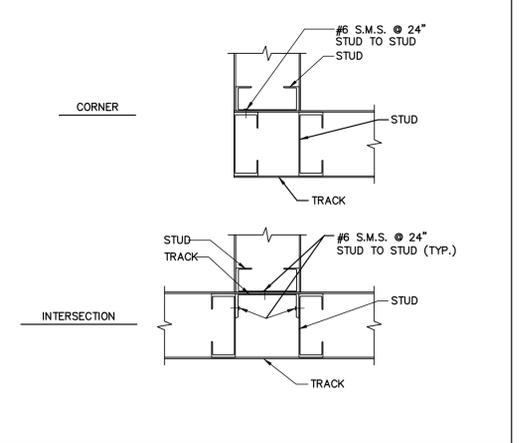
LOCATION	SPACING (U.N.O.)
EXTERIOR WALL	16" O.C. MAX
INTERIOR BEARING	24" O.C. MAX
INTERIOR NON-BRG	32" O.C. MAX



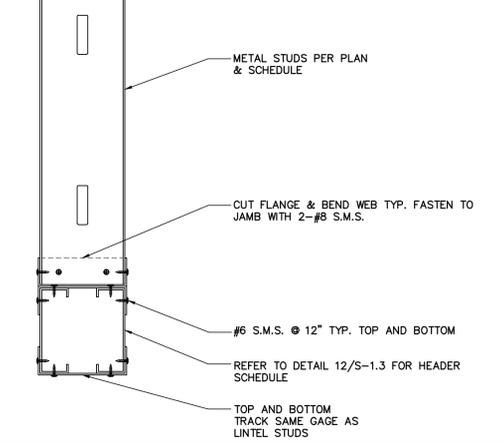
METAL STUD PARTITION BRACING PERP. TO JOISTS 19



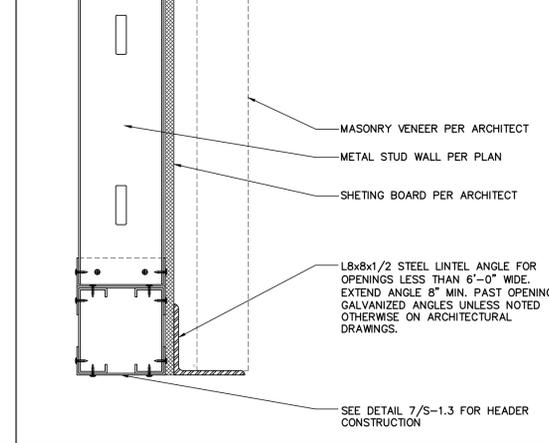
METAL STUDS JAMB COLUMN AT STOREFRONT 15



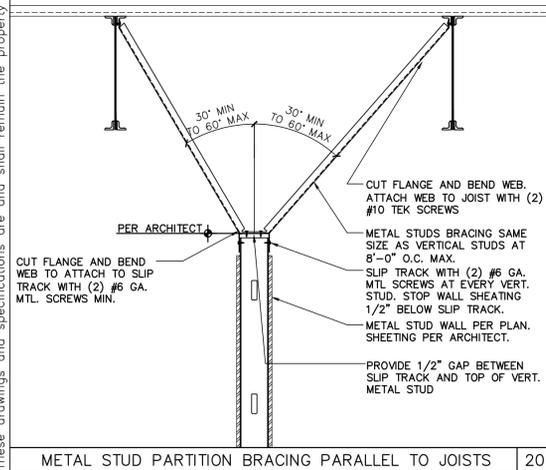
WALL TO WALL CONNECTIONS 11



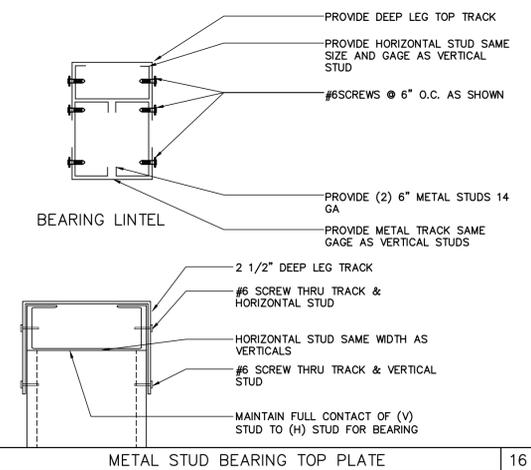
TYPICAL HEADER CONNECTION 7



STEEL LINTEL ANGLE FOR MASONRY VENEER 3



METAL STUD PARTITION BRACING PARALLEL TO JOISTS 20



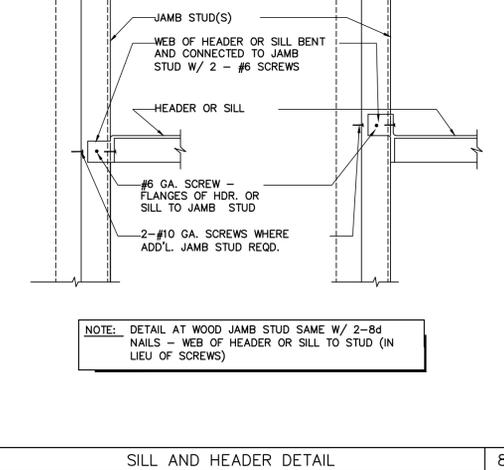
METAL STUD BEARING TOP PLATE 16

METAL STUDS HEADERS/BEAMS SCHEDULE

MARK	MAX CLEAR SPAN	WALL THICKNESS	HEADER MEMBERS*
BM-1	3'-4"	6"	(2) 600S200-33
BM-2	6'-4"	6"	(2) 600S200-68
BM-3	8'-0"	6"	(2) 800S200-68
BM-4	10'-0"	6"	(2) 1000S200-97
BM-5	12'-0"	6"	(2) 1000S250-97
BM-6	14'-0"	6"	(3) 1200S200-97

* PROVIDE TOP AND BOTTOM TRACK SAME GAGE AS HEADER MEMBER

METAL STUD WALL HEADERS/BEAMS SCHEDULE 12



SILL AND HEADER DETAIL 8

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CONSTRUCTION DOCUMENTS

WEBB COUNTY REHABILITATION CENTER
 LAREDO, TEXAS

PROJECT NUMBER SSE-11-0-01

REVISIONS

FILENAME:

SHEET TITLE

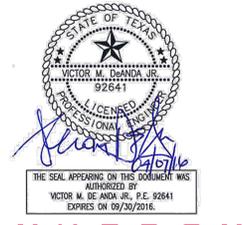
TYPICAL METAL STUD WALL DETAILS

DRAWN BY: LP/VDA

SHEET NO.

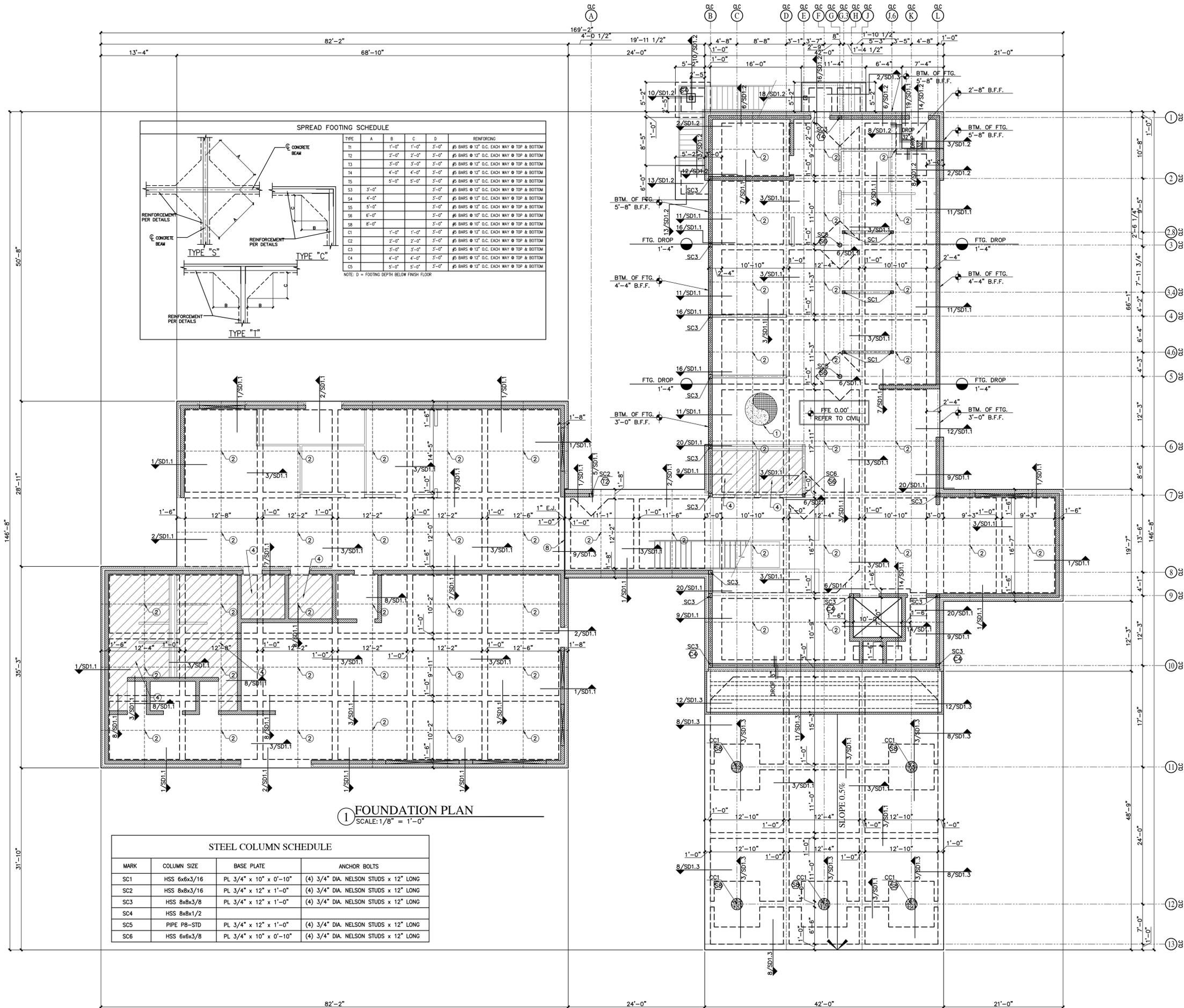
S-1.3

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SYNERGY STRUCTURAL ENGINEERING, INC.
 6909 Springfield Ave. SUITE 105
 Laredo, TX. 78041
 (956) 753-5860 synergy@synergy-se.com
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SPREAD FOOTING SCHEDULE

TYPE	A	B	C	D	REINFORCING
T1	1'-0"	1'-0"	3'-0"		#5 BARS @ 12" O.C. EACH WAY @ TOP & BOTTOM
T2	2'-0"	2'-0"	3'-0"		#5 BARS @ 12" O.C. EACH WAY @ TOP & BOTTOM
T3	3'-0"	3'-0"	3'-0"		#5 BARS @ 12" O.C. EACH WAY @ TOP & BOTTOM
T4	4'-0"	4'-0"	3'-0"		#5 BARS @ 12" O.C. EACH WAY @ TOP & BOTTOM
T5	5'-0"	5'-0"	3'-0"		#5 BARS @ 12" O.C. EACH WAY @ TOP & BOTTOM
S3	3'-0"		3'-0"		#5 BARS @ 12" O.C. EACH WAY @ TOP & BOTTOM
S4	4'-0"		3'-0"		#5 BARS @ 12" O.C. EACH WAY @ TOP & BOTTOM
S5	5'-0"		3'-0"		#5 BARS @ 12" O.C. EACH WAY @ TOP & BOTTOM
S6	6'-0"		3'-0"		#5 BARS @ 12" O.C. EACH WAY @ TOP & BOTTOM
S8	8'-0"		3'-0"		#5 BARS @ 10" O.C. EACH WAY @ TOP & BOTTOM
C1	1'-0"	1'-0"	3'-0"		#5 BARS @ 12" O.C. EACH WAY @ TOP & BOTTOM
C2	2'-0"	2'-0"	3'-0"		#5 BARS @ 12" O.C. EACH WAY @ TOP & BOTTOM
C3	3'-0"	3'-0"	3'-0"		#5 BARS @ 12" O.C. EACH WAY @ TOP & BOTTOM
C4	4'-0"	4'-0"	3'-0"		#5 BARS @ 12" O.C. EACH WAY @ TOP & BOTTOM
C5	5'-0"	5'-0"	3'-0"		#5 BARS @ 12" O.C. EACH WAY @ TOP & BOTTOM

NOTE: D = FOOTING DEPTH BELOW FINISH FLOOR

STEEL COLUMN SCHEDULE

MARK	COLUMN SIZE	BASE PLATE	ANCHOR BOLTS
SC1	HSS 6x6x3/16	PL 3/4" x 10" x 0'-10"	(4) 3/4" DIA. NELSON STUDS x 12" LONG
SC2	HSS 8x8x3/16	PL 3/4" x 12" x 1'-0"	(4) 3/4" DIA. NELSON STUDS x 12" LONG
SC3	HSS 8x8x3/8	PL 3/4" x 12" x 1'-0"	(4) 3/4" DIA. NELSON STUDS x 12" LONG
SC4	HSS 8x8x1/2		
SC5	PIPE P8-STD	PL 3/4" x 12" x 1'-0"	(4) 3/4" DIA. NELSON STUDS x 12" LONG
SC6	HSS 6x6x3/8	PL 3/4" x 10" x 0'-10"	(4) 3/4" DIA. NELSON STUDS x 12" LONG

FOUNDATION PLAN
SCALE: 1/8" = 1'-0"

- FOUNDATION NOTES**
- SEE SHEET S-1.1 FOR GENERAL NOTES AND TYPICAL CONCRETE DETAILS.
 - SEE SHEET S-1.2 & S-1.3 FOR TYPICAL WALL DETAILS.
 - CONTRACTOR IS RESPONSIBLE FOR LOCATION OF ALL FLOOR DRAINS (F.D.) WHETHER OR NOT THEY ARE NOTED ON THE STRUCTURAL NOTES OR PLANS.
 - DIMENSIONS SHOWN ARE FOR GENERAL INFORMATION, COORDINATE WITH ARCHITECTURAL PLANS.
 - CONTRACTOR/SUBCONTRACTOR IS RESPONSIBLE FOR VERIFYING ALL DIMENSIONS WITH ARCHITECTURAL PLANS BEFORE COMMENCING ANY WORK. THE CONTRACTOR/SUBCONTRACTOR SHALL REPORT ANY DISCREPANCIES TO THE ARCHITECT/ENGINEER BEFORE THE WORK HAS BEGUN.
 - WALL LEGEND:
 INDICATES METAL STUD WALL PER ARCHITECT
 INDICATES 8" CMU WALL
 REFER TO CMU WALL SCHEDULE FOR REINFORCING.
 - ABBREVIATIONS:
 CLC= CENTER LINE COLUMN
 FOC= FACE OF COLUMN
 FOW= FACE OF WALL
 FFE= FINISH FLOOR ELEVATION
 TOP= TOP OF PARAPET
 JOE= JOIST BEARING ELEVATION
 TOS= TOP OF STEEL
 - ALL ELEVATIONS REFERENCED HEREIN, ARE FROM THE BUILDING FINISH FLOOR ELEVATION OF 0'-0". REFER TO CIVIL PLANS FOR FINAL BUILDING ELEVATION.
 - REFER TO DETAIL 14/S-1.2 FOR CMU CONTROL JOINTS, UNLESS NOTED OTHERWISE. CONTROL JOINTS SHALL START AT 10 FT FROM EDGES OR CORNERS AND 20 FT O.C. IN BETWEEN.

- KEYED FOUNDATION NOTES**
- 5" THICK SLAB ON GRADE WITH #4 BARS @ 15" O.C. EACH WAY AT MID-DEPTH OF SLAB OVER 10 MIL VISQUEEN MOISTURE BARRIER OVER APPROVED COMPACTED FILL.
 - SLAB CONTROL JOINTS, SEE DETAIL 6/S-1.1
 - CMU WALL EXPANSION JOINT SEE DETAIL 14/S-1.2
 - RECESS SLAB PER ARCHITECT. SHADED AREAS INDICATE DEPRESSED SLAB, VERIFY AND COORDINATE WITH ARCHITECTURAL PLANS.
 - 8x16 CMU PILASTER WITH (2) #5 BARS VERTICAL WITH #3 TIES @ 8" O.C.
 - PRE-FABRICATED METAL STAIRS, REFER TO ARCHITECTURAL DRAWINGS FOR ADDITIONAL INFORMATION, PROVIDE SIGNED AND SEALED SHOP DRAWINGS BY LICENSED ENGINEER.
 - PRE-FABRICATED METAL SCREEN, REFER TO ARCHITECTURAL DRAWINGS FOR ADDITIONAL INFORMATION, PROVIDE SIGNED AND SEALED SHOP DRAWINGS BY LICENSED ENGINEER.
 - 1" EXPANSION JOINT FULL DEPTH OF GRADE BEAM WITH 3/4" DIA SMOOTH DOWELS x 18" LONG @ 12" O.C. AT MID-DEPTH OF GRADE BEAM.

CMU WALL REINFORCING SCHEDULE

WALL TYPE	t	REINFORCING- SEE FOOT NOTE (6)	SECC. INSP.	FOOT NOTE
WL-1	6"	#4 BARS (V) @ 48" O.C. CTR. & (1) #4 BAR @ 5'-4" O.C. (H)	(1)	NO
WL-2	8"	#5 BARS (V) @ 48" O.C. CTR. & (2) #5 BAR @ 5'-4" O.C. (H)	(2)	NO
WL-3	8"	#5 BARS (V) @ 24" O.C. CTR. & (2) #5 BAR @ 5'-4" O.C. (H)	(3),(4)	NO
WL-4	8"	#5 BARS (V) @ 8" O.C. CTR. & (2) #5 BAR @ 5'-4" O.C. (H)	(5)	NO

(1) TYPICAL INTERIOR NON-BEARING 8" CMU WALL
 (2) TYPICAL INTERIOR BEARING 8" CMU WALL
 (3) TYPICAL EXTERIOR BEARING 8" CMU WALL
 (4) TYPICAL EXTERIOR SHIRT WALLS
 (5) TYPICAL HORIZONTAL (H) REINFORCEMENT TO OCCUR IN CONTINUOUS BOND BEAMS SPACED AS INDICATED IN THE SCHEDULE ABOVE.

CONCRETE COLUMN SCHEDULE

MARK	COLUMN SIZE	VERTICAL REINFORCING	TIES
CC1	24" DIA	(12) #5	#4 @ 6"
CC2			

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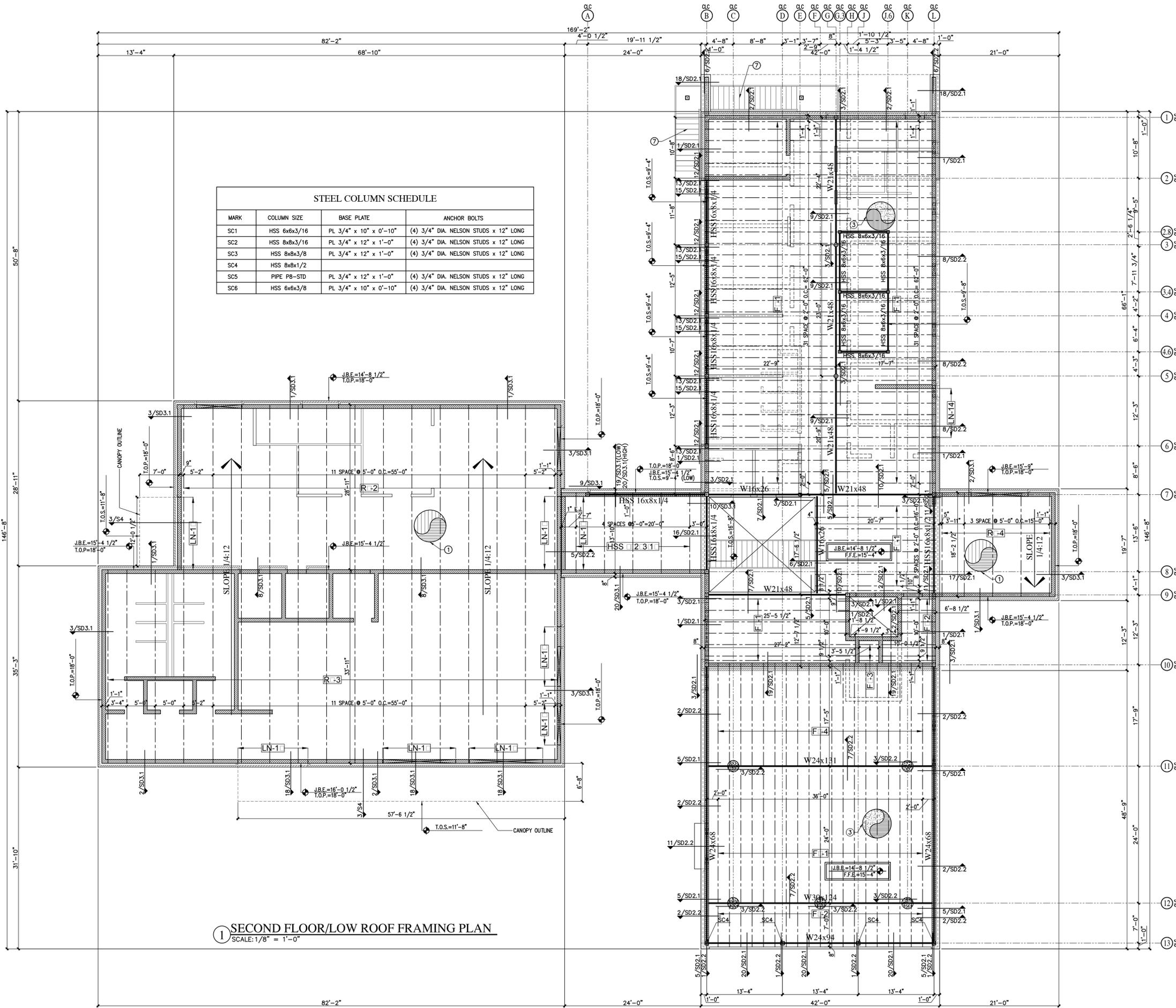
WEBB COUNTY REHABILITATION CENTER
 LAREDO, TEXAS

PROJECT NUMBER: SSE-11-0-0-1
 REVISIONS:
 FILENAME:
 SHEET TITLE: FOUNDATION PLAN
 DRAWN BY: LP/VDA
 SHEET NO.: S-2
 DATE: APRIL 7, 2011



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 STRUCTURAL ENGINEERING, INC.
 6909 Springfield Ave. SUITE 105
 Laredo, TX. 78041
 (956) 753-5860 synergy@synergy-se.com
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STEEL COLUMN SCHEDULE			
MARK	COLUMN SIZE	BASE PLATE	ANCHOR BOLTS
SC1	HSS 6x6x3/16	PL 3/4" x 10" x 0'-10"	(4) 3/4" DIA. NELSON STUDS x 12" LONG
SC2	HSS 8x8x3/16	PL 3/4" x 12" x 1'-0"	(4) 3/4" DIA. NELSON STUDS x 12" LONG
SC3	HSS 8x8x3/8	PL 3/4" x 12" x 1'-0"	(4) 3/4" DIA. NELSON STUDS x 12" LONG
SC4	HSS 8x8x1/2	PL 3/4" x 12" x 1'-0"	(4) 3/4" DIA. NELSON STUDS x 12" LONG
SC5	PIPE P8-STD	PL 3/4" x 12" x 1'-0"	(4) 3/4" DIA. NELSON STUDS x 12" LONG
SC6	HSS 6x6x3/8	PL 3/4" x 10" x 0'-10"	(4) 3/4" DIA. NELSON STUDS x 12" LONG

1 SECOND FLOOR/LOW ROOF FRAMING PLAN
SCALE: 1/8" = 1'-0"

FRAMING GENERAL NOTES

- SEE SHEET S-1.1 FOR GENERAL NOTES AND TYPICAL CONCRETE DETAILS.
- SEE SHEET S-1.2 & S-1.3 FOR TYPICAL WALL DETAILS.
- REFER TO MECHANICAL AC DRAWINGS FOR LOCATION AND SIZE OF REFRIGERANT PIPING AND DUCT WORK, MECHANICAL UNITS, WEIGHTS, & SUPPORTS.
- DIMENSIONS SHOWN ARE FOR GENERAL INFORMATION, COORDINATE WITH ARCHITECTURAL PLANS.
- JOIST MANUFACTURER TO REFER TO FIRE SPRINKLER SYSTEM PLANS FOR LOCATION AND WEIGHTS OF PIPES.
- WALL LEGEND:
INDICATES METAL STUD WALL PER ARCHITECT
INDICATES 8" CMU WALL PER ARCHITECT
REFER TO CMU WALL SCHEDULE FOR REINFORCING.
- ABBREVIATIONS:
O.C.=CENTER LINE COLUMN
F.O.C.=FACE OF COLUMN
F.O.W.=FACE OF WALL
F.F.E.=FINISH FLOOR ELEVATION
T.O.P.=TOP OF PARAPET
J.B.E.=JOIST BEARING ELEVATION
T.O.S.=TOP OF STEEL
- ALL ELEVATIONS REFERENCED HEREIN, ARE FROM THE BUILDING FINISH FLOOR ELEVATION OF 0'-0". REFER TO CIVIL PLANS FOR FINAL BUILDING ELEVATION.

KEYED FRAMING NOTES

- ROOFING AND RIGID INSULATION PER ARCHITECT OVER STRUCTURAL METAL DECK 1.5F 20 GA. WITH SCREW PATTERN 36" WITH #12 TEK'S AT SUPPORT AND #10 TEK'S AT SIDE LAPS @ 12" O.C. (4 PER SPAN).
- METAL ROOF AND RIGID INSULATION PER ARCHITECT OVER VULCRAFT 3N 18GA STRUCTURAL METAL DECK WITH FASTENER PATTERN 24" WITH #12 TEK SCREWS AT SUPPORT AND #10 TEK SCREWS @ 12" O.C. AT SIDELAPS.
- 4" NORMAL WEIGHT CONCRETE DECK WITH WWF 6x6-W2.9xW2.9 OVER VULCRAFT METAL DECK 1.0C 24 GA. WITH FASTENER PATTERN 33" WITH #12 TEK SCREWS AT SUPPORT AND #10 TEK SCREWS @ 12" O.C. AT SIDELAPS. TOTAL THICKNESS OF SLAB = 4" (3" CONC. FILL + 1" MIL. DECK). PROVIDE SAW CRACK CONTROL JOINTS @ 15'-0" O.C. MAX. EACH WAY 1/4" WIDE x 1" DEEP.
- HSS 8x2x3/16 CONTINUOUS BLOCKING FLUSHED WITH TOP CHORD OF JOISTS AND WELDED TO STEEL JOISTS. PROVIDE #12 TEK SCREWS @ 3" O.C. RE: 12/SD-3.1
- WELD BLOCKING ALL AROUND TO STEEL COLUMN
- ELEVATOR HOIST BEAM TO BE W8x18 WITH BEARING PLATES PL 1/2"x6"x0'-8" WITH (2) 1/2" DIA NELSON STUDS x 6" LONG AT EACH END OF BEAM. LOCATION OF BEAM PER ELEVATOR MANUFACTURER.
- PRE-FABRICATED METAL STAIRS. REFER TO ARCHITECTURAL DRAWINGS FOR ADDITIONAL INFORMATION. PROVIDE SIGNED AND SEALED SHOP DRAWINGS BY LICENSE ENGINEER.
- PRE-FABRICATED METAL SCREEN. REFER TO ARCHITECTURAL DRAWINGS FOR ADDITIONAL INFORMATION. PROVIDE SIGNED AND SEALED SHOP DRAWINGS BY LICENSE ENGINEER.
- CMU WALL CONTROL JOINT ABOVE STEEL BEAM RE: 14/S1.2

FLOOR OPEN WEB STEEL JOIST SCHEDULE

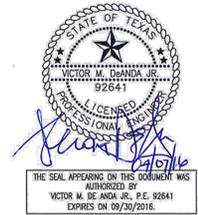
MARK	DESIGNATION	SPACING	REMARKS
FJ-1	18K5	2'-0"	3-1/2" BRG. SEAT
FJ-2	10K1	2'-0"	3-1/2" BRG. SEAT
FJ-3	2.5K1	2'-0"	3-1/2" BRG. SEAT
FJ-4	14K1	2'-0"	3-1/2" BRG. SEAT

- NOTES:
(1) MANUFACTURER TO PROVIDE REQUIRED HORIZONTAL AND DIAGONAL BRIDGING & THE SIZE & ROWS REQUIRED SHALL BE AT A MINIMUM FOLLOW VULCRAFT RECOMMENDATIONS.
(2) U.N.O. CMU WALLS BEARING PLATES TO BE PL 1/2"x6"x0'-10" WITH (2) 1/2" DIA. NELSON STUDS x 6" LONG FOR SINGLE JOIST AND PL 1/2"x8"x0'-10" WITH (2) 1/2" DIA. NELSON STUDS x 6" LONG FOR DOUBLE JOISTS BEARING ON CMU WALL.

ROOF OPEN WEB STEEL JOIST SCHEDULE

MARK	DESIGNATION	SPACING	REMARKS
RJ-1	NOT USED		
RJ-2	20K5	5'-0"	
RJ-3	26K5	5'-0"	
RJ-4	14K1	5'-0"	
RJ-5	24K12	5'-0"	
RJ-6	2.5K3	2'-0"	
RJ-7	NOT USED		

- NOTES:
(1) SHORT TERM AXIAL LOAD, TENSION OR COMPRESSION TO BE CARRIED CONCURRENTLY BY JOISTS/GIRDERS IN ADDITION TO ALL OTHER DESIGN LOADS.
(2) MANUFACTURER TO PROVIDE REQUIRED HORIZONTAL AND DIAGONAL BRIDGING & THE SIZE & ROWS REQUIRED SHALL BE AT A MINIMUM FOLLOW VULCRAFT RECOMMENDATIONS.
(3) U.N.O. CMU WALLS BEARING PLATES TO BE PL 1/2"x6"x0'-10" WITH (2) 1/2" DIA. NELSON STUDS x 6" LONG FOR SINGLE JOIST AND PL 1/2"x8"x0'-10" WITH (2) 1/2" DIA. NELSON STUDS x 6" LONG FOR DOUBLE JOISTS BEARING ON CMU WALL.
(4) TOP CHORD SINGLE PITCHED UNDERSLUNG.
(5) TOP CHORD OFFSET DOUBLE PITCHED UNDERSLUNG.



SYNERGY
STRUCTURAL ENGINEERING, INC.
6909 Springfield Ave. SUITE 105
Laredo, TX. 78041
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CONSTRUCTION DOCUMENTS

WEBB COUNTY
REHABILITATION CENTER
LAREDO, TEXAS

PROJECT NUMBER
SSE-110-01

REVISIONS

FILENAME:

SHEET TITLE

SECOND FLOOR
LOW ROOF FRAMING PLAN

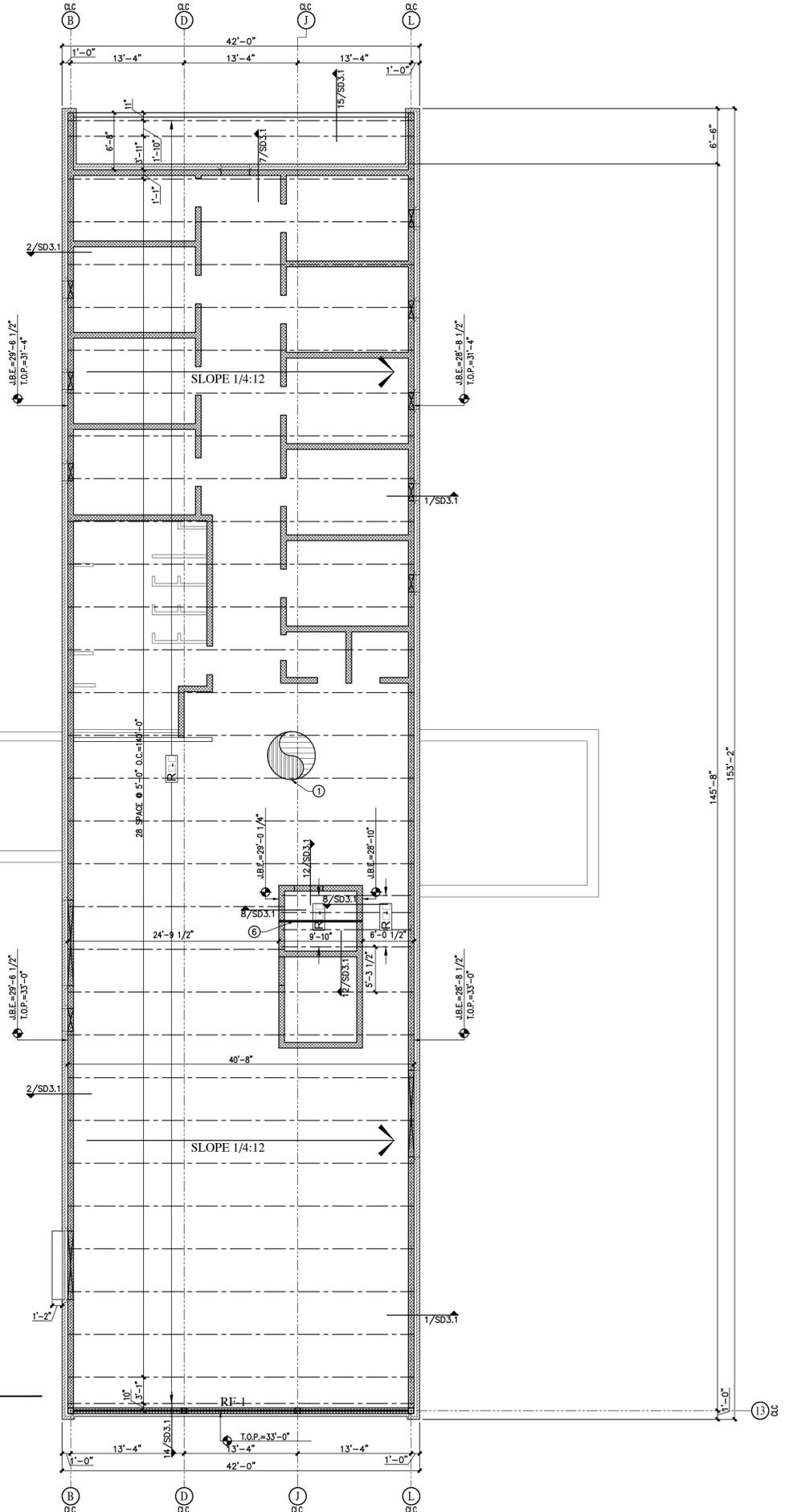
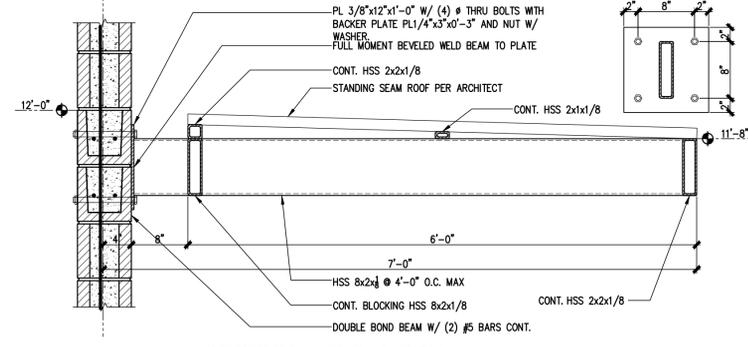
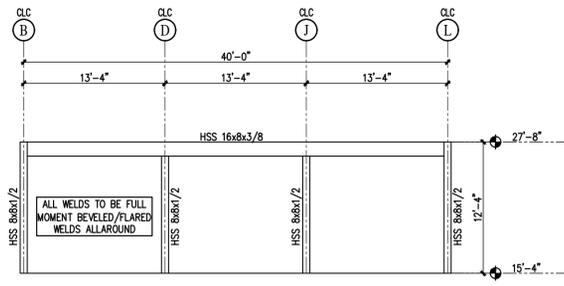
DRAWN BY: LP/VDA

SHEET NO.

S-3

DATE: APRIL 7, 2011

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FRAMING GENERAL NOTES

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- SEE SHEET S-1.2 & S-1.3 FOR TYPICAL WALL DETAILS.
- REFER TO MECHANICAL AC DRAWINGS FOR LOCATION AND SIZE OF REFRIGERANT PIPING AND DUCT WORK, MECHANICAL UNITS, WEIGHTS, & SUPPORTS.
- DIMENSIONS SHOWN ARE FOR GENERAL INFORMATION, COORDINATE WITH ARCHITECTURAL PLANS.
- JOIST MANUFACTURER TO REFER TO FIRE SPRINKLER SYSTEM PLANS FOR LOCATION AND WEIGHTS OF PIPES.
- WALL LEGEND:
 - INDICATES METAL STUD WALL PER ARCHITECT
 - INDICATES 8" CMU WALL
 - REFER TO CMU WALL SCHEDULE FOR REINFORCING.
- ABBREVIATIONS:
 - CL= CENTER LINE COLUMN
 - FCC= FACE OF COLUMN
 - FW= FACE OF WALL
 - FFE= FINISH FLOOR ELEVATION
 - TOP= TOP OF PARAPET
 - JBE= JOIST BEARING ELEVATION
 - TOS= TOP OF STEEL
- ALL ELEVATIONS REFERENCED HEREIN, ARE FROM THE BUILDING FINISH FLOOR ELEVATION OF 0'-0". REFER TO CIVIL PLANS FOR FINAL BUILDING ELEVATION.

KEYED FRAMING NOTES

- ROOFING AND RIGID INSULATION PER ARCHITECT OVER STRUCTURAL METAL DECK 1.5F 20 GA. WITH SCREW PATTERN 35/5 WITH #12 TEKS AT SUPPORT AND #10 TEKS AT SIDE LAPS @ 12" O.C. (4 PER SPAN).
- METAL ROOF AND RIGID INSULATION PER ARCHITECT OVER WULFRATH 3M 18GA STRUCTURAL METAL DECK WITH FASTENER PATTERN 24/4 WITH #12 TEK SCREWS AT SUPPORT AND #10 TEKS SCREWS @ 12" O.C. AT SIDELAPS.
- 4" NORMAL WEIGHT CONCRETE DECK WITH WWF 6x6-W2.9xW2.9 OVER WULFRATH METAL DECK 1.0C 24 GA WITH FASTENER PATTERN 33/4 WITH #12 TEK SCREWS AT SUPPORT AND #10 TEKS SCREWS @ 12" O.C. AT SIDELAPS. TOTAL THICKNESS OF SLAB = 4" CONC. FILL + 1.0" WULF. DECK. PROVIDE SAW CRACK CONTROL JOINTS @ 15'-0" O.C. MAX. EACH WAY 1/4" WIDE x 1" DEEP.
- HSS 8x2x3/16 CONTINUOUS BLOCKING FLUSHED WITH TOP CHORD OF JOISTS AND WELDED TO STEEL JOISTS. PROVIDE #12 TEK SCREWS @ 3" O.C. RE: 12/SD.3.1
- WELD BLOCKING ALL AROUND TO STEEL COLUMN
- ELEVATOR HOIST BEAM TO BE W8x18 WITH BEARING PLATES PL 1/2"x6"x0-8" WITH (2) 1/2" DIA NELSON STUDS x 8" LONG AT EACH END OF BEAM. LOCATION OF BEAM PER ELEVATOR MANUFACTURER.
- PRE-FABRICATED METAL STAIRS, REFER TO ARCHITECTURAL DRAWINGS FOR ADDITIONAL INFORMATION. PROVIDE SIGNED AND SEALED SHOP DRAWINGS BY LICENSE ENGINEER.
- PRE-FABRICATED METAL SCREEN, REFER TO ARCHITECTURAL DRAWINGS FOR ADDITIONAL INFORMATION. PROVIDE SIGNED AND SEALED SHOP DRAWINGS BY LICENSE ENGINEER.
- CMU WALL CONTROL JOINT ABOVE STEEL BEAM RE: 14/S1.2

ROOF OPEN WEB STEEL JOIST SCHEDULE

MARK	DESIGNATION	SPACING	REMARKS
RJ-1	NOT USED		
RJ-2	20K5	5'-0"	
RJ-3	26K5	5'-0"	
RJ-4	14K1	5'-0"	
RJ-5	24K12	5'-0"	
RJ-6	2.5K3	2'-0"	
RJ-7	NOT USED	5'-0"	

- NOTES:**
- SHORT TERM AXIAL LOAD, TENSION OR COMPRESSION TO BE CARRIED CONCURRENTLY BY JOISTS/GIRDERS IN ADDITION TO ALL OTHER DESIGN LOADS.
 - MANUFACTURER TO PROVIDE REQUIRED HORIZONTAL AND DIAGONAL BRIDGING & THE SIZE & ROWS REQUIRED SHALL BE AT A MINIMUM FOLLOW WULFRATH RECOMMENDATIONS.
 - U.N.O. CMU WALLS BEARING PLATES TO BE PL 1/2"x6"x0-10" WITH (2) 1/2" DIA. NELSON STUDS x 15" LONG SINGLE JOIST AND PL 1/2"x8"x0-10" WITH (2) 1/2" DIA. NELSON STUDS x 6" LONG FOR DOUBLE JOISTS BEARING ON CMU WALL.
 - TOP CHORD SINGLE PITCHED UNDERSLUNG.
 - TOP CHORD OFFSET DOUBLE PITCHED UNDERSLUNG.



SYNERGY
STRUCTURAL ENGINEERING, INC.
6909 Springfield Ave. SUITE 105
Laredo, TX. 78041
(956) 753-5860 synergy@synergy-se.com
TBPE Reg. No.: F-7661

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WEBB COUNTY
REHABILITATION CENTER
LAREDO, TEXAS

PROJECT NUMBER
SSE-10-0

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FILENAME:

SHEET TITLE

HIGH ROOF
FRAMING PLAN

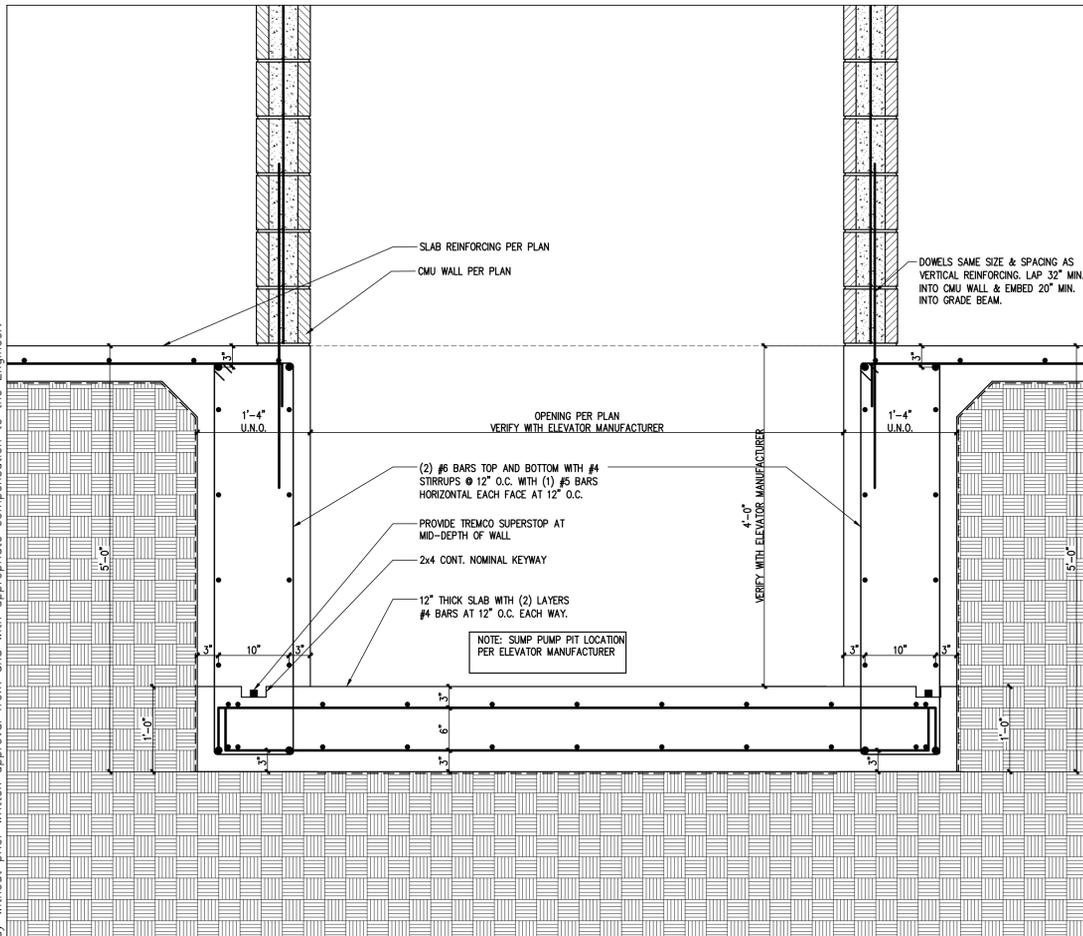
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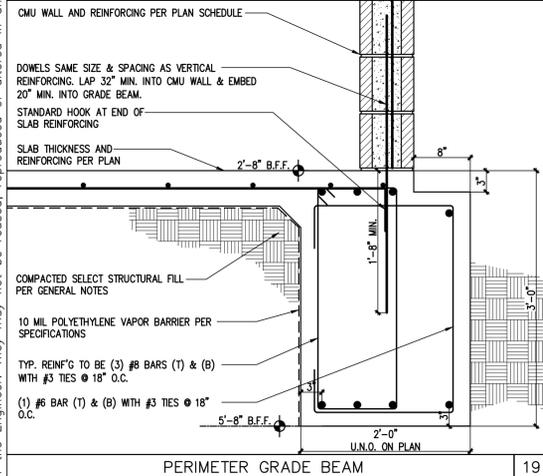
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DATE: APRIL 7, 2011

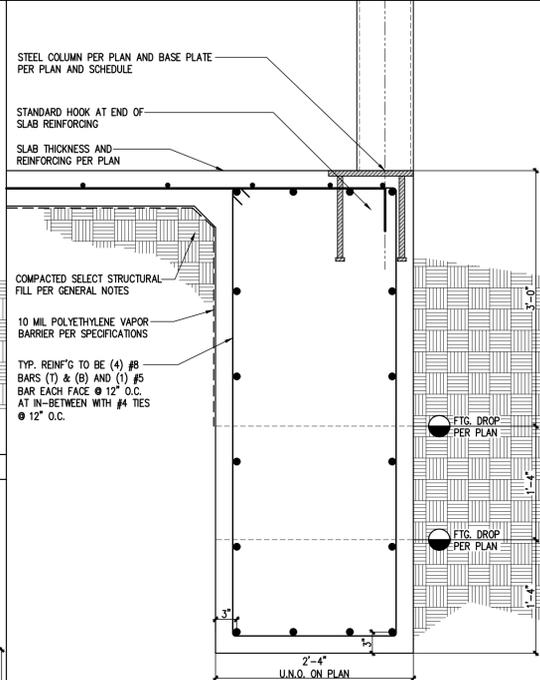
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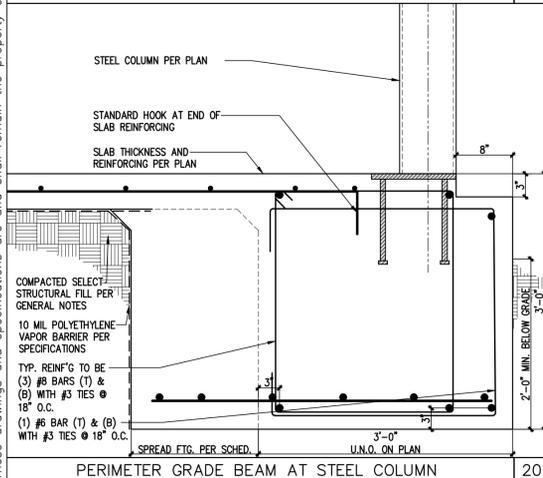
SECTION AT ELEVATOR PIT 14



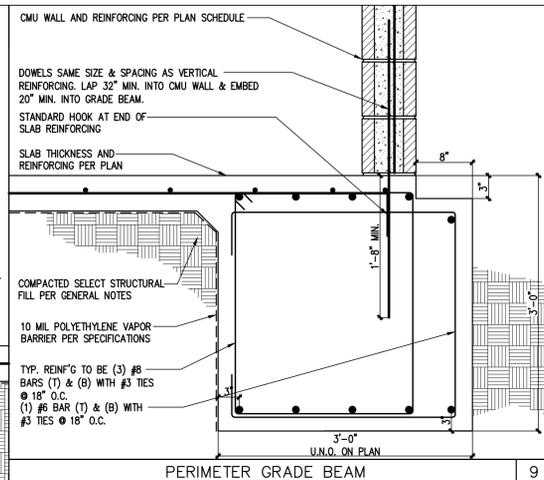
PERIMETER GRADE BEAM 19



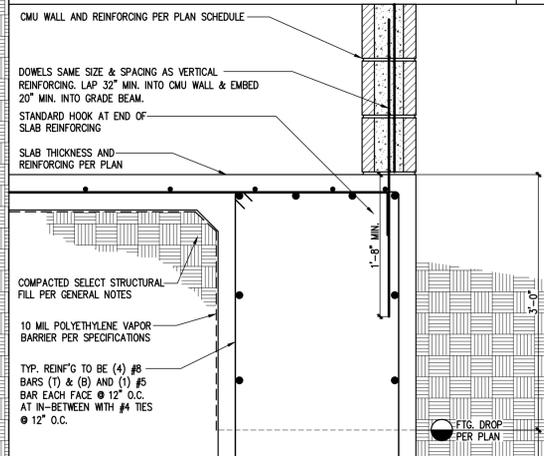
STEEL COLUMN AT PERIMETER GRADE BEAM 16



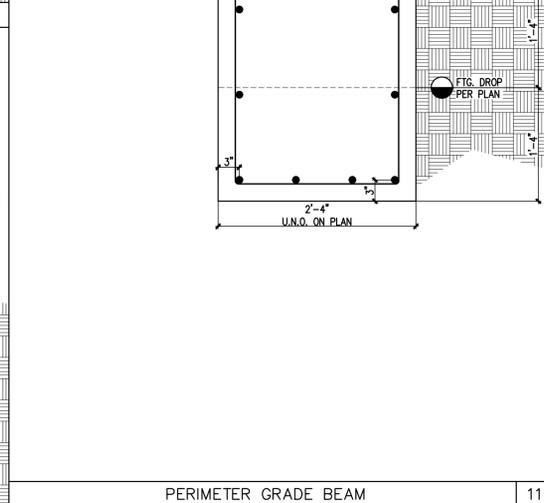
PERIMETER GRADE BEAM AT STEEL COLUMN 20



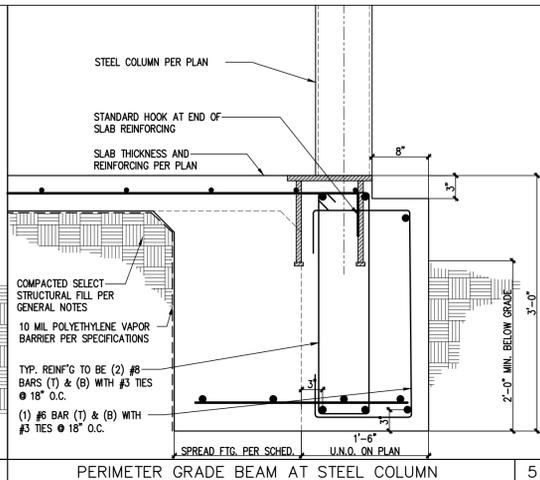
PERIMETER GRADE BEAM 9



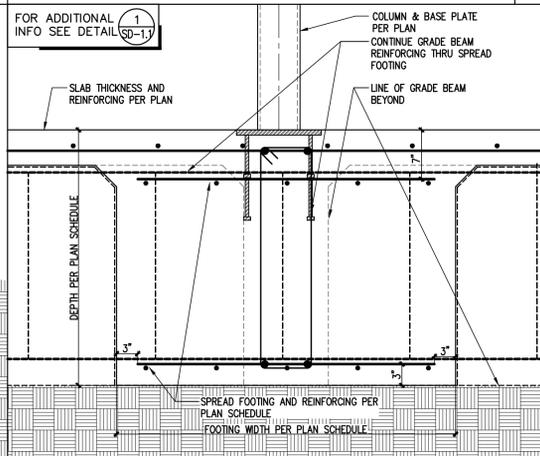
PERIMETER GRADE BEAM 11



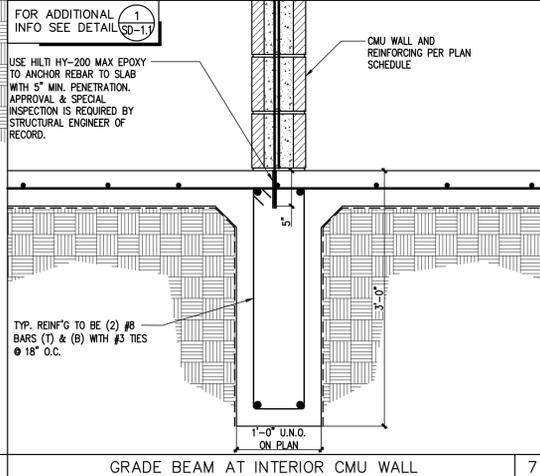
PERIMETER GRADE BEAM 12



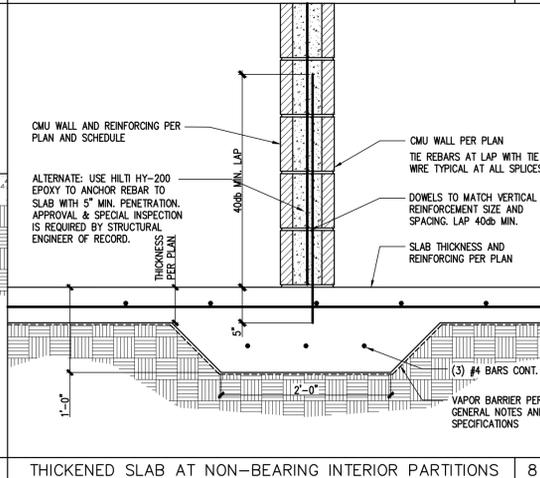
PERIMETER GRADE BEAM AT STEEL COLUMN 5



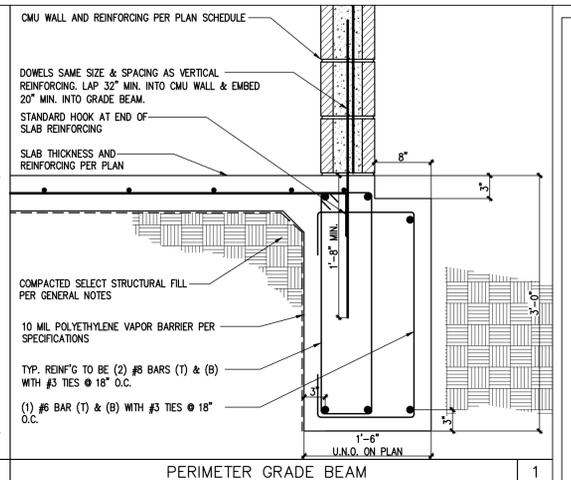
TYPICAL INTERIOR SPREAD FOOTING AT STEEL COLUMN 6



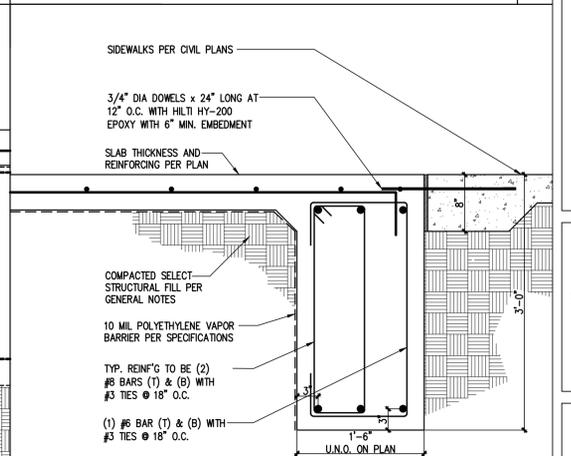
GRADE BEAM AT INTERIOR CMU WALL 7



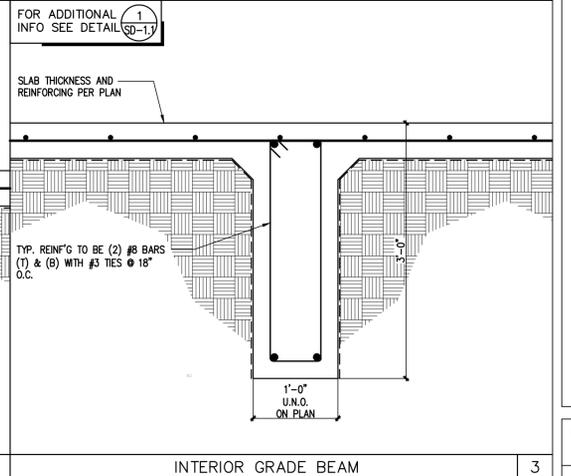
THICKENED SLAB AT NON-BEARING INTERIOR PARTITIONS 8



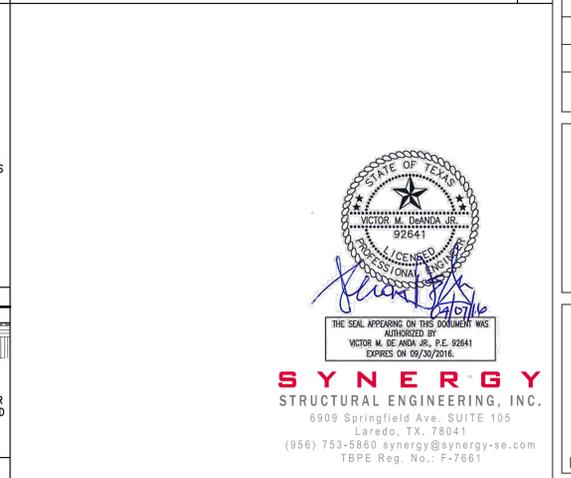
PERIMETER GRADE BEAM 1



PERIMETER GRADE BEAM 2



INTERIOR GRADE BEAM 3



PERIMETER GRADE BEAM 1

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 (512) 327-0444 FAX (512) 301-4909

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WEBB COUNTY
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PROJECT NUMBER
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REVISIONS

FILENAME:

SHEET TITLE
 FOUNDATION
 DETAILS

DRAWN BY: LP/VDA

SHEET NO.

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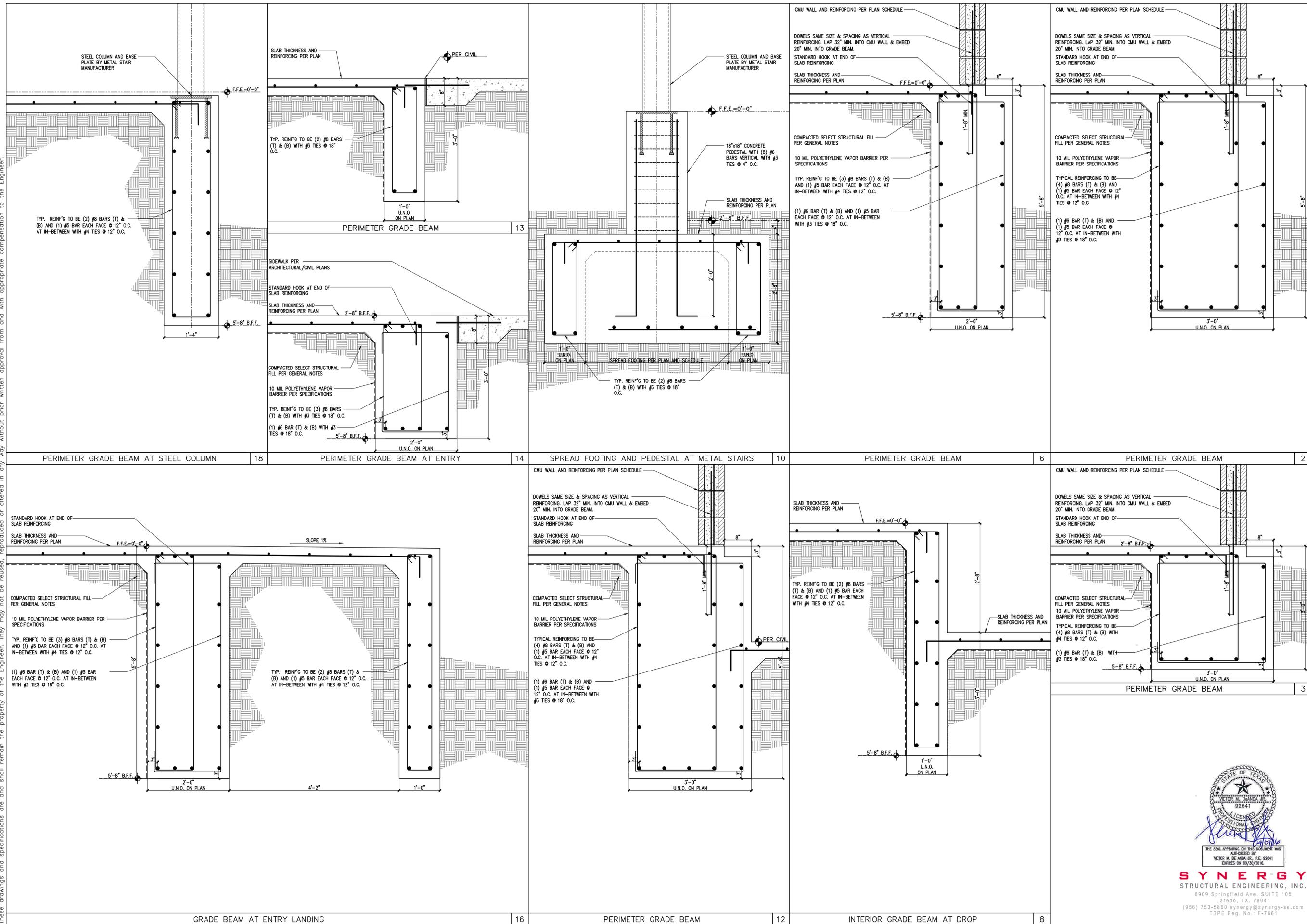
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 Laredo, TX. 78041
 (956) 753-5860 synergy@synergy-se.com
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 AUSTIN, TEXAS 78736
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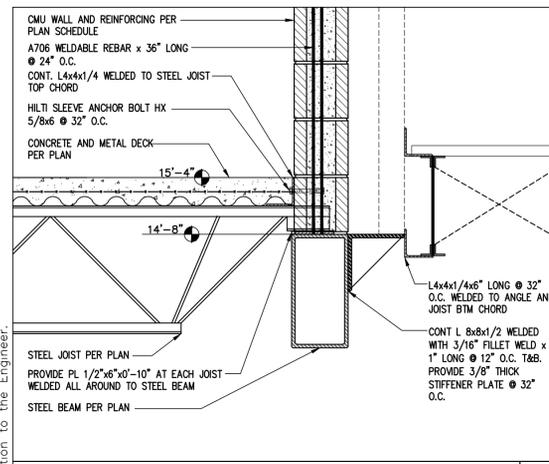
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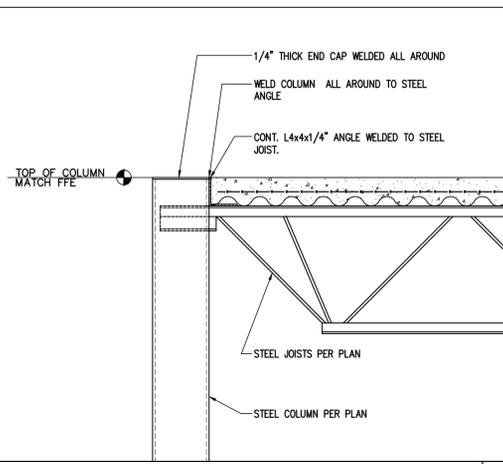
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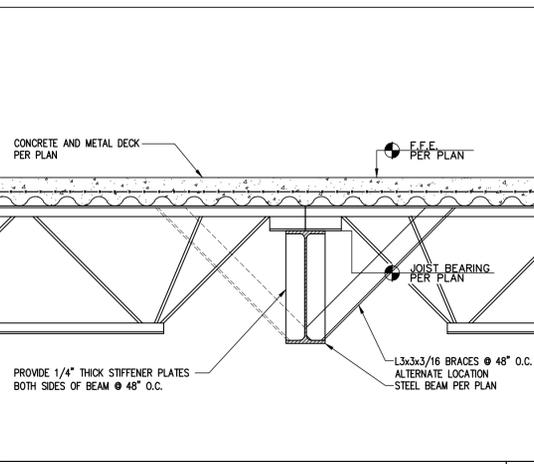
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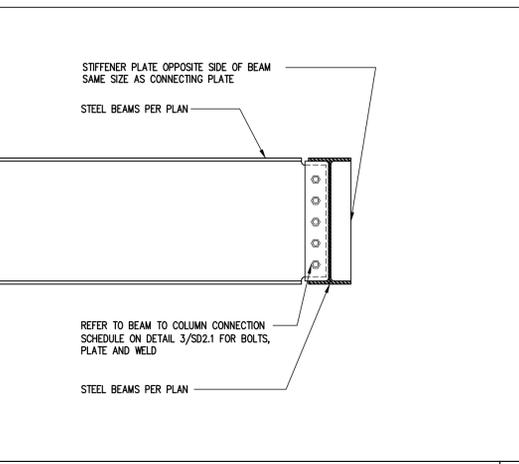
FLOOR JOISTS BEARING ON STEEL BEAM 17



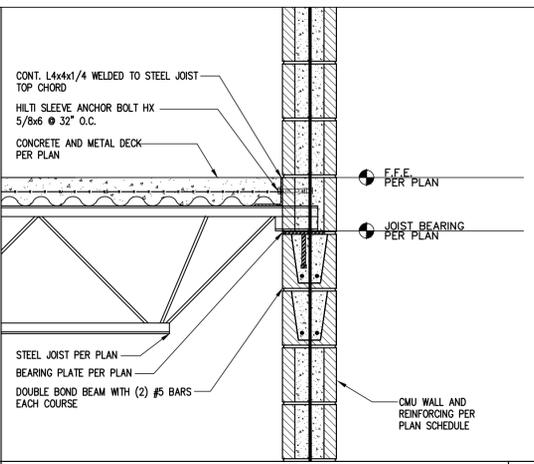
STEEL COLUMN CONNECTION TO FLOOR DECK 13



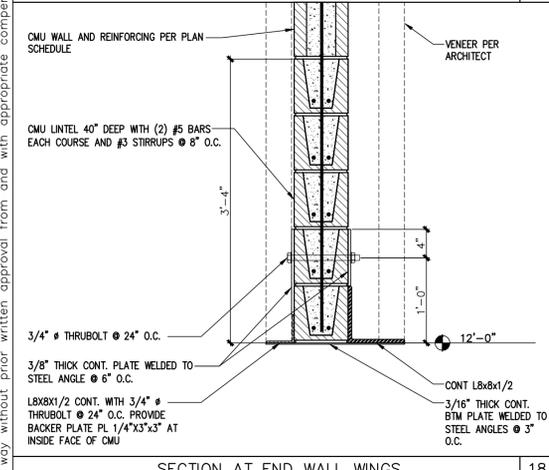
STEEL JOISTS BEARING ON STEEL BEAM 9



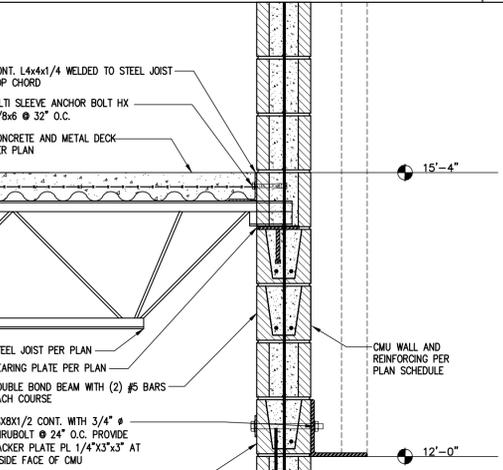
STEEL BEAM TO BEAM CONNECTION 5



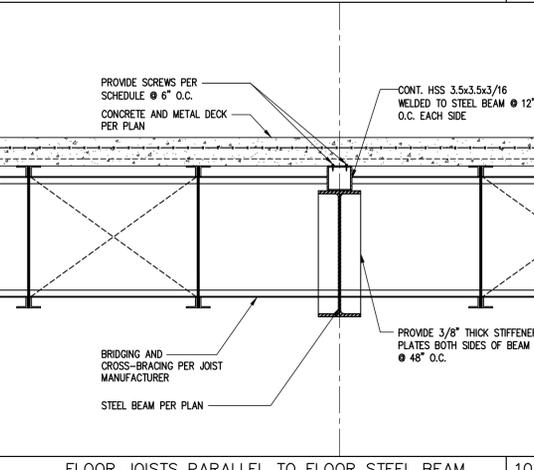
FLOOR JOIST BEARING ON PERIMETER CMU WALL 1



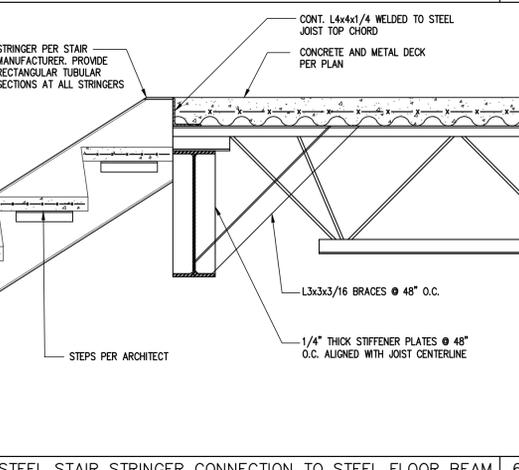
SECTION AT END WALL WINGS 18



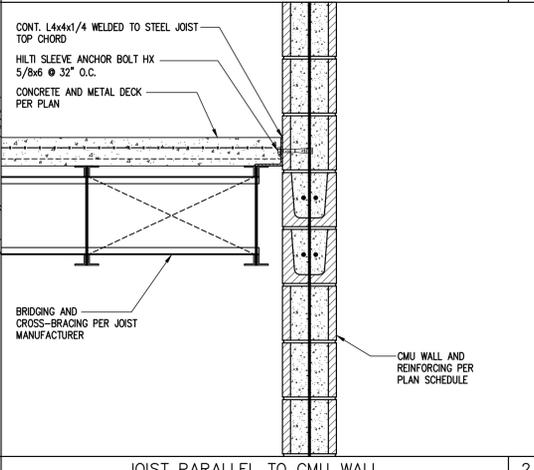
FLOOR JOISTS AND CMU WALL BEARING ON STEEL BEAM 15



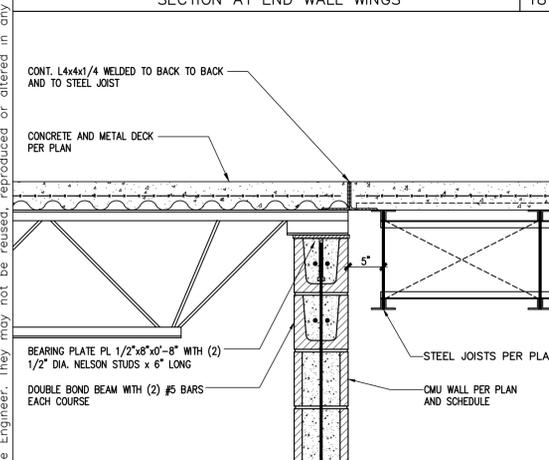
FLOOR JOISTS PARALLEL TO FLOOR STEEL BEAM 10



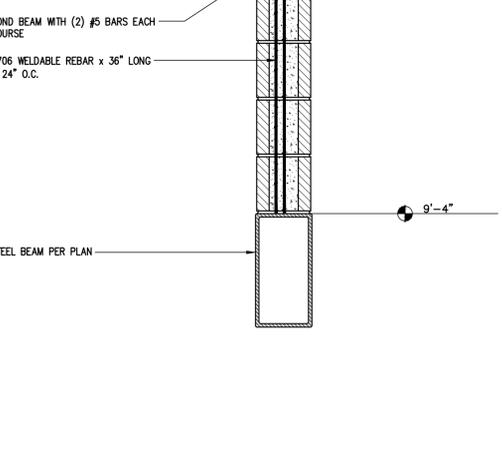
STEEL STAIR STRINGER CONNECTION TO STEEL FLOOR BEAM 6



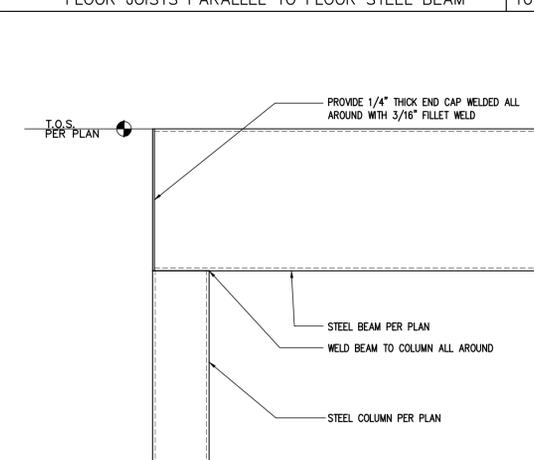
JOIST PARALLEL TO CMU WALL 2



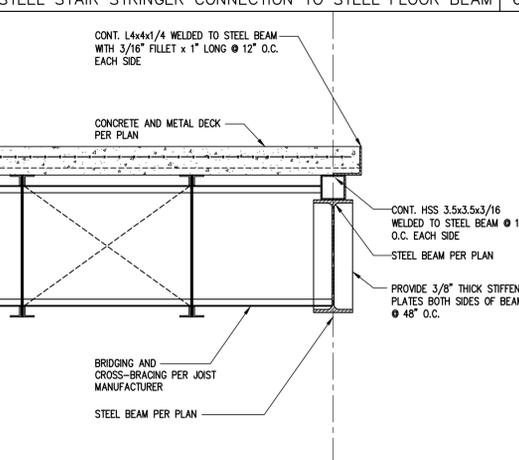
STEEL JOIST BEARING ON INTERIOR CMU WALL 19



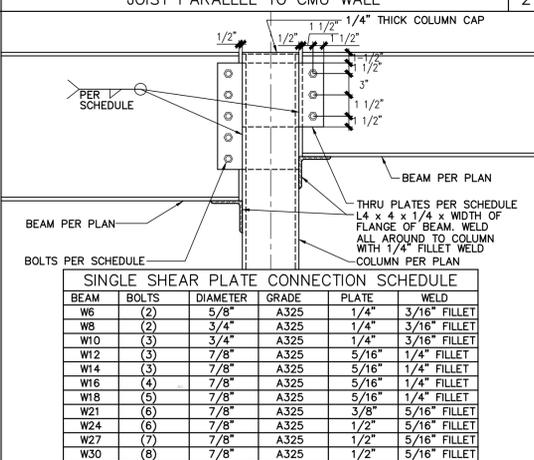
FLOOR BEAM CONNECTION TO STEEL COLUMN 11



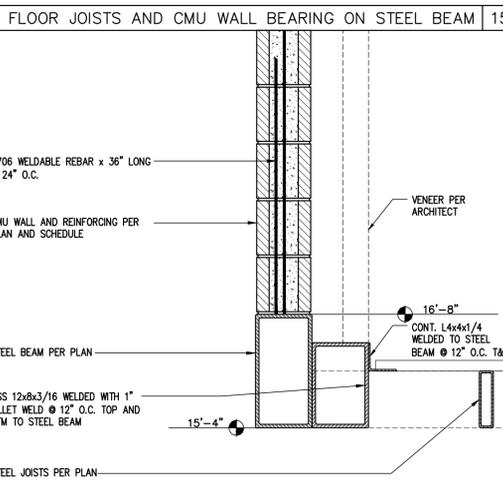
FLOOR JOISTS PARALLEL TO STEEL BEAM 7



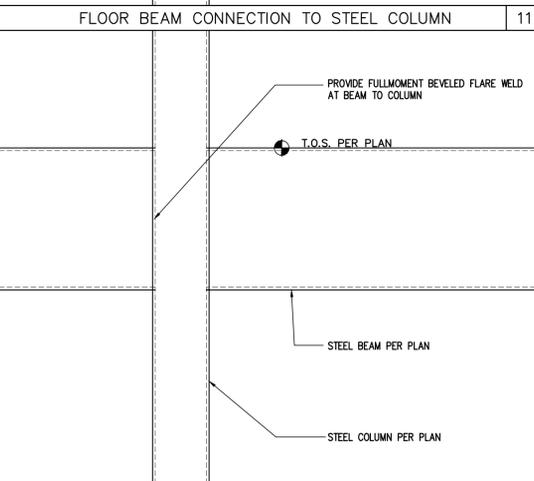
TYPICAL BEAM TO COLUMN CONNECTION SCHEDULE 3



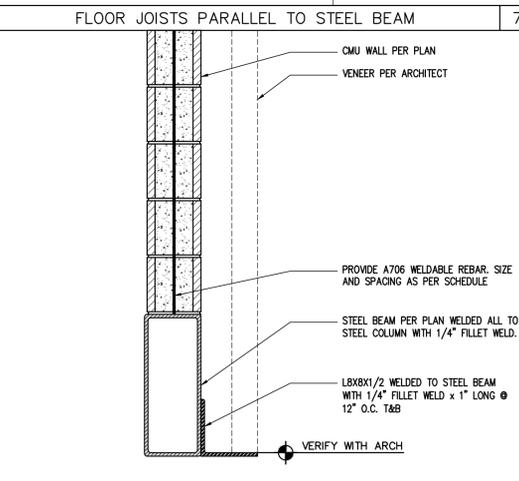
FLOOR JOISTS BEARING ON PERIMETER STEEL BEAM 20



SECTION AT STEEL BEAM HEADER 16



FLOOR BEAM CONNECTION TO STEEL BEAM 12



STEEL BEAM HEADER 8

BEAM	BOLTS	DIAMETER	GRADE	PLATE	WELD
W6	(2)	5/8"	A325	1/4"	3/16" FILLET
W8	(2)	3/4"	A325	1/4"	3/16" FILLET
W10	(3)	3/4"	A325	1/4"	3/16" FILLET
W12	(3)	7/8"	A325	5/16"	1/4" FILLET
W14	(3)	7/8"	A325	5/16"	1/4" FILLET
W16	(4)	7/8"	A325	5/16"	1/4" FILLET
W18	(5)	7/8"	A325	5/16"	1/4" FILLET
W21	(6)	7/8"	A325	3/8"	5/16" FILLET
W24	(6)	7/8"	A325	1/2"	5/16" FILLET
W27	(7)	7/8"	A325	1/2"	5/16" FILLET
W30	(8)	7/8"	A325	1/2"	5/16" FILLET

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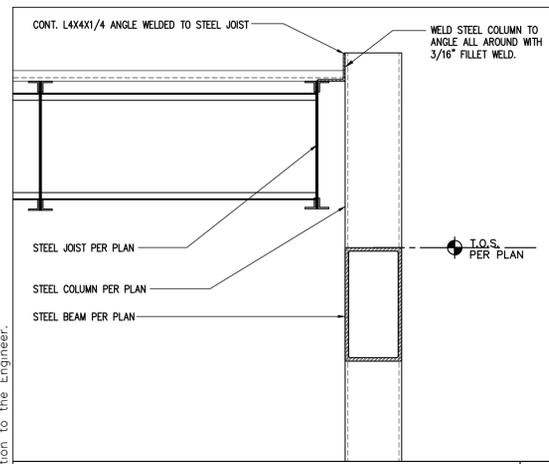
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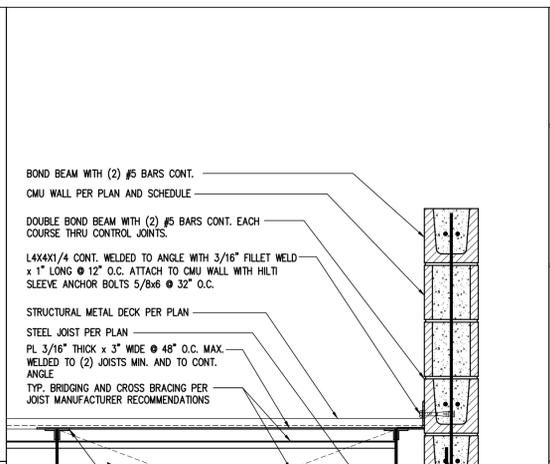
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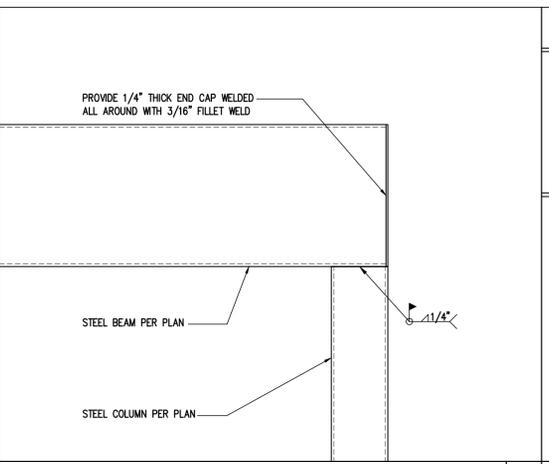
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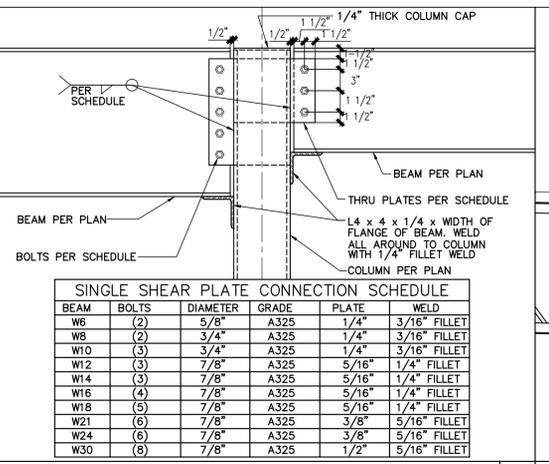
STEEL COLUMN CONNECTION TO PERIMETER STEEL ANGLE 17



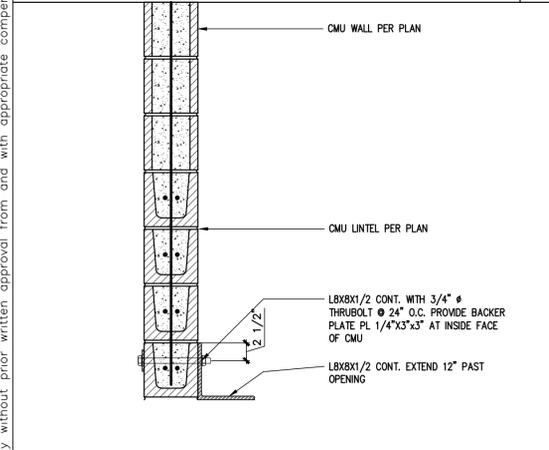
STEEL BEAM CONNECTION TO STEEL COLUMN 9



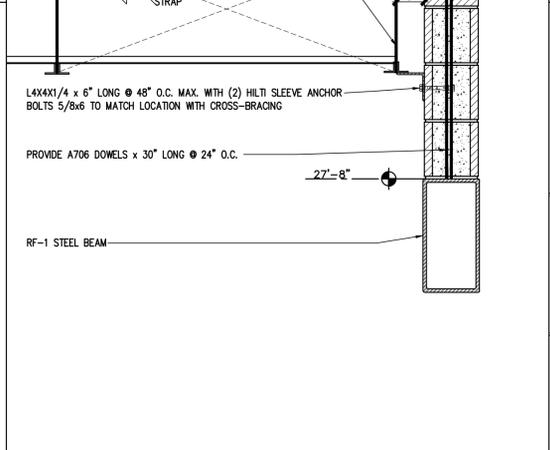
TYPICAL BEAM TO COLUMN CONNECTION SCHEDULE 5



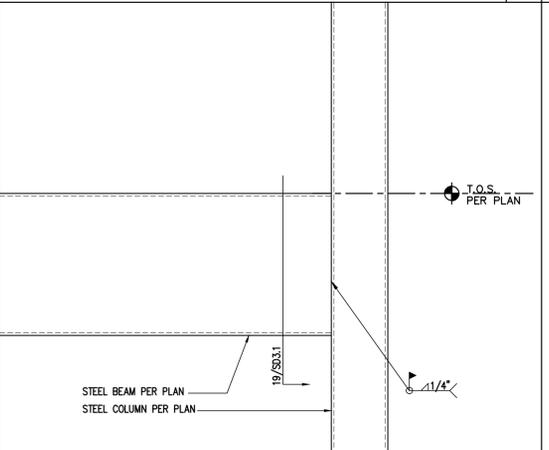
STEEL JOIST BEARING ON CMU WALL 1



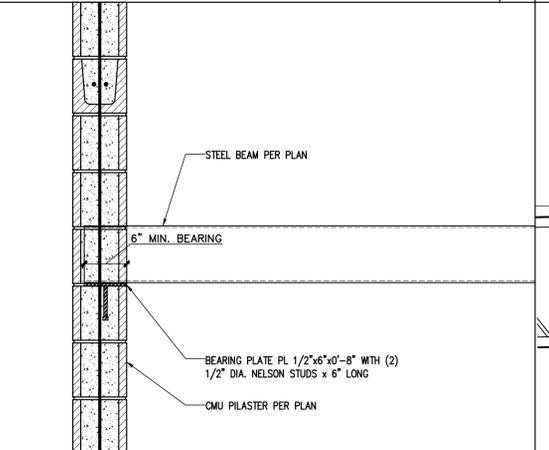
SECTION AT CMU LINTEL HEADER 18



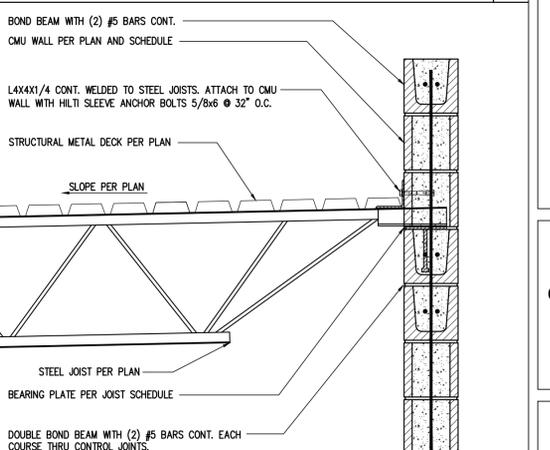
STEEL JOISTS PARALLEL TO RIGID FRAME 14



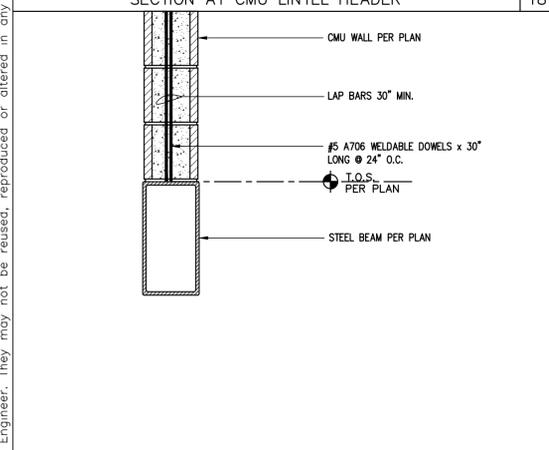
STEEL BEAM CONNECTION TO STEEL COLUMN 10



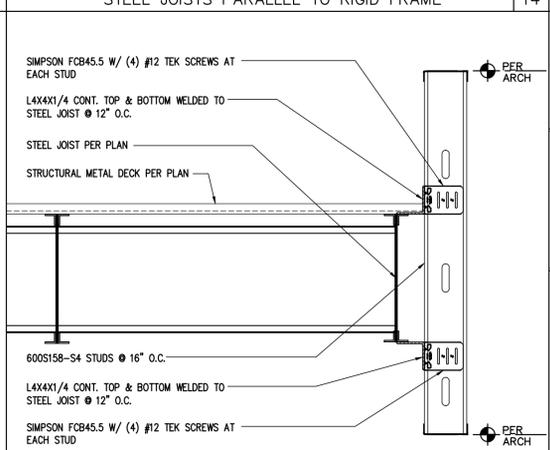
STEEL BEAM BEARING ON CMU PILASTER 6



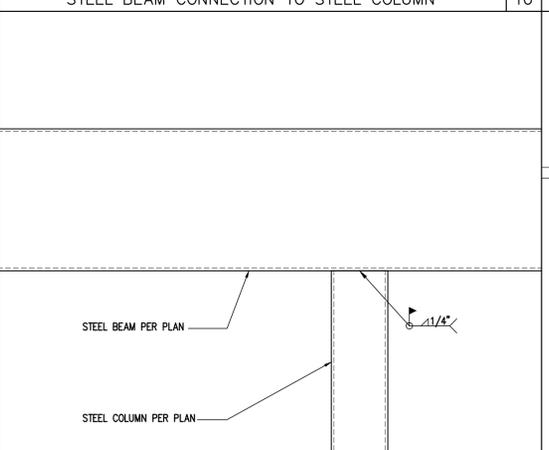
STEEL JOISTS BEARING ON CMU WALL 2



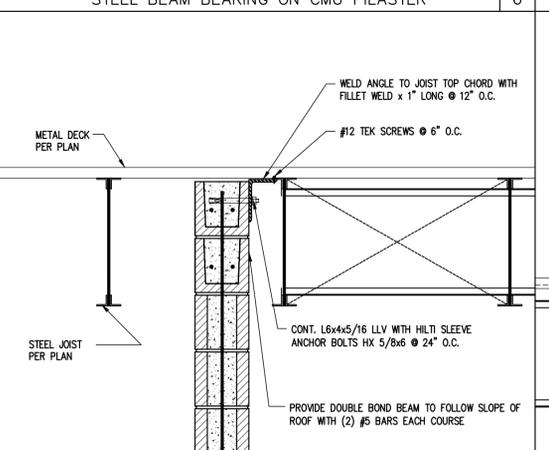
SECTION AT STEEL HEADER 19



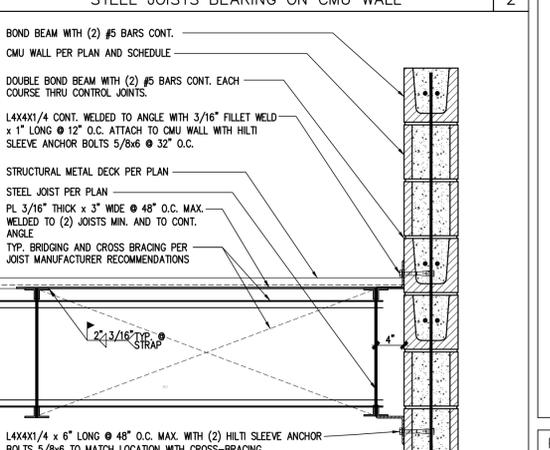
METAL STUD WALL PARALLEL TO JOIST 15



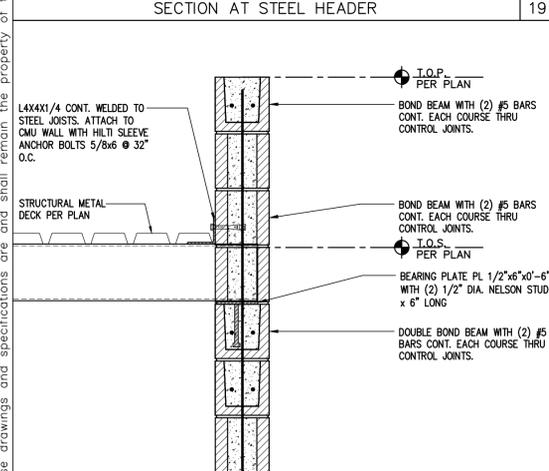
STEEL BEAM CONNECTION TO STEEL COLUMN 11



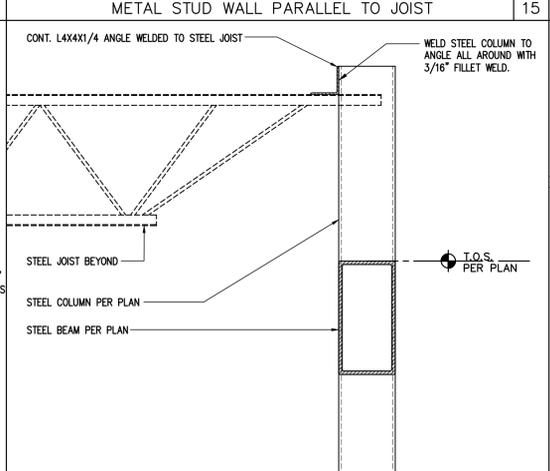
INTERIOR SHEAR WALL CONNECTION TO ROOF 7



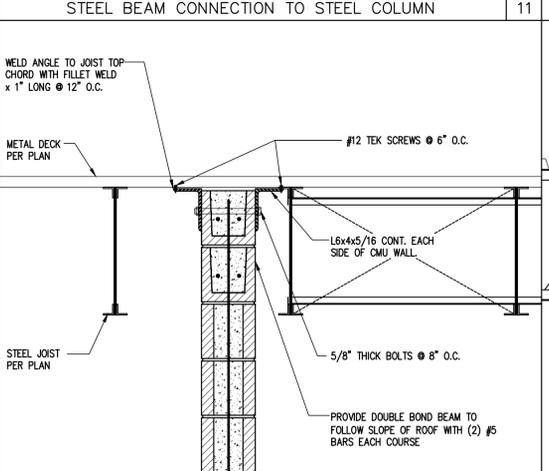
STEEL JOIST TO CMU WALL CONNECTION (PARAL.) 3



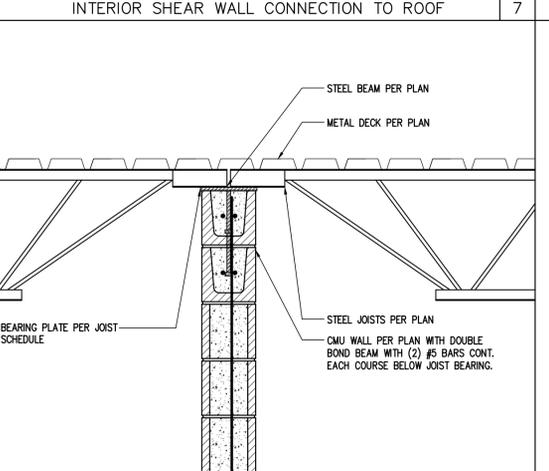
SECTION AT ROOF BEAM 20



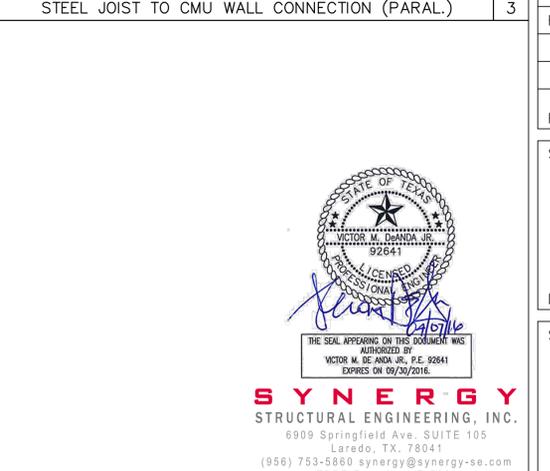
STEEL COLUMN CONNECTION TO PERIMETER ANGLE 16



JOISTS CONNECTION TO SHEARWALL 12



STEEL HEADER AT OPENING 8



STEEL JOIST BEARING ON CMU WALL 1

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PROJECT NUMBER SSE-11-0-01

REVISIONS

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SHEET TITLE

FRAMING DETAILS

DRAWN BY: LP/VDA

SHEET NO.

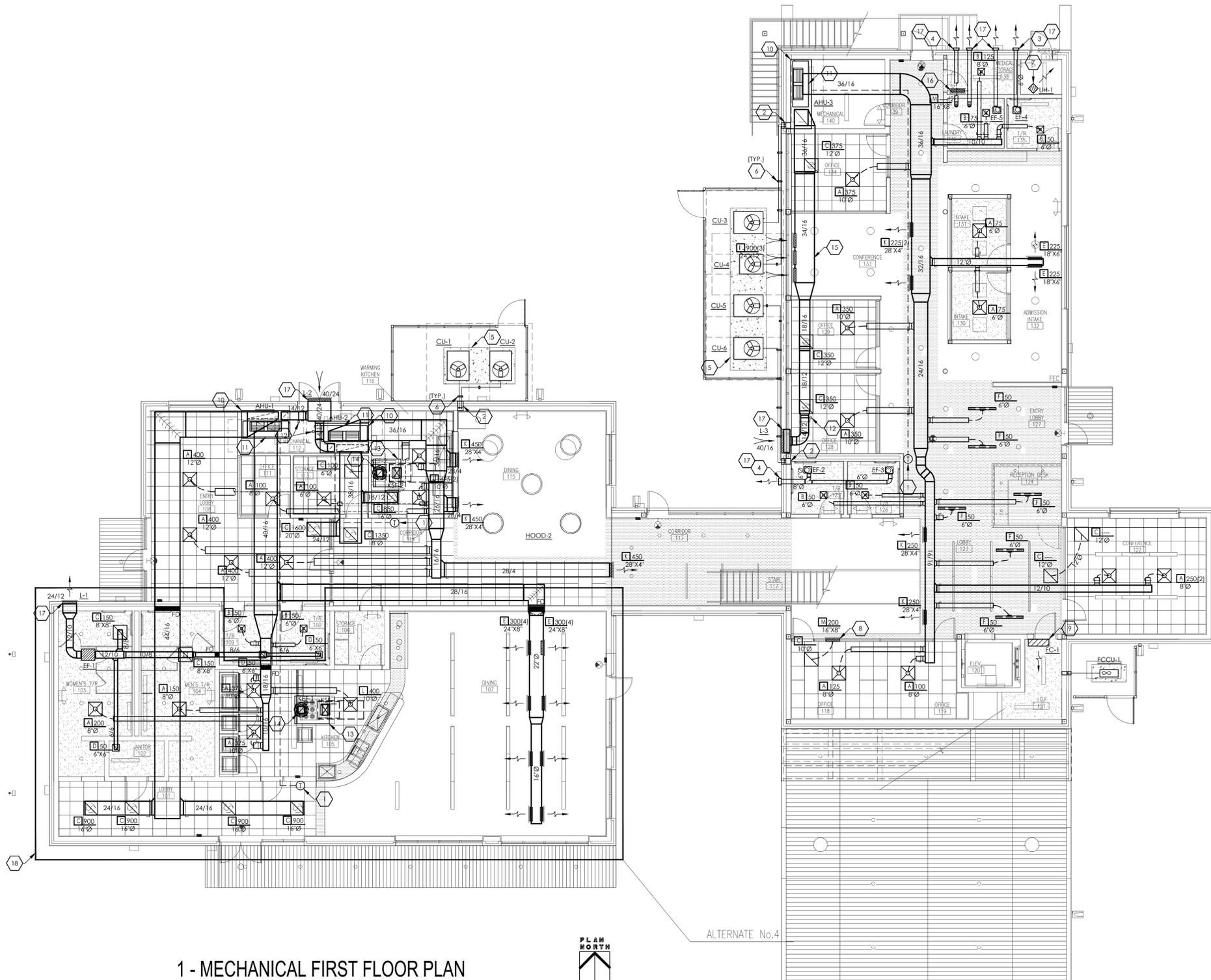
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 STRUCTURAL ENGINEERING, INC.
 6909 Springfield Ave. SUITE 105
 Laredo, TX. 78041
 (956) 753-5860 synergy@synergy-se.com
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1 - MECHANICAL FIRST FLOOR PLAN

SCALE: 1/8" = 1'-0"



ALTERNATE No.4

KEYED NOTES: MECHANICAL

- 1 CONTROLS FOR A/C UNIT WILL BE BY MEANS OF A 24 VOLT 7-DAY PROGRAMMABLE THERMOSTAT WITH HEAT-OFF-COOL AND FAN ON-AUTO CAPABILITIES SHOWN ON A DIGITAL DISPLAY. MOUNT THERMOSTAT AT 48" ABOVE FINISHED FLOOR. PROVIDE WITH KEYS CLEAR PLASTIC COVER.
- 2 ROUTE REFRIGERANT LINES UP INSIDE OF WALL AND COVER TO RESPECTIVE AIR HANDLER. ANCHOR LINES TO STRUCTURE AND SEAL ALL PENETRATIONS WATER TIGHT. PROVIDE SHEET METAL HOOD OVER REFRIGERANT LINES. REFERENCE DETAIL 08 ON PAGE M3.1 FOR WALL PENETRATION DETAIL.
- 3 ROUND EXHAUST DUCT OUT TO WALL CAP.
- 4 ROUND DUCT FOR DRYER EXHAUST OUT TO WALL CAP. DUCT TO BE SIZED ACCORDING TO DRYER MANUFACTURERS REQUIREMENTS.
- 5 PLACE CONDENSING UNIT ON 6" CONCRETE PAD.
- 6 PROVIDE ALUMINUM PIPING SUPPORTS AT EVERY 4 FEET. PROVIDE ALUMINUM JACKETING ON ALL LINES EXTERIOR TO THE BUILDING.
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- 8 AIR TRANSFER GRILLES ABOVE WINDOWS.
- 9 MOUNT AIR CONDITIONING UNIT CENTERED ABOVE DOOR. REFER TO PLUMBING PAGES FOR CONDENSATE ROUTING.
- 10 UNIT TO BE MOUNTED ON A 30" HIGH PLATFORM CONSTRUCTED OF 2" ANGLE IRON/1-1/2" SQUARE METAL TUBING. WRAP PLATFORM IN GALVANIZED SHEET METAL. LINE INTERIOR OF PLATFORM W/ 1" DUCT BOARD, W/ FOIL FACING AIRSTREAM. COAT INSIDE W/ MASTIC (TO FACILITATE CLEANING) & SEAL AIR TIGHT. SEE DETAILS.
- 11 PROVIDE W/ RACK TO ACCESS UNIT FILTERS FROM THE FRONT.
- 12 PROVIDE W/ MOTORIZED DAMPER W/ OPEN/CLOSE OPERATION. DAMPER TO BE ACTUATED TO MAX ONLY WHEN COMPRESSOR OR HEATER IS ENERGIZED & ACTUATED TO THE CLOSED POSITION @ ALL OTHER TIMES. PROVIDE W/ ADDITIONAL MANUAL BALANCING DAMPER TO BALANCE CFM AMOUNTS OF OUTSIDE AIR. MECHANICAL CONTRACTOR TO PROVIDE W/ ANY ELECTRICAL HARDWARE TO POWER DAMPER.
- 13 KITCHEN HOOD PROVIDED BY OTHERS.
- 14 WRAP GREASE DUCT & TOP OF HOOD ABOVE CEILING W/ TWO LAYERS OF 3/8" FIRE BARRIER DUCT WRAP 615" OR EQUAL FROM HOOD COLLAR TO FAN ON ROOF.
- 15 RETURN AIR DUCT TO BE INTERNALLY LINED WITH 3/4" ACOUSTICAL DUCT LINER EQUAL TO "KNAUF INSULATION" SONIC XP DUCT LINER.
- 16 MOUNT AIR DEVICES @ 4" FROM BOTTOM OF DOOR.
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AUSLAND ARCHITECTS-METAFORM STUDIO ARCHITECTS
 ARCHITECTURE + PLANNING + INTERIORS
 6626 SILVERMINE DRIVE, SUITE 100A
 AUSTIN, TEXAS 78736
 (512) 327-0444 FAX (512) 301-4909



**WEBB COUNTY YOUTH VILLAGE
 REHABILITATION CENTER**
 111 CAMINO NUEVO ROAD, HWY 359
 LAREDO, TEXAS 78046

PROJECT NUMBER

REVISIONS

SHEET TITLE
 MECHANICAL
 FIRST
 FLOOR PLAN

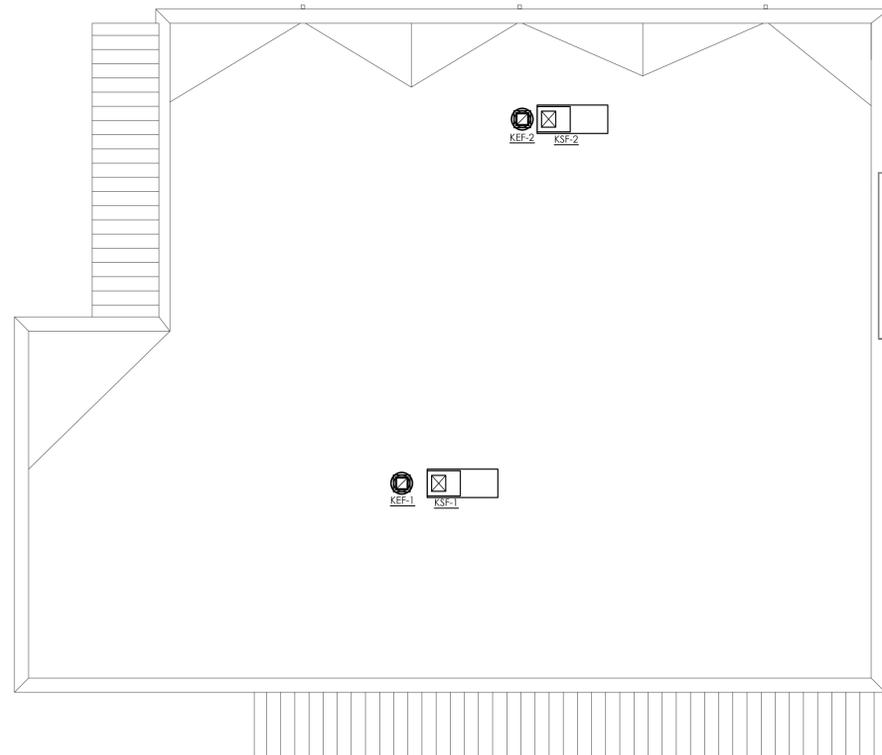
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SHEET NO.

M1.1

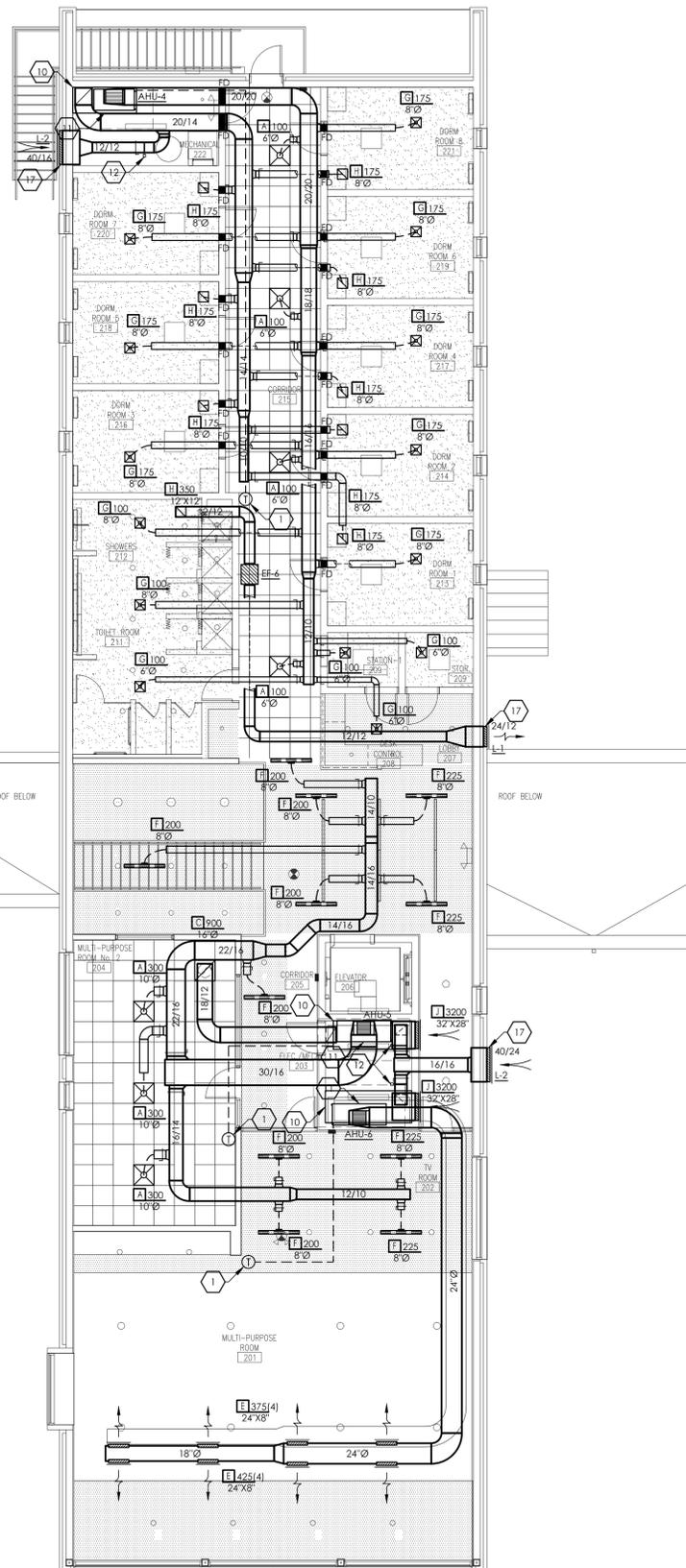
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TRINITY
 MEP ENGINEERING
 3533 Moreland Dr. Ste A | Westaco, Tx 78596
 p:956.973.0500 | f:956-351-5750
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1 - MECHANICAL SECOND FLOOR PLAN

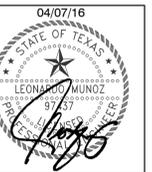
SCALE: 1/8" = 1'-0"



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LAREDO, TEXAS 78046

PROJECT NUMBER

REVISIONS

SHEET TITLE
MECHANICAL
SECOND
FLOOR PLAN

DRAWN BY:

SHEET NO.

M1.2

DATE:

TRINITY
MEP ENGINEERING
3533 Moreland Dr. Ste A | Weslaco, Tx 78596
p:956.973.0500 | f:956-351-5750
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GENERAL NOTES - MECHANICAL:

- (1) THE MECHANICAL CONTRACTOR IS FULLY RESPONSIBLE FOR PERFORMING THE WORK IN FULL COMPLIANCE WITH ALL APPLICABLE LOCAL, STATE, AND FEDERAL CODES UNDER THIS SECTION OF THE CONTRACT. IF THE CONTRACTOR DETERMINES THAT THE CONTRACT DOCUMENTS AND PLANS ARE NOT IN COMPLIANCE WITH THE APPLICABLE LOCAL CODES, HE/SHE SHALL INFORM THE ARCHITECT PRIOR TO CONSTRUCTION START FOR DIRECTION. FAILURE TO DO SO SHALL NOT RELIEVE THE CONTRACTOR OF HIS RESPONSIBILITY TO MEET APPLICABLE LOCAL CODES, AND RE-WORK SHALL BE AT CONTRACTOR'S EXPENSE.
- (2) CONTRACTOR SHALL HANG AND INSTALL ALL DUCTWORK FLUSH WITH THE BUILDING STRUCTURE TO ACCOMMODATE NEW CEILINGS. CONTRACTOR SHALL COORDINATE ALL INSTALLATION WORK WITH ARCHITECTURAL AND ELECTRICAL DESIGN. ALL DUCTWORK SHALL BE MODIFIED AS NECESSARY AND REQUIRED TO FIT AROUND BUILDING STRUCTURES, ARCHITECTURAL BUILD-OUT AND ELECTRICAL CABLE TRAY INSTALLATIONS. MECHANICAL CONTRACTOR SHALL FAMILIARIZE HIMSELF WITH THE WORK SCOPE OF OTHER TRADES AND PARTICIPATE IN COORDINATING ALL CONSTRUCTION EFFORTS.
- (3) CONNECT EACH DIFFUSER TO THE MAIN DISTRIBUTION DUCTS WITH A FLEX-DUCT SECTION; CONNECTIONS SHALL BE COMPLETED IN ACCORDANCE WITH THE DETAIL. EACH FLEX-DUCT CONNECTION SHALL INCLUDE A BUTTERFLY DAMPER TO BE INSTALLED AT THE TRUNK DUCT.
- (4) CONTRACTOR SHALL PROVIDE ALL DUCTWORK REQUIRED TO COMPLETE THE HVAC SYSTEM. TIE IN BRANCH DUCTS TO MAIN DUCTS WITH SHEET METAL FLANGES. FLANGE CONNECTION SHALL BE FASTENED WITH CRIMPED SHEET METAL STRIPS AND SEALED WITH SILICONE CAULK.
- (5) CONTRACTOR SHALL SUPPLY AND INSTALL FIRE DAMPERS AND ACCESS DOORS IN THE HORIZONTAL DUCTS WHERE THEY PENETRATE FIRE WALLS & BARRIERS.
- (6) ALL OPENINGS CUT IN MASONRY AND PLASTER WALLS OR CONCRETE FLOORS SHALL BE CORE DRILLED OR SAWED WHEN POSSIBLE. CONTRACTOR SHALL CHECK BUILDING CONSTRUCTION BEFORE MAKING PENETRATIONS TO AVOID CUTTING THROUGH STRUCTURAL BEAMS AND REINFORCING. CONTRACTOR SHALL INFORM THE ENGINEER IF REINFORCING IS CUT OR DAMAGED WHILE MAKING OPENINGS. CONTRACTOR SHALL REINFORCE ALL OPENINGS AS REQUIRED BY DRAWINGS AND SPECIFICATIONS. PATCH AND SEAL OPENINGS WITH 8000 PSI CEMENT GROUT. INSTALL DECORATIVE TRIM (EQUIPMENT FLANGES, FRAMING OR ESCUTCHEONS) AROUND OPENINGS IN FINISHED AREAS. COORDINATE ALL CUTTING AND PATCHING WITH THE OTHER TRADES.
- (7) ON ANY WORK SHOWN ON MECHANICAL DRAWINGS REQUIRING DEMOLITION OF EXISTING OR NEW BUILDING STRUCTURES AND FINISHES, IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO COMPLETE THE NECESSARY DEMOLITION. CONTRACTOR SHALL PATCH AND REPAIR ALL DEMOLITION WORK. PATCHING SHALL BE COMPLETED WITH THE SAME MATERIALS AS THE SURROUNDING AREAS, OR WITH ARCHITECT-APPROVED PATCHING MATERIALS. REPAIRS SHALL BE COMPLETED ACCORDING TO ARCHITECTURAL SPECIFICATIONS. ALL REFINISHING SHALL BE APPROVED BY THE ARCHITECT.
- (8) CONTRACTOR SHALL BE RESPONSIBLE FOR COMPLETING THE INSTALLATION OF THE AIR DISTRIBUTION SYSTEM SHOWN, DUCTWORK, DUCT ACCESSORIES AND CONTROLS SHOWN AND REQUIRED SHALL BE SUPPLIED AND INSTALLED. ALL INSTALLATION WORK SHALL BE DONE IN ACCORDANCE WITH APPLICABLE CODES, INCLUDING NFPA 90A AND 90B (NFPA 90A: STANDARD FOR THE INSTALLATION OF AIR-CONDITIONING AND VENTILATING SYSTEMS) | NFPA 90B: STANDARD FOR THE INSTALLATION OF WARM AIR HEATING AND AIR-CONDITIONING SYSTEMS).
- (9) CONTRACTOR SHALL BALANCE ALL AIR DISTRIBUTION SYSTEMS TO ACHIEVE THE AIR VOLUME REQUIREMENTS INDICATED. BALANCING SHALL INCLUDE ADJUSTMENT OF ALL MANUAL VOLUME DAMPERS, SPURTER DAMPERS, ZONE DAMPERS (IF REQUIRED), BUTTERFLY DAMPERS AND INDIVIDUAL DIFFUSER VOLUME DAMPERS (FINAL BALANCING ONLY). CONTRACTOR SHALL SUPPLY THE ENGINEER WITH A COMPLETE BALANCING REPORT WHICH INCLUDES: VOLUME, ROOM REFERENCE AND ZONE VOLUME TOTALS.
- (10) MOUNT ALL THERMOSTATS (SENSORS) 48" ABOVE THE FINISHED FLOOR LEVEL. THERMOSTATS SHOWN SHALL BE IN CONTROL OF THE ZONE SYSTEM WHICH IS SUPPLYING AIR TO THE AREA WHERE THE THERMOSTAT IS LOCATED. CONTRACTOR SHALL SUPPLY AND INSTALL ALL CONTROL VOLTAGE WIRING AND CONDUIT FOR THERMOSTAT (DDC CONTROL) INSTALLATION.
- (11) CONTRACTOR SHALL INSTALL NEW REFRIGERANT PIPING FLUSH WITH THE BUILDING STRUCTURE AND MECHANICAL ROOM BOUNDARIES AS SHOWN. CONTRACTOR SHALL COORDINATE ALL INSTALLATION WORK WITH DUCTS AND ELECTRICAL CONDUIT. MECHANICAL CONTRACTOR SHALL FAMILIARIZE HIMSELF WITH THE WORK SCOPE OF OTHER TRADES AND PARTICIPATE IN COORDINATING ALL CONSTRUCTION EFFORTS.
- (12) ALL PIPING SHALL BE INSULATED AND JACKETED. REFER TO THE SPECIFICATIONS, THE CONDENSING AND ROOF TOP CONDENSER COILS ARE TO BE COATED IN ACCORDANCE WITH THE SPECIFICATIONS.
- (13) PROVIDE SMOKE DETECTOR AND SHUTDOWN CONTROLS ON AIR HANDLERS AND SUPPLY FANS. SMOKE DETECTORS SHALL BE PROVIDED BY ELECTRICAL AND INSTALLED BY MECHANICAL. COORDINATE TO PROVIDE A COMPLETE SYSTEM. PROVIDE BOTH SUPPLY AND RETURN SIDE DEVICES.
- (14) PROVIDE SEVEN DAY PROGRAMMABLE THERMOSTAT, 24 HOUR SINGLE/MULTI STAGE COMMERCIAL THERMOSTAT. DUAL SET POINTS, OCCUPIED AND UNOCCUPIED PERIODS, UNIT OPTIMIZATION, AUTO HEATING/COOLING AND AUTO CHANGE OVER. SUB-BASE BACK-UP BATTERY AND TEMPORARY OVER-RIDE. 24 VAC CONTROL VOLTAGE. PROVIDE PLASTIC SEE THRU PROTECTIVE COVER WITH KEY LOCK.

MECHANICAL SYMBOL LEGEND		MECHANICAL ABBREVIATIONS	
		A/C	AIR CONDITIONED
		AD	ACCESS DOOR
		AFF	ABOVE FINISHED FLOOR
		AHU	AIR HANDLING UNIT
		APPROX	APPROXIMATE
		ARCH	ARCHITECTURAL
		BDD	BACK DRAFT DAMPER
		BHP	BRAKE HORSEPOWER
		BTU	BRITISH THERMAL UNIT
		CFM	CUBIC FEET PER MINUTE
		CH	CHILLER
		CHP	CHILLED WATER PUMP
		CLG	CEILING
		CWP	CONDENSER WATER PUMP
		CO	CLEANOUT
		CT	COOLING TOWER
		CU	CONDENSING UNIT
		CW	COLD WATER
		CL	CENTER LINE
		DB	DRY BULB
		DIA	DIAMETER
		DN	DOWN
		DWG	DRAWING
		DY	DIRECT EXPANSION
		EAT	ENTERING AIR TEMPERATURE
		EDH	ELECTRIC DUCT HEATER
		EF	EXHAUST FAN
		ELEC	ELECTRICAL
		ELEV	ELEVATION
		F	DEGREES FAHRENHEIT
		FC	FAN COIL
		FD	FIRE DAMPER
		FLEX	FLEXIBLE
		FLG	FLANGE
		FLR	FLOOR
		FPM	FEET PER MINUTE
		FT	FEET, FOOT
		FS	FLOW SWITCH
		GAL	GALLON
		GALV	GALVANIZED
		GPM	GALLONS PER MINUTE
		HB	HOSE BIBB
		HP	HORSEPOWER
		HR	HEAT PUMP (WATER SOURCE)
		HR	HOUR
		HVAC	HEATING/VENTILATING/AIR CONDITIONING
		HWP	HOT WATER PUMP
		HZ	HERTZ
		ID	INSIDE DIAMETER
		IE	INVERT ELEVATION (FLOW LINE)
		IN	INCHES
		INSUL	INSULATION
		IN WG	INCHES OF WATER
		KW	KILOWATT(S)
		LAT	LEAVING AIR TEMPERATURE
		LB	POUND
		L	LOUVER
		MAX	MAXIMUM
		MBD	MANUAL BALANCING DAMPER
		MD	MOTORIZED DAMPER
		MECH	MECHANICAL
		MIN	MINIMUM
		MS	MOTOR STARTER
		NA	NOT APPLICABLE
		NC	NORMALLY CLOSED
		NIC	NOT IN CONTRACT
		NO	NORMALLY OPEN
		NTS	NOT TO SCALE
		OA	OUTSIDE AIR
		OAH	OUTSIDE AIR INTAKE HOOD
		OBD	OPPOSED BLADE DAMPER
		OC	ON CENTER
		P	PUMP
		PBD	PARALLEL BLADE DAMPER
		PP	PRIMARY CHILLED WATER PUMP
		PRESS	PRESSURE
		PRV	PRESSURE REDUCING VALVE
		PSIG	POUNDS PER SQUARE INCH (GAUGE)
		R	RETURN (AIR DEVICE)
		RA	RETURN AIR
		RE: 4M7.01	REFER TO DETAIL 4, SHEET M7.01
		RET	RETURN
		RH	RELATIVE HUMIDITY
		RHD	RELIEF HOOD
		RPM	REVOLUTIONS PER MINUTE
		RTU	ROOF TOP UNIT
		S	SUPPLY (AIR DEVICE)
		SA	SUPPLY AIR
		SCH	SCHEDULE
		SCHP	SECONDARY CHILLED WATER PUMP
		SD	SMOKE DAMPER
		SEC	SECOND
		SF	SUPPLY FAN
		SMACNA	SHEET METAL AND AIR CONDITIONING CONTRACTORS NATIONAL ASSOCIATION
		SP	STATIC PRESSURE
		SPEC	SPECIFICATION
		SF	SQUARE FOOT
		STD	STANDARD
		TEMP	TEMPERATURE
		TSTAT	THERMOSTAT
		TYP	TYPICAL
		UF	UNDER FLOOR
		UH	UNIT HEATER
		UL	UNDERWRITERS LABORATORIES
		VEL	VELOCITY
		VENT	VENTILATE
		VF	VENTILATION FAN
		VOL	VOLUME
		VOLT	VOLTAGE
		W	WIDE, WIDTH
		W/	WITH
		WB	WET BULB
		W/O	WITHOUT

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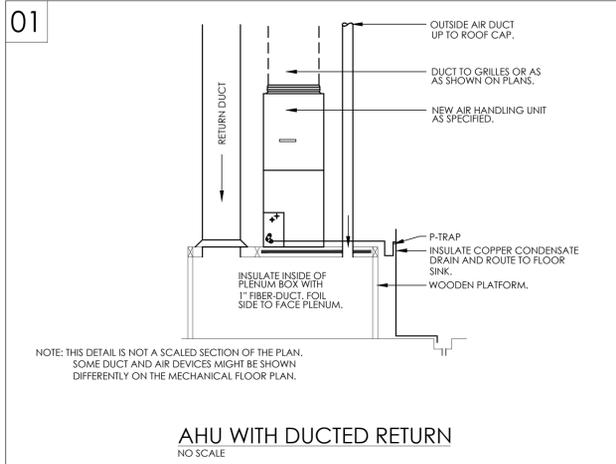
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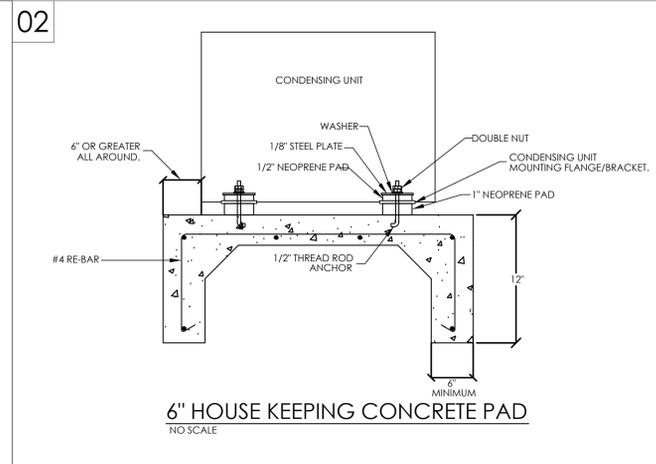
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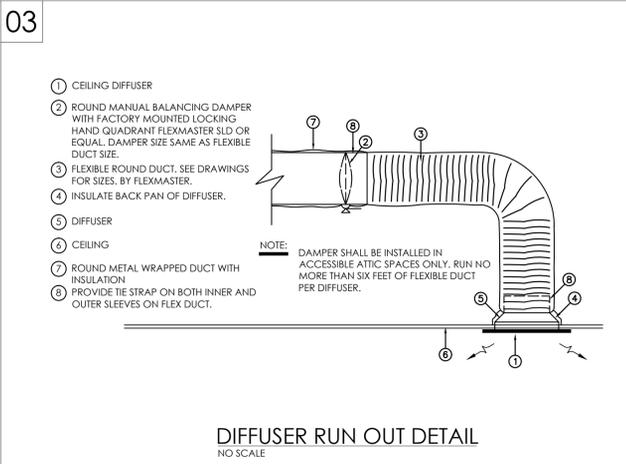
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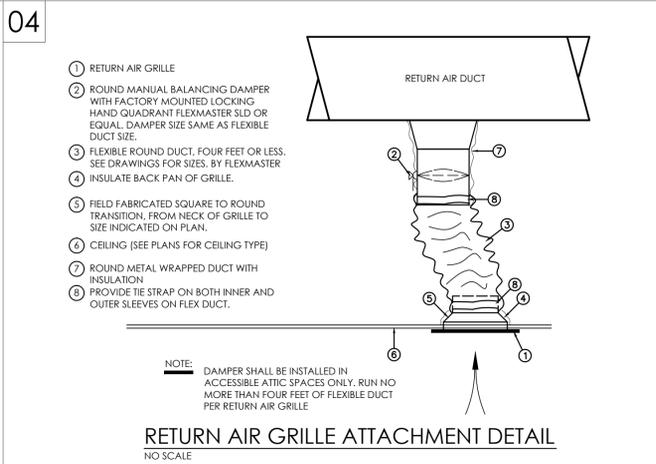
AHU WITH DUCTED RETURN
NO SCALE



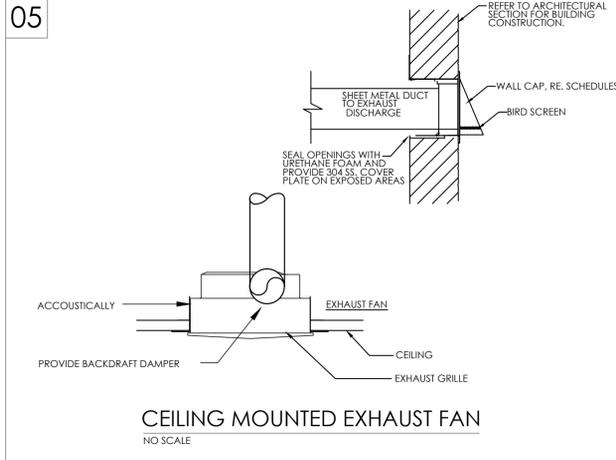
6" HOUSE KEEPING CONCRETE PAD
NO SCALE



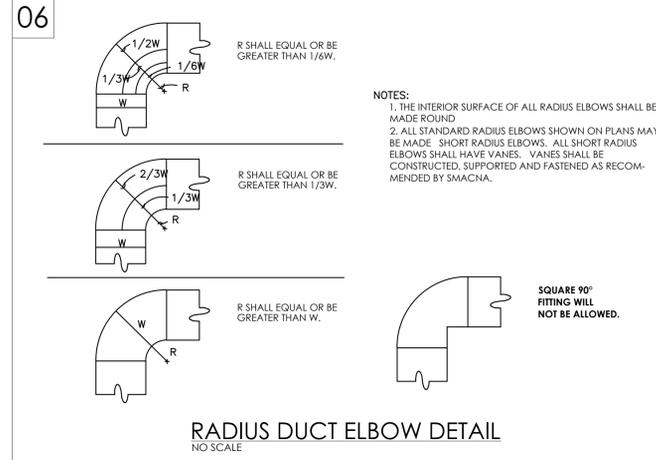
DIFFUSER RUN OUT DETAIL
NO SCALE



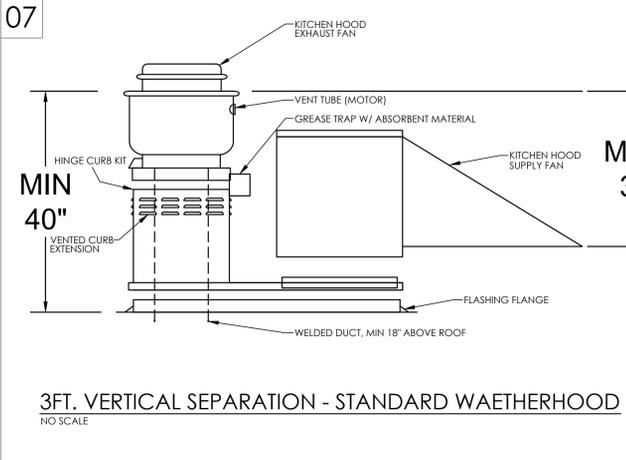
RETURN AIR GRILLE ATTACHMENT DETAIL
NO SCALE



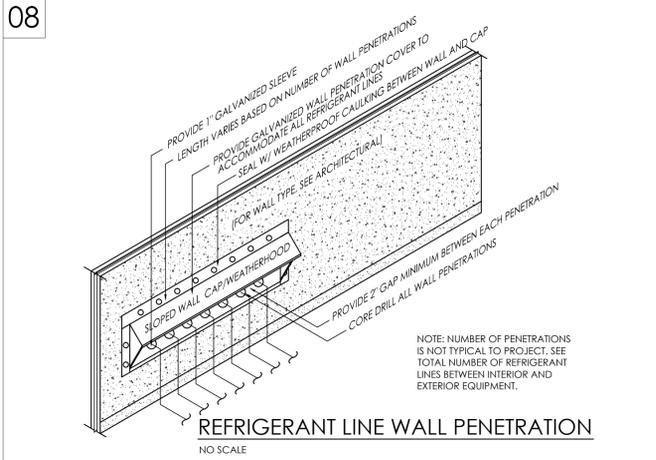
CEILING MOUNTED EXHAUST FAN
NO SCALE



RADIUS DUCT ELBOW DETAIL
NO SCALE



3FT. VERTICAL SEPARATION - STANDARD WAETHERHOOD
NO SCALE



REFRIGERANT LINE WALL PENETRATION
NO SCALE

AIR HANDLING UNIT SCHEDULE			
TAG	AHU-1,2,3	AHU-4	AHU-5,6
TYPE	SNGL ZN VAV	SNGL ZN VAV	SNGL ZN VAV
FLOW CONFIGURATION	VERTICAL	VERTICAL	VERTICAL
AREA SERVED	KITCH./BY/DIN./CNF	DORM./SHOWER	CLASS./MULTI
INDOOR UNIT FAN			
SUPPLY CFM	4000	2400	3200
MIN. OUTSIDE AIR (CFM)	700	600	500
EXT. STATIC INCHES WC	1.0	0.625	0.625
MIN FAN POWER	2.0 HP - VFD	2.0 HP - VFD	2.0 HP - VFD
INDOOR UNIT COOLING COIL			
ENTERING AIR DB/WB (°F)	79/64.7	81.5/66.2	78.3/64.3
LEAVING AIR DB/WB (°F)	55.9/54.4	55.8/55.2	55.8/54.4
MIN. TOTAL/SENSIBLE CAPACITY (MBH)	128/105	84/5/71.2	97/81
DESIGN RETURN AIR DB/WB (°F)	73/61	73/61	73/61
DESIGN OUTSIDE AIR DB/WB (°F)	107/79	107/79	107/79
INDOOR UNIT HEATING SELECTION			
HEATER TYPE/AMBIENT DESIGN DB (°F)	ELEC/28	ELEC/28	ELEC/28
HEAT INPUT/STAGES	30 KW/2	25 KW/2	25 KW/2
ENTERING/LEAVING DB (°F)	63/87	60/93	64/89
DETAILS AND ACCESSORIES			
VOLTAGE/PHASE	480/3	480/3	480/3
MCA/MOCP	49/50	41/45	42/45
MANUFACTURER	TRANE	TRANE	TRANE
MODEL	TWE150	TWE090	TWE120
NOMINAL UNIT SIZE TONNAGE	12.5 TONS	7.5 TONS	10.0 TONS
MAX WEIGHT (lbs)	750 lbs	375 lbs	750 lbs
NOTES	2,3	2,3	2,3

DX MINI-SPLIT SCHEDULE	
INDOOR UNIT TAG	FC-1
SERVES	IT ROOM
LOCATION	WALL
FAN PROPERTIES	
MIN SUPPLY (CFM)	250
MINIMUM O/A (CFM)	0
UNIT CAPACITIES	
ENTERING AIR (DB/WB)	74/62
TOTAL CAPACITY (BTUH)	9,000
HEATING CAPACITY (BTUH)	0
UNIT DETAILS	
VOLTAGE/PHASE	208/1
MANUFACTURER	DAIKIN
MODEL NO.	FTXN09KEV
MAX WEIGHT (LBS)	25
CONDENSING UNIT TAG	
FCU-1	
DETAILS	
VOLTAGE/PHASE	208/1
MCA/MOCP	5/15
AMB. AIR TEMP. (CLG°/HTG°)	100/36
REFRIGERANT	R-410A
COOLING MODE OPER. RANGE	15°F - 110°F
HEATING MODE OPER. RANGE	N/A
MANUFACTURER	DAIKIN
MODEL NO.	RKN09KEV
MAX WEIGHT (LBS)	75
MIN COOL/HEAT EFFICIENCY	18 SEER/1
MAX EQUIV. LINE LENGTH (FT)	66
MAX. VERTICAL RISE (FT)	49
CONTROL TYPE	
WL-RC	
NOTES	1-8

AIR DEVICE SCHEDULE													
TAG	A	B	C	D	E	F	G	H	I	J	K	L	M
SERVICE TYPE	SUPPLY	SUPPLY	RETURN	RETURN	SUPPLY	SUPPLY	SUPPLY	RETURN	RETURN	RETURN	SUPPLY	SUPPLY	TRANSFER
PHYSICAL PROPERTIES													
FACE SIZE	24"x24"	12"x12"	24"x24"	12"x12"	24"x8"	one 48"x2" slot	12"x12"	12"x12"	24"x12"	32"x28"	24"x4"	24"x24"	SEE PLANS
NECK SIZE	SEE PLANS	SEE PLANS	SEE PLANS	SEE PLANS	24"x8"	SEE PLANS	10"x10"	10"x10"	24"x12"	32"x28"	24"x4"	24"x4"	SEE PLANS
MOUNTING SURFACE	CEILING	CEILING	CEILING	CEILING	ROUND DUCT	CEILING	CEILING	CEILING	ROUND DUCT	WALL	WALL/DUCT	CEILING	WALL
DETAILS AND ACCESSORIES													
DAMPER TYPE	OPPOSED BLADE	OPPOSED BLADE	OPPOSED BLADE	OPPOSED BLADE	AIR SCOOP	BUTTERFLY DAMPER	OPPOSED BLADE	NONE					
ACCESSORY	INSUL BACKPAN	INSUL BACKPAN	NONE	NONE	ROUND FRAME	INSUL PLENUM	BARRIER BARS	BARRIER BARS	ROUND FRAME	NONE	NONE	INSUL BACKPAN	NONE
COLOR FINISH	WHITE	WHITE	WHITE	WHITE	WHITE	WHITE	WHITE	WHITE	ALUMINUM	STEEL	ALUMINUM	STEEL	ALUMINUM
MATERIAL	STEEL	ALUMINUM	ALUMINUM	ALUMINUM	ALUMINUM	ALUMINUM	STEEL	STEEL	ALUMINUM	STEEL	ALUMINUM	ALUMINUM	STEEL
PRICE	PRICE	PRICE	PRICE	PRICE	PRICE	PRICE	PRICE	PRICE	PRICE	PRICE	PRICE	PRICE	PRICE
SCD	ASCD	80	80	SDGE	ASPI	MSPG	MSPG	SDGER	91	620	APDN	530	
NOTES					1,2	1,3	4	4	1,2	1	1	5	1

FAN SCHEDULE						
TAG	EF-1	EF-2,3,4	EF-5	EF-6	KEF-1,2	KSF-1,2
SERVICE	RR's	RR's	JANITORS	SHOWERS	HOOD-1,2	HOOD-1,2
LOCATION	PLENUM	CEILING	CEILING	PLENUM	ROOF	ROOF
FAN PROPERTIES						
CFM	450	75	75	350	1200	960
FAN RPM	1857	674	674	1506	1416	1299
EXT SP (IN W/G)	0.5	0.2	0.5	0.75	0.5	0.5
FAN POWER	45 W	45 W	45 W	1/4 HP	1/2 HP	850 W
VOLTS/PHASE	277/1	277/1	277/1	277/1	277/1	277/1
SOUND LEVEL	8.0 SONES	2.0 SONES	2.0 SONES	4.9 SONES	12.8 SONES	13.5 SONES
MOUNTING	SUSPENDED	CEILING	CEILING	SUSPENDED	14" CURB	14" CURB
MANUFACTURER	GREENHECK	GREENHECK	GREENHECK	GREENHECK	GREENHECK	GREENHECK
MODEL	BCF-106-4	SP-890	SP-890	BCF-106-4	CUE-121-VG	KSF-80-H08
MAX WEIGHT	100 lbs	25 lbs	25 lbs	100 lbs	150 lbs	150 lbs
NOTES	2,3,4,7,8	1,2,3,4,12	1,2,3,5,12	2,3,4,7,8	1,2,5,6,9,11	2,3,6,7,10,12
NOTES:						
01. PROVIDE W/ FAN SPEED CONTROLLER						
02. PROVIDE WITH FACTORY INSTALLED DISCONNECT.						
03. PROVIDE W/ BACKDRAFT DAMPER						
04. INTERLOCK FAN W/ LIGHTS. PROVIDE W/ TIME DELAY SHUTOFF.						
05. PROVIDE W/ WALL MOUNTED SWITCH.						
06. PROVIDE W/ LIFTING LUGS.						
07. PROVIDE W/ AUTOMATIC BELT TENSIONERS.						
08. FAN TO BE SUSPENDED FROM STRUCTURE VIA SPRING VIBRATION ISOLATORS IN RUBBER SPRING CURBS.						
09. PROVIDE FAN W/ NONSTICK COATING & KIT FOR RESTAURANT APPLICATIONS.						
10. INTERLOCK KITCHEN SUPPLY FAN W/ RESPECTIVE EXHAUST FAN, AS PER IMC 508.						
11. PROVIDE KITCHEN HOOD EXHAUST FAN W/ VENTED & CANTED CURB, FLASHING FLANGE & HINGE CURB KIT						
12. MECH CONTRACTOR TO PROVIDE W/ & MOUNT 277/1 TO 120/1 STEPDOWN TRANSFORMER FOR FAN POWER, TO BE WIRED BY ELEC.						

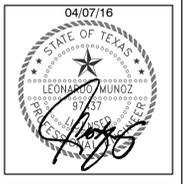
LOUVER SCHEDULE				
TAG	LH-1	L-2	L-3	UH-1
TYPE	EXHAUST	INTAKE	INTAKE	
SERVICE	RR's	AHU-1,2,5,6	AHU-3,4	
DETAILS AND ACCESSORIES				
MAX CFM	450	1400	700	
LENGTH/HEIGHT (IN)	24/12	40/24	40/16	
FREE AREA (SQ FT)	D-6	2.41	1.45	
VELOCITY (FPM)	750.00	580.91	482.76	
MAX PRESSURE DROP (IN. H2O)	0.100	0.0625	0.0625	
FINISH	1.2 mil 70% PVDF	1.2 mil 70% PVDF	1.2 mil 70% PVDF	
BIRD	BIRD	BIRD	BIRD	
ACTUATION TYPE	NONE	NONE	NONE	
BORDER STYLE	2" FLANGE	2" FLANGE	2" FLANGE	
MANUFACTURER	GREENHECK	GREENHECK	GREENHECK	
MODEL	EDJ-401	EHH-401	EHH-401	
NOTES	1	1	1	
NOTES:				
01. LOUVER OPENINGS TO BE SAW CUT. SEAL OPENING WEATHER TIGHT.				

UNIT HEATER SCHEDULE	
TAG	UH-1
SERVICE/LOCATION	RISER ROOM
DETAILS & ACCESSORIES	
VOLTS/PHASE	277/1
POWER INPUT	3.3 KW
AMPERAGE	12
MANUFACTURER	MARKEL
MODEL	(UH series)
NOTES	ALL
NOTES:	
1. PROVIDE W/ AUTOMATIC ON/OFF VIA THERMOSTAT.	
2. UNIT TO SWITCH ON WHEN SPACE TEMPERATURE REACHES 35°.	
3. PROVIDE W/ DISCONNECT.	
4. SUSPEND FROM STRUCTURE BY 1/4" ALL THREAD ROD AND SPRING VIBRATION ISOLATORS.	

CONDENSING UNIT SCHEDULE			
TAG	CU-1,2,3	CU-4	CU-5,6
OUTDOOR UNIT ELECTRICAL			
VOLTAGE/PHASE	480/3	480/3	480/3
MCA/MOCP	27/30	17/20	25/30
DETAILS AND ACCESSORIES			
MIN COOL/HEAT EFFICIENCY	11 EER/1	11.2 EER/1	11.2 EER/1
COMPRESSOR QTY/STAGE QTY	2/2	2/2	2/2
COOL/HEAT AMBIENT DB (°F)	110/28	110/28	107/28
MANUFACTURER	TRANE	TRANE	TRANE
MODEL	TTA150	TTA090	TTA120
NOMINAL UNIT SIZE TONNAGE	12.5 TONS	7.5 TONS	10.0 TONS
MAX WEIGHT	550 lbs	375 lbs	525 lbs
NOTES	1,2	1,2	1,2
NOTES:			
01. PROVIDE CONDENSER W/ FACTORY APPLIED E-COATING & FACTORY HAIL GUARDS.			
02. PROVIDE W/ SINGLE POINT POWER, TRANE, CARRIER, LENNOX, YORK APPROVED AS MANUFACTURERS			
03. PROVIDE W/ FACTORY VFD & EZ FILTER FRAME FOR FRONT LOADING FILTERS.			

NOTES:	
1. ELECTRICAL CONTRACTOR TO PROVIDE SINGLE CIRCUIT POWER FROM SERVICE TO OUTDOOR UNIT AND WIRE TO INDOOR UNIT.	
2. WIRELESS REMOTE CONTROLLER.	
3. PROVIDE INDOOR UNITS WITH MOUNTING BRACKETS IF REQUIRED.	
4. SEE PLUMBING FOR CONDENSATE ROUTING.	
5. CONTRACTOR TO PROVIDE ROOF CURB AND FASTEN CONDENSING UNIT TO IT	
6. CONTRACTOR TO PROVIDE LINE SETS.	
7. SIGHT GLASSES, FILTER DRYERS, AND FIELD SUPPLIED EXPANSION VALVES ARE NOT TO BE USED ON THIS EQUIPMENT.	
8. INSTALL PER MANUFACTURERS INSTRUCTIONS AND PIPING RECOMMENDATIONS.	

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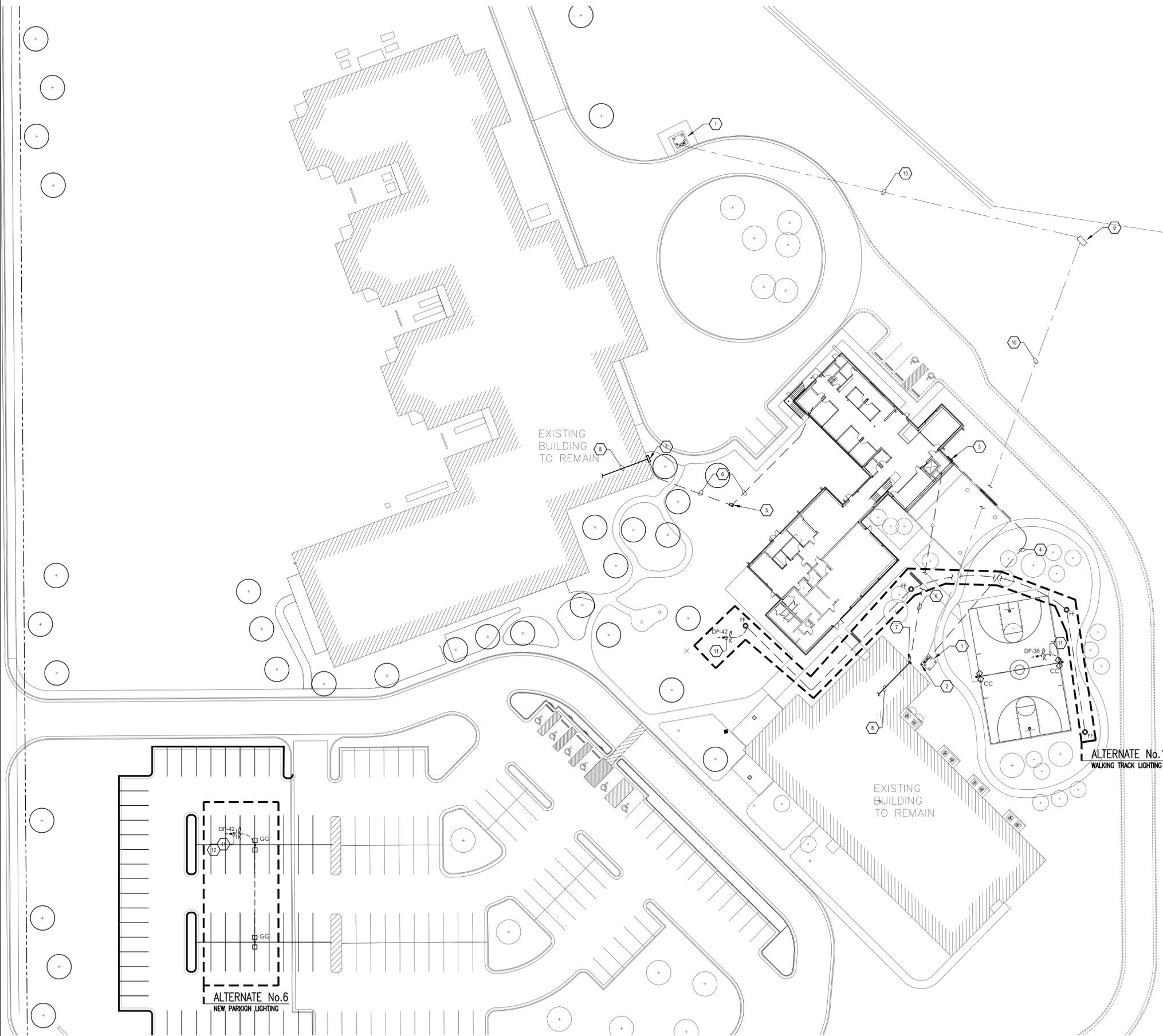
PROJECT NUMBER
REVISIONS

SHEET TITLE
MECHANICAL DETAILS/ SCHEDULES

DRAWN BY:
SHEET NO.

M3.1
DATE:

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GENERAL ELECTRICAL NOTES (TO ALL SHEETS)

- A. CONTRACTOR TO VERIFY ALL EXISTING MAIN POWER SERVICES AND COORDINATE WITH POWER COMPANY FOR ALL NEW REQUIREMENTS AND ALL COST ASSOCIATED. CONTRACTOR SHALL INCLUDE ANY COST FOR THE NEW TRANSFORMER AND OTHER ASSOCIATED FEES IN BID. CONTRACTOR IS RESPONSIBLE TO VERIFY ALL FEES WITH POWER COMPANY AND TO INCLUDE IN BID. CONTRACTOR IS RESPONSIBLE TO COORDINATE WITH POWER COMPANY AS SOON THE CONTRACT IS AWARDED TO ORDER TRANSFORMER AND THE RELATED ELECTRICAL SERVICE EQUIPMENT AS SOON AS POSSIBLE.
- B. CONTRACTOR IS RESPONSIBLE FOR ALL EXCAVATION, TRENCHING AND BACKFILLING. COORDINATE WITH ALL UTILITIES PRIOR TO EXCAVATION.
- C. CONTRACTOR TO VERIFY ALL EXISTING MAIN TELEPHONE SERVICES AND COORDINATE WITH TELEPHONE COMPANY FOR ALL REQUIREMENTS AND ALL COST ASSOCIATED. INCLUDE ALL COST IN BID. CONDUIT FROM MAIN TELEPHONE RISER SHALL BE FURNISHED AND INSTALLED BY ELECTRICAL CONTRACTOR.
- D. ALL ELECTRICAL EQUIPMENT OUTDOORS SHALL BE RATED TYPE NEMA 3R UNLESS OTHERWISE NOTED.
- E. CONTRACTOR SHALL HAVE A WORKING KNOWLEDGE OF LOCAL CODES AND ORDINANCES. ALL WORK SHALL CONFORM TO NATIONAL ELECTRICAL CODES AND ALL OTHER AUTHORITY HAVING JURISDICTION. OBTAIN PERMITS AND PAY ALL FEES. PERFORM MODIFICATIONS TO MEET CODE AND ORDINANCE REQUIREMENTS AT NO ADDITIONAL COST TO OWNER, ARCHITECT OR ENGINEER. VERIFY PRIOR TO BID DATE.
- F. VERIFY AT JOB SITE THE EXACT LOCATIONS OF STRUCTURAL MEMBERS SUCH AS BEAMS, COLUMNS, ETC. TO LOCATE EQUIPMENT CONDUIT, PANELS AND DEVICES. IF DEVIATIONS FROM THE DRAWING ARE NECESSARY TO MEET STRUCTURAL CONDITIONS MAKE DEVIATIONS WITHOUT ADDITIONAL COST TO OWNER, ARCHITECT, OR ENGINEER.
- G. IN COOPERATION WITH OTHER CONTRACTORS, DETERMINE THE EXACT LOCATION OF EQUIPMENT AND DEVICES AND CONNECTIONS THERETO BY REFERENCE TO THE SUBMITTALS AND ROUGH-IN DRAWINGS, AND BY MEASUREMENTS AT THE SITE. REFER TO ALL OTHER TRADES SUBMITTAL FOR ELECTRICAL INFORMATION.
- H. GROUND ENTIRE ELECTRICAL SYSTEM IN STRICT ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE.
- I. VERIFY AT JOB SITE GENERAL WORK TO BE DONE AS SPECIFIED, AS NOTED, OR AS REQUIRED FOR INSTALLATION ELECTRICAL SYSTEMS PRIOR TO SUBMISSION OF BIDS.
- J. CONTRACTOR SHALL FIELD VERIFY EXISTING CONDITIONS AND EQUIPMENT TO BE REMOVED AND REPLACED BEFORE SUBMITTING HIS BID.
- K. ELECTRICAL DRAWINGS ARE DIAGRAMMATIC AND SMALL SCALE ONLY. THEY CONVEY THE INTENT OF THE WORK BUT DO NOT SHOW DETAIL SUCH AS JUNCTION AND PULL BOXES REQUIRED BY THE SPECIFICATIONS AND THE NATIONAL ELECTRICAL CODE(NEC). PROVIDE ALL MATERIALS AND METHODS CALLED FOR IN THE SPECIFICATIONS AND AS REQUIRED IN THE NEC TO PROVIDE A COMPLETE INSTALLATION OF ALL WORK.
- L. ALL WIRING SHALL BE COPPER.
- M. ALL SLEEVES, PENETRATIONS, ETC. SHALL BE SEALED SOLID NON-SHRINKING MATERIAL IMMEDIATELY UPON FILLING OF THE OPENING WITH PIPE OR CONDUIT.
- N. ARRANGE FOR SOURCES OF TEMPORARY CONSTRUCTION SERVICES. SUCH SERVICES SHALL BE NOMINALLY 120/240V, 1-PHASE, 3-WIRE FROM WHICH A COMPLETE SYSTEM OF TEMPORARY POWER AND LIGHTING SHALL BE PROVIDED FOR ALL CONSTRUCTION NEEDS.

KEYED NOTES: ELECTRICAL

- 1 EXISTING POWER COMPANY PAD MOUNTED TRANSFORMER, 480/277V, 3Ø. FIELD VERIFY EXISTING CONDITION PRIOR TO ANY WORK.
- 2 EXISTING 480/277V, 3Ø, 4W, ELECTRICAL SERVICE METER.
- 3 NEW BUILDING MAIN SWITCH DISCONNECT 'MS'. PROVIDE WEATHER PROOF LABEL.
- 4 CONTRACTOR TO PROVIDE AND INSTALL PVC CONDUIT FROM EXISTING UTILITY TRANSFORMER TO NEW ELECTRICAL SERVICE EQUIPMENT PER POWER COMPANY STANDARDS. CONTRACTOR IS RESPONSIBLE TO FIELD VERIFY ALL EXISTING/NEW UNDERGROUND UTILITIES PRIOR TO ANY WORK. VERIFY ALL REQUIREMENTS PRIOR TO ANY ROUGH-IN. REFER TO ELECTRICAL RISER DIAGRAM.
- 5 PROVIDE NEW INGRADE PULL BOX. REFER TO DETAIL.
- 6 CONTRACTOR TO PROVIDE AND INSTALL (2)-4" PVC CONDUIT FOR COMMUNICATION SERVICE EQUIPPED WITH PULLSTRINGS, AND TURNED UP AND CAPPED AT BOTH ENDS. DEPTH OF CONDUIT SHALL BE A MINIMUM OF 36". VERIFY ALL REQUIREMENTS WITH LOCAL UTILITIES' COMMUNICATION SUPPLIER BEFORE ROUGH-IN. PROVIDE TRENCHING AND BACKFILL AS REQUIRED.
- 7 ROUTE NEW CONDUIT ALONG EXISTING WALL TO ABOVE EXISTING CEILING LEVEL. PROVIDE J-BOXES AND CORE DRILL FOR NEW 2-4" CONDUIT INSIDE THE BUILDING. PROVIDE PULLSTRING.
- 8 ROUTE NEW CONDUITS INSIDE THE BUILDING ABOVE THE EXISTING CEILING LEVEL AT AN ACCESSIBLE LOCATION.
- 9 EXISTING UTILITY POWER COMPANY PULLBOX EXISTING LOCATION. FIELD VERIFY EXISTING LOCATION AND COORDINATE WITH POWER COMPANY PRIOR TO ANY WORK.
- 10 EXISTING UTILITY POWER COMPANY PRIMARY UNDERGROUND LINE PROPOSED EXISTING LOCATION. CONTRACTOR IS RESPONSIBLE TO FIELD VERIFY EXACT LOCATION PRIOR TO ANY WORK.
- 11 SHALL BE CONTROLLED VIA LIGHTING CONTRACTOR 'LC'.
- 12 ELECTRICAL CONTRACTOR SHALL BE RESPONSIBLE FOR SAW CUTTING & PATCHING ALONG WITH BORING UNDER EXISTING FLAT WORK. FIELD VERIFY EXISTING CONDITIONS AND ROUTING PRIOR TO COMMENCING ANY WORK.

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PROJECT NUMBER

REVISIONS

SHEET TITLE
 ELECTRICAL
 SITE PLAN

DRAWN BY:

SHEET NO.

ES1.1

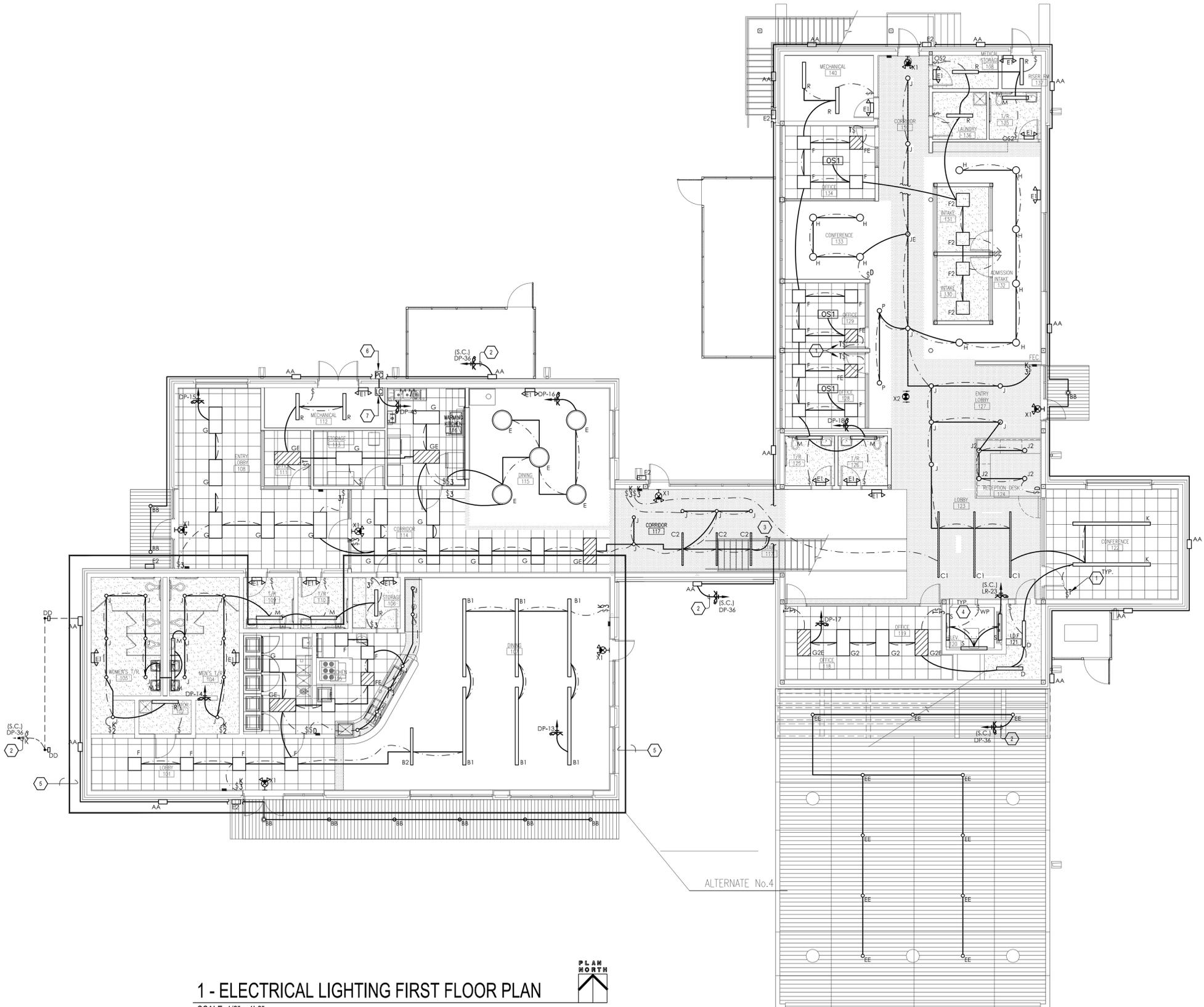
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1 - ELECTRICAL SITE PLAN

SCALE: 1" = 30'-0"



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1 - ELECTRICAL LIGHTING FIRST FLOOR PLAN
 SCALE: 1/8" = 1'-0"



ALTERNATE No.4

GENERAL NOTES: LIGHTING

- A. ALL EXIT FIXTURES TYPE "X1" & "X2". EMERGENCY LIGHT FIXTURE TYPE "E1", "E2" AND ALL EMERGENCY BALLAST SHALL BE ON CIRCUIT "DP-34". FIXTURE TYPE LABEL WITH AN "E" ARE LIGHT FIXTURES WITH EMERGENCY BALLAST. REFER TO LIGHT FIXTURE SCHEDULE.
- B. VERIFY CEILING TYPES AND COORDINATE WITH FIXTURE TYPE LIGHT FIXTURE SHALL BE COMPATIBLE WITH CEILING TYPE AS INDICATED ON THE ARCHITECTURAL DOCUMENTS. NOTIFY ENGINEER IF DISCREPANCIES EXIST PRIOR TO ORDERING FIXTURES.
- C. COORDINATE EXACT ROUTING OF ALL CONDUIT ABOVE CEILING IN BUILDING. TYPICAL FOR ALL BUILDING EXTERIOR LIGHTING.
- D. COORDINATE LOCATION OF LIGHTS WITH DIFFUSERS AND GRILLES.
- E. SWITCH LEGS ARE NOT SHOWN WHERE SWITCHING SCHEME IS OBVIOUS.

KEYED NOTES: LIGHTING

- 1 PROVIDE DUAL LEVEL SWITCHING. "T" MEAN USING A TANDEM SWITCH.
- 2 SHALL BE CONTROLLED VIA LIGHTING CONTACTOR "LC".
- 3 CONTINUES UP TO SECOND FLOOR.
- 4 COORDINATE EXACT LOCATION OF LIGHT FIXTURE AND LIGHT FIXTURE DEVICE WITH ELEVATOR MANUFACTURE PRIOR TO COMMENCING ANY WORK.
- 5 ALL ELECTRICAL WORK THAT FALLS WITHIN INDICATED AREA SHALL BE UNDER ALTERNATE #4. DEVICES THAT ARE PROPOSED ON CMU WALLS THE FOLLOWING SHALL BE INCLUDED AS PART OF THE BASE BID BOXES. CONDUIT TO ABOVE PROPOSED ALTERNATE #4 CEILING LEVEL WITH PULLSTRINGS.
- 6 277V PHOTOCELL. LOCATE AS DIRECTED BY MANUFACTURER.
- 7 LIGHTING CONTACTOR "LC1" SHALL BE 277V, 30AMP, ELEC. HELD, HOA, 8-POLE IN A NEMA-1 ENCLOSURE.

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SHEET TITLE
 ELECTRICAL LIGHTING FIRST
 FLOOR PLAN

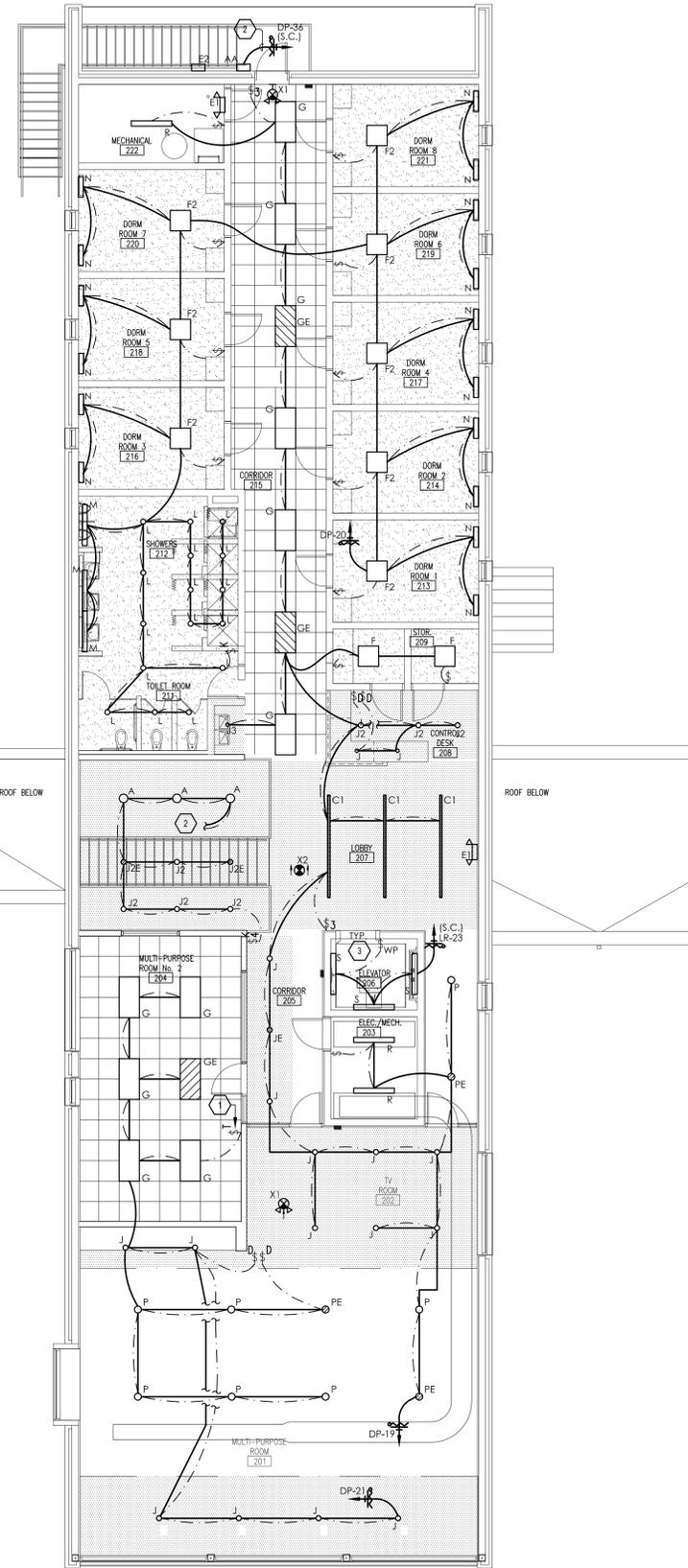
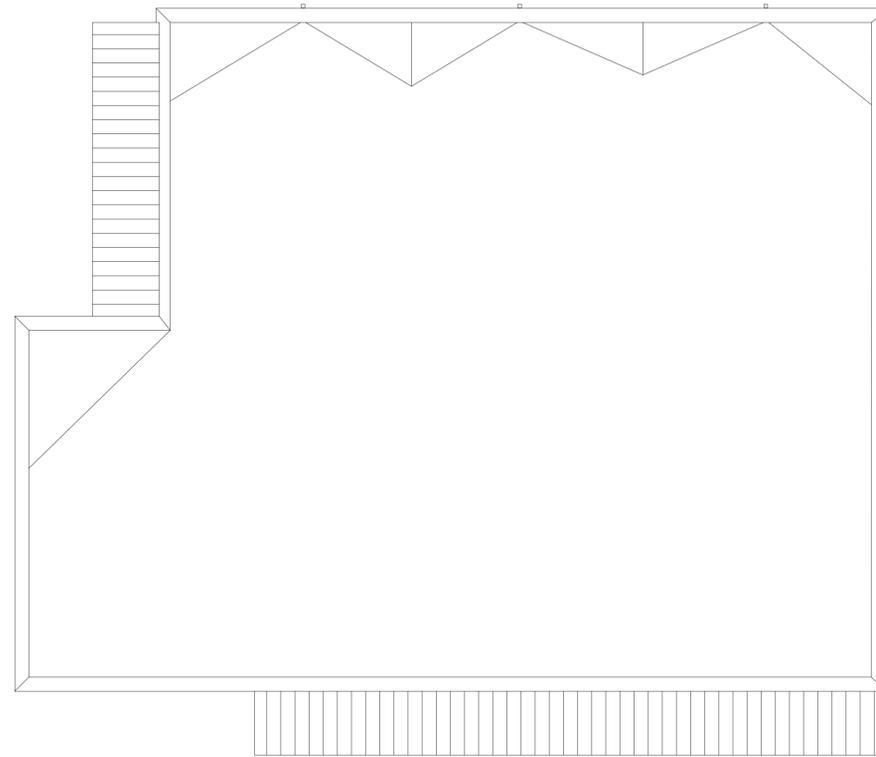
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E1.1

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1 - ELECTRICAL LIGHTING SECOND FLOOR PLAN

SCALE: 1/8" = 1'-0"



GENERAL NOTES: LIGHTING

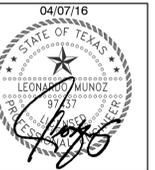
- A. ALL EXIT FIXTURES TYPE "X1 & X2"; EMERGENCY LIGHT FIXTURE TYPE "E1"; "E2" AND ALL EMERGENCY BALLAST SHALL BE ON CIRCUIT "DP-34"; FIXTURE TYPE LABEL WITH AN "E" ARE LIGHT FIXTURES WITH EMERGENCY BALLAST. REFER TO LIGHT FIXTURE SCHEDULE.
- B. VERIFY CEILING TYPES AND COORDINATE WITH FIXTURE TYPE LIGHT FIXTURE SHALL BE COMPATIBLE WITH CEILING TYPE AS INDICATED ON THE ARCHITECTURAL DOCUMENTS. NOTIFY ENGINEER IF DISCREPANCIES EXIST PRIOR TO ORDERING FIXTURES.
- C. COORDINATE EXACT ROUTING OF ALL CONDUIT ABOVE CEILING IN BUILDING. TYPICAL FOR ALL BUILDING EXTERIOR LIGHTING.
- D. COORDINATE LOCATION OF LIGHTS WITH DIFFUSERS AND GRILLES.
- E. SWITCH LEGS ARE NOT SHOWN WHERE SWITCHING SCHEME IS OBVIOUS.

KEYED NOTES: LIGHTING

- 1 PROVIDE DUAL LEVEL SWITCHING. "T" MEAN USING A TANDEM SWITCH.
- 2 CONTINUES DOWN TO FIRST FLOOR.
- 3 COORDINATE EXACT LOCATION OF LIGHT FIXTURE AND LIGHT FIXTURE DEVICE WITH ELEVATOR MANUFACTURE PRIOR TO COMMENCING ANY WORK.

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PROJECT NUMBER

REVISIONS

SHEET TITLE
ELECTRICAL LIGHTING SECOND
FLOOR PLAN

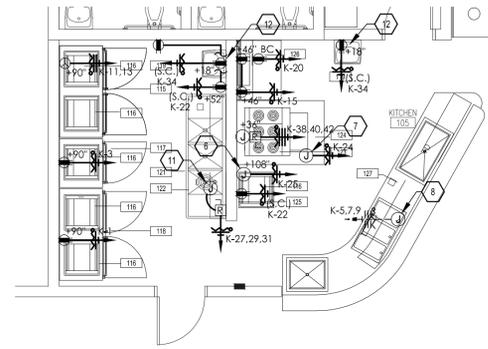
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E1.2

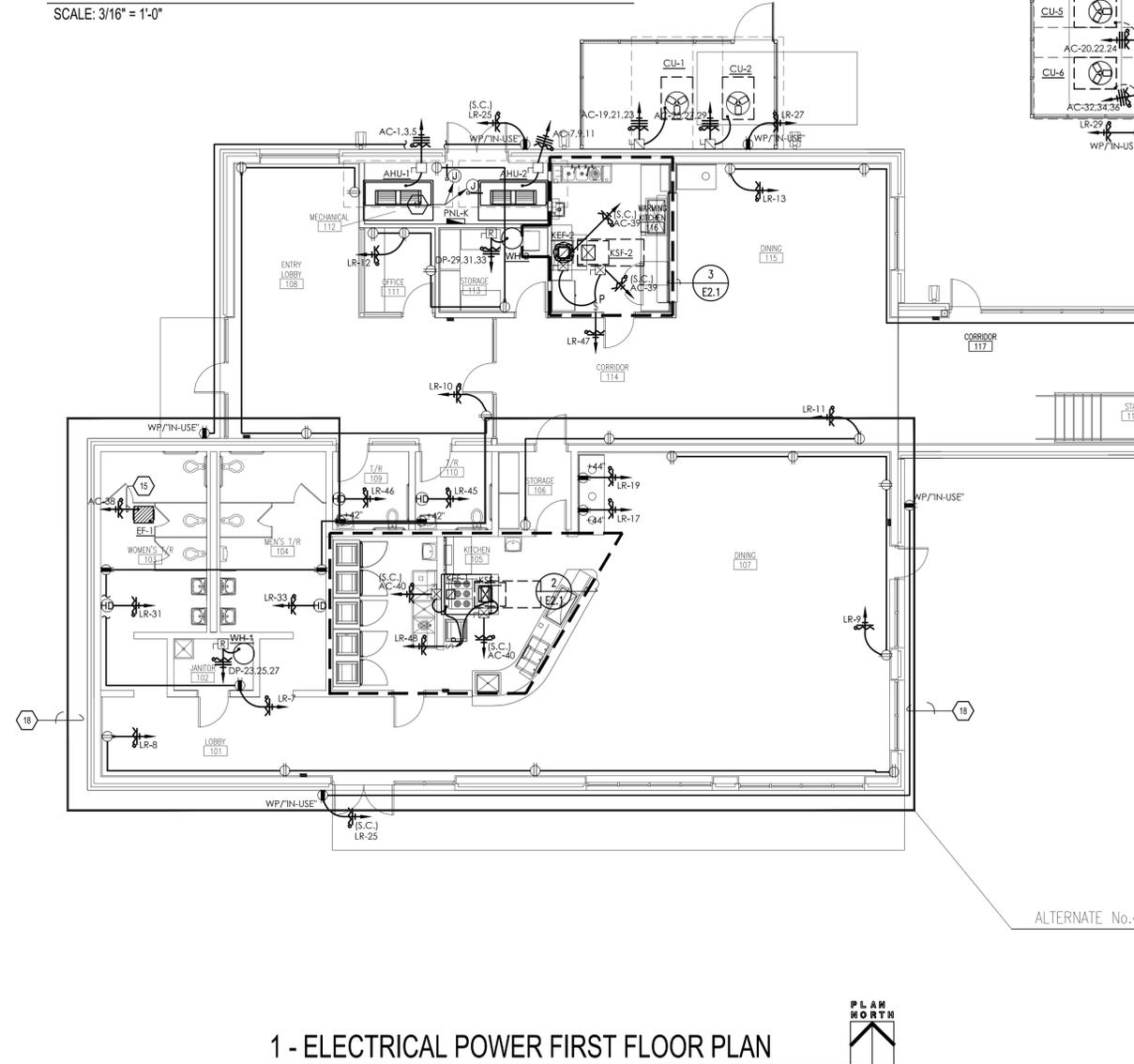
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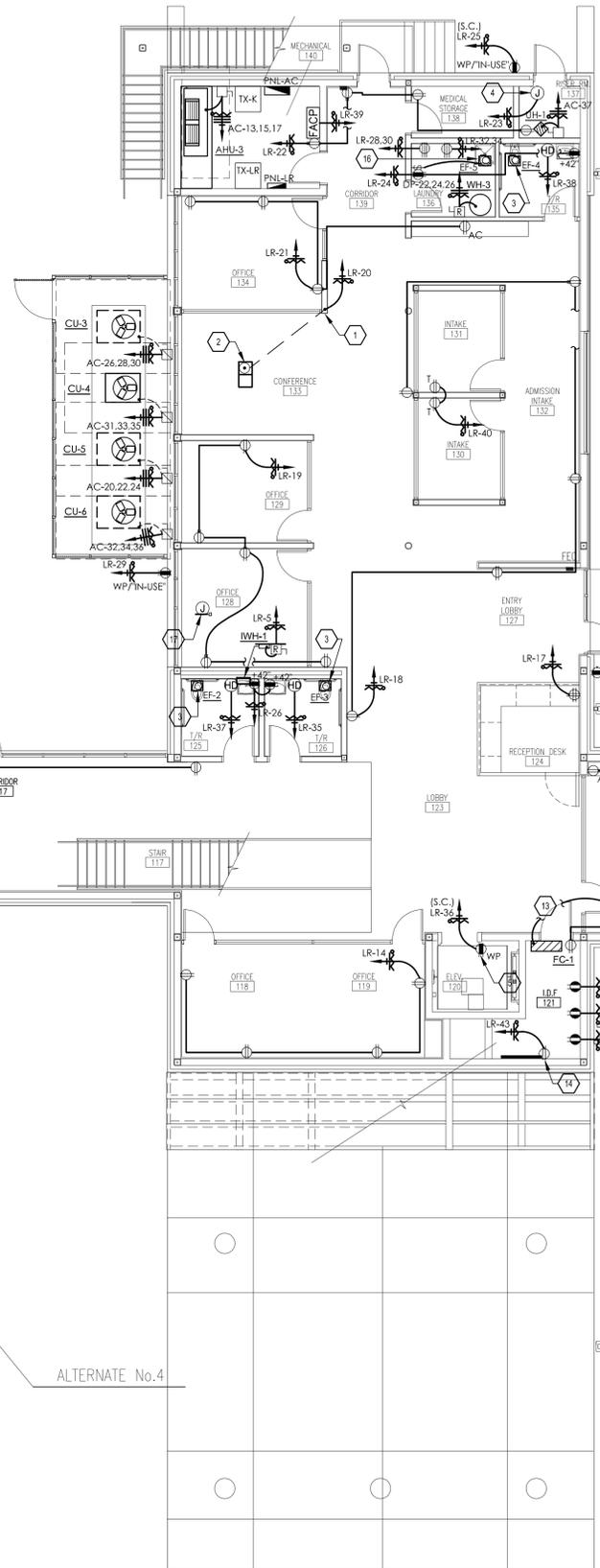
2 - ELECTRICAL POWER KITCHEN PLAN

SCALE: 3/16" = 1'-0"

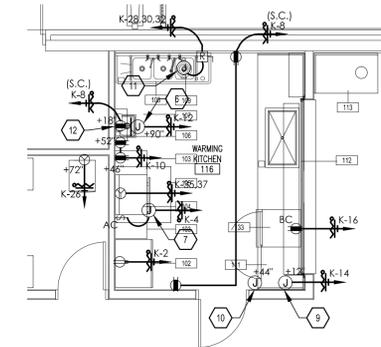


1 - ELECTRICAL POWER FIRST FLOOR PLAN

SCALE: 1/8" = 1'-0"



ALTERNATE No.4



3 - ELECTRICAL POWER WARMING KITCHEN PLAN

SCALE: 3/16" = 1'-0"

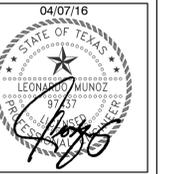
GENERAL NOTES: POWER

- A. COORDINATE EXACT LOCATION AND MOUNTING HEIGHT OF ALL POWER SOURCE WIRING IN ACCORDANCE WITH ARCHITECTURAL MILLWORK.
- B. ELECTRICAL CONTRACTOR SHALL MAKE FINAL CONNECTION TO H.V.A.C. EQUIPMENT, PLUMBING EQUIPMENT, REFER TO PANEL SCHEDULE FOR WIRE SIZE.
- C. ELECTRICAL CONTRACTOR SHALL PROVIDE STARTERS, RELAYS, CONTACTORS AND THE REQUIRED ELECTRICAL ACCESSORIES FOR MECHANICAL SYSTEM AS REQUIRED.
- D. COORDINATE EXACT LOCATION OF ALL MECHANICAL EQUIPMENT IN ACCORDANCE WITH MECHANICAL DRAWINGS TO MEET ELECTRICAL AND MECHANICAL REQUIRED CLEARANCE BY THE LATEST CODE.
- E. COORDINATE EXACT LOCATION OF ISOLATED OUTLETS FOR COMPUTERS WITH OWNER.
- F. ELECTRICAL CONTRACTOR SHALL PROVIDE J-BOX AND CONDUIT FOR H.V.A.C. CONTROLS AND THERMOSTATS. COORDINATE EXACT LOCATION WITH MECHANICAL CONTRACTOR.
- G. NEMA RATED OUTLETS, REFER TO BREAKER SIZE AND COORDINATE WITH EQUIPMENT REQUIREMENTS PRIOR TO BID.

KEYED NOTES: POWER

- 1 STUB UP IN THROUGH WALL TO ABOVE CEILING LEVEL.
- 2 FLOOR BOX LOCATION COORDINATE FINAL LOCATION WITH OWNER AND FURNITURE PRIOR TO COMMENCING HAY WORK.
- 3 TIE INTO ROOMS LIGHTING CIRCUIT AND INTERLOCK FAN WITH ROOMS LIGHTS. WIRING SHALL BE 2#12, 1#12G, 2/C.
- 4 J-BOX FOR FIRE SPRINKLER SYSTEM, COORDINATE EXACT LOCATION AND ELECTRICAL REQUIREMENTS WITH FIRE SPRINKLER CONTRACTOR PRIOR TO COMMENCING ANY WORK. INTERLOCK WITH FIRE ALARM SYSTEM.
- 5 WEATHER PROOF RECEPTACLE IN ELEVATOR PIT AREA. PRIOR TO COMMENCING ANY ROUGH-INS CONSULT WITH ELEVATOR MANUFACTURE FOR EXACT LOCATION AND PLUMBING CONTRACTOR FOR SUMP PUMP LOCATION. RECEPTACLE SHALL SERVE CONVENIENCE AND SUMP PUMP.
- 6 J-BOX FOR FIRE SUPPRESSION SYSTEM. COORDINATE EXACT LOCATION AND ELECTRICAL REQUIREMENTS WITH KITCHEN CONSULTANT PRIOR TO COMMENCING ANY WORK.
- 7 J-BOX FOR HOOD, COORDINATE EXACT LOCATION AND ELECTRICAL REQUIREMENTS WITH KITCHEN CONSULTANT PRIOR TO COMMENCING ANY WORK.
- 8 PEDESTAL MOUNTED NEMA-3R J-BOX FOR SERVING LINE LOAD CENTER. COORDINATE EXACT HEIGHT AND ELECTRICAL REQUIREMENTS WITH KITCHEN CONSULTANT PRIOR TO COMMENCING ANY WORK.
- 9 NEMA-3R J-BOX FOR SERVING LINE LOAD CENTER. COORDINATE EXACT HEIGHT AND ELECTRICAL REQUIREMENTS WITH KITCHEN CONSULTANT PRIOR TO COMMENCING ANY WORK.
- 10 NEMA-3R J-BOX FOR REMOTE FIRE PULL. COORDINATE EXACT LOCATION AND ELECTRICAL REQUIRED CONNECTIONS WITH KITCHEN CONSULTANT PRIOR TO COMMENCING ANY WORK.
- 11 NEMA-3R J-BOX FOR GARBAGE DISPOSAL CONNECTION. COORDINATE EXACT LOCATION AND ELECTRICAL REQUIRED CONNECTIONS WITH KITCHEN CONSULTANT PRIOR TO COMMENCING ANY WORK.
- 12 RECEPTACLE FOR SINK SENSOR. COORDINATE EXACT LOCATION AND ALL ELECTRICAL REQUIREMENTS WITH EQUIPMENT MANUFACTURE AND PLUMBING CONTRACTOR PRIOR TO COMMENCING ANY WORK.
- 13 INTERLOCK FCCU-1 WITH FC-1 WIRE SHALL BE 3#10, 1#10G, 3/4/C. COORDINATE ALL ROUTING PRIOR TO COMMENCING ANY WORK.
- 14 3/4"X8"X4" W PLYWOOD TELEPHONE BOARD FINISHED ONE SIDE. PROVIDE GROUND BAR AND TIE INTO ELECTRICAL GROUNDING SYSTEM VIA WIRE #4.
- 15 TIE INTO GANG RESTROOM LIGHTING CIRCUIT. WIRING SHALL BE 2#10, 1#10G, 3/4/C.
- 16 TIE INTO ROOMS LIGHTING CIRCUIT. WIRING SHALL BE 2#10, 1#10G, 3/4/C.
- 17 J-BOX FOR DAMPERS. CIRCUIT SHALL BE LR-49. COORDINATE ALL ELECTRICAL CONNECTIONS WITH MECHANICAL CONTRACTOR, AND LOCAL CODE.
- 18 ALL ELECTRICAL WORK THAT FALLS WITHIN INDICATED AREA SHALL BE UNDER ALTERNATE #4. DEVICES THAT ARE PROPOSED ON CMU WALLS, THE FOLLOWING SHALL BE INCLUDED AS PART OF THE BASE BID BOXES, CONDUIT TO ABOVE PROPOSED ALTERNATE #4 CEILING LEVEL WITH PULLSTRINGS.

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 6626 SILVERMINE DRIVE, SUITE 100A
 AUSTIN, TEXAS 78736
 (512) 327-0444 FAX (512) 301-4909



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 REHABILITATION CENTER
 111 CAMINO NUEVO ROAD, HWY 359
 LAREDO, TEXAS 78046

PROJECT NUMBER

REVISIONS

SHEET TITLE
 ELECTRICAL POWER FIRST
 FLOOR PLAN

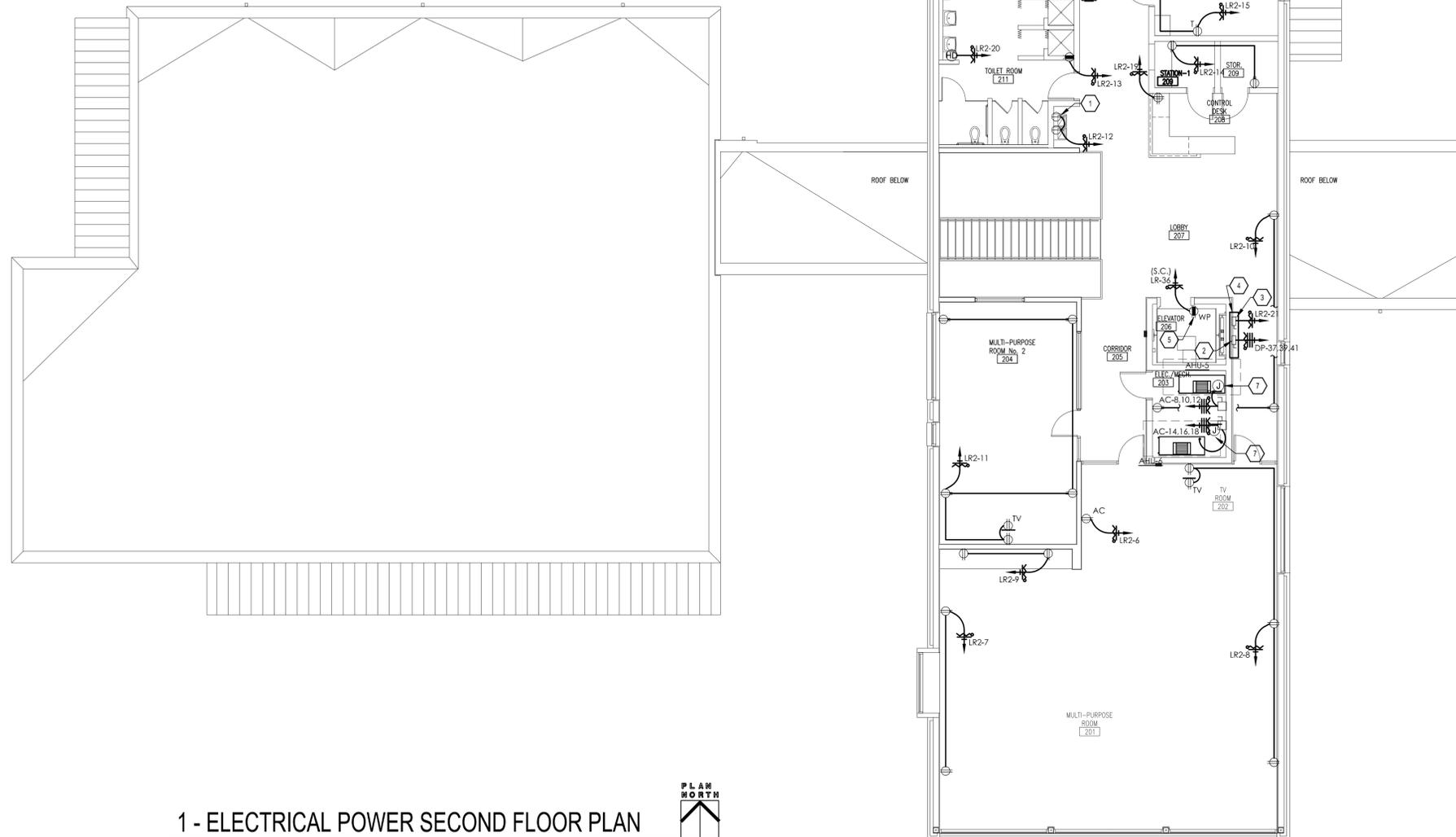
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1 - ELECTRICAL POWER SECOND FLOOR PLAN

SCALE: 1/8" = 1'-0"



GENERAL NOTES: POWER

- A. COORDINATE EXACT LOCATION AND MOUNTING HEIGHT OF ALL POWER SOURCE WIRING IN ACCORDANCE WITH ARCHITECTURAL MILLWORK.
- B. ELECTRICAL CONTRACTOR SHALL MAKE FINAL CONNECTION TO H.V.A.C EQUIPMENT, PLUMBING EQUIPMENT, REFER TO PANEL SCHEDULE FOR WIRE SIZE.
- C. ELECTRICAL CONTRACTOR SHALL PROVIDE STARTERS, RELAYS, CONTACTORS AND THE REQUIRED ELECTRICAL ACCESSORIES FOR MECHANICAL SYSTEM AS REQUIRED.
- D. COORDINATE EXACT LOCATION OF ALL MECHANICAL EQUIPMENT IN ACCORDANCE W/MECHANICAL DRAWINGS TO MEET ELECTRICAL AND MECHANICAL REQUIRED CLEARANCE BY THE LATEST CODE.
- E. COORDINATE EXACT LOCATION OF ISOLATED OUTLETS FOR COMPUTERS WITH OWNER.
- F. ELECTRICAL CONTRACTOR SHALL PROVIDE J-BOX AND CONDUIT FOR H.V.A.C. CONTROLS AND THERMOSTATS. COORDINATE EXACT LOCATION WITH MECHANICAL CONTRACTOR.
- G. NEMA RATED OUTLETS, REFER TO BREAKER SIZE AND COORDINATE WITH EQUIPMENT REQUIREMENTS PRIOR TO BID.

KEYED NOTES: POWER

- 1. COORDINATE EXACT LOCATION WITH PLUMBER TO CONCEAL CORD BEHIND ELECTRIC DRINKING FOUNTAIN PRIOR TO ANY ROUGH-IN.
- 2. MAIN DISCONNECT FOR ELEVATOR 'JH'. ELECTRICAL CONTRACTOR TO COORDINATE EXACT LOCATION AND ALL REQUIRED ELECTRICAL CONNECTIONS WITH ELEVATOR MANUFACTURE PRIOR TO COMMENCING ANY WORK.
- 3. MAIN DISCONNECT FOR ELEVATOR 'CA8'. ELECTRICAL CONTRACTOR TO COORDINATE EXACT LOCATION AND ALL REQUIRED ELECTRICAL CONNECTIONS WITH ELEVATOR MANUFACTURE PRIOR TO COMMENCING ANY WORK.
- 4. ELECTRICAL CONTRACTOR COORDINATE WITH ARCHITECT/ELEVATOR MANUFACTURE/OWNER FOR ELEVATOR ELECTRICAL EQUIPMENT ENCLOSURE PER LATEST NEC STANDARDS PRIOR TO COMMENCING ANY WORK. PROVIDE ALL NECESSARY ITEMS FOR CODE COMPLIANT OPERATIONAL SYSTEM.
- 5. VERIFY ALL ELECTRICAL DEVICES/EQUIPMENT INSIDE ELEVATOR SHAFT WITH ELEVATOR MANUFACTURE PRIOR TO COMMENCING ANY WORK. DISCONNECT SHALL BE PROVIDED BY ELECTRICAL CONTRACTOR LOCATED ABOVE ELEVATOR IN HOIST AREA. FINAL LOCATION AND ELECTRICAL CONNECTIONS SHALL BE DECIDED BY ELEVATOR MANUFACTURE.
- 6. TIE INTO ROOMS LIGHTING CIRCUIT AND INTERLOCK FAN WITH ROOMS LIGHTS. WIRING SHALL BE #8, 1# 10G, 3/4".
- 7. J-BOX FOR DAMPERS, CIRCUIT SHALL BE LR2-23. COORDINATE ALL ELECTRICAL CONNECTIONS WITH MECHANICAL CONTRACTOR, AND LOCAL CODE.

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 ARCHITECTURE + PLANNING + INTERIORS
 6626 SILVERMINE DRIVE, SUITE 100A
 AUSTIN, TEXAS 78736
 (512) 327-0444 FAX (512) 301-4909



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 REHABILITATION CENTER
 111 CAMINO NUEVO ROAD, HWY 359
 LAREDO, TEXAS 78046

PROJECT NUMBER

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SHEET TITLE
 ELECTRICAL
 POWER SECOND
 FLOOR PLAN

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 MEP ENGINEERING
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PROJECT NUMBER
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SHEET TITLE
 ELECTRICAL
 SPECIAL SYSTEM
 FIRST FLOOR PLAN

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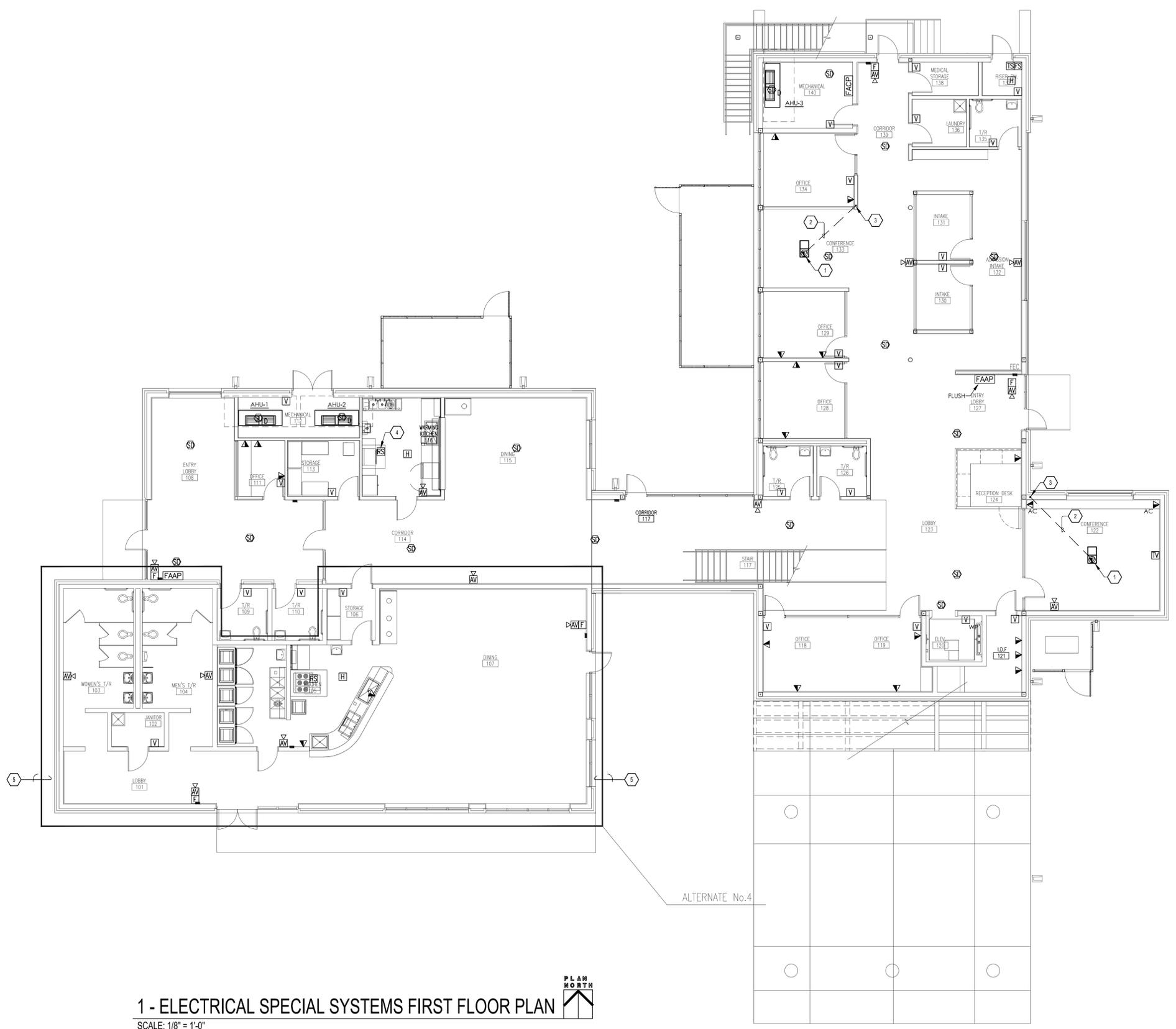
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GENERAL NOTES: SPECIAL SYSTEMS

- A. COORDINATE EXACT LOCATION AND MOUNTING HEIGHT OF ALL POWER SOURCE WIRING IN ACCORDANCE WITH ARCHITECTURAL MILLWORK.
- B. PROVIDE CLEAR VANDAL COVER WITH STOPPER II OPTION FOR ALL FIRE ALARM PULL STATIONS.
- C. EQUIPMENT AS FURNISHED OF A SINGLE MANUFACTURER.
- D. COORDINATE EXACT LOCATION OF ALL MECHANICAL EQUIPMENT IN ACCORDANCE MECHANICAL DRAWINGS.
- E. ALL CONDUITS SHALL BE REAMED AND COMPLETED WITH CONNECTORS AND INSULATED BUSHINGS AT BOTH ENDS.
- F. ALL DEVICES SHOWN ON DRAWINGS ARE SYMBOLIC ONLY. THE ENTIRE FIRE ALARM SYSTEM, SHALL BE IN FULL COMPLIANCE AND MEET ALL CODES AND REQUIREMENTS OF THE LOCAL ADMINISTRATIVE AUTHORITY. ANY MODIFICATIONS REQUIRED TO PROVIDE COMPLIANCE SHALL BE MADE AT NO ADDITIONAL COST TO THE OWNER OR ARCHITECT/ ENGINEER.
- G. FIRE ALARM LICENSE HOLDER SHALL ASSUME ALL RESPONSIBILITY FOR DESIGN AND SUBMIT DRAWINGS TO JURISDICTION HAVING AUTHORITY AND ABIDE BY ALL OTHER REQUIREMENTS PER NFPA.
- H. ALL SPECIAL SYSTEM CONDUITS SHALL BE STUBBED UP ABOVE THE CEILING LEVEL. IF CABLE TRAY IS PRESENT, STUBBED CONDUITS TO CABLE TRAY.

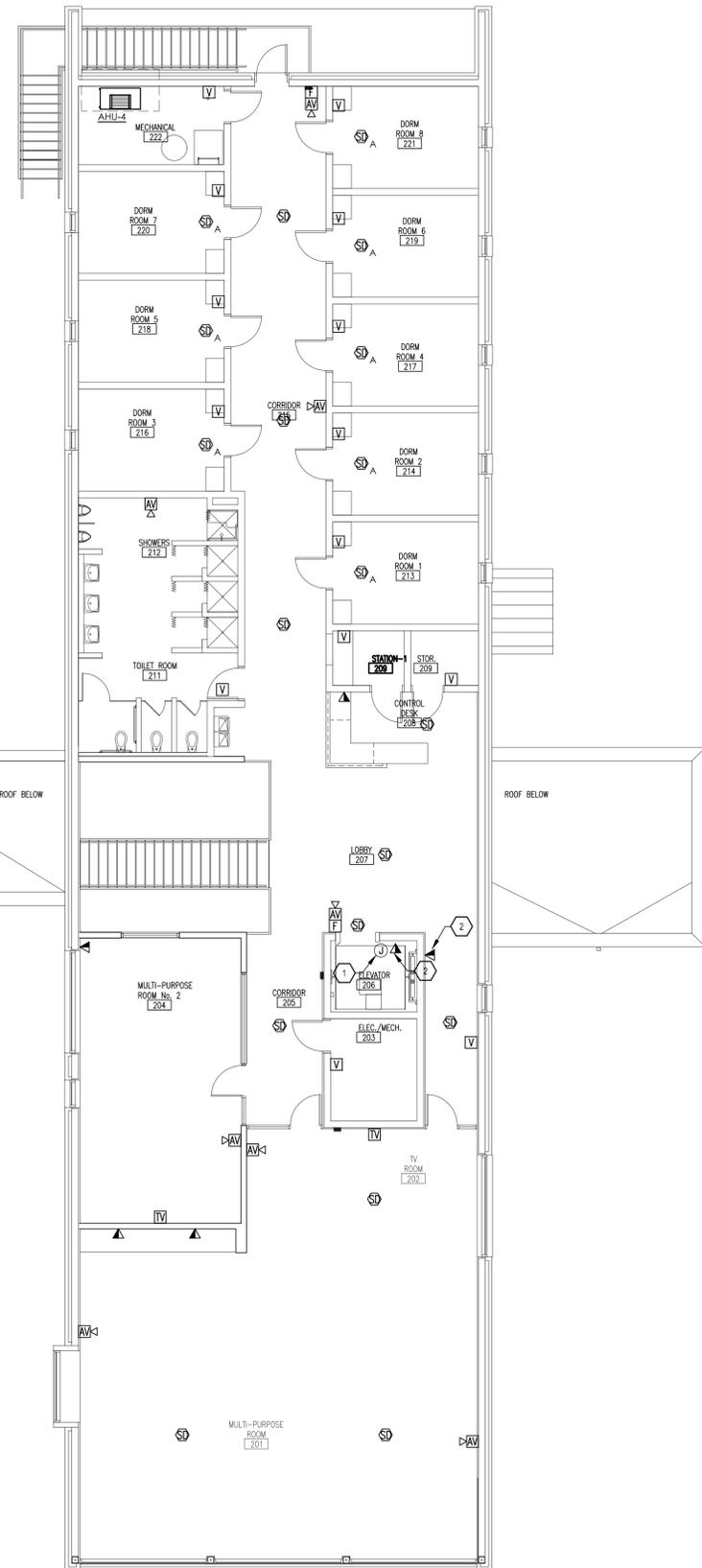
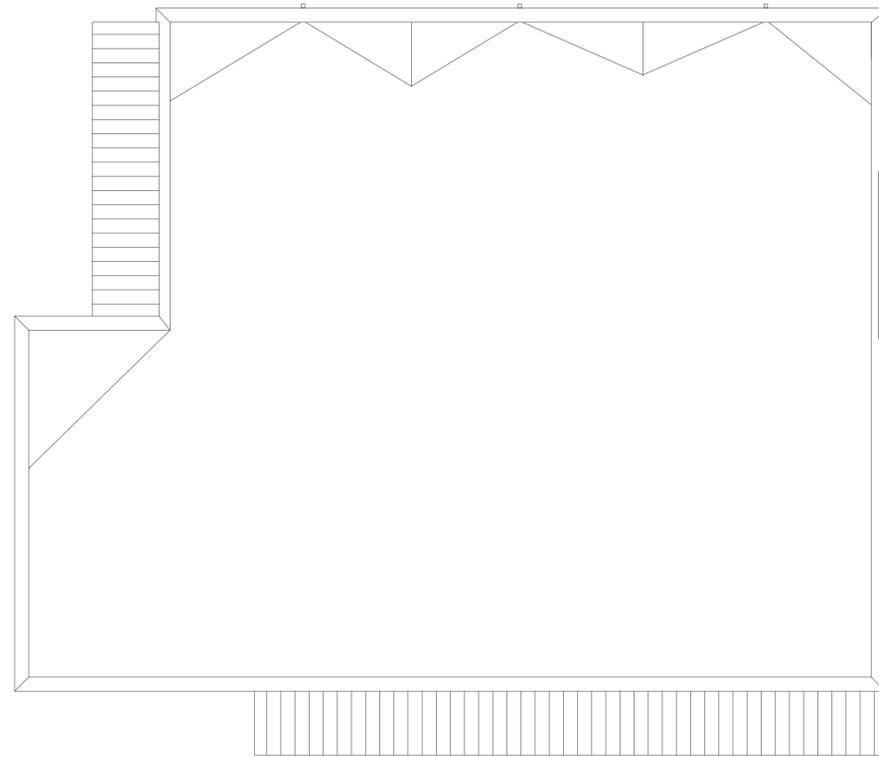
KEYED NOTES: SPECIAL SYSTEMS

- 1 COORDINATE EXACT LOCATION OF FLOOR BOX WITH MILLWORK AND OWNER PRIOR TO COMMENCING ANY WORK.
- 2 PROVIDE 1-1" WITH PULLSTRING. ROUTE TO NEAREST FULL WALL.
- 3 STUB-UP IN THROUGH WALL TO ABOVE CEILING LEVEL.
- 4 FIRE ALARM DEVICE FOR HOOD FIRE SUPPRESSION SYSTEM.
- 5 TELEPHONE/DATA DEVICES AND ALL ASSOCIATED CONDUIT THAT FALLS WITHIN INDICATED AREA SHALL BE UNDER ALTERNATE #4. ALL FIRE ALARM WITHIN THIS INDICATED AREA SHALL BE PART OF BASE BID.



1 - ELECTRICAL SPECIAL SYSTEMS FIRST FLOOR PLAN
 SCALE: 1/8" = 1'-0"





1 - ELECTRICAL SPECIAL SYSTEMS SECOND FLOOR PLAN
SCALE: 1/8" = 1'-0"



GENERAL NOTES: SPECIAL SYSTEMS

- A. COORDINATE EXACT LOCATION AND MOUNTING HEIGHT OF ALL POWER SOURCE WIRING IN ACCORDANCE WITH ARCHITECTURAL MILLWORK.
- B. PROVIDE CLEAR VANDAL COVER WITH STOPPER II OPTION FOR ALL FIRE ALARM PULL STATIONS.
- C. EQUIPMENT AS FURNISHED OF A SINGLE MANUFACTURER.
- D. COORDINATE EXACT LOCATION OF ALL MECHANICAL EQUIPMENT IN ACCORDANCE WITH MECHANICAL DRAWINGS.
- E. ALL CONDUITS SHALL BE REAMED AND COMPLETED WITH CONNECTORS AND INSULATED BUSHINGS AT BOTH ENDS.
- F. ALL DEVICES SHOWN ON DRAWINGS ARE SYMBOLIC ONLY. THE ENTIRE FIRE ALARM SYSTEM SHALL BE IN FULL COMPLIANCE AND MEET ALL CODES AND REQUIREMENTS OF THE LOCAL ADMINISTRATIVE AUTHORITY. ANY MODIFICATIONS REQUIRED TO PROVIDE COMPLIANCE SHALL BE MADE AT NO ADDITIONAL COST TO THE OWNER OR ARCHITECT/ENGINEER.
- G. FIRE ALARM LICENSE HOLDER SHALL ASSUME ALL RESPONSIBILITY FOR DESIGN AND SUBMIT DRAWINGS TO JURISDICTION HAVING AUTHORITY AND ABIDE BY ALL OTHER REQUIREMENTS PER NFPA.
- H. ALL SPECIAL SYSTEM CONDUITS SHALL BE STUBBED UP ABOVE THE CEILING LEVEL. IF CABLE TRAY IS PRESENT, STUBBED CONDUITS TO CABLE TRAY.

KEYED NOTES: SPECIAL SYSTEMS

- 1 PROVIDE J-BOX FOR ELEVATOR CAB FIRE ALARM REQUIREMENTS. COORDINATE EXACT LOCATION AND ELECTRICAL REQUIREMENTS WITH ELEVATOR MANUFACTURE AND LATEST JURISDICTION CODE REQUIREMENTS.
- 2 PROVIDE TELEPHONE DEVICE FOR ELEVATOR CAB COMMUNICATION. COORDINATE EXACT LOCATION WITH ELEVATOR MANUFACTURE PRIOR TO COMMENCING ANY WORK.

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ARCHITECTURE + PLANNING + INTERIORS
6626 SILVERMINE DRIVE, SUITE 100A
AUSTIN, TEXAS 78736
(512) 327-0444 FAX (512) 301-4909



WEBB COUNTY YOUTH VILLAGE
REHABILITATION CENTER
111 CAMINO NUEVO ROAD, HWY 359
LAREDO, TEXAS 78046

PROJECT NUMBER

REVISIONS

SHEET TITLE
ELECTRICAL SPECIAL SYSTEMS
SECOND FLOOR PLAN

DRAWN BY:

SHEET NO.

E3.2

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ELECTRICAL LEGEND-LIGHTING

---ALL SYMBOLS SHOWN MAY NOT APPEAR IN ALL DRAWINGS. SYMBOLS ARE SHOWN SCHEMATIC AND MAY NOT BE TO SCALE.

SYMBOL	DESCRIPTION
	2'x4' FLUORESCENT LIGHT FIXTURE
	2'x4' FLUORESCENT FIXTURE W/EMERGENCY BATTERY PACK
	2'x2' FLUORESCENT LIGHT FIXTURE
	2'x2' FLUORESCENT FIXTURE W/EMERGENCY BATTERY PACK
	1'x4' FLUORESCENT LIGHT FIXTURE
	TRACK LIGHT WITH HEADS AS INDICATED
	INCANDESCENT, FLUORESCENT, OR HID WALL WASHER LIGHT FIXTURE CEILING MTD.
	INCANDESCENT, FLUORESCENT, OR HID FIXTURE CLG. OR WALL MTD.
	FLUORESCENT, OR HID FIXTURE WITH EMERGENCY BATTERY PACK, CLG. OR WALL MTD.
	EXIT LIGHT, CEILING OR WALL MOUNTED - SHADING INDICATING SINGLE OR DOUBLE FACE; DIRECTIONAL ARROWS AS INDICATED
	EXIT LIGHT SAME AS ABOVE, EXCEPT WITH AN EMERGENCY UNIT AS A COMBO
	CEILING FAN
	FLUORESCENT STRIP LIGHT
	FLUORESCENT STRIP LIGHT WITH EMERGENCY BATTERY PACK
	WALL SWITCH SPST, 20A, 120/277V
	DOUBLE POLE TOGGLE SWITCH, 20A/120/277V
	3-WAY WALL SWITCH, 20A, 120/277V
	4-WAY WALL SWITCH, 20A, 120/277V
	WALL DIMMER SWITCH
	WALL SWITCH SPST, 20A, 120/277V - PILOT LIGHT SWITCH
	WALL SWITCH SPST, 20A, 120/277V - KEYED SWITCH, X = 3 OR 4 WAY

ELECTRICAL LEGEND-SPECIAL SYSTEMS

---ALL SYMBOLS SHOWN MAY NOT APPEAR IN ALL DRAWINGS. SYMBOLS ARE SHOWN SCHEMATIC AND MAY NOT BE TO SCALE.

SYMBOL	DESCRIPTION
	WALL MOUNTED TELEPHONE/DATA OUTLET, FURNISH AND INSTALL 1'c., WITH PULLSTRING AND INSULATED BUSHING, STUBBED ABOVE CEILING, +24" UNLESS OTHERWISE NOTE. BOX TO BE MINIMUM 2 1/8" DEEP.
	WALL MOUNTED TELEPHONE OUTLET, FURNISH AND INSTALL 3/4" c., WITH PULLSTRING AND INSULATED BUSHING, STUBBED ABOVE CEILING, +24" UNLESS OTHERWISE NOTE. BOX TO BE MINIMUM 2 1/8" DEEP.
	WALL MOUNTED DATA OUTLET, FURNISH AND INSTALL 1'c., WITH PULLSTRING AND INSULATED BUSHING, STUBBED ABOVE CEILING, +24" UNLESS OTHERWISE NOTE. BOX TO BE MINIMUM 2 1/8" DEEP.
	PUBLIC TELEPHONE OUTLET, J-BOX & 3/4" c.
	TELEVISION OUTLET, CLG. OR WALL MOUNTED - STUB 3/4" c. ABOVE CEILING FROM OUTLET BOX
	PUSHBUTTON WALL MOUNTED.
	FLOOR MOUNTED 2-DUPLEX RECEPTACLE / 1-GANG FOR TELE/DATA OUTLETS- FLUSH MOUNTED UNO FLOOR BOX = MFR.-WIEMOLD MODEL#RFB4-RFB-B-RFB-DR-RFB4-LPB COVER #FPB7C8-VERIFY FLOOR FINISH PRIOR TO ORDER SAME BOX FOR POWER OUTLETS.
	FLOOR MOUNTED 2-DUPLEX RECEPTACLE / 1-GANG FOR DATA OUTLET- FLUSH MOUNTED UNO FLOOR BOX = MFR.-WIEMOLD MODEL#RFB4-RFB-B-RFB-DR-RFB4-LPB COVER #FPB7C8-VERIFY FLOOR FINISH PRIOR TO ORDER SAME BOX FOR POWER OUTLETS.
	AUDIO VIDEO DROP, REFER TO DETAIL
	INTERCOM - CALL SWITCH- JBOX WITH 3/4" c.
	INTERCOM/PAGING LAY-IN SPEAKER
	PA EXTERIOR SPEAKER
	SECURITY DOOR CONTACT SENSOR - STUB 1/2" c. ABOVE CEILING FROM OUTLET BOX
	SECURITY MOTION DETECTOR SENSOR - STUB 1/2" c. ABOVE CEILING FROM OUTLET BOX
	SECURITY GLASS BREAK SENSOR - STUB 1/2" c. ABOVE CEILING FROM OUTLET BOX
	SECURITY KEY PAD - STUB 3/4" c. ABOVE CEILING FROM OUTLET BOX
	ACCESS CONTROL PANEL JUNCTION BOX - BY OTHERS
	CARD READER BOX - STUB 3/4" c. ABOVE CEILING LEVEL FROM OUTLET BOX SYSTEM BY OTHERS
	MAGNETIC LOCK BOX - STUB 3/4" c. ABOVE CEILING LEVEL FROM OUTLET BOX SYSTEM BY OTHERS
	INTRUSION EXTERIOR SPEAKER
	SINGLE SIDED CLOCK, J-BOX W/3/4" c.
	DOUBLE SIDED CLOCK, J-BOX W/3/4" c.
	CAMERA, J-BOX W/ 3/4" c. CONDUIT

ELECTRICAL LEGEND-FIRE ALARM

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SYMBOL	DESCRIPTION
	FIRE ALARM PULL STATION: STUB 3/4" c. ABOVE CEILING FROM J-BOX
	FIRE ALARM AUDIBLE/VISUAL SIGNAL: STUB 3/4" c. ABOVE CEILING FROM J-BOX
	FIRE ALARM VISUAL SIGNAL: STUB 3/4" c. ABOVE CEILING FROM J-BOX
	FIRE ALARM SMOKE DETECTOR CEILING OR WALL MOUNTED: STUB 3/4" c. ABOVE CEILING FROM J-BOX
	HEAT DETECTOR CEILING OR WALL MOUNTED: STUB 3/4" c. ABOVE CEILING FROM J-BOX
	DUCT SMOKE DETECTOR: STUB 3/4" c. ABOVE CEILING FROM J-BOX
	SMOKE DETECTOR WITH AN AUDIBLE BASE: STUB 3/4" c. ABOVE CEILING FROM J-BOX
	FIRE ALARM CONTROL PANEL, ADDRESSABLE, SURFACE MTD UNO.
	FIRE ALARM REMOTE ANNUNCIATOR PANEL, FLUSH MOUNTED UNO
	POWER SUPPLY, DEDICATED 110V
	DOOR HOLDER DEVICE: STUB 3/4" c. ABOVE CEILING FROM J-BOX
	TAMPER SWITCH: STUB 3/4" c. ABOVE CEILING FROM J-BOX
	FLOW SWITCH: STUB 3/4" c. ABOVE CEILING FROM J-BOX
	FIRE ALARM OUTDOOR SPEAKER, WEATHER PROOF: STUB 3/4" c. ABOVE CEILING FROM J-BOX

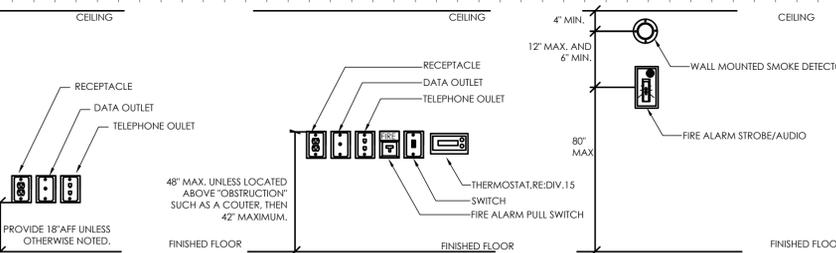
ELECTRICAL LEGEND-GENERAL

---ALL SYMBOLS SHOWN MAY NOT APPEAR IN ALL DRAWINGS. SYMBOLS ARE SHOWN SCHEMATIC AND MAY NOT BE TO SCALE.

SYMBOL	DESCRIPTION
	HEAVY DUTY DISCONNECT SWITCH FUSED
	HEAVY DUTY DISCONNECT SWITCH NONFUSED
	HEAVY DUTY COMBINATION DISCONNECT/MOTOR STARTER
	HEAVY DUTY MOTOR STARTER
	ENCLOSED BREAKER, RE: TO SCH. FOR MORE INFO.
	ROTARY TYPE DISCONNECT SWITCH
	120V, 20AMP, MOTOR RATED SWITCH, NEMA-1 ENCLOSURE
	MOTOR
	PANELBOARD, CLEARANCE AS PER LATEST NEC
	SWITCH LEG
	ELECTRICAL CONDUIT
	UNDERGROUND ELECTRICAL CONDUIT
	MULTI-POLE DEVICE CIRCUIT NUMBERS
	THREE SINGLE POLE DEVICE CIRCUIT NUMBERS
	CONDUIT AND WIRE HOMERUN TO PANEL, SHORT HATCH INDICATES NEUTRAL CONDUCTOR, LONG HATCHES INDICATE PHASE CONDUCTORS, AND LONG HATCH WITH CIRCLE INDICATES ISOLATES OR INSULATED GROUND. ALPHANUMERIC DESCRIPTION INDICATES PANEL AND BREAKER.
	DETAIL NUMBER
	SHEET NUMBER
	THERMOSTAT WALL MOUNTED - STUB 1/2" c. ABOVE CEILING FROM OUTLET BOX. COORDINATE EXACT LOCATION AND HEIGHT WITH MECHANICAL DIVISION.
	TELEPHONE BOARD
	PHOTO CELL/MFR.INTERMATIC #K4136M
	LIGHTING CONTRACTOR, NEMA-1, W/H.O.A. SWITCH
	TIME CLOCK (MFR.TORX#72022)
	CIRCULATING PUMP

MOUNTING HEIGHT DETAIL

NOTE: VERIFY WITH ARCHITECTURAL FOR ADA REQUIREMENTS.



ELECTRICAL ABBREVIATIONS:

ABBV.	DESCRIPTION	ABBV.	DESCRIPTION
AFF	ABOVE FINISHED FLOOR	MFR.	MANUFACTURER
BFC	BELOW FINISHED CEILING	(S.C.)	SHARE CIRCUIT
C	CONDUIT	QRCP(S)	QUAD RECEPTACLE(S)
CB	CIRCUIT BREAKER	RCPT(S)	DUPLEX RECEPTACLE(S)
EC	EMPTY CONDUIT	QRCP(S)	I.G. RECEPTACLE(S)
EX	EXISTING	QRCRCP(S)	QUAD I.G. RECEPTACLE(S)
F	FUSE	PNL	PANEL
G	GROUND (EQUIPMENT)	SO (S.O.)	SPACE ONLY
GF	GROUND FAULT INTERRUPTER	ST (S.T.)	SHUNT TRIP
MTD	MOUNT OR MOUNTED	SW	SWITCH
NF	NONFUSED	UF	UNDERFLOOR
NIC	NOT IN CONTRACT	UG	UNDERGROUND
H.D	HEAVY DUTY	UNO(UN.O.)	UNLESS NOTED OTHERWISE
NL	NIGHT LIGHT	WG	WIRE GUARD
AC	ABOVE COUNTER	WP	WEATHERPROOF
HT.	HEIGHT	XFMR	TRANSFORMER
MTD.	MOUNTING	MB	MAIN BREAKER
FDR.	FEEDER	MLO	MAIN LUGS ONLY
CKT.	CIRCUIT	RMC	RIGID METAL CONDUIT
LIG.	LIGHTING	RNC	RIGID NONMETALLIC CONDUIT
LC	LIGHTING CONTACTOR	S/N	ELECTRICAL METALLIC TUBING CONDUIT
IG	ISOLATED GROUND	SNT	SOLID NEUTRAL
EA	EACH	AC	ABOVE COUNTER
N1	NEMA-1	AHJ	AUTHORITY HAVING JURISDICTION
N3R	NEMA-3R		
N4X	NEMA-4X		
SS	STAINLESS STEEL		

NOTES:

- 1) 48" AFF INDICATES TO TOP OF DEVICE; 15" AFF INDICATES TO BOTTOM OF DEVICE; ALL OTHER MOUNTING HEIGHTS REFER TO CENTERLINE OF DEVICE. AC INDICATES 4" ABOVE COUNTER TO BOTTOM OF DEVICE.

ELECTRICAL LEGEND - WIRING DEVICES

---ALL SYMBOLS SHOWN MAY NOT APPEAR IN ALL DRAWINGS. SYMBOLS ARE SHOWN SCHEMATIC AND MAY NOT BE TO SCALE.

	SINGLE RECEPTACLE - 20A/125V/2P/3W/G NEMA 5-20R
	DUPLEX RECEPTACLE - 20A/125V/2P/3W/G NEMA 5-20R
	HOSPITAL GRADE DUPLEX RECEPTACLE/GFI - 20A/125V/2P/3W/G NEMA 5-20R
	DUPLEX RCPT. GR. - 20A/125V/2P/3W/G NEMA 5-20R
	DUPLEX RCPT. WEATHER RESISTANT 'WR', GFI INSTALLED IN A 'IN-USE' WEATHER PROOF STEEL ENCLOSURE - 20A/125V/2P/3W/G NEMA 5-20R W/ 'IN-USE' SHALL BE EQUAL TO MFR. CARLON METALLIC SERIES SINGLE GANGS, VERTICAL MOUNT #ME9UVMG DOUBLE GANG, VERTICAL MOUNT #ME92VMG
	QUADRAPLEX RECEPTACLE
	ISOLATED GROUND QUADPLEX RECEPTACLE
	ISOLATED GROUND DUPLEX RECEPTACLE - 20A/125V NEMA 5-20R
	208V RECEPTACLE, VERIFY NEMA NO. WITH EQUIPMENT SUPPLIER
	SPECIAL PURPOSE RECEPTACLE (NEMA NO., AS INDICATED)
	JUNCTION BOX - SIZE & MOUNTING AS REQUIRED MINIMUM OF 4" SQUARE
	J-BOX - AIR HAND DRYER: (RECESSED HAND DRYERS TO BE PROVIDED BY DIVISION 16. ELECTRICAL) #B-750 AUTOMATIC HANDCRAFT AS MANUFACTURER BY BOBRICK. (COLOR WHITE) QUANTITY: REFER TO DRAWINGS (MIN. ONE PER LAV. COMPLETE W/ ELE. CONNECTIONS TYP.)
	FLOOR MOUNTED 2-DUPLEX RECEPTACLE/2-GANG FOR DATA - FLUSH MOUNTED UNO FLOOR BOX = MFR.-WIEMOLD MODEL#RFB4-MULTISERVICE STEEL RECESSED FLOOR BOX, RFB-B-RFB-DR-RFB4-LPB COVER #FPB7C8-VERIFY FLOOR FINISH PRIOR TO ORDER SAME BOX FOR DATA OUTLETS.
	ELECTRICAL DEVICE AS SHOWN ON PLANS SURFACE MOUNT RACEWAY. SURFACE MOUNT RACEWAY SHALL BE WIEMOLD #V700 SERIES. PROVIDE ALL RELATED #V700 SERIES ACCESSORIES FOR AN OPERABLE SYSTEM.

GENERAL ELECTRICAL NOTES

1. ALL SYMBOLS AND ABBREVIATIONS SHOWN ON THIS LEGEND MAY NOT APPEAR ON THIS SET OF DRAWINGS.
2. USE DIRECTIONAL ARROW ON EXIT SIGNS AS REQUIRED.
3. IEEE STANDARD C37.2-1991. ELECTRICAL POWER SYSTEM DEVICE FUNCTION NUMBERS.
4. CONTRACTOR SHALL NOT INSTALL MORE THAN THREE CURRENT CARRYING CONDUCTORS IN A COMMON RACEWAY. IF CONTRACTOR IS PLANNING ON GROUPING MULTIPLE CIRCUITS IN A SINGLE RACEWAY, THE CONTRACTOR MUST SUBMIT ALL DERATING CALCULATIONS FOR THE PROPOSED INSTALLATION IN ACCORDANCE WITH NEC ARTICLE 310.15 (B) (2) FOR APPROVAL PRIOR TO INSTALLATION. NON APPROVED INSTALLATIONS WILL BE REMOVED AND REINSTALLED BY THE CONTRACTOR IN ACCORDANCE WITH THE NEC AT NO ADDITIONAL COST TO THE OWNER.
5. THERE SHALL NOT BE MORE THAN THE EQUIVALENT OF THREE 90° BENDS (270 DEGREES TOTAL) BETWEEN PULL POINTS. WHERE THERE ARE MORE THAN THREE QUARTER BENDS, CONTRACTOR SHALL PROVIDE PULL BOXES AS SPECIFIED AND SIZED IN ACCORDANCE WITH NEC.
6. COMPLY WITH NEC REQUIREMENTS FOR ELECTRICAL INSTALLATIONS. ALL ELECTRICAL EQUIPMENT AND MATERIAL TO BE APPROVED, LISTED, LABELED, IDENTIFIED AND INSTALLED PER RECOGNIZED ELECTRICAL TESTING LABORATORY.
7. ALL RECEPTACLES, SWITCHES AND JUNCTION BOXES SERVED BY EMERGENCY BRANCH CIRCUITS SHALL BE "RED" IN COLOR. COVERPLATES SHALL BE LABELED IN ACCORDANCE WITH SPECIFICATIONS TO INDICATE PANELBOARD AND CIRCUIT NO. (IE: E71A-3).

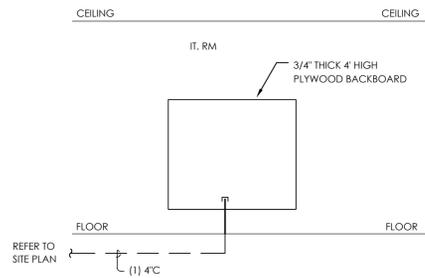
LAREDO JUVENILE REHAB CAMPUS LUMINAIRE SCHEDULE

TYPE	MANUFACTURER	CATALOG NUMBER	MOUNTING	LAMP QTY/FIXT	WATTS	TYPE	VOLTS	COMMENTS/LOCATIONS
A	DELRAY	6300-1 BLC-XX-D3	PENDANT	3TB/1 PAR	32/75	T8 /PAR75 35K	120/277	WALKWAY NEXT TO STAIRCASE
B	PEERLESS	SPM4 2.54 TSHO 0/100 WHR OPD 4FT XXX 277 ADEZ 15E EC X F2 SCT LPH40 24"	PENDANT	2	54	TSHO 35K	120/277	IN CAFETERIA
BE	SAME AS TYPE 'B' EXCEPT WITH 1400 LUMEN EMERGENCY BATTERY PACK							
C1	SELUX	L36 1A25 40K LW SF1 TS 10' 519LM/6.4 W FT 1 1/4"20 STUD	RECESSED	LED	64	LED 40K	120/277	10' RUNNEL CEILING SLOT LIGHT W/DRIVERS
C2	SELUX	L36 1A25 40K LW SF1 TS 5' 519LM/6.4 W FT 1 1/4"20 STUD	RECESSED	LED	32	LED 40K	120/277	5' RUNNEL CEILING SLOT LIGHT W/DRIVERS
D	GOTHAM	EVO 8"-40-30-BAR-MWD-LD-120-E21-TRW	RECESSED	LED	47.1	LED 40K	120/277	DOWNLIGHTS OVER STAIRS
E	DELRAY	6723 S W35 C2RDS C	PENDANT	LED	131.69	LED 35K	120/277	WARMING KITCHEN--3/ 36" CYLINDRO PENDANTS
F	LITHONIA	2R15 24THO MVOLT GEB115S LP841	RECESSED	2	24	TSHO 41K	120/277	SMALL OFFICES, BEDROOMS
FE	SAME AS TYPE 'F' EXCEPT WITH 1400 LUMEN EMERGENCY BATTERY PACK							
G	LITHONIA	2R15 28T5 MVOLT GEB115S LP841	RECESSED	2	28	T5 41K	120/277	LARGE ADMIN OFFICES IN-TAKE AREA
GE	SAME AS TYPE 'G' EXCEPT WITH 1400 LUMEN EMERGENCY BATTERY PACK							
H	ENERGIE	RON3-13-42-120-TLC	PENDANT	1	42	TRT 35K	120/277	SMALL CAFETERIA PENDANT
J	GOTHAM	EVO-40-25-6AR-MWD-LD-120-E21-TRW	RECESSED	LED	29.5	LED 40K	120/277	DOWNLIGHTS IN ADMIN OFFICES AND 2ND FLR HALL
JE	SAME AS TYPE 'J' EXCEPT WITH 1400 LUMEN EMERGENCY BATTERY PACK							
J2	GOTHAM	EVO-40-45-6AR-MWD-LD-120-E21-TRW	RECESSED	LED	50	LED 40K	120/277	DOWNLIGHTS IN ADMIN OFFICES AND 2ND FLR HALL
J2E	SAME AS TYPE 'J2E' EXCEPT WITH 1400 LUMEN EMERGENCY BATTERY PACK							
K	PEERLESS	SPM4QST 2.28 T5 0/100 WHR OPD 12FT XXX 277 ADEZ SCT	SUSPENDED	6	28	T5 40K	120/277	12' LIGHT OVER CONFERENCE RM TABLE
KE	SAME AS TYPE 'K' EXCEPT WITH 1400 LUMEN EMERGENCY BATTERY PACK							
L	GOTHAM	LGFLP 1/26TR 6DPR MVOLT WLP ERLHL	RECESSED	1	26	TRT40K	120/277	SHOWER LIGHT
M	Acuity Brands	PPL TOM X X 2TB GEB10IS 120	RECESSED	2	28	T8 40K	120/277	WATER WALL AND VANITY WALL IN RESTROOMS
N	LITHONIA	WC 1 14T5 FAC 120 CO S1 E810IS	WALL MTD	1	14	T5 40K	120/277	OVER BED LIGHT & RESTROOMS 1ST FLR
P	GOTHAM	EVO CYL 40K 25 6AAR MWD LD MVOLT E21 ACC.	AIRCRAFT PENDANT		29.5	LED 40K	120/277	EXPOSED STRUCTURE HALLWAYS 1ST FLR INTAKE
PE	SAME AS TYPE 'P' EXCEPT WITH 1400 LUMEN EMERGENCY BATTERY PACK							
Q	GOTHAM	EVO 40/20 4AR MD LD MVOLT E21 TRW	RECESSED		23.5	LED 40K	120/277	4" ROUND DOWNLIGHT AS NEEDED
R	LITHONIA	C-2-32-MVOLT-GE8-WGCUN	SURFACE	2	75	T8 40K	120/277	4" FLUORESCENT CHANNEL WITH ELECTRONIC BALLAST, WITH WIRE GUARD
S	LITHONIA	YSL-3-32--MVOLT-GE810IS-DL	SURFACE	3	75	T8 40K	120/277	ELEVATOR PIT
E1	LITHONIA	ELMT W LP06VS LTP	WALL MTD	1	19.2	LED	120/277	
E2	LITHONIA	ELMT W LP06VS LTP	WALL MTD	1	19.2	LED	120/277	
X1	LITHONIA	LHQM LED W R SD	SURFACE	1	0.62	LED	120/277	EXIT/EMERGENCY COMBO UNIT
X2	LITHONIA	LQM S W 3 R 120/277 ELN SD	SURFACE	1				

480/277V, 3Ø, 4W ELECTRICAL LOAD ANALYSIS	
DISCRPTION	TOTAL KVA
LIGHTING	25
GENERAL POWER	77
KITCHEN	87
A/C	238
WATER HEATER	60
ELEVATOR	24
TOTAL KVA:	511 KVA
TOTAL AMPS:	615 AMPS
TOTAL AMPS+25%:	768 AMPS
WIRE SIZE AMPS:	800 AMPS

DISCONNECT SCHEDULE	
LABEL	DESCRIPTION
AHU-1,2,3,4,6	60AMP, 3Ø, 4W, N1,480V, S/N, N.F., H.D. DISCONNECT
AHU-5	30AMP, 3Ø, 4W, N1,480V, S/N, N.F., H.D. DISCONNECT
CU-1,2,3,4,5,6	30AMP, 3Ø, 4W, N3R,480V, S/N, H.D. FUSED DISCONNECT
UH-1	30AMP, 1Ø, 3W, N3R,277V, S/N, H.D. FUSED DISCONNECT
WH-1,2,3	30AMP, 3Ø, 4W, N3R,480V, S/N, N.F., H.D. ROTARY TYPE DISCONNECT
WH-4	60AMP, 3Ø, 4W, N3R,480V, S/N, N.F., H.D. ROTARY TYPE DISCONNECT
IWH-1	30AMP, 1Ø, 3W, N3R,120V, S/N, N.F., H.D. ROTARY TYPE DISCONNECT
ELEVATOR 'JH'	60AMP, 3Ø, 4W, N3R,480V, S/N, N.F., H.D. FUSED DISCONNECT
ELEVATOR 'JH1'	60AMP, 3Ø, 4W, N3R,480V, S/N, N.F., H.D. FUSED DISCONNECT
ELEVATOR CAB	30AMP, 1Ø, 3W, N3R,120V, S/N, N.F., H.D. NON FUSED DISCONNECT
E122	30AMP, 1Ø, 3W, N3R,208V, S/N, N.F., H.D. ROTARY TYPE DISCONNECT
RANGE	200AMP, 3Ø, 4W, N3R,208V, S/N, N.F., H.D. ROTARY TYPE DISCONNECT

NOTE: 1. REFER TO BREAKER SIZE FOR FUSE SIZE.
2. REFER TO PANELBOARD FOR DISCONNECT PHASES AND VOLTAGE.



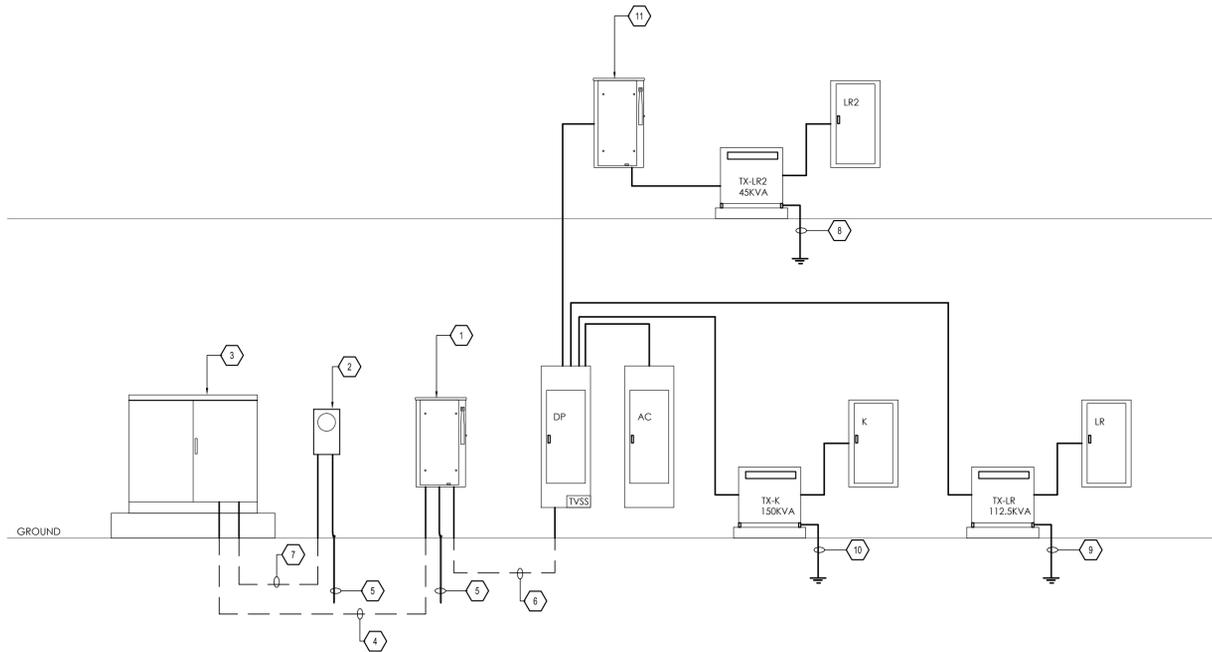
2 TELE/DATA RISER
SCALE: NTS

GENERAL NOTES:

- A. PROVIDE GROUND /BONDING AS INDICATED ON THE NATIONAL ELECTRICAL CODE.
- B. NAME PLATES SHALL BE PROVIDED FOR ALL ELECTRICAL SWITCH GEAR, PANEL BOARDS, LIGHTING CONTACTORS, LIGHTING CONTROL PANELS, ETC., BY ELECTRICAL CONTRACTOR.
- C. NEW ELECTRICAL METERING AND SERVICE EQUIPMENT SHALL BE PROVIDED AND INSTALLED ACCORDING TO THE LOCAL POWER UTILITY CO. AND CITY REQUIREMENTS. VERIFY AND COORDINATE WITH POWER UTILITY CO. AND AHJ BEFORE BID AND INSTALLATION.
- D. COMPLY WITH NFPA 70E SAFETY REQUIREMENTS.
- E. PANELBOARDS WITH MORE THAN 42 CIRCUITS SHALL BE IN ONE CABINET ENCLOSURE, UNLESS OTHERWISE NOTED.
- F. PROVIDE 4" CONCRETE PAD FOR ALL DRY-TYPE TRANSFORMERS.
- G. ALL TWO SECTION PANELBOARDS SHALL BE FEED THRU LUGS.
- H. CONTRACTOR SHALL BE RESPONSIBLE FOR DELIVERY OF ELECTRICAL SERVICE TO THE NEW BUILDING WITHIN PROJECT SCHEDULE. COORDINATE ALL COST FOR LABOR AND MATERIALS WITH LOCAL ELECTRICAL UTILITY COMPANY PRIOR TO BID. ALL COST ASSOCIATED WITH THE DELIVERY OF ELECTRICAL SERVICE INCLUDING ALL MATERIALS SHALL BE INCLUDED IN BID. TRANSITION OF NEW ELECTRICAL SERVICE SHALL PROCEED IN WEEKENDS OR HOLIDAYS, INCLUDE ALL COST IN BID FOR OVERTIME FROM ELECTRIC UTILITY COMPANY. NO ADDITIONAL PAYMENT WILL BE MADE FOR SERVICE DELIVERY COSTS AFTER CONTRACT HAS BEEN AWARDED.
- I. CONTRACTOR SHALL INCLUDE ALL COST TO PROVIDE SHORT CIRCUIT AND PROTECTIVE DEVICE. THE SHORT-CIRCUIT AND PROTECTIVE DEVICE COORDINATE STUDIES SHALL BE SUBMITTED TO THE DESIGN ENGINEER PRIOR TO RECEIVING FINAL APPROVAL OF THE DISTRIBUTION EQUIPMENT SHOP DRAWINGS AND/OR PRIOR TO RELEASE OF EQUIPMENT DRAWINGS FOR MANUFACTURING. APPROVAL FROM THE ENGINEER MAY BE OBTAINED FOR PRELIMINARILY SUBMITTAL OF SUFFICIENT STUDY DATA TO ENSURE THAT THE SELECTION OF DEVICE AND CHARACTERISTICS WILL BE SATISFACTORY.

**ELECTRICAL RISER
DIAGRAM KEYED NOTES:**

- 1 PROVIDE 800AMPS, 480V, 3Ø, 4W, S/N, N3R, HEAVY DUTY FUSED SERVICE ENTRANCE DISCONNECT, FUSED@800AMPS.
- 2 EXISTING ELECTRICAL SERVICE METER 480/277V, 3Ø, 4W. CONTRACTOR SHALL COORDINATE WITH UTILITY POWER COMPANY FOR ANY MODIFICATIONS FOR NEW SECONDARY CONDUCTORS.
- 3 EXISTING UTILITY POWER COMPANY PAD MOUNT TRANSFORMER 480/277V, 3Ø, 4W. COORDINATE WITH POWER COMPANY FOR UPSIZING FOR NEW ADDITIONAL ELECTRICAL LOAD. INCLUDE ANY COST RELATED FOR UPSIZING THE TRANSFORMER.
- 4 PROVIDE 2-RUNS EACH 4#600KCMIL, 4"C.
- 5 1#3/0G IN 1"C, 3/4"X1/2" COPPER CLAD RODS. PROVIDE GROUNDING AS PER NEC REQUIREMENTS.
- 6 PROVIDE 2-RUNS EACH 4#600KCMIL, 1#1/0G, 4"C.
- 7 EXISTING.
- 8 1#6G, GROUND ELECTRODE CONDUCTOR, CALDWELDED CONNECTION TO BUILDING REBAR AND STRUCTURE STEEL.
- 9 1#4G, GROUND ELECTRODE CONDUCTOR, CALDWELDED CONNECTION TO BUILDING REBAR AND STRUCTURE STEEL.
- 10 1#2G, GROUND ELECTRODE CONDUCTOR, CALDWELDED CONNECTION TO BUILDING REBAR AND STRUCTURE STEEL.
- 11 PROVIDE 100AMPS, 480V, 3Ø, 4W, S/N, N3R, HEAVY DUTY, NON- FUSED DISCONNECT.



1 ELECTRICAL SCHEMATIC DIAGRAM
SCALE: NTS

DRY-TYPE TRANSFORMER SCHEDULE			
LABEL	TRANSFORMER DESCRIPTION	PRIMARY VOLTAGE FEEDER - 480V, 3Ø	SECONDARY VOLTAGE FEEDER - 120/208V, 3Ø, 4W
TX-K	TYPE-DT-3; GENERAL, 150KVA, COPPER WINDINGS,3-PHASE, (P)480V-(S)208/120V,115"RISE,NEMA-1	3#250KCMIL, 1#4G IN 3"C	4#600KCMIL, 1#1G IN 4"C
TX-LR	TYPE-DT-3; GENERAL, 112.5KVA, COPPER WINDINGS,3-PHASE, (P)480V-(S)208/120V,115"RISE,NEMA-1	3#3/0, 1#6G IN 2"C	4#4/0, 1#4G IN 3"C
TX-LR2	TYPE-DT-3; GENERAL, 45KVA, COPPER WINDINGS,3-PHASE, (P)480V-(S)208/120V,115"RISE,NEMA-1	3#4, 1#8G IN 1.5"C	4#3, 1#8G IN 1.5"C

NOTE: ALL DRY-TYP TRANSFORMER SHALL BE ENERGY EFFICIENT MODELS AND MEET 2016 ENERGY EFFICIENT REQUIREMENTS..

AUSLAND ARCHITECTS-METAFORM STUDIO ARCHITECTS
ARCHITECTURE + PLANNING + INTERIORS
6626 SILVERMINE DRIVE, SUITE 100A
AUSTIN, TEXAS 78736
(512) 327-0444 FAX (512) 301-4909



**WEBB COUNTY YOUTH VILLAGE
REHABILITATION CENTER**
111 CAMINO NUEVO ROAD, HWY 359
LAREDO, TEXAS 78046

PROJECT NUMBER

REVISIONS

SHEET TITLE
ELECTRICAL
RISER/SCHEDULES

DRAWN BY:

SHEET NO.

E5.1

DATE:

TRINITY
MEP ENGINEERING
3533 Moreland Dr, Ste A | Westaco, Tx 78696
p:956.973.0500 | f:956-351-5750
www.trinitymep.com | Copyright 2016
Texas Registered Engineering Firm - F10362
Project number:14.4.07

PANEL: DP	AMP	LUGS	NEMA	V(L)	(P)	(W)	V(LN)	MNT	KAIC	FDR:	2-RUNS EACH.		
LOCATION:	800	MB	3R	480	3	4	120	SUR.	44	4#600KCMIL, 1#1/0G, 4" C			
LOAD	CTK	LOAD	BKR	POLE	FEEDER/BRANCH CIRCUIT	FEEDER/BRANCH CIRCUIT	POLE	BKR	LOAD	CTK	LOAD		
SERVED	#	KVA	SIZE		SIZE	SIZE		SIZE	KVA	#	SERVED		
PANEL-AC	1	121	400	3	4#600KCMIL, 1#3G, 4" C	4#2, 1#8G, 2" C	3	100	4	2	PANEL-LR2		
-	3	122			-	-		7	4		VIA TX-LR2		
-	5	117			-	-		5	6		-		
PANEL-LR	7	20	225	3	4#4/0, 1#4G, 3" C	4#600KCMIL, 1#3G, 4" C	3	400	33	8	PANEL-K		
VIA TX-LR	9	23			-	-		26	10		VIA TX-K		
-	11	19			-	-		28	12		-		
LIGHTING	13	2.7	20	1	2#10, 1#10G, 3/4" C	2#10, 1#10G, 3/4" C	1	20	3	14	LIGHTING		
LIGHTING	15	2.3	20	1	2#10, 1#10G, 3/4" C	2#10, 1#10G, 3/4" C	1	20	1.5	16	LIGHTING		
LIGHTING	17	2.7	20	1	2#10, 1#10G, 3/4" C	2#10, 1#10G, 3/4" C	1	20	1.9	18	LIGHTING		
LIGHTING	19	2.3	20	1	2#10, 1#10G, 3/4" C	2#8, 1#10G, 3/4" C	1	20	2.3	20	LIGHTING		
LIGHTING	21	1.5	20	1	2#10, 1#10G, 3/4" C	4#10, 1#10G, 3/4" C	3	25	4	22	WH-3		
WH-1	23	4	25	3	4#10, 1#10G, 3/4" C	-		4	24		-		
-	25	4			-	-		4	26		-		
-	27	4			-	-		50	10	28	WH-4		
WH-2	29	2	20	3	4#10, 1#10G, 3/4" C	4#6, 1#10G, 1" C	3	50	10	28	-		
-	31	2			-	-		10	32		-		
-	33	2			-	-		1	20	1.5	34	EMERGENCY/EXIT	
SPACE	35				-	-		1	20	2.3	36	EXTERIOR LIGHTING	
ELEVATOR JH	37	8	60	3	4#6, 1#10G, 1" C	2#4, 1#8G, 1 1/2" C	1	20	1	38	EXTERIOR LIGHTING		
-	39	8			-	-		1	20	0.8	40	EXTERIOR LIGHTING	
-	41	8			-	-		1	20	0.4	42	EXTERIOR LIGHTING	
LC/PC	43	0.4	20	1	2#12, 1#12G, 1/2" C	-					44	SPACE	
SPACE	45				-	-					46	SPACE	
SPACE	47				-	-					48	SPACE	
TVSS	49		60	3	4#6, 1#10G, 1" C	-					50	SPACE	
-	51				-	-					52	SPACE	
-	53				-	-					54	SPACE	
LOADS	-	(KVA)						218	214	203	(KVA)	-	DESCRIPTIVE LOADS
CONNECTED LOAD	-	635									26	-	LIGHTING
RESERVE	-	0									0	-	RECEPTACLES
TOTAL LOAD	-	635									0	-	COOLING
											60	-	HEATING
TOTAL AMPS	-	763									548	-	OTHER

NOTES:
1) PROVIDE INTEGRAL 140KA TVSS.
2) PROVIDE SHUNT TRIP BREAKER, INTERLOCK WITH FIRE ALARM SYSTEM

PANEL: AC	AMP	LUGS	NEMA	V(L)	(P)	(W)	V(LN)	MNT	KAIC	FDR:	2-RUNS EACH.		
LOCATION:	400	MLO	1	480	3	4	120	SUR.	22	1-RUN 4#600KCMIL, 1#3G, 4" C			
LOAD	CTK	LOAD	BKR	POLE	FEEDER/BRANCH CIRCUIT	FEEDER/BRANCH CIRCUIT	POLE	BKR	LOAD	CTK	LOAD		
SERVED	#	KVA	SIZE		SIZE	SIZE		SIZE	KVA	#	SERVED		
AHU-1	1	13.6	50	3	4#6, 1#10G, 1" C	4#6, 1#10G, 1" C	3	45	11.4	2	AHU-4		
-	3	13.6			-	-			11.4	4	-		
-	5	13.6			-	-			11.4	6	-		
AHU-2	7	13.6	50	3	4#6, 1#10G, 1" C	4#6, 1#10G, 1" C	3	45	11.7	8	AHU-5		
-	9	13.6			-	-			11.7	10	-		
-	11	13.6			-	-			11.7	12	-		
AHU-3	13	13.6	50	3	4#6, 1#10G, 1" C	4#6, 1#10G, 1" C	3	45	11.7	14	AHU-6		
-	15	13.6			-	-			11.7	16	-		
-	17	13.6			-	-			11.7	18	-		
CU-1	19	7.5	30	3	4#10, 1#10G, 3/4" C	4#12, 1#12G, 1/2" C	3	20	4.8	20	CU-4		
-	21	7.5			-	-			4.8	22	-		
-	23	7.5			-	-			4.8	24	-		
CU-2	25	7.5	30	3	4#10, 1#10G, 3/4" C	4#10, 1#10G, 3/4" C	3	30	7	26	CU-5		
-	27	7.5			-	-			7	28	-		
-	29	7.5			-	-			7	30	-		
CU-3	31	7.5	30	3	4#10, 1#10G, 3/4" C	4#10, 1#10G, 3/4" C	3	30	7	32	CU-6		
-	33	7.5			-	-			7	34	-		
-	35	7.5			-	-			7	36	-		
UH-1	37	3.3	20	1	2#12, 1#12G, 1/2" C	2#10, 1#10G, 3/4" C	1	20	1	38	EF-1		
KEF-2/KSF-2	39	2	20	1	2#8, 1#10G, 3/4" C	2#8, 1#10G, 3/4" C	1	20	2.8	40	KEF-1/KSF-1		
SPACE	41				-	-				42	SPACE		
LOADS	-	(KVA)						124	124	119	(KVA)	-	DESCRIPTIVE LOADS
CONNECTED LOAD	-	238									0	-	LIGHTING
RESERVE	-	25									0	-	RECEPTACLES
TOTAL LOAD	-	297									0	-	COOLING
											232	-	HEATING
TOTAL AMPS	-	357									6	-	OTHER

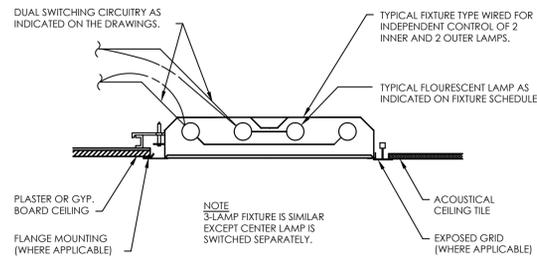
NOTES:
1) PROVIDE SHUNT TRIP BREAKER, INTERLOCK WITH FIRE ALARM SYSTEM

PANEL: LR	AMP	LUGS	NEMA	V(L)	(P)	(W)	V(LN)	MNT	KAIC	FDR:	2-RUNS EACH.		
LOCATION:	225	MB	1	208	3	4	120	SUR.	10	1-RUN 4#4/0, 1#4G, 3" C			
LOAD	CTK	LOAD	BKR	POLE	FEEDER/BRANCH CIRCUIT	FEEDER/BRANCH CIRCUIT	POLE	BKR	LOAD	CTK	LOAD		
SERVED	#	KVA	SIZE		SIZE	SIZE		SIZE	KVA	#	SERVED		
FCCU-1	1	1.6	20	2	3#12, 1#12G, 1/2" C	-		1	20	2	SPARE		
-	3	1.6			-	-		1	20	4	SPARE		
IWH-1	5	2.4	25	1	2#10, 1#10G, 3/4" C	2#10, 1#10G, 3/4" C	1	20	0.4	6	2 RCPTS		
5 RCPTS	7	1	20	1	2#8, 1#10G, 3/4" C	2#8, 1#10G, 3/4" C	1	20	0.8	8	4 RCPTS		
4 RCPTS	9	0.8	20	1	2#8, 1#10G, 3/4" C	2#10, 1#10G, 3/4" C	1	20	0.8	10	4 RCPTS		
3 RCPTS	11	0.6	20	1	2#10, 1#10G, 3/4" C	2#10, 1#10G, 3/4" C	1	20	1	12	5 RCPTS		
3 RCPTS	13	0.6	20	1	2#10, 1#10G, 3/4" C	2#10, 1#10G, 3/4" C	1	20	0.8	14	4 RCPTS		
4 RCPTS	15	0.6	20	1	2#10, 1#10G, 3/4" C	2#12, 1#12G, 1/2" C	1	20	0.2	16	1 RCPT		
1 RCPT	17	0.4	20	1	2#12, 1#12G, 1/2" C	2#12, 1#12G, 1/2" C	1	20	1	18	5 RCPTS		
5 RCPTS	19	1	20	1	2#12, 1#12G, 1/2" C	2#12, 1#12G, 1/2" C	1	20	0.2	20	1 RCPT		
3 RCPTS	21	0.6	20	1	2#12, 1#12G, 1/2" C	2#12, 1#12G, 1/2" C	1	20	0.8	22	4 RCPTS		
J-BOX	23	0.6	20	1	2#12, 1#12G, 1/2" C	2#12, 1#12G, 1/2" C	1	20	0.4	24	2 RCPTS		
EXTERIOR 4 RCPTS	25	1.2	20	1	2#12, 1#12G, 1/2" C	2#12, 1#12G, 1/2" C	1	20	0.4	26	2 RCPTS		
EXTERIOR RCPT	27	1.5	20	1	2#8, 1#10G, 3/4" C	3#6, 1#10G, 1" C	2	50	4	28	WASHER/DRYER		
EXTERIOR RCPT	29	1.5	20	1	2#12, 1#12G, 1/2" C	-				30	-		
HAND DRYER	31	2.3	25	1	2#10, 1#10G, 3/4" C	3#6, 1#10G, 1" C	2	50	4	32	WASHER/DRYER		
HAND DRYER	33	2.3	25	1	2#10, 1#10G, 3/4" C	-				34	-		
HAND DRYER	35	2.3	25	1	2#8, 1#10G, 3/4" C	2#12, 1#12G, 1/2" C	1	20	0.6	36	J-BOX		
HAND DRYER	37	2.3	25	1	2#8, 1#10G, 3/4" C	2#10, 1#10G, 3/4" C	1	25	2.5	38	HAND DRYER		
FACP	39	0.4	20	1	2#12, 1#12G, 1/2" C	2#10, 1#10G, 3/4" C	1	20	1	40	1 RCPT		
ELEV. CAB	41	1.5	20	1	2#12, 1#12G, 1/2" C	2#10, 1#10G, 3/4" C	1	20	1	42	1 RCPT		
TELE. BOARD	43	0.4	20	1	2#12, 1#12G, 1/2" C	2#10, 1#10G, 3/4" C	1	20	1	44	1 RCPT		
HAND DRYER	45	2.3	25	1	2#8, 1#10G, 3/4" C	2#8, 1#10G, 3/4" C	1	25	2.3	46	HAND DRYER		
PILOT SWITCH	47	0.4	20	1	2#10, 1#10G, 3/4" C	2#10, 1#10G, 3/4" C	1	20	0.4	48	PILOT SWITCH		
DAMPER	49	0.6	20	1	2#10, 1#10G, 3/4" C	-				50	SPACE		
SPARE	51		20	1	-	-				52	SPACE		
SPARE	53		20	1	-	-				54	SPACE		
SPARE	55		20	1	-	-				56	SPACE		
SPARE	57		20	1	-	-				58	SPACE		
SPARE	59		20	1	-	-				60	SPACE		
SPARE	61		20	1	-	-				62	SPACE		
SPARE	63		20	1	-	-				64	SPACE		
LOADS	-	(KVA)						20	23	19	(KVA)	-	DESCRIPTIVE LOADS
CONNECTED LOAD	-	60									0	-	LIGHTING
RESERVE - %	-	25									41	-	RECEPTACLES
TOTAL LOAD	-	75									3	-	COOLING
											0	-	HEATING
											0	-	MOTOR
											0	-	KITCHEN
TOTAL AMPS	-	208									16	-	OTHER

NOTES:
1) PROVIDE SHUNT TRIP BREAKER, INTERLOCK WITH FIRE ALARM SYSTEM

PANEL: K	AMP	LUGS	NEMA	V(L)	(P)	(W)	V(LN)	MNT	KAIC
----------	-----	------	------	------	-----	-----	-------	-----	------

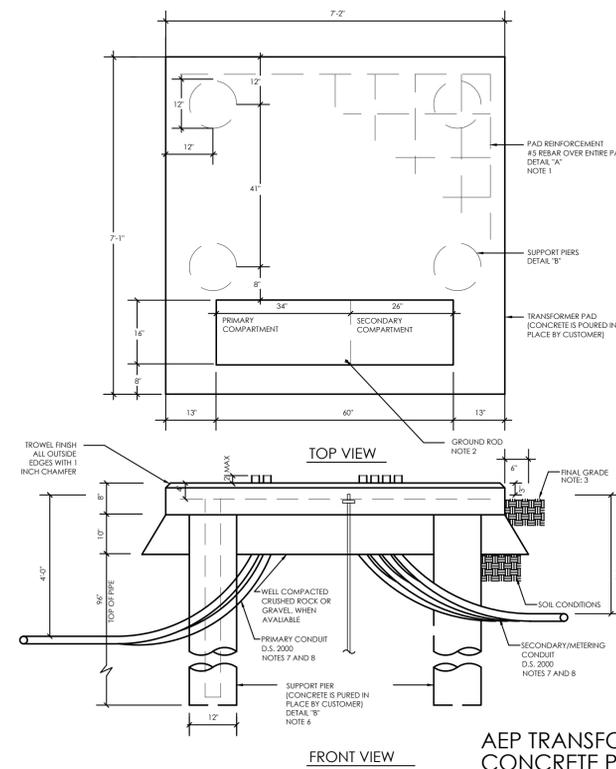
01



DUAL CIRCUIT FIXTURE WIRING
NO SCALE

02

CONCRETE PAD & PIERS FOR THREE PHASE PAD-MOUNTED TRANSFORMER

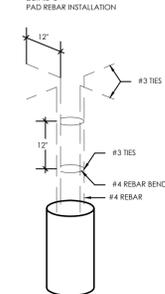


AEP TRANSFORMER CONCRETE PAD DETAIL
NO SCALE

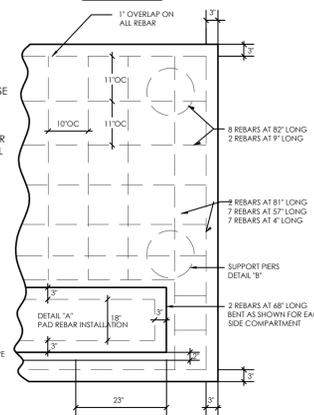
AMERICAN ELECTRIC POWER COMPANY DISTRIBUTION STANDARDS

- NOTE:
- SLAB REINFORCEMENT SHALL BE #5 REBARS, ON CENTER (OC) SPACING TO FOLLOW DIMENSIONS SHOWN ON THE DRAWING WITH 4" COVER. REINFORCING BARS SHALL CONFORM TO ASTM A615 GRADE 60. CONCRETE SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 4000 PSI AFTER 28 DAYS.
 - FOR GROUND ROD PLACEMENT, REFER TO DS 2235, 2236, OR 2237.
 - FINAL GRADE SHALL BE ESTABLISHED BEFORE INSTALLATION OF PAD.
 - CONCRETE PAD WITH PIERS IS TO BE INSTALLED OF PAD.
 - PIERS SHALL BE 12" MINIMUM IN DIAMETER, 8 FEET DEEP WITH 4 - #4 VERTICAL REBAR AND #3 TIES AT 12" ON CENTER (O/C), AND PROVIDE A MINIMUM 3" COVER. THE #4 BEND BARS SHOULD BE 12" LONG IN THE HORIZONTAL DIRECTION.
 - PIERS REBAR BENT IN THE HORIZONTAL DIRECTION SO THAT IT MAY TIE IN WITH PAD REBAR.
 - THE NUMBER AND PLACEMENT OF SECONDARY CONDUITS TO BE DETERMINED BY ENGINEERING. CONDUIT MAY EXTEND IN ANY DIRECTION AS REQUIRED BY THE CUSTOMER.
 - BURIAL DEPTH OF CONDUIT IS DEFINED AS THE DISTANCE BETWEEN FINAL GRADE AND THE TOP OF THE CONDUIT. UNLESS OTHERWISE DESIGNATED BY ENGINEERING, CONDUITS SHALL BE INSTALLED AT A BURIAL DEPTH OF NOT LESS THAN 4'-0" AND SECONDARY CONDUITS SHALL BE INSTALLED AT A BURIAL DEPTH OF NOT LESS THAN 3'-0". THESE INITIAL DEPTHS ARE TO ALLOW FOR CHANGES TO THE SURFACE CONDITIONS. LOCAL AGREEMENTS AND CODES MAY REQUIRE ADDITIONAL DEPTH. IF OTHER ARE KNOWN EXTENSIVE CHANGES TO THE FINAL GRADE SUCH THAT THEIR DEPTHS ARE NOT MAINTAINED, CORRECTIVE ACTION SHALL BE TAKEN.

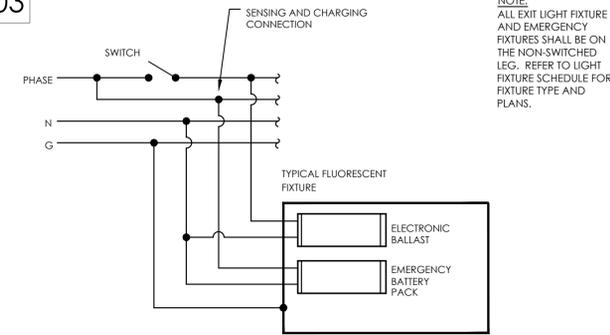
DETAIL - "B" - PIER REBAR INSTALLATION



DETAIL - "A" - PAD INSTALLATION TOP VIEW



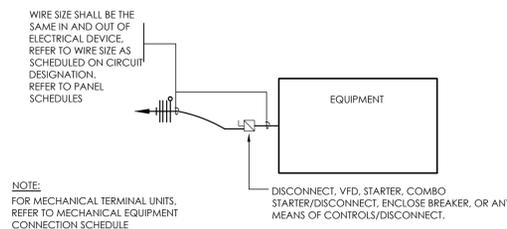
03



TYPICAL EMERGENCY LIGHT FIXTURE SCHEMATIC
NO SCALE

NOTE: ALL EXIT LIGHT FIXTURE AND EMERGENCY FIXTURES SHALL BE ON THE NON-SWITCHED LEG. REFER TO LIGHT FIXTURE SCHEDULE FOR FIXTURE TYPE AND PLANS.

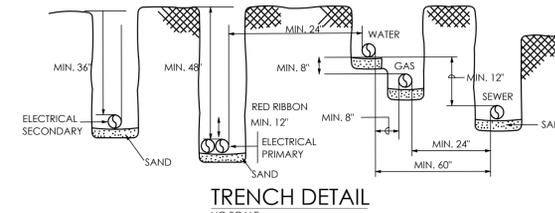
04



EQUIPMENT CIRCUIT DETAIL
NO SCALE

05

- CLEAR TRENCH OF ALL ROCKS AND DEBRIS BEFORE ADDING SAND CUSHION.
COMPACT TRENCH FILL TO 95% PROCTOR DENSITY.
MAINTAIN A MINIMUM OF 60 INCHES UNDISTURBED EARTH BETWEEN PARALLEL WATER AND SEWER LINES OR SUPPORT WATER LINE ON SEPARATE SHELF A MINIMUM OF 12" ABOVE SEWER LINE.
MAINTAIN A MINIMUM OF 24" HORIZONTALLY BETWEEN ELECTRICAL PRIMARY AND SEWER. MAINTAIN A MINIM OF 12" VERTICALLY OR 24" HORIZONTALLY BETWEEN ELECTRICAL PRIMARY AND WATER LINES, GAS LINES, TELEPHONE RACEWAYS AND CABLE RACEWAYS.

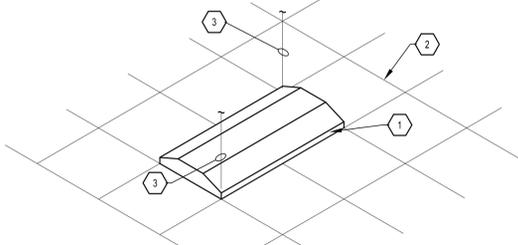


TRENCH DETAIL
NO SCALE

06

KEYED NOTES:

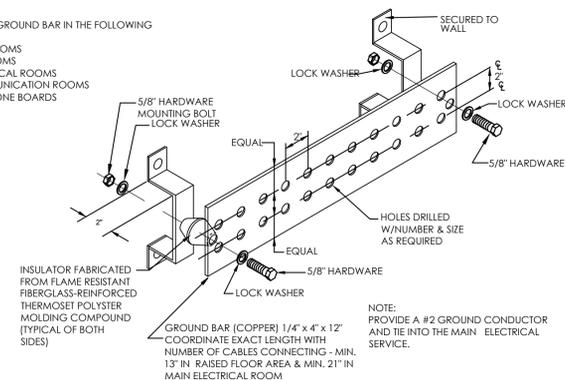
- 2x4 LAY-IN FLOURESCENT FIXTURE
- SUSPENDED CEILING
- TIE WIRE. CONNECT TO ALL FOUR CORNERS OF FIXTURE TO TOP OF STRUCTURE, INDEPENDENT OF CEILING SUPPORTS.



TYPICAL LAY-IN FIXTURE SUPPORT
NO SCALE

07

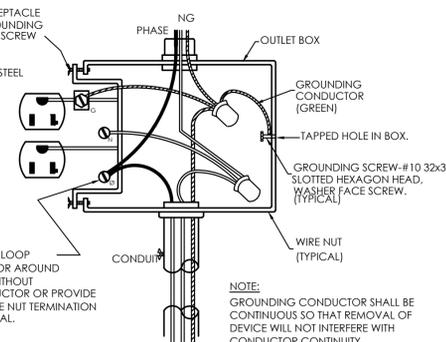
- PROVIDE GROUND BAR IN THE FOLLOWING ROOMS:
- MDF ROOMS
 - IDF ROOMS
 - ELECTRICAL ROOMS
 - COMMUNICATION ROOMS
 - TELEPHONE BOARDS



WALL MOUNTED SINGLE-POINT GROUND BAR DETAIL
NO SCALE

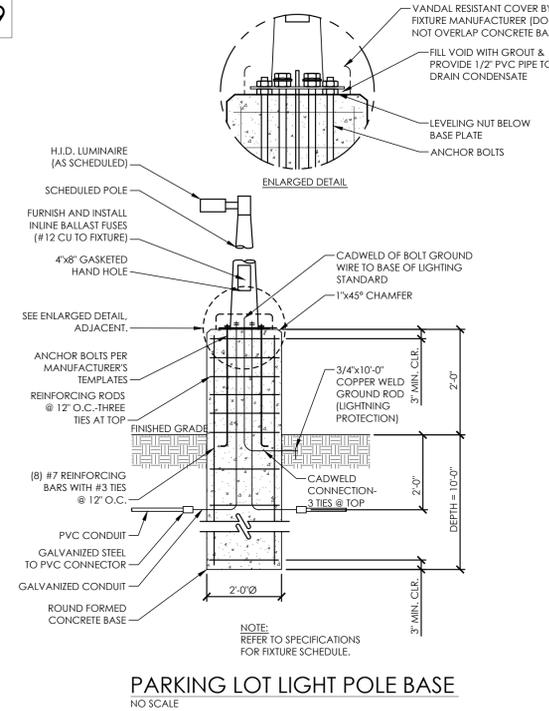
08

- NOTE:
- PROVIDE STAINLESS STEEL WALL PLATE.



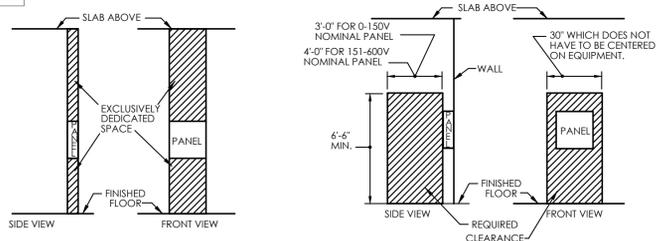
TYPICAL RECEPTACLE GROUNDING DETAIL
NO SCALE

09



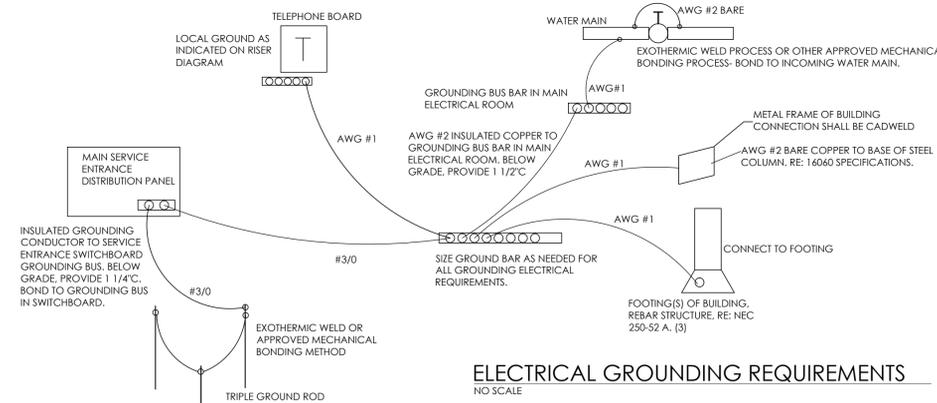
PARKING LOT LIGHT POLE BASE
NO SCALE

10



TYPICAL PANEL BOARD REQUIRED CLEARANCE
NO SCALE

11



ELECTRICAL GROUNDING REQUIREMENTS
NO SCALE

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AUSTIN, TEXAS 78736
(512) 327-0444 FAX (512) 301-4909



WEBB COUNTY YOUTH VILLAGE
REHABILITATION CENTER
111 CAMINO NUEVO ROAD, HWY 359
LAREDO, TEXAS 78046

PROJECT NUMBER

REVISIONS

SHEET TITLE

ELECTRICAL DETAILS

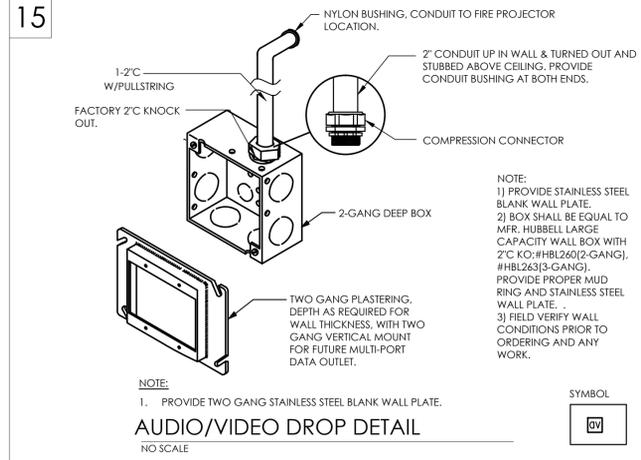
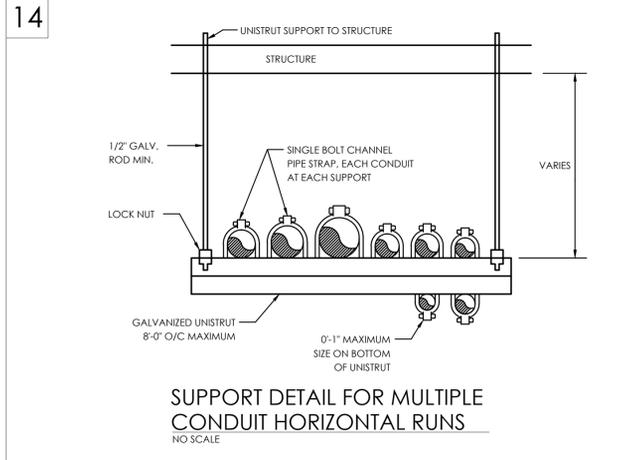
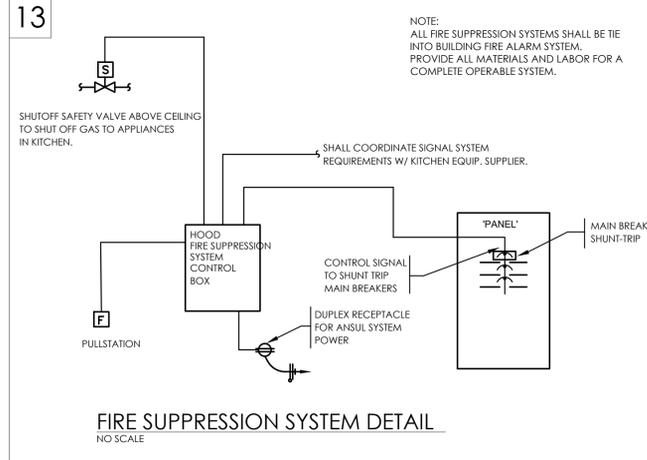
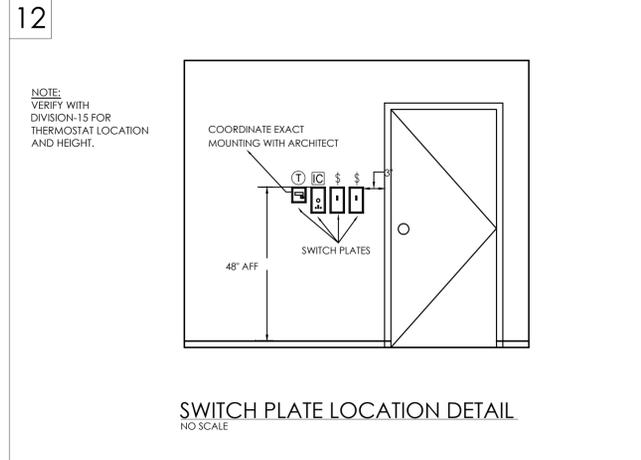
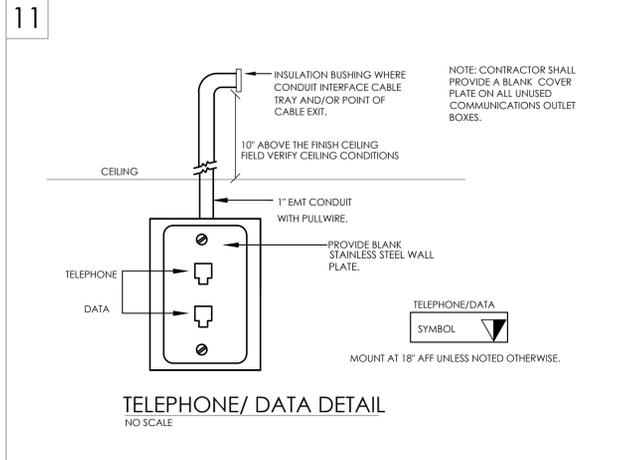
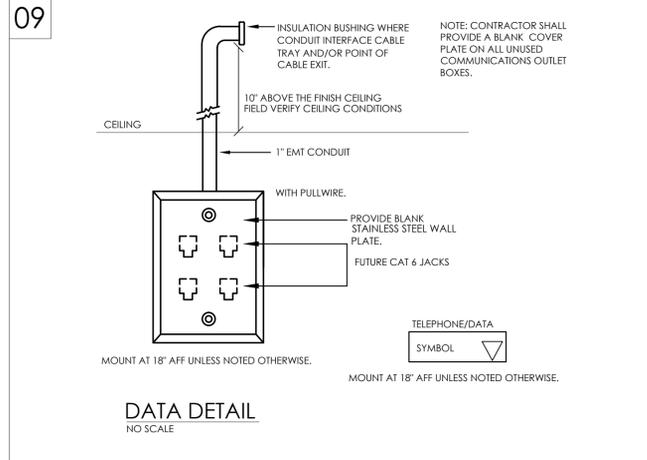
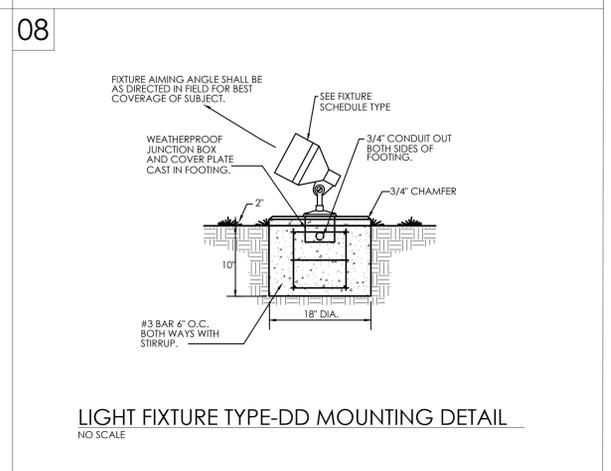
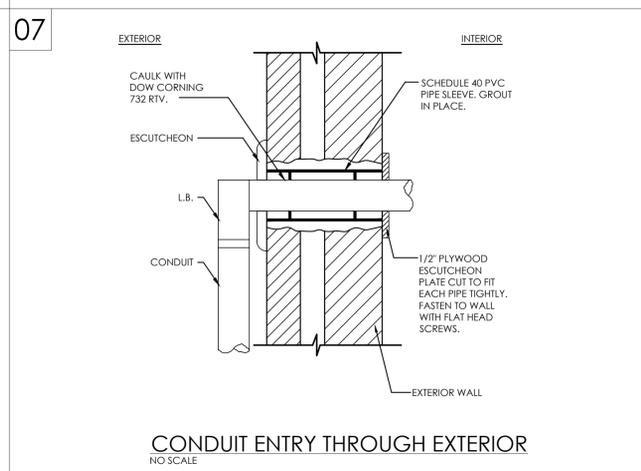
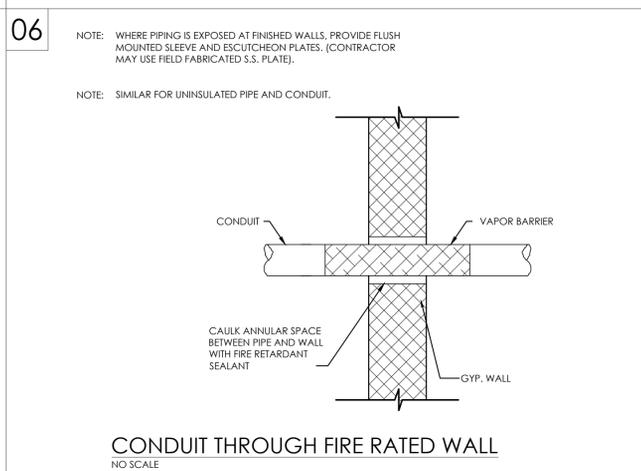
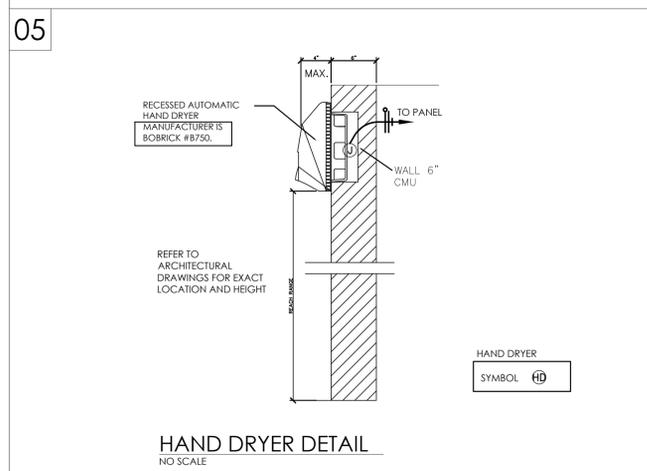
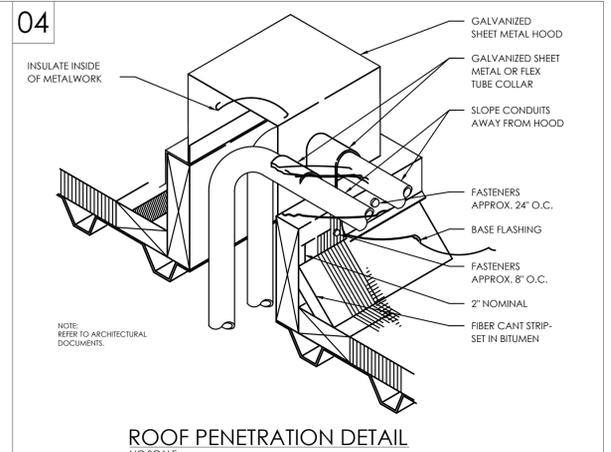
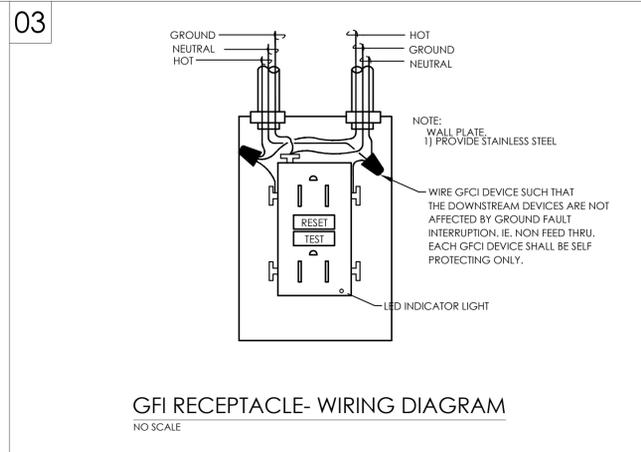
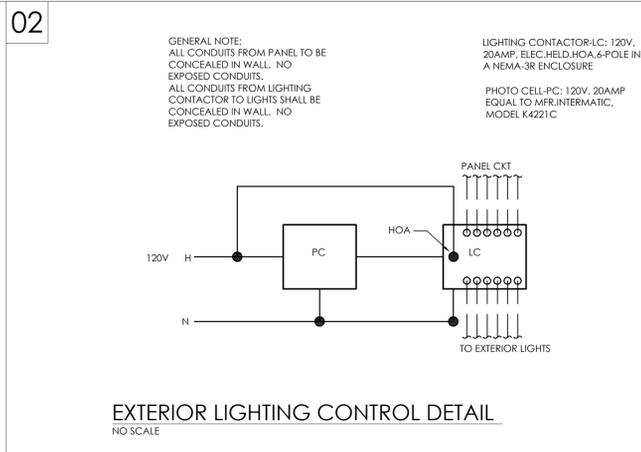
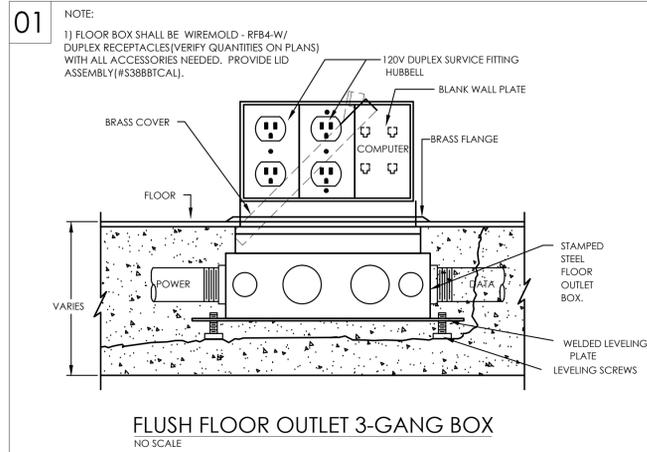
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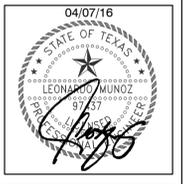
E6.1

DATE:

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AUSTIN, TEXAS 78736
(512) 327-0444 FAX (512) 301-4909



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PROJECT NUMBER
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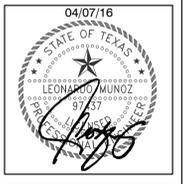
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ELECTRICAL
DETAILS

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E6.2

DATE:

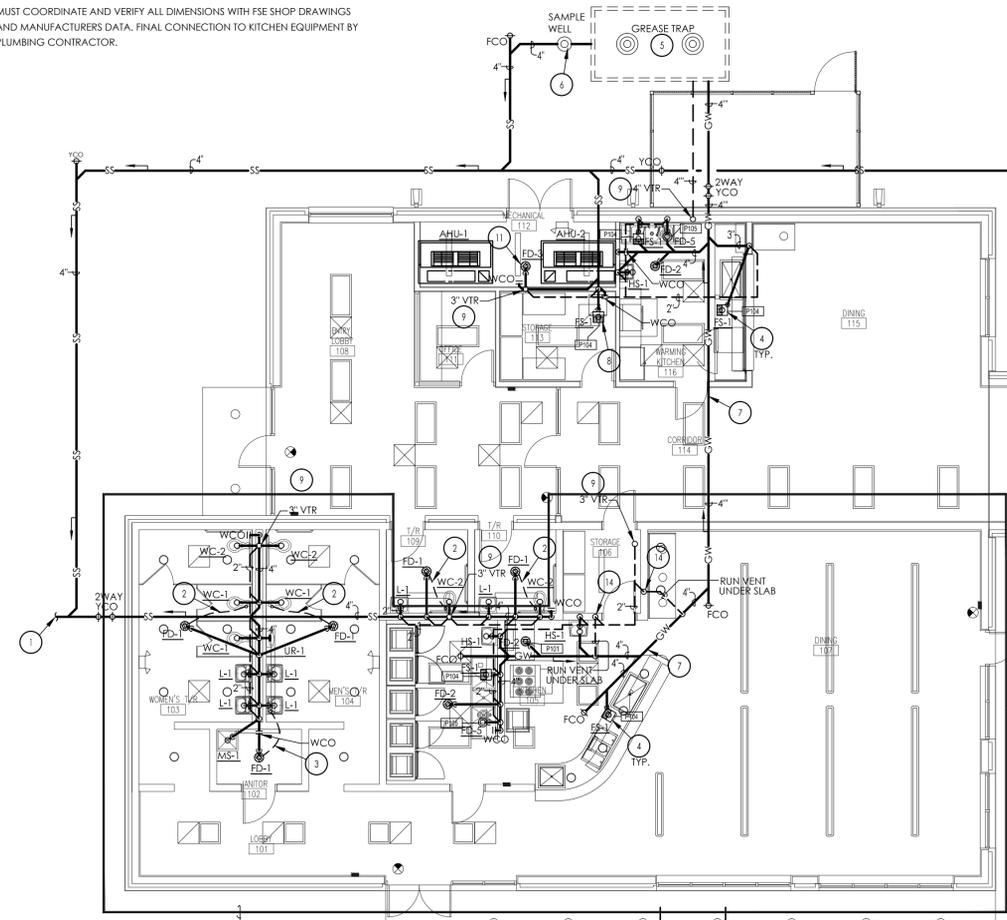
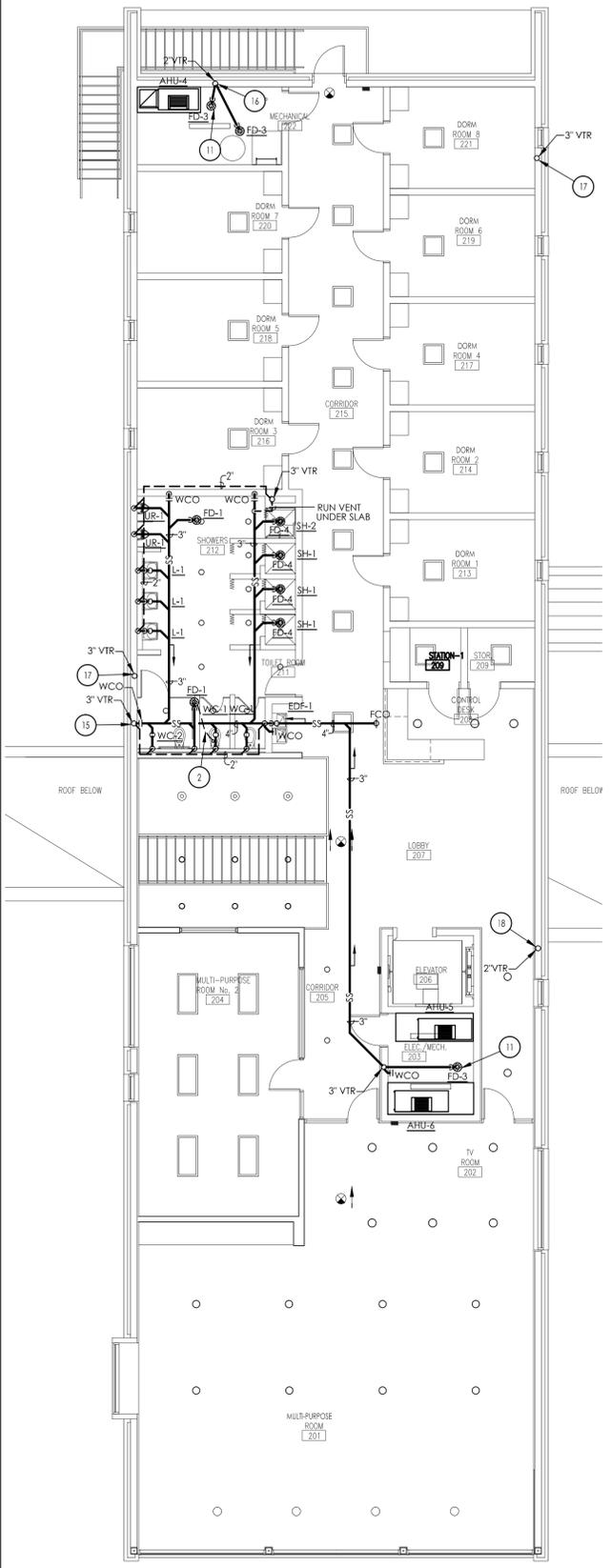
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KEYED NOTES: PLUMBING

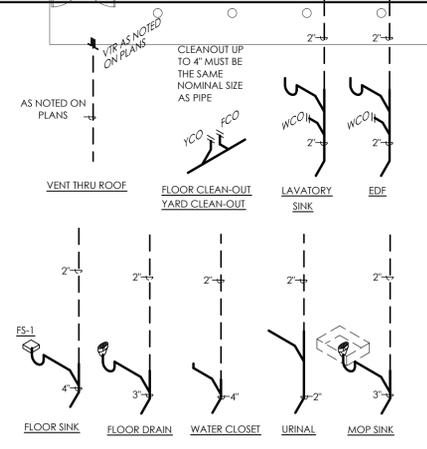
- REFER TO CIVIL SITE PLAN FOR CONTINUATION OF PLUMBING FIVE FEET AWAY FROM BUILDING. PLUMBING CONTRACTOR TO BE RESPONSIBLE FOR COORDINATION. VERIFICATION AND CONNECTION OF ALL UTILITIES TO SITE UTILITY STUB-OUTS. CONTRACTOR SHALL VERIFY LOCATIONS, INVERT SLOPE, ELEVATION, AND DIRECTION OF FLOW WITH CIVIL ENGINEERING DRAWINGS.
- 1/2" COPPER FROM TRAP PRIMER COVER WITH POLYETHYLENE SLEEVE "POLY SLEEVE" OR EQUAL. PROVIDE FLUSH VALVE TRAP SEAL PRIMER EQUAL TO SLOAN VBF-72-A. SEE DETAIL 12/P4.1.
- 1/2" COPPER FROM TRAP PRIMER COVER WITH POLYETHYLENE SLEEVE "POLY SLEEVE" OR EQUAL. PROVIDE LAVATORY/SINK WITH "PRIME-EZE" TRAP SEAL PRIMER BY JR SMITH. SEE DETAIL 08/P4.1.
- COORDINATE EXACT LOCATION OF ALL FLOOR DRAINS AND FLOOR SINKS WITH FSE CONTRACTOR. REFER TO MANUFACTURER'S DATA FOR ROUGH-INS AND INSTALLATION.
- PROVIDE AND INSTALL GREASE TRAP EQUAL TO PARK GT2000. SEE DETAIL 01/P4.2.
- PROVIDE AND INSTALL SAMPLE WELL EQUAL TO PARK SWB-154. SEE DETAIL 04/P4.2.
- PROVIDE 3/8" SLOPE ON ALL GREASE WASTE LINES.
- FLOOR SINK FOR CONDENSATE DRAIN FROM ICE MAKER. COORDINATE LOCATION WITH FSE CONTRACTOR.
- KEEP ALL VTRs AT LEAST 10 FEET AWAY FROM ANY FRESH AIR INTAKE. COORDINATE LOCATION OF ALL VTRs WITH HVAC CONTRACTORS.
- 4" SOIL STACK FROM RESTROOMS ABOVE.
- FLOOR DRAIN FOR CONDENSATE FROM AHU's. COORDINATE LOCATION WITH HVAC CONTRACTOR.
- ELEVATOR SUMP PUMP. REFER TO DETAIL 06/P4.2.
- 3" WASTE FROM FLOOR DRAIN ABOVE.
- 2" DRY VENT FOR COMBINATION WASTE AND VENT SYSTEM FOR FLOOR DRAIN.
- 4" WASTE DOWN, 3" VENT UP TO 3" VTR.
- 3" WASTE DOWN, 2" VENT UP TO 2" VTR.
- 3" VENT FROM RESTROOM BELOW. UP TO 3" VTR.
- 2" VENT FROM BELOW. UP TO 2" VTR.
- PROVIDE 3"UB DRAIN FOR FAN COIL UNIT. WITH DEEP SEAL P-TRAP. IN WALL. ALONG WITH DRAIN KIT. TRAP PRIMER AND 8X8 UNIVERSAL ACCESS DOOR EQUAL TO MIFAB SERIES UA. REFER TO DETAIL 09/P4.2.
- ALL PLUMBING SANITARY SEWER, GREASE WASTE, VENT, PLUMBING FIXTURES, PLUMBING EQUIPMENT, HARDWARE, ACCESSORIES (ETC.) THAT FALLS WITHIN INDICATED AREA SHALL BE UNDER ALTERNATE #4. IF ALTERNATE #4 IS NOT APPROVED, DISREGARD ALL PLUMBING FIXTURES IN INDICATED AREA. PROVIDE SANITARY SEWER, GREASE WASTE & VENT ROUGH-INS TO FUTURE PLUMBING FIXTURES & EQUIPMENT IN INDICATED AREA (AS PART OF THE BASE BID).

NOTE:
 DRAWING IS DIAGRAMMATIC ONLY. CONTRACTOR SHALL COORDINATE EXACT LOCATIONS OF PIPING, DEVICES AND EQUIPMENT WITH BUILDING ELEMENTS AND THE WORK OF OTHER TRADES.
 KITCHEN EQUIPMENT BY FSE CONTRACTOR.
 VERIFY EXACT LOCATION OF KITCHEN EQUIPMENT AND CONNECTIONS WITH FOOD SERVICE EQUIPMENT CONTRACTOR PRIOR TO ROUGH-IN. CONTRACTOR MUST COORDINATE AND VERIFY ALL DIMENSIONS WITH FSE SHOP DRAWINGS AND MANUFACTURER'S DATA. FINAL CONNECTION TO KITCHEN EQUIPMENT BY PLUMBING CONTRACTOR.



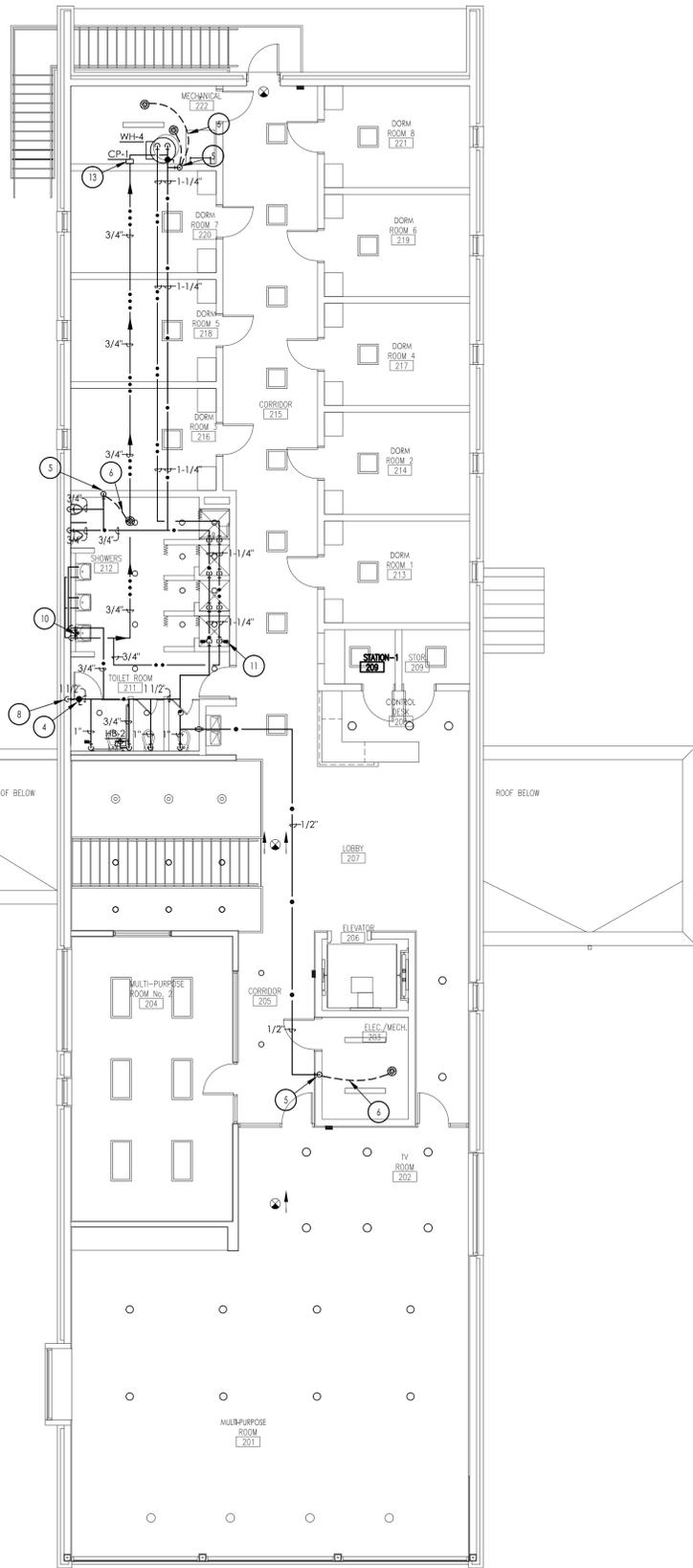
ALTERNATE No.4

PLUMBING SCHEDULE						
NO.	SIZE	DESCRIPTION	LOCATION	A.F.F.	SERVICE TO	REMARKS
P101	-	FLOOR DRAIN	FLOOR	0"	GENERAL	
P102	-	NUMBER NOT USED	-	-	-	
P103	-	NUMBER NOT USED	-	-	-	
P104	12"	SO. FLOOR SINK	FLOOR	0"	EQUIPMENT DRAIN	ETC. RE NOTE #3
P105	2"	DIRECT DRAIN	WALL	0"	DISPOSER	ETC. RE NOTE #3
P106	1/2"	DIRECT DRAIN	WALL	12"	HAND LAVATORY	ETC. RE NOTE #3
P107	1/2"	HOT AND COLD	WALL	12"	HAND LAVATORY	ETC. RE NOTE #3
P108	-	NUMBER NOT USED	-	-	-	
P109	3/4"	HOT & COLD WATER	WALL	12"	SINK FAUCET	ETC. RE NOTE #3
P110	-	NUMBER NOT USED	-	-	-	
P111	3/4"	HOT & COLD WATER	FLOOR	0"	FAUCET	ETC. RE NOTE #3
P112	-	NUMBER NOT USED	-	-	-	
P113	-	NUMBER NOT USED	-	-	-	
P114	1/2"	COLD WATER	WALL	72"	ICE MACHINE	ETC. CONDENSER CONNECTION
P115	1/2"	COLD WATER	WALL	44"	BEVERAGE EQUIPMENT	
P116	1/2"	HOT & COLD WATER	WALL	12"	FAUCET	
P117	-	NUMBER NOT USED	-	-	-	
P118	-	NUMBER NOT USED	-	-	-	
P119	-	NUMBER NOT USED	-	-	-	

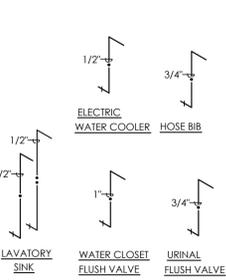


GREASE-INTERCEPTOR SIZING EQUATION			
SUBJECT TO 80% EFFICIENCY - TOTAL NUMBER OF FIXTURES (FU) IS 25			
TYPE OF FIXTURE (TRAP ARM SIZE)	FU	QTY	TOTAL FU
FLOOR DRAIN	3	0	0
FLOOR SINK	4	4	16
EMERGENCY FLOOR DRAIN	0	3	0
BAR SINK	2	0	0
VEGETABLE SINK	2	0	0
WASH SINK 3-COMP SINK	3	0	0
WASH SINK 2-COMP SINK	2	0	0
PRE-RINSE STATION	2	0	0
MOP SINK	2	0	0
HAND WASH SINK 1-COMP	1	3	3
WORK STOVE	4	0	0
GARBAGE GRINDER	3	2	6
CONSTANT FLOW	1	0	0
DISHWASHER	3	0	0
TOTAL FIXTURE UNIT COUNT			25

TOTAL FIXTURE UNIT COUNT	25
FLOW RATE	6
RETENTION TIME	12
GREASE INTERCEPTOR LIQUID HOLDING CAPACITY	1800



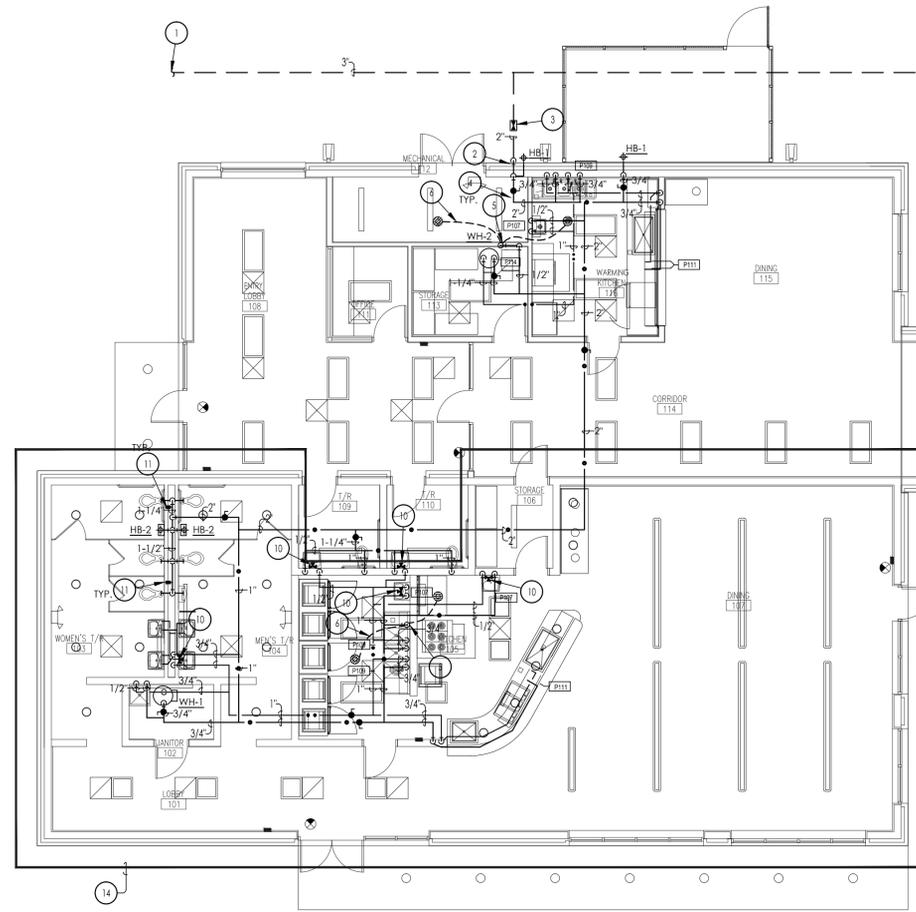
DOMESTIC WATER
2 - PLUMBING SECOND FLOOR PLAN
 SCALE: 1/8" = 1'-0"



KEYED NOTES: PLUMBING

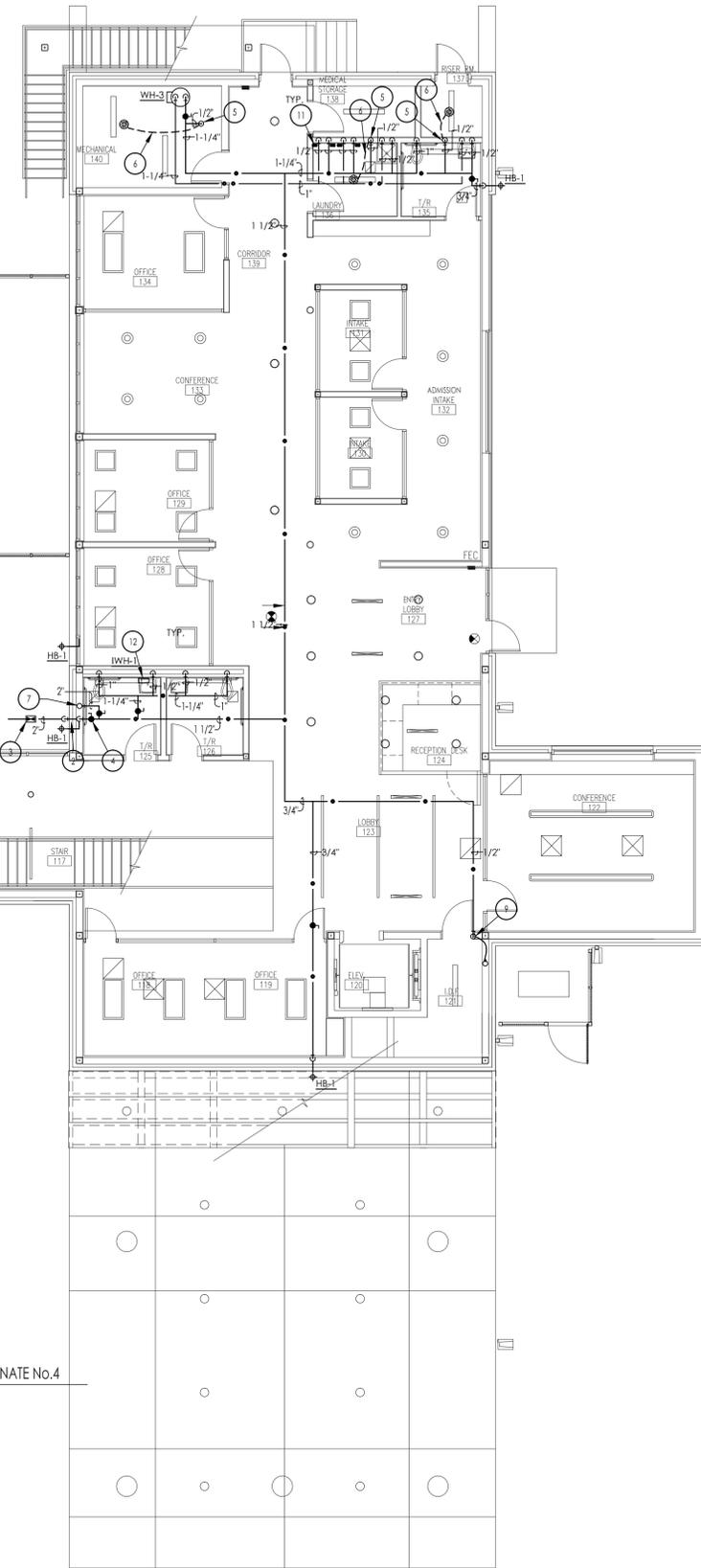
- 1 REFER TO CIVIL SITE PLAN FOR CONTINUATION OF PIPE. PLUMBING CONTRACTOR TO BE RESPONSIBLE FOR COORDINATION, VERIFICATION AND CONNECTION OF ALL UTILITIES TO SITE UTILITY STUB-OUTS.
- 2 WATER SERVICE ENTRANCE. REFER TO DETAIL 01/P4.1.
- 3 CUT-OFF VALVE IN CAST IRON BOX. SET BOX FLUSH WITH FINISHED GRADE.
- 4 BRONZE CUT-OFF BALL VALVE ABOVE CEILING. PROVIDE ACCESS PANEL WHERE LOCATED IN AN INACCESSIBLE CEILING. PANEL SHALL BE 12X12" PAINTED TO MATCH CEILING.
- 5 PRESSURE DROP ACTIVATED TRAP PRIMER. PROVIDE ACCESS PANEL IF INACCESSIBLE. SEE DETAIL 07/P4.1.
- 6 1/2" COPPER FROM TRAP PRIMER COVER WITH POLYETHYLENE SLEEVE "POLY SLEEVE" OR EQUAL. TYPICAL ALL TRAP-PRIMERS.
- 7 2" CW UP TO RESTROOM ON 2ND FLOOR.
- 8 2" CW FROM BELOW.
- 9 PRESSURE DROP ACTIVATED TRAP PRIMER. PROVIDE ACCESS PANEL IF INACCESSIBLE.
- 10 PROVIDE THERMOSTATIC MIXING VALVE EQUAL TO POWERS LF6480. SET TEMPERATURE PER LOCAL JURISDICTION REQUIREMENTS.
- 11 WATER HAMMER ARRESTOR, MIFAB OR EQUAL. PROVIDE ACCESS PANEL WHERE LOCATED IN AN INACCESSIBLE CEILING. PANEL SHALL BE 12X12" PAINTED TO MATCH CEILING.
- 12 PROVIDE UNDERCOUNTER POINT OF USE INSTANTANEOUS WATER HEATER TO SERVE TWO LAVATORIES.
- 13 HOT WATER RECIRCULATING PUMP. SEE DETAIL 05/P4.2.
- 14 ALL PLUMBING DOMESTIC COLD WATER, HOT WATER, PLUMBING FIXTURES, PLUMBING EQUIPMENT, HARDWARE, ACCESSORIES (ETC.) THAT FALLS WITHIN INDICATED AREA SHALL BE UNDER ALTERNATE #4. IF ALTERNATE #4 IS NOT APPROVED, DISREGARD ALL PLUMBING FIXTURES IN INDICATED AREA. PROVIDE COLD WATER & HOT WATER ROUGH-INS TO FUTURE PLUMBING FIXTURES IN INDICATED AREA (AS PART OF THE BASE BID).

DOMESTIC WATER
3 - TYPICAL RISER SCHEMATIC
 SCALE: NTS



PLUMBING SCHEDULE						
NO.	SIZE	DESCRIPTION	LOCATION	A.F.F.	SERVICE TO	REMARKS
P101	-	FLOOR DRAIN	FLOOR	0"	GENERAL	
P102	-	NUMBER NOT USED	-	-	-	
P103	-	NUMBER NOT USED	-	-	-	
P104	1/2"	5/8" FLOOR SINK	FLOOR	0"	EQUIPMENT DRAIN	ETC. SEE NOTE #3
P105	2"	DIRECT DRAIN	WALL	0"	DEPOSER	ETC. SEE NOTE #3
P106	1/2"	DIRECT DRAIN	WALL	15"	HAND LAVATORY	ETC. SEE NOTE #5
P107	1/2"	HOT AND COLD	WALL	15"	HAND LAVATORY	ETC. SEE NOTE #5
P108	-	NUMBER NOT USED	-	-	-	
P109	3/4"	HOT & COLD WATER	WALL	15"	SINK FAUCET	ETC. SEE NOTE #5
P110	-	NUMBER NOT USED	-	-	-	
P111	3/4"	HOT & COLD WATER	FLOOR	0"	FAUCET	ETC. SEE NOTE #5
P112	-	NUMBER NOT USED	-	-	-	
P113	-	NUMBER NOT USED	-	-	-	
P114	1/2"	COLD WATER	WALL	72"	ICE MACHINE	ETC. CONDENSER CONNECTION
P115	1/2"	COLD WATER	WALL	44"	BEVERAGE EQUIPMENT	
P116	1/2"	HOT & COLD WATER	WALL	15"	FAUCET	
P117	-	NUMBER NOT USED	-	-	-	
P118	-	NUMBER NOT USED	-	-	-	
P119	-	NUMBER NOT USED	-	-	-	

DOMESTIC WATER
1 - PLUMBING FIRST FLOOR PLAN
 SCALE: 1/8" = 1'-0"



ALTERNATE No.4

AUSLAND ARCHITECTS-METAFORM STUDIO ARCHITECTS
 ARCHITECTURE + PLANNING + INTERIORS
 6626 SILVERMINE DRIVE, SUITE 100A
 AUSTIN, TEXAS 78736
 (512) 327-0444 FAX (512) 301-4909



WEBB COUNTY YOUTH VILLAGE
 REHABILITATION CENTER
 111 CAMINO NUEVO ROAD, HWY 359
 LAREDO, TEXAS 78046

PROJECT NUMBER
 REVISIONS

SHEET TITLE
 PLUMBING
 DOM. WATER
 FLOOR PLAN

DRAWN BY:
 SHEET NO.

P2.1
 DATE:

TRINITY
 MEP ENGINEERING
 3533 Moreland Dr. Ste A | Westaco, Tx 78596
 p:956.973.0500 | f:956-351-5750
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 Texas Registered Engineering Firm - F10362
 Project number:14.4.07

ABBREV. DESCRIPTION

AC	ABOVE CEILING
AFF	ABOVE FINISHED FLOOR
ASA	AMERICAN STANDARDS ASSOCIATION
ASME	AMERICAN SOCIETY OF MECHANICAL ENGINEERS
ASTM	AMERICAN SOCIETY FOR TESTING MATERIALS
AW	ACID WASTE
AWWA	AMERICAN WATER WORKS ASSOCIATION
AV	ACID VENT
BTUH	BRITISH THERMAL UNIT PER HOUR
CA	COMPRESSED AIR
CI	CAST IRON
CO	CLEANOUT
CU	COPPER
DN	DOWN
EQ	EQUAL
FCO	FLOOR CLEANOUT
FF	FINISH FLOOR
FG	FINISH GRADE
FH	FIRE HYDRANT
GAL	GALLON(S)
GALV	GALVANIZED
GW	GREASE WASTE
HB	HOSE BIBB
HP	HORSEPOWER
NIC	NOT IN CONTRACT
NIS	NOT TO SCALE
OC	ON CENTER
RD	ROOF DRAIN(S)
RE:4/P:6	REFER TO DETAIL 4 DRAWING P-6
RO	REVERSE OSMOSIS
SD	STORM DRAIN
SPEC	SPECIFICATION
TYP	TYPICAL
UG	UNDERGROUND
UL	UNDERWRITERS LABORATORIES
VTR	VENT THRU ROOF
V	VACUUM
W/	WITH
WCO	WALL CLEAN OUT
YCO	YARD CLEAN OUT

PLUMBING PIPING MATERIAL:

- SANITARY DRAIN & VENT INSIDE BUILDING BELOW GRADE: SCHEDULE 40 PVC
- SANITARY DRAIN OUTSIDE BUILDING: SCHEDULE 40 PVC
- SANITARY DRAIN & VENT INSIDE BUILDING ABOVE GRADE: SCHEDULE 40 PVC
- SANITARY DRAIN & VENT IN PLENUM CEILING: NO-HUB CAST IRON
- DOMESTIC HOT & COLD WATER: COPPER, TYPE "L" HARD DRAWN
- DOMESTIC WATER BELOW GRADE: COPPER, TYPE "C" SOFT ANNEALED
- DOMESTIC WATER BELOW GROUND OUTSIDE OF BUILDING PIPING 2" SIZE AND SMALLER: COPPER, TYPE "L" HARD DRAWN
- DOMESTIC WATER BELOW GROUND OUTSIDE OF BUILDING PIPING OVER 2" SIZE: SDR 26 CLASS 160 PVC

LIBERTY PUMPS
ELV SERIES SUBMERSIBLE SUMP PUMP WITH OILTECTOR CONTROL

ELEVATOR SUMP SYSTEM SCHEDULE							
SYSTEM MODEL	SUBMERSIBLE PUMP DATA						
SYSTEM SIZE	MARK	FLOW CAP GPM	TDH	DISCH SIZE	RPM	HP	VOLT/PH
ELV-250	SP-1	50	15'	1 1/2"	1750	1/3	115/1

PLUMBING FIXTURE SCHEDULE						
MARK	FIXTURE TYPE	CONNECTION SIZE				DESCRIPTION
		San. Sewer	Vent	Cold Water	Hot Water	
WC-1	WATER CLOSET FLOOR MOUNTED	4"	2"	1"	-	ZURN MODEL NO. Z5655-BWL, FLOOR MOUNTED WATER CLOSET, WITH ELONGATED RIM, 15" RIM HEIGHT, VITREOUS CHINA, SIPHON JET FLUSH ACTION, 10"-12" ROUGH IN, WITH ZURN FLUSHVALVE MODEL NO. Z6000AV-HET 1.28 GPF, 1" TOP SPUD INLET AND 2 BOLT CAPS, WITH OPEN FRONT SEAT LESS COVER, FLUSH LEVER SHALL BE MOUNTED ON APPROACH SIDE OF FIXTURE.
WC-2	WATER CLOSET FLOOR MOUNTED ADULT HANDICAPPED	4"	2"	1"	-	ZURN MODEL NO. Z5665-BWL, FLOOR MOUNTED WATER CLOSET, WITH ELONGATED RIM, 16-3/4" RIM HEIGHT, VITREOUS CHINA, SIPHON JET FLUSH ACTION, 10"-12" ROUGH IN, WITH ZURN FLUSHVALVE MODEL NO. Z6000AV-HET 1.28 GPF, 1" TOP SPUD INLET AND 2 BOLT CAPS, WITH "BENEKE" OPEN FRONT SEAT LESS COVER MODEL 5335S, FLUSH LEVER SHALL BE MOUNTED ON APPROACH SIDE OF FIXTURE.
UR-1	URINAL (STANDARD & HANDICAPPED) REFER TO ARCH'L DRAWING FOR MOUNTING HEIGHTS	2"	2"	3/4"	-	ZURN MODEL NO. Z5738-206-00 SIPHON JET WALL HUNG URINAL, VITREOUS CHINA, 1/8 GPF FLUSH, COMPACT DESIGN, WITH INTEGRAL TRAP, 3/4" TOP INLET, 14" LP, INCLUDES WALL HANGERS, 2" IPS OUTLET FLANGE AND RUBBER GASKET, WITH ZURN FLUSHOMETER, 125 GPF MODEL NO. Z6003AV-ULF. PROVIDE ZURN CARRIER SYSTEM MODEL NO. Z-1221.
L-1	LAVATORY WALL HUNG ADULT HANDICAPPED REFER TO ARCH'L DRAWING FOR MOUNTING HEIGHTS	2"	2"	1/2"	1/2"	CRANE "HARWICH" MODEL NO. 1412V (20x18) WALL HUNG LAVATORY, WITH ANTI-SPLASH RIM AND HIGH BACK, CONCEALED FRONT OVERTHROW, INCLUDES WALL HANGER, VITREOUS CHINA, WITH FAUCET HOLES ON 4" CENTERS, PROVIDE FAUCET EQUAL TO MOEN MODEL 8886, TWO-HANDLE METERING FAUCET, VANDAL RESISTANT, ADA APPROVED, PROVIDE PROTECTIVE COVER ON P-TRAP AND STOPS.
HS-1	HAND SINK ADA	2"	2"	1/2"	1/2" TW	SLOAN MODEL NO. EHS-1000 STAINLESS STEEL ADA HAND WASHING SINK WITH SLOAN SENSOR OPERATED FAUCET MODEL NO. EIF-770 BDT, PROVIDE WITH THERMOSTATIC MIXING VALVE, PROVIDE WITH PLUG-IN TRANSFORMER EIF-233.
EDF-1	ELECTRIC WATER COOLER W/ Water Refilling Station REFER TO ARCH'L DRAWING FOR MOUNTING HEIGHTS	2"	2"	1/2"	-	B-I-LEVEL ELECTRIC WATER COOLER SHALL BE "ELKAY" MODEL NO. L21LBWSVRSK, WITH Elkay EZH2O Water Refilling Station, CAPACITY OF 8.0 GALLONS, STAINLESS STEEL BASIN WITH INTEGRAL DRAIN GRID AND EMBOSSED BUBBLER PAD, LEAD FREE ADA COMPLIANT, WITH ZURN CARRIER MODEL NO. Z-1225, WITH APRON MODEL NO. LKAPR-EL, TO COMPLY WITH TAS AND ADA.
SH-1	SHOWER & SHOWER HEAD	2"	2"	1/2"	1/2"	SHOWER SYSTEM EQUAL TO BRADLEY MODEL NO. 1C-TMV-51. INCLUDES INSTITUTIONAL SHOWER HEAD AND THERMOSTATIC MIXING VALVE VALVE.
SH-2	BUILT-IN SHOWER HANDICAPPED	2"	2"	1/2"	1/2"	SHOWER SYSTEM EQUAL TO BRADLEY MODEL NO. HN300-TMV-SX-AKV-RSD BARRIER FREE SHOWER UNIT, INCLUDES FIXED DIRECTION ADJUSTABLE SPRAYHEAD, DIVERTER VALVE, HAND-HELD SHOWER SPRAY, 2.0 GPM FLOW CONTROL, L-SHAPED GRAB BAR, BARRIER-FREE SEAT, SHOWER CURTAIN, ROD AND HOOKS. PROVIDE WITH OPTIONS: TMV (THERMOSTATIC MIXING VALVE), SX (SEVERE SERVICE SHOWERHEAD), AKV (ALLEN KEY VOLUME CONTROL), RSD (RECESSED SOAP DISH).
MS-1	MOP SINK	3"	2"	1/2"	1/2"	FIAT MODEL NO. TSB100, 24"x24"x12" TERRAZO MOP SINK, COMPLETE WITH FAUCET MODEL 830-AA, MOP SINK SHALL INCLUDE ALL HOSE BRACKETS, HOSE, AND MOP HANGER, WITH 3" DRAIN WITH STRAINER & DEEP SEAL P-TRAP, PROVIDE WALL GUARD MSG2424.
HB-1	HOSE BIB EXTERIOR GENERAL USE	-	-	3/4"	-	MILD TEMPERATURE WALL HYDRANT SHALL BE WADE MODEL 8600MT-175 3/4" INLET WITH BRONZE CASING, BRONZE FACE AND STRAIGHT INLET CONNECTION WITH INTEGRAL BACKFLOW PREVENTER.
HB-2	WALL FAUCET INTERIOR HOSE BIB	-	-	3/4"	-	WOODFORD MODEL B26 (IN BOX) P-3/4" INLET, WITH BACKFLOW PREVENTER AND LOOSE TEE KEY.
FS-1	FLOOR SINK	AS NOTED ON PLANS				EQUAL TO WADE PART # 9144-TY-16-26-27, 12" SQUARE A.R.C. TOP, WITH 8" DEEP SUMP STAINLESS STEEL FLOOR SINK LESS FLANGE, 3/4" GRATE, ALUMINUM SEDIMENT BUCKET.
FD-1	RESTROOM FLOOR DRAIN	AS NOTED ON PLANS				EQUAL TO JOSAM PART # 30003-6A-Y-50, CAST IRON BODY WITH CLAMP RING, FLANGE, ADJUSTABLE NIKALOY STRAINER, HUB OUTLET WITH GASKET AND 1/2" PRIMER TAP.
FD-2	TRACTOR GRATE FLOOR DRAIN	AS NOTED ON PLANS				EQUAL TO JOSAM PART # 30003-7E-Y-50, COATED CAST IRON BODY WITH CLAMP RING, TWO PIECE BODY WITH DOUBLE DRAINAGE FLANGE, WITH 7" TRACTOR GRATE STRAINER AND 1/2" PRIMER TAP, HUB OUTLET WITH GASKET.
FD-3	FLOOR DRAIN W/ FUNNEL	AS NOTED ON PLANS				EQUAL TO JOSAM PART # 30003-7E2-Y, COATED CAST IRON BODY WITH CLAMP RING, TWO PIECE BODY WITH DOUBLE DRAINAGE FLANGE, ADJUSTABLE NIKALOY FUNNEL STRAINER.
FD-4	SHOWER FLOOR DRAIN	AS NOTED ON PLANS				EQUAL TO JOSAM PART # 30002-6A-Y-50, CAST IRON BODY WITH CLAMP RING, FLANGE, ADJUSTABLE NIKALOY STRAINER, HUB OUTLET WITH GASKET AND 1/2" PRIMER TAP.
FD-5	6" FUNNEL DRAIN	AS NOTED ON PLANS				EQUAL TO JAY R. SMITH PART # 3822T.

NOTES:

- INSULATE ALL WATER AND WASTE PIPING UNDER LAVATORIES WITH HANDY-SHIELD JACKET BY PLUMBEREX.
- PROVIDE SINGLE FIXTURE WATER HAMMER ARRESTORS EQUAL TO MINI-RESTER, HYDRA-RESTER SIOUX CHIEF, FOR ALL PLUMBING FIXTURES IN THE WATER SUPPLY SYSTEM.
- ALL VITREOUS CHINA FIXTURES SHALL BE WHITE.

ELECTRIC WATER HEATER SCHEDULE							
DESIG.	STORAGE GALLONS	RECOVERY G.P.H.	DEGREE RISE °F	WATER TEMP. LEAVING	WATER INLET	WATER OUTLET	REMARKS
WH-1 WH-3	52	61	80°	140°	1-1/4"	1-1/4"	AO SMITH MODEL NO. DRE-52-12 12KW, 480V/3Ø, ELECTRIC TANK TYPE. PROVIDE WATS EXPANSION TANK DET-5
WH-2	52	31	80°	140°	1-1/4"	1-1/4"	AO SMITH MODEL NO. DRE-52-6KW, 480V/3Ø, ELECTRIC TANK TYPE. PROVIDE WATS EXPANSION TANK DET-5
WH-4	120	154	80°	120°	1-1/4"	1-1/4"	AO SMITH MODEL NO. DRE-120, 30KW, 480V/3Ø, ELECTRIC TANK TYPE. PROVIDE WATS EXPANSION TANK DET-10

INSTANTANEOUS ELECTRIC WATER HEATER SCHEDULE								
MARK	MODEL	VOLTAGE	KW	AMPS	DEGREE RISE AT 0.5 GPM	WATER INLET	WATER OUTLET	MANUFACTURER
IWH-1	SP2412	120	2.4	20	33	3/8"	3/8"	EEMAX "SINGLE POINT" WATER HEATER

RECIRCULATING PUMP SCHEDULE						
MARK	GPM	FEET HEAD	H.P.	RPM	VOLTS/PHASE	REMARKS
CP-1	0-11	0-10	1/40	3250	115 volts/Ø	EQUAL TO TACO MODEL 006-B4 CARTRIDGE CIRCULATOR, MAINTENANCE FREE, WET-ROTOR, IN-LINE, SINGLE STAGE CIRCULATOR. PROVIDE TACO CLOCK TIMER AND TEMPERATURE AQUASTAT MODEL NO. 00 TIMERES/AQUASTAT

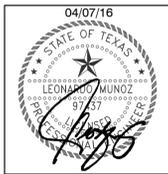
PLUMBING GENERAL NOTES: (ALL SHEETS)

- ALL WORK AND MATERIAL SHALL BE IN COMPLIANCE WITH ALL APPLICABLE CODES AS ADAPTED AND AMENDED BY THE INSPECTING AUTHORITIES.
- ALL PLUMBING WORK SHALL BE INSTALLED SO AS TO AVOID CONFLICT WITH ALL ELECTRICAL WORK, MECH. WORK AND STRUCTURAL MEMBERS. COORDINATE WITH MECHANICAL, ELEC. AND STRUCTURAL FOR PROPER CLEARANCES. CONTRACTOR SHALL COORDINATE AND ESTABLISH A SEQUENCE OF INSTALLATION WITH OTHER TRADES WORKING ON THE PROJECT.
- REFER TO ARCHITECTURAL DRAWINGS AND SPECIFICATIONS FOR PHASING AND SEQUENCE OF CONSTRUCTION OF WORK.
- SLEEVE ALL OUTSIDE WALL, FLOOR SLAB, AND GRADE BEAM PENETRATIONS PER DETAILS AND PER CODE.
- LOCATE ALL PLUMBING VENTS TO ROOF (VTR) SO THAT THEY TERMINATE A MINIMUM OF 1'-0" AWAY FROM ANY VERTICAL SURFACE AND 10'-0" AWAY FROM ANY OUTSIDE AIR INTAKES.
- RECORD INVERT ELEVATIONS OF ALL 'YCO'S ON "AS-BUILT" DRAWINGS.
- ALL SANITARY SEWER PIPING 4" AND LARGER SHALL BE INSTALLED AT 1/8" PER FT. MINIMUM. ALL SANITARY SEWER PIPING 3" AND SMALLER SHALL BE INSTALLED AT 1/4" PER FT. MINIMUM.
- PLUMBING CONTRACTOR SHALL PAY FOR ALL UTILITY CONNECTIONS FEES, PERMITS, TESTS AND INSPECTIONS. FURNISH 3 COPIES OF INSPECTION CERTIFICATE BEFORE REQUESTING FINAL PAYMENT. PLUMBING CONTRACTOR TO BE RESPONSIBLE FOR COORDINATION, VERIFICATION AND CONNECTION OF ALL UTILITIES TO SITE UTILITY STUB-OUTS. REFERENCE ASSOCIATED ARCHITECTURAL, ELECTRICAL, MECHANICAL, STRUCTURAL, KITCHEN AND CIVIL DRAWINGS FOR RELATED INFORMATION.
- PLUMBING CONTRACTOR SHALL BE RESPONSIBLE FOR PATCHING AND REPAIRING ALL AREAS WHICH ARE DAMAGED BY HIS OPERATIONS.
- CUTTING OF CONCRETE FLOORS SHALL BE BY MACHINE SAW, HOLES FOR PIPES (WALL OR FLOOR) SHALL BE DONE WITH CORE DRILLING EQUIPMENT WITH PRIOR APPROVAL FROM THE STRUCTURAL ENGINEERS.
- PRESSURE TEST ALL INSTALLATIONS PRIOR TO CONNECTING EQUIPMENTS.
- LABEL ALL PIPING PER ANSI STANDARD.
- INSULATE ALL PIPING AS STATED IN SPECIFICATIONS.
- INSTALL SHUT-OFF VALVES (STOPS) AND PIPING UNIONS AT EACH PIECE OF EQUIPMENT, PLUMBING FIXTURES, AND BRANCHES TO FIXTURE GROUPS. VALVES SHALL BE LOCATED IN AN ACCESSIBLE LOCATION, OR ACCESS PANELS PROVIDED AS NECESSARY.
- PROVIDE ANY BACK FLOW PREVENTION DEVICE REQUIRED BY CODE OR GOVERNING AUTHORITIES. CONTRACTOR SHALL VERIFY THIS WITH CITY OR LOCAL AGENCIES AND INCLUDE COST OF SAME IN BID. CONTRACTOR TO HAVE BACK FLOWS CERTIFIED.
- ALL EXPOSED PIPING FOR DESIGNATED DISABLED ACCESS FIXTURES SHALL BE COVERED OR OTHERWISE WRAPPED IN ACCORDANCE WITH A.D.A. REQUIREMENTS AND LOCAL AUTHORITY.
- ALTERNATE MATERIALS NOT IDENTIFIED IN SPECIFICATIONS/DRAWINGS BUT APPROVED BY LOCAL AUTHORITY SHALL BE SUBMITTED TO ARCHITECT AND PLUMBING ENGINEER FOR REVIEW PRIOR TO INSTALLATION.
- ISOMETRIC DIAGRAMS ARE FOR SIZING PURPOSES ONLY AND SHALL NOT BE USED FOR MATERIAL TAKE-OFFS, OR BE CONSTRUED TO INDICATE ACTUAL SITE INSTALLATION.
- DRAWING IS SCHEMATIC IN NATURE AND SHOW THE GENERAL LAYOUT OF THE PLUMBING SYSTEM. CONTRACTOR SHALL COORDINATE EXACT LOCATIONS OF PIPING, DEVICES AND EQUIPMENT WITH BUILDING ELEMENTS AND THE WORK OF OTHER TRADES.
- EVERY FLOOR DRAIN, FLOOR SINK OR HUB DRAIN SHALL BE SERVED BY AN AUTOMATIC TRAP PRIMER.
- REFER TO KITCHEN EQUIPMENT PLAN AND SPECIFICATIONS. INFORMATION SHOWS EXACT LOCATIONS AND NECESSARY PLUMBING REQUIREMENTS FOR THE KITCHEN EQUIPMENT. COORDINATE WITH KITCHEN EQUIPMENT SUPPLIER.
- ALL PLUMBING FIXTURES IDENTIFIED SHALL BE PROVIDED AND INSTALLED BY THE PLUMBING CONTRACTOR UNLESS NOTED OTHERWISE.
- INSTALL VACUUM BREAKERS AT ALL THREADED HOSE CONNECTIONS AND AT ALL CONNECTIONS WHERE CROSS-CONTAMINATION COULD OCCUR.
- PIPING SHALL NOT BE INSTALLED OVER ELECTRICAL EQUIPMENT.
- CONTACT ARCHITECT BEFORE PENETRATING STRUCTURAL ELEMENTS WITH PIPING, EQUIPMENT, ETC.
- VERIFY EXACT LOCATIONS OF "HVAC" EQUIPMENT WITH MECHANICAL DRAWINGS. VERIFY PRIOR TO ANY INSTALLATION THAT THERE IS SUFFICIENT SPACE IN WALLS, CHASES AND CEILING CAVITIES FOR PLUMBING SYSTEM PIPING, VENTS, EQUIPMENT, ETC.
- PROVIDE ACOUST-O-PLUMB PIPE CLAMPS ON ALL DOMESTIC WATER PIPES 1" AND SMALLER IN SIZE. REFER TO FLOOR PLANS AND RISER DIAGRAMS.
- FIRESTOP ALL PENETRATIONS THRU FIRE-RATED ASSEMBLIES. REFER TO SPECIFICATIONS AND ARCHITECTURAL DRAWINGS.
- CAULK AROUND ALL PLUMBING FIXTURES. CAULK COLOR TO MATCH FIXTURE COLOR.
- SEAL ALL EXTERIOR WALL AND ROOF PENETRATIONS WATER TIGHT.
- CLEANING CLEAN AND DISINFECT POTABLE DOMESTIC WATER PIPING AS FOLLOWS:
 - PURGE NEW PIPING AND PARTS OF EXISTING DOMESTIC WATER PIPING THAT HAVE BEEN ALTERED, EXTENDED, OR REPAIRED BEFORE USING.
 - USE PURGING AND DISINFECTING PROCEDURES PRESCRIBED BY AUTHORITIES HAVING JURISDICTION OR, IF METHODS ARE NOT PRESCRIBED, PROCEDURES DESCRIBED IN EITHER AWWA C651 OR AWWA C652 OR AS DESCRIBED BELOW:
 - FLUSH PIPING SYSTEM WITH CLEAN, POTABLE WATER UNTIL DIRTY WATER DOES NOT APPEAR AT OUTLETS.
 - FILL AND ISOLATE SYSTEM ACCORDING TO EITHER OF THE FOLLOWING:
 - FILL SYSTEM OR PART THEREOF WITH WATER/CHLORINE SOLUTION WITH AT LEAST 50 PPM (50 MG/L) OF CHLORINE. ISOLATE WITH VALVES AND ALLOW TO STAND FOR 24 HOURS.
 - FILL SYSTEM OR PART THEREOF WITH WATER/CHLORINE SOLUTION WITH AT LEAST 200 PPM (200 MG/L) OF CHLORINE. ISOLATE AND ALLOW TO STAND FOR THREE HOURS.
 - FLUSH SYSTEM WITH CLEAN, POTABLE WATER UNTIL NO CHLORINE IS IN WATER COMING FROM SYSTEM AFTER THE STANDING TIME.
 - SUBMIT WATER SAMPLES IN STERILE BOTTLES TO AUTHORITIES HAVING JURISDICTION. REPEAT PROCEDURES IF BIOLOGICAL EXAMINATION SHOWS CONTAMINATION.
 - PREPARE AND SUBMIT REPORTS OF PURGING AND DISINFECTING ACTIVITIES.
 - CLEAN INTERIOR OF DOMESTIC WATER PIPING SYSTEM. REMOVE DIRT AND DEBRIS AS WORK PROGRESSES.

PLUMBING SYMBOL LEGEND			
SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
	BALL VALVE		DOMESTIC COLD WATER
	CHECK VALVE		DOMESTIC HOT WATER
	GATE VALVE		DOMESTIC HOT WATER RETURN
	UNION		SANITARY SEWER VENT
	DIRECTION OF FLOW		SANITARY WASTE LINE
	GREASE WASTE LINE		140° HOT WATER
	FLOOR CLEANOUT		SANITARY DIRECTION OF FLOW
	FLOOR SINK		BRANCH - TOP CONNECTION
	FLOOR DRAIN		PIPE RISER
	WALL HYDRANT OR HOSE BIBB		PIPE DROP
	FILTERED WATER		POINT OF CONNECTION [APPROXIMATED FIELD VERIFY EXACT POINT OF CONNECTION]

NOTE: 1. NOT ALL SYMBOLS USED ON THIS PROJECT
2. INSTALL WATER CLOSET FLUSH VALVE HANDLE TOWARDS WIDER SIDE OF WATER CLOSET OR DOOR OPENING.
3. INSTALL ADA APPROVED FLUSH VALVE HANDLE FOR ADA PLUMBING FIXTURES.

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ARCHITECTURE + PLANNING + INTERIORS
6626 SILVERMINE DRIVE, SUITE 100A
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(512) 327-0444 FAX (512) 301-4909



WEBB COUNTY YOUTH VILLAGE REHABILITATION CENTER
111 CAMINO NUEVO ROAD, HWY 359
LAREDO, TEXAS 78046

PROJECT NUMBER

REVISIONS

SHEET TITLE
PLUMBING
SCHEDULE

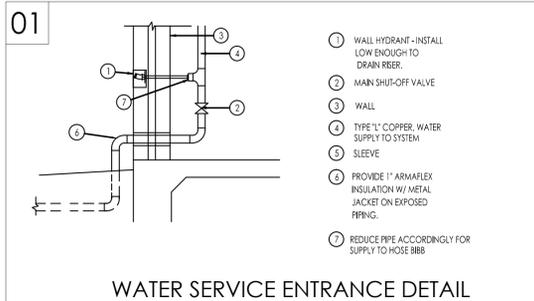
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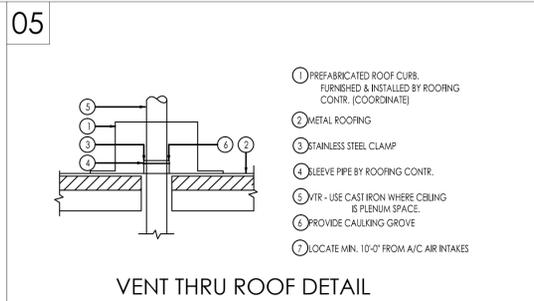
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TRINITY
MEP ENGINEERING
3533 Moreland Dr. Ste A | Westaco, Tx 78596
p:956.973.0500 | f:956-951-5750
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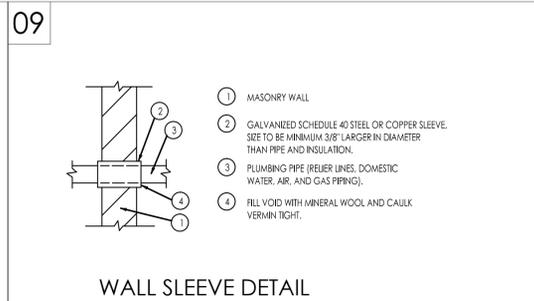
WATER SERVICE ENTRANCE DETAIL

NO SCALE



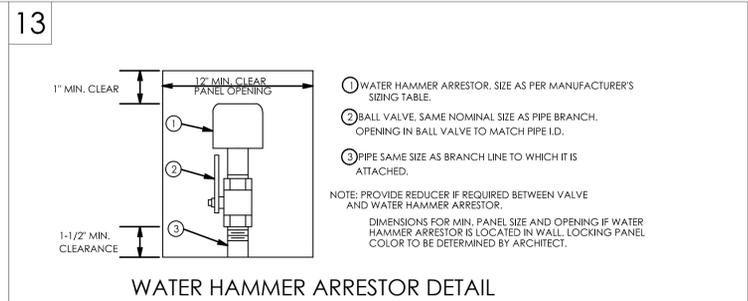
VENT THRU ROOF DETAIL

NO SCALE



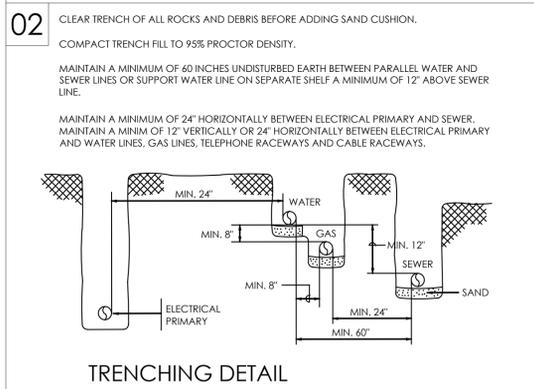
WALL SLEEVE DETAIL

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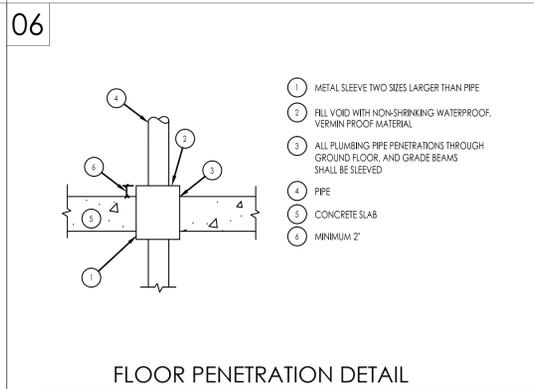
WATER HAMMER ARRESTOR DETAIL

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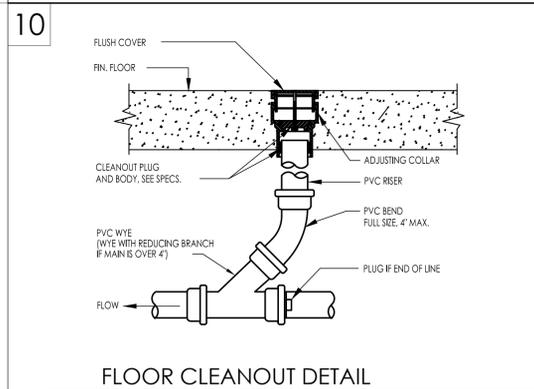
TRENCHING DETAIL

NO SCALE



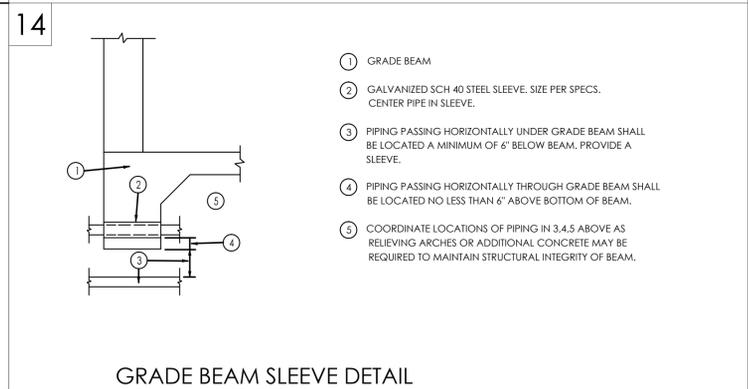
FLOOR PENETRATION DETAIL

NO SCALE



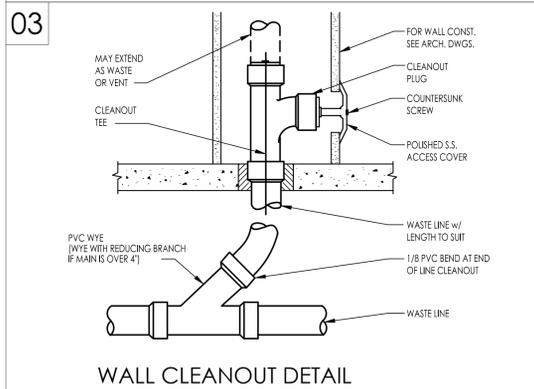
FLOOR CLEANOUT DETAIL

NO SCALE



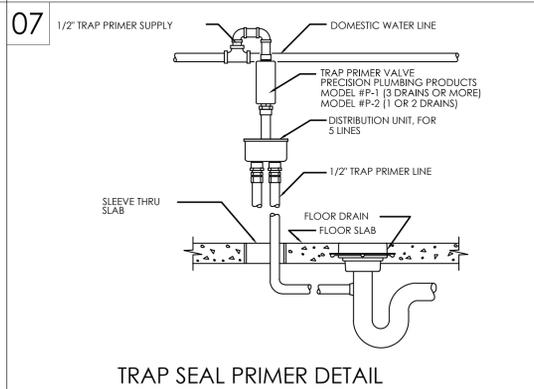
GRADE BEAM SLEEVE DETAIL

NO SCALE



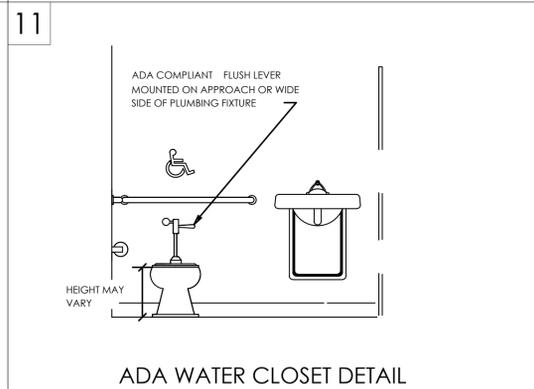
WALL CLEANOUT DETAIL

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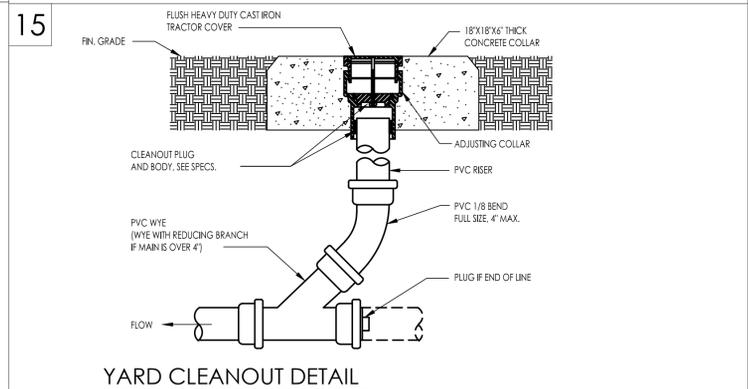
TRAP SEAL PRIMER DETAIL

NO SCALE



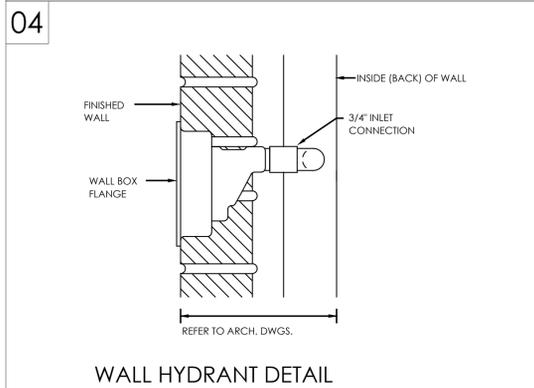
ADA WATER CLOSET DETAIL

NO SCALE



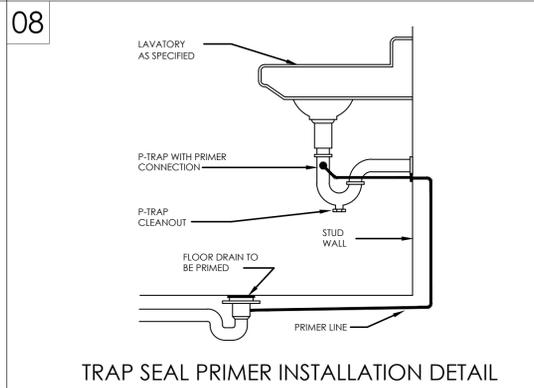
YARD CLEANOUT DETAIL

NO SCALE



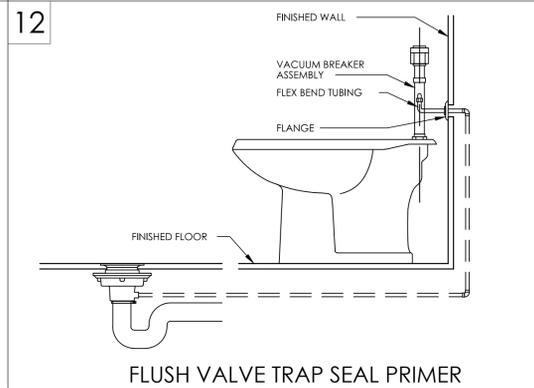
WALL HYDRANT DETAIL

NO SCALE



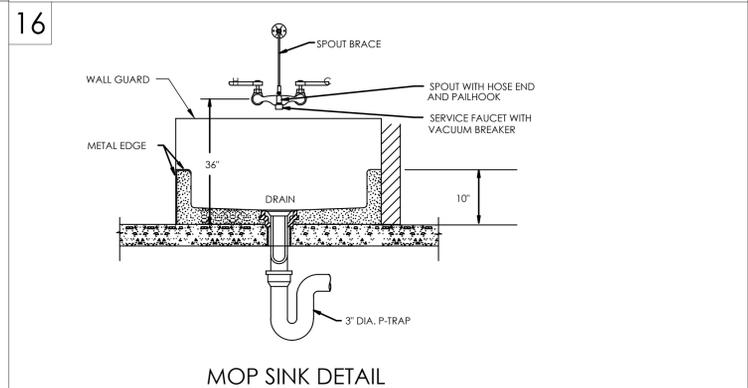
TRAP SEAL PRIMER INSTALLATION DETAIL

NO SCALE



FLUSH VALVE TRAP SEAL PRIMER

NO SCALE



MOP SINK DETAIL

NO SCALE

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 ARCHITECTURE + PLANNING + INTERIORS
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 AUSTIN, TEXAS 78736
 (512) 327-0444 FAX (512) 301-4909



WEBB COUNTY YOUTH VILLAGE
REHABILITATION CENTER
 111 CAMINO NUEVO ROAD, HWY 359
 LAREDO, TEXAS 78046

PROJECT NUMBER
REVISIONS

SHEET TITLE
PLUMBING
 DETAILS

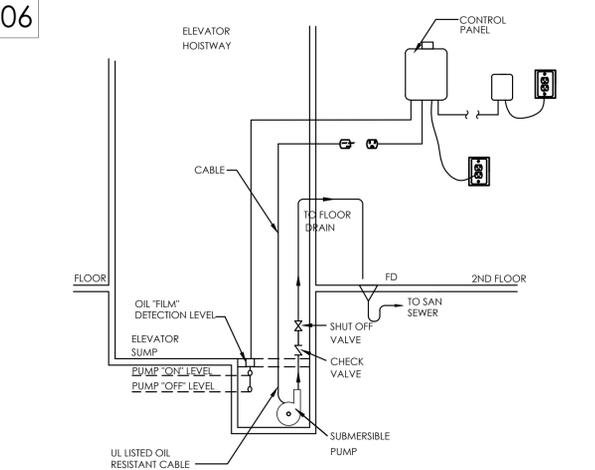
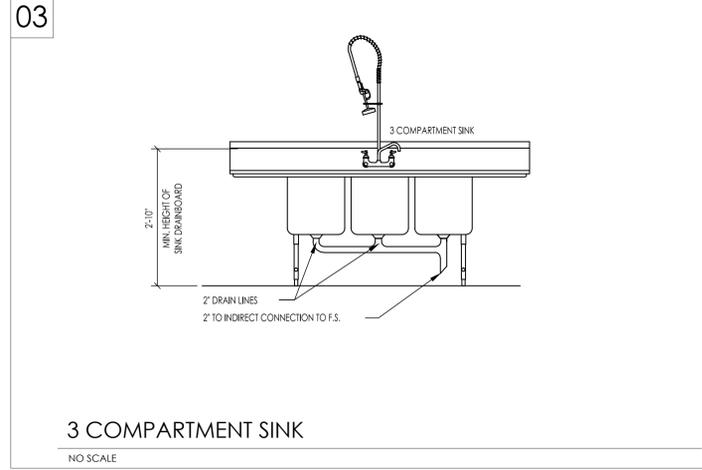
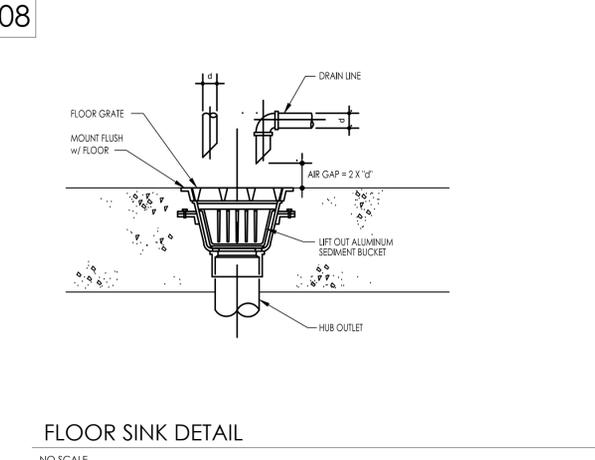
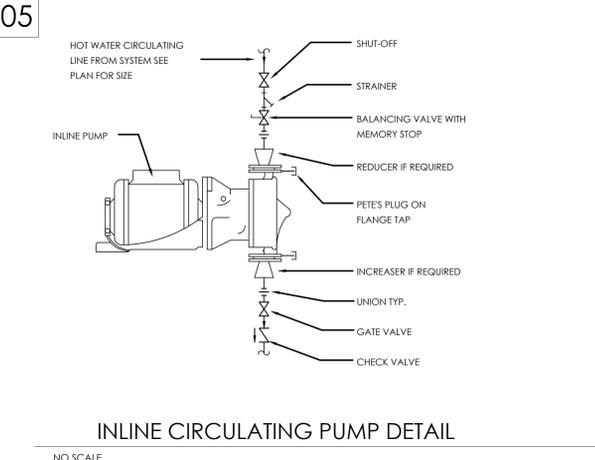
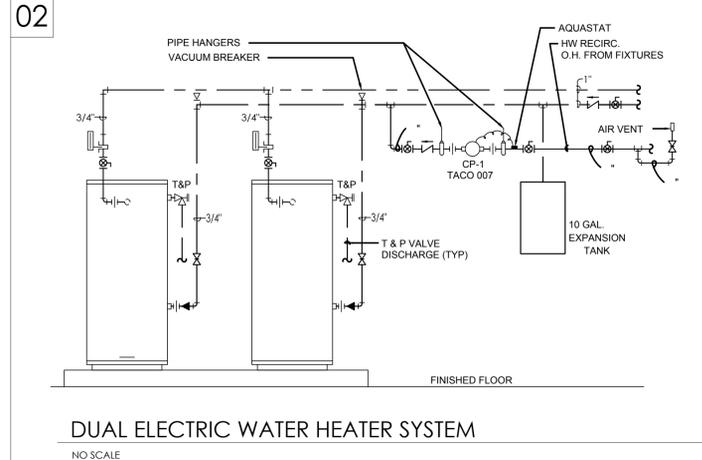
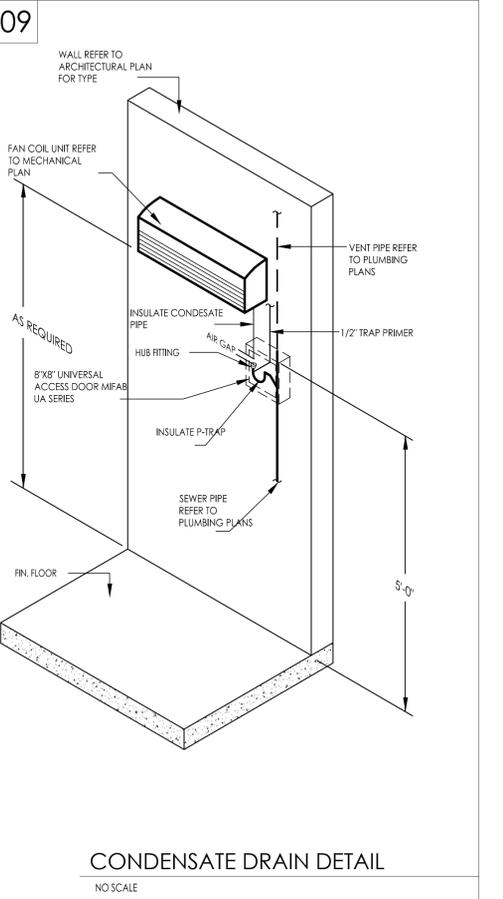
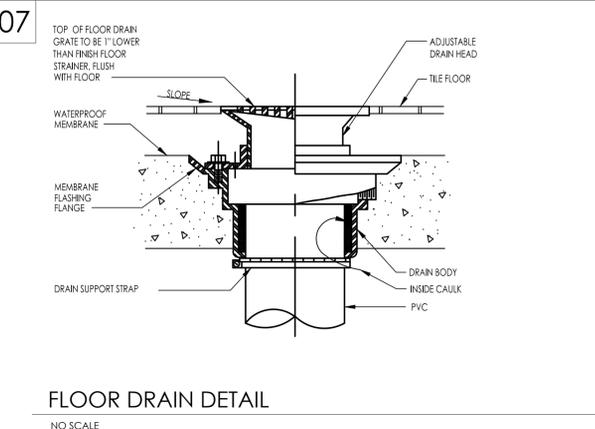
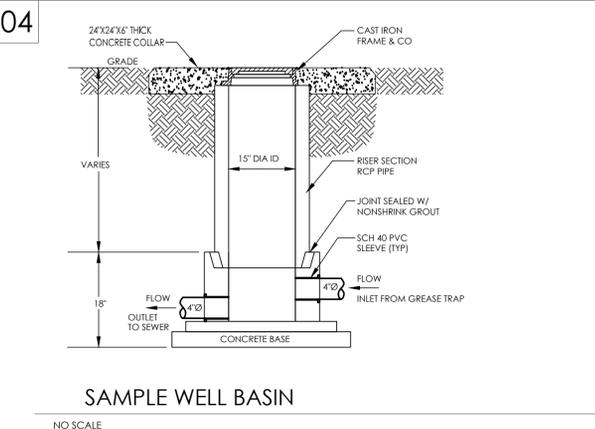
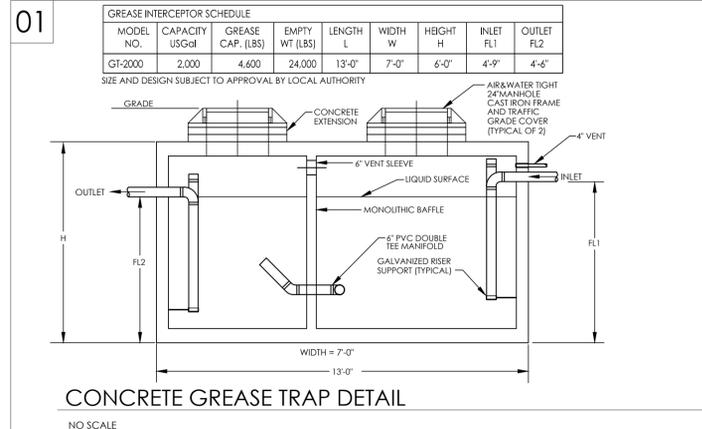
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SHEET NO.

P4.1

DATE:

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 MEP ENGINEERING
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 Project number:14.4.07



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WEBB COUNTY YOUTH VILLAGE REHABILITATION CENTER
111 CAMINO NUEVO ROAD, HWY 359
LAREDO, TEXAS 78046

PROJECT NUMBER

REVISIONS

SHEET TITLE
PLUMBING
DETAILS

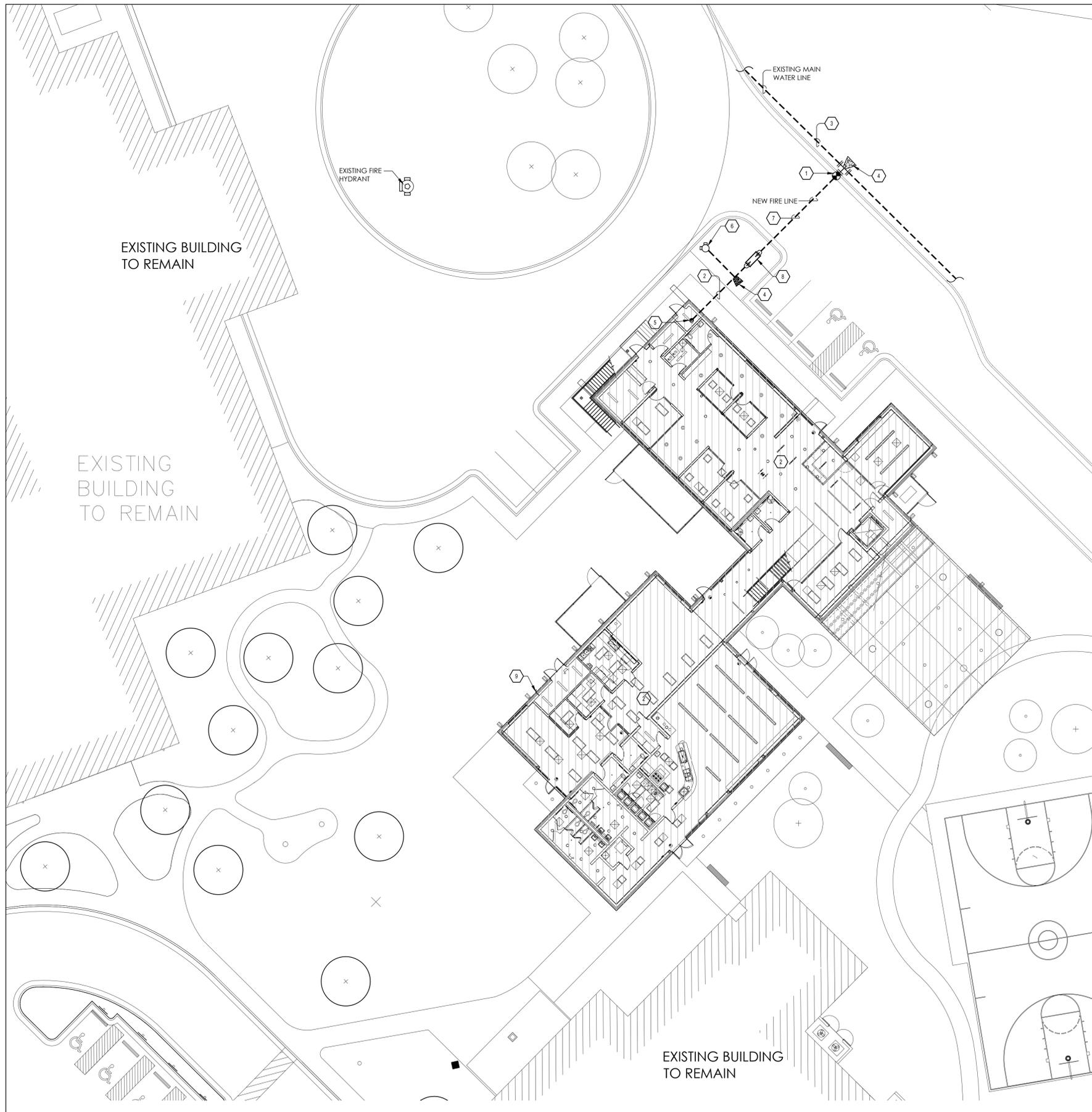
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P4.2

DATE:

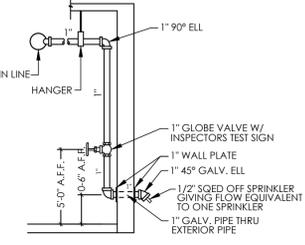
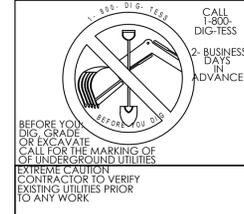
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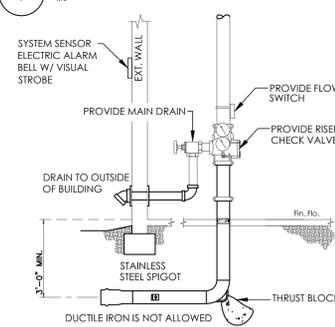
GENERAL NOTES - FIRE PROTECTION:

- A. SYSTEM TO BE DESIGNED TO MEET CITY OF LAREDO AND FIRE MARSHAL CODES. PLANS SHALL BE SUBMITTED TO THE CITY OF LAREDO FOR REVIEW AND APPROVAL. FIRE MARSHAL TO BE THE FINAL APPROVING AUTHORITY FOR ALL FIRE PROTECTION WORK.
- B. FIRE DEPARTMENT CONNECTION SHALL BE AS REQUIRED BY LOCAL FIRE MARSHAL.
- C. ALL PIPE TO BE SIZED HYDRAULICALLY
- D. ALL PIPING UNDER SLAB SHALL BE STAINLESS STEEL. ELSE USE DUCTILE IRON. VERIFY WITH LOCAL APPROVING AUTHORITY.
- E. DETAILS DESCRIBE SOME SPRINKLER COMPONENTS REQUIRED BY AN AUTOMATICALLY OPERATED SYSTEM. SPRINKLER CONTRACTOR TO PROVIDE ALL SYSTEM COMPONENTS REQUIRED FOR A TURN KEY FIRE SPRINKLER SYSTEM.
- F. PROVIDE SIGNS FOR FDC, ALL VALVES, AND RISER.
- G. HAZARD CLASSIFICATION SHALL BE AS PER NFPA 13.
- H. ALL UNDERGROUND PIPE TO BE DR-18 C900 AND TO BE INSTALLED AS PER NFPA 24.
- I. REFER TO SPECIFICATIONS FOR FURTHER INSTRUCTIONS.
- J. ALL ABOVE CEILING PIPING WILL NEED TO BE ROUTED AROUND EXISTING CONDUITS, BEAMS, MECHANICAL DUCT WORK AND DRAIN LINES. ALL PIPE LEFT WITH TRAP WATER NEEDS TO BE PROVIDED W/ A DRAIN VALVE.
- K. SEAL ALL WALL OPENINGS W/ MORTAR OR FIRE CAULKING.

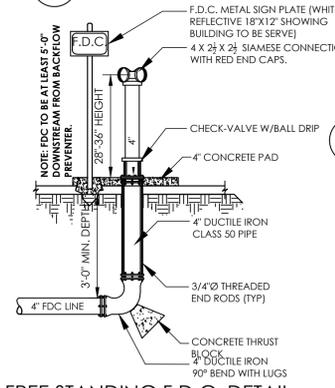
NOTE: CARE SHALL BE TAKEN DURING DIGGING. ALL LINES DAMAGED UNDERGROUND WILL BE FIXED BY THE CONTRACTOR.



3 INSPECTOR'S TEST DETAIL



5 RISER ROOM DETAIL

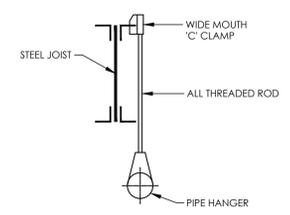


7 FREE STANDING F.D.C. DETAIL

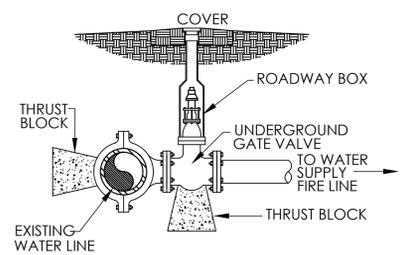
KEYED NOTES - FIRE PROTECTION:

- 1 FIRE SPRINKLER MAIN TO CONNECT TO EXISTING WATER LINE. SEE DETAIL #4.
- 2 THIS IS A NEW BUILDING FACILITY. PROVIDE A NEW FIRE PROTECTION SYSTEM. COORDINATE W/ ALL OTHER TRADES.
- 3 ESTIMATED LOCATION OF MAIN WATER LINE. SEE CIVIL SITE PLAN FOR EXACT LOCATION AND SIZE.
- 4 PROVIDE A THRUST BLOCK @ EVERY CHANGE IN DIRECTION.
- 5 FIRE SPRINKLER SYSTEM RISER SHALL BE PLACED IN THIS ROOM. REFER TO DETAIL #5.
- 6 PLACE F.D.C. IN THIS LOCATION. COORDINATE EXACT LOCATION. REFER TO DETAIL #7.
- 7 RUN FIRE MAIN AND FDC LINES BETWEEN 3 AND 4 FEET DEEP. PROVIDE 4 INCHES OF SAND UNDER PIPE. COVER ALL PIPE AND LEAVE JOINTS EXPOSED FOR ENGINEER AND FIRE DEPARTMENT INSPECTION.
- 8 PROVIDE BACKFLOW PREVENTER @ THIS LOCATION. COORDINATE FINAL LOCATION. SEE DETAIL #6.
- 9 INSPECTOR'S TEST TO CONNECT TO FIRE PROTECTION SYSTEM. CONTRACTOR COORDINATE EXACT LOCATION. SEE DETAIL #3.

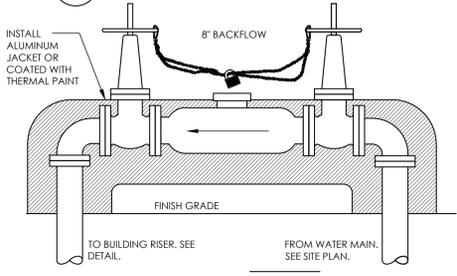
THIS DRAWING IS DIAGRAMMATIC AND SHOULD BE USED AS REFERENCE FOR BIDDING PURPOSES ONLY. THIS DRAWING SHALL NOT BE USED FOR PERMIT OR CONSTRUCTION. CONTRACTOR IS FULLY RESPONSIBLE FOR THE DESIGN OF THE NEW FIRE SPRINKLER SYSTEM. ALL NFPA CODES APPLICABLE SHALL BE USED AND FOLLOWED.



2 HANGER DETAIL



4 FIRE LINE CONNECTION DETAIL



6 BACKFLOW PREVENTER DETAIL

1 - FIRE PROTECTION SITE PLAN

SCALE: 1/16" = 1'-0"

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 6626 SILVERMINE DRIVE, SUITE 100A
 AUSTIN, TEXAS 78736
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WEBB COUNTY YOUTH VILLAGE REHABILITATION CENTER
 111 CAMINO NUEVO ROAD, HWY 559
 LAREDO, TEXAS 78046

PROJECT NUMBER
 REVISIONS

SHEET TITLE
FIRE PROTECTION SITE PLAN

DRAWN BY:
 SHEET NO.

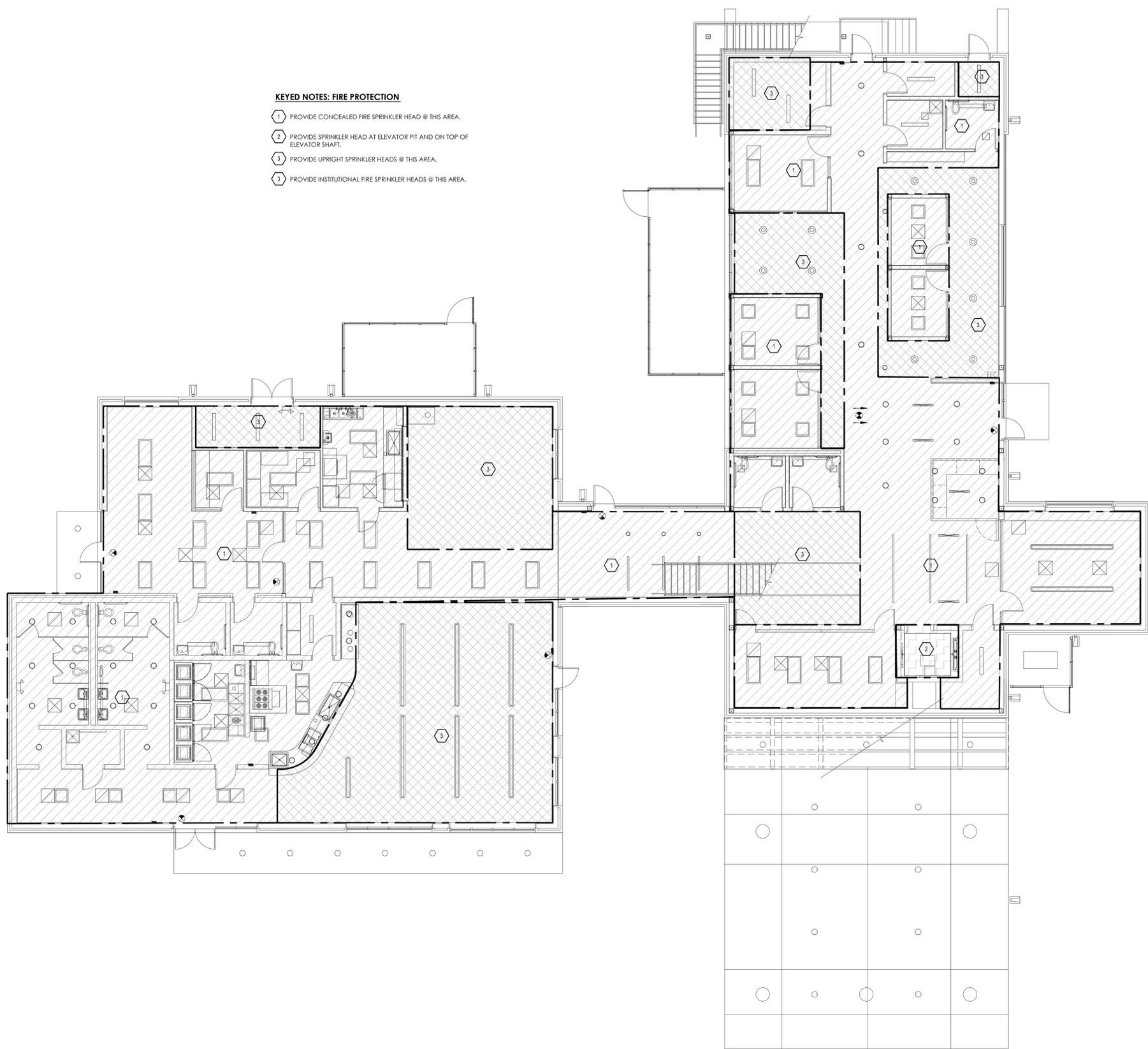
FP1.1

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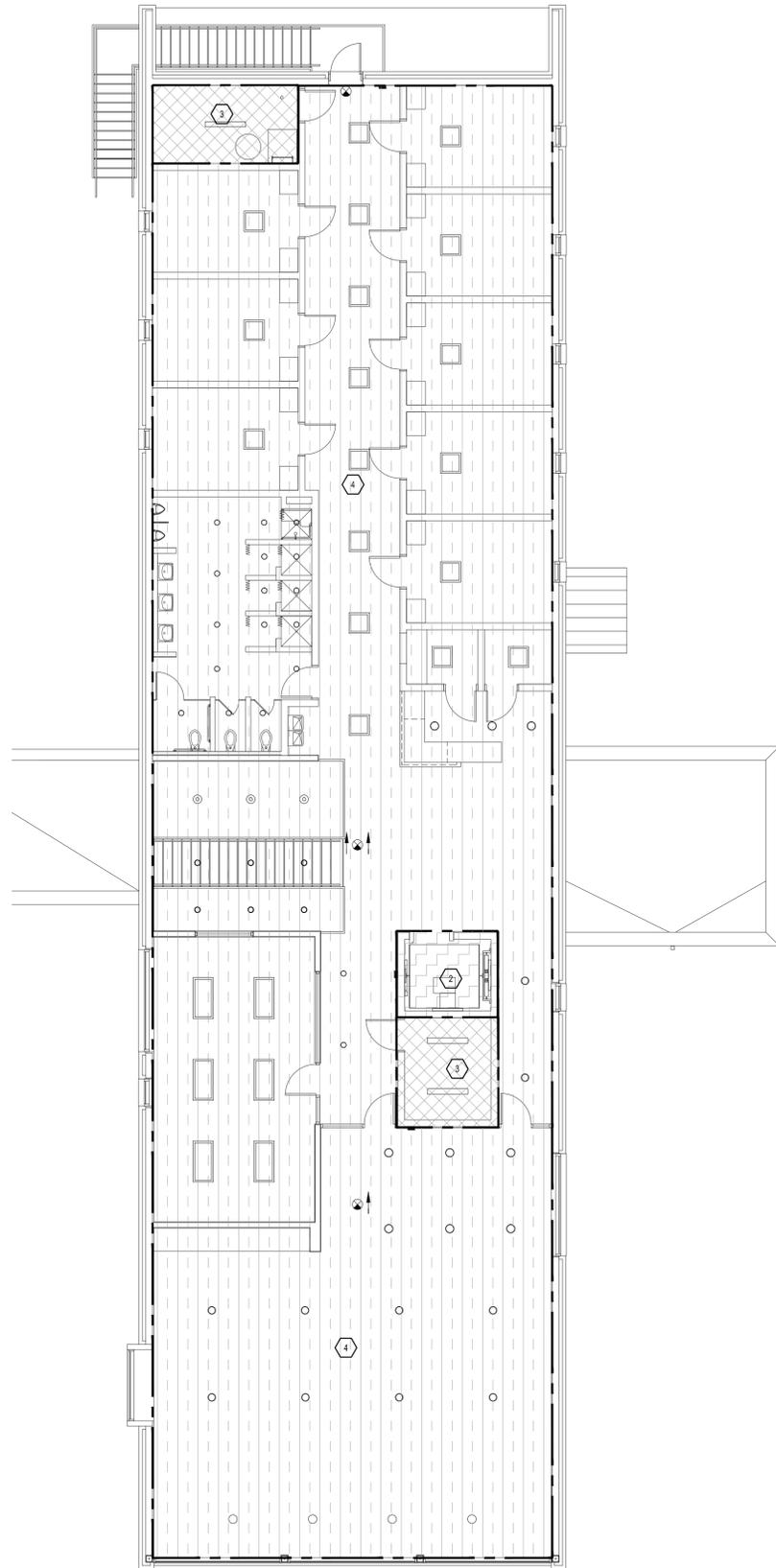
KEYED NOTES: FIRE PROTECTION

- ① PROVIDE CONCEALED FIRE SPRINKLER HEAD @ THIS AREA.
- ② PROVIDE SPRINKLER HEAD AT ELEVATOR PIT AND ON TOP OF ELEVATOR SHAFT.
- ③ PROVIDE UPRIGHT SPRINKLER HEADS @ THIS AREA.
- ④ PROVIDE INSTITUTIONAL FIRE SPRINKLER HEADS @ THIS AREA.



1 - FIRE PROTECTION FIRST FLOOR

SCALE: 1/8" = 1'-0"



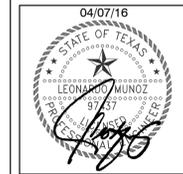
2 - FIRE PROTECTION SECOND FLOOR

SCALE: 1/8" = 1'-0"

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**WEBB COUNTY YOUTH VILLAGE
REHABILITATION CENTER**
111 CAMINO NUEVO ROAD, HWY 359
LAREDO, TEXAS 78046

PROJECT NUMBER

REVISIONS

SHEET TITLE
FIRE PROTECTION
FLOOR PLAN

DRAWN BY:

SHEET NO.

FP1.2

DATE:

copy no. _____

Webb County Youth Village Rehabilitation Center

111 Camino Nuevo Road, Hwy 359
Laredo, Texas 78041



County of Webb, State of Texas
1110 Houston Street
Laredo, Texas 78040

specifications

Bidding & Construction Documents Volume 1 of 2

April 7, 2016

**WEBB COUNTY
PURCHASING DEPARTMENT**

PLANS AND SPECIFICATIONS FOR

“Webb County Youth Village Rehabilitation Center”

April 7, 2016

Honorable Tano E. Tijerina,
Webb County Judge

Hon. Frank Sciaraffa
Webb County Commissioner Pct. 1

Hon. Rosaura “Wawi” Tijerina
Webb County Commissioner Pct. 2

Hon. John Galo
Webb County Commissioner Pct. 3

Hon. Jaime Canales
Webb County Commissioner Pct. 4

Ms. Leticia Gutierrez
Interim Purchasing Agent
1110 Washington Street, Suite 101
Laredo, Texas 78040
(956) 523-4125

Architect

AUSLAND ARCHITECTS
6626 Silvermine Dr., Ste.700
Austin, Texas 78736
(512) 327.0444

In association with:
METAFORM STUDIO ARCHITECTS, INC
6909 Springfield Ave, Suite 107
Laredo, Texas 78041
(956) 568.3315



Kennedy C. Whitley
04.07.2016

Structural Engineer

Synergy Structural Engineering
6909 Springfield Ave, Ste 105
Laredo, Texas 78041
(956) 753-5860



Victor M. Deanda Jr.
4/8.09/2016

Mechanical, Electrical, & Plumbing Engineers

Trinity MEP Engineering, PLLC
3533 Moreland Dr.
Weslaco, Texas 78596
(956) 973-0500



4.7.16
Leonardo Munoz



4/9/16
Wilford L. McGee III

Civil Engineer

Howland Engineering & Surveying Co.
7615 N. Bartlett Ave
Laredo, Texas 78041
(956) 722-4411



Ricardo M. Villarreal
4/7/16

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REQUEST FOR COMPETITIVE SEALED PROPOSALS (RFCSP)
WEBB COUNTY YOUTH VILLAGE REHABILITATION CENTER
LAREDO, TEXAS

Notice is hereby given that the County of Webb is now accepting Competitive Sealed Proposals for the following:

Proposal No. 2016-03 “Webb County Youth Village Rehabilitation Center”, Laredo, Texas

Webb County proposes a new construction project located at 111 Camino Nuevo Road, Hwy 359 in Laredo, Texas entitled “The Webb County Youth Village Rehabilitation Center” project consisting of but not limited to a new two story masonry and steel building of approx. 15,457 square feet containing sixteen beds, educational spaces, TV room, lobby and control desk on the second floor and an intake reception, offices, conference rooms, toilets, warming kitchen and dining area, entry lobby with office and a JJAEP dining area and kitchen on the ground floor. Site Improvements include but are not limited to a basketball court, outdoor lighting, utility improvements, sidewalk, ramp, paving and road improvements, and landscape/irrigation improvements on approximately eight acres and is budgeted at approximately \$2,400,000.00.

Project Documents include selection criteria and detailed information regarding the project scope and other information that offerors require to respond to the RFCSP. Construction is scheduled to begin after approval of Webb County Commissioner’s Court.

Competitive Sealed Proposals will be received no later than **Thursday, June 16, 2016 at 2:00 pm** Central Standard Time. All proposals will be opened and publicly read. Late proposals will not be considered.

One (1) original and eight (8) copies of the Competitive Sealed Proposal must be submitted in sealed envelopes to the Office of the County Clerk. Sealed envelopes must be marked (Sealed-Proposal) with proposal number on front lower left-hand corner of envelope.

Proposal No.: 2016-03 “Webb County Youth Village Rehabilitation Center”, Laredo, Texas

Proposals may be hand delivered or mailed to: **Webb County Clerk’s Office**
County Clerk
1110 Victoria St. Ste. 201
Laredo, Texas 78040

A Proposal Security in the amount of five percent (5%) of the Proposer amount must accompany each proposal in the form of a payment bond, cashier’s check, or bank money order made payable to the County of Webb. Performance and Payment Bonds each in the amount of (100) % of the contract amount, will be required from the successful Proposer.

Each Offeror must submit the information requested in the “Information for Offerors” in order to be evaluated against each of the criteria. All questions regarding this process should be submitted in writing to Ausland Architects, Attention: Kennedy C Whiteley, 6626 Silvermine Dr., Suite #700, Austin, Texas

78736, Phone number (512) 327-0444 or to Metaform Studio 6909 Springfield Ave., Suite 107, Laredo, Texas 78041 before or at the “Proposal Conference.”

SELECTION CRITERIA: Each competitive sealed proposal will be evaluated based upon the following selection criteria, and the total possible points that may be awarded for each criteria are in parenthesis after each criteria:

A.	Relevant Experience	(12 points)
B.	Project Management Ability	(12 points)
C.	Past Performance	(10 points)
D.	Subcontractors and Suppliers	(26 points)
E.	<u>Price</u>	<u>(40 points)</u>
	TOTAL:	100 points

A pre-proposal conference for the project will be held at **10:30 am on Friday, June 3, 2016 at Webb County Billy Hall Administration Building 1st floor Conference Room 1A.**

To review the plans and specifications and to answer any questions from potential proposers. Any questions in regard to the pre-proposal conference you may contact Ms. Leticia Gutierrez, Interim Purchasing Agent (956) 523-4125.

All firms interested in submitting proposals may attend, ask questions, and discuss the projects with the Architect, Engineers and Owner’s representatives. Offerors are strongly encouraged to attend however; this pre-proposal conference is not mandatory.

Project Documents may be obtained from the offices of the Webb County Purchasing Department, 1110 Washington Street, Suite 101, (956) 523-4125, Laredo, Texas 78041, upon receipt of \$100.00 for each project set consisting of one (1) full size hard print copy and one (1) PDF copy on CD. The entire amount of deposit will be refunded if the plans and specifications are returned in good order within ten (10) working days after the bid opening. Webb County Commissioner’s Court, reserves the right to accept or reject any or all qualification statements and to waive any formalities and/or irregularities. Plans will be available on **Tuesday, May 10, 2016.**

**Leticia Gutierrez,
Webb County Interim Purchasing Agent**

INFORMATION FOR OFFERORS

1. RECEIPT OF COMPETITIVE SEALED PROPOSALS:

Competitive Sealed Proposals will be received until **2:00 pm.**, Central Standard/Time on **Thursday, June 16, 2016,**

2. ACCURACY OF PROPOSALS

It is specifically required that each offeror warrants that his/her competitive sealed proposal contains true, correct and complete information, and that the offeror will make no claim for omission or error.

3. VISIT TO SITE

Each offeror, before submitting a proposal for this work, shall visit the site to inspect and satisfy himself/herself with the existing conditions and requirements of the site under which he/she will be obligated to perform his work or that will in any manner affect the work. There will be no change order allowed for increased costs associated with conditions which could have been determined by examining the site and project documents before submission of proposals and/or before contract is awarded to the successful offeror.

4. PREPROPOSAL CONFERENCE

A. Pre-Proposal Conference for the project will be held at **10:30 am on Friday, June 3, 2016 at Webb County Billy Hall Administration Building 1st floor, Conference Room 1A, located at 1110 Washington Street, Laredo, Texas.** All firms interested in submitting proposals may attend, ask questions, and discuss the projects with the Architects, Engineers, and Owner representatives. The project site will be visited after this meeting. All offerors may attend, ask questions and discuss projects with architects and engineers and Owners. Offerors are strongly encouraged to attend, however pre-proposal conference is not mandatory.

5. REQUIREMENTS OF COMPETITIVE SEALED PROPOSALS

In order for your competitive sealed proposal to be evaluated it must contain the following completed information: **One (1) original and eight (8) copies of these forms must be submitted**

- A. Competitive Sealed Proposal Form, Proposal Bond, List of Proposed Subcontractors & Suppliers, Contractor's Qualifications Statements (AIA -A305), Insurance & Bonding Certification, and Certificate of Insurance.
- B. Form of Non-Collusive Affidavit
- C. Current (Not earlier than August 2014) Audited Financial Statement (see paragraph 9).
- E. Proposal Bond or Cashier's check for 5% of the Base Proposal (see paragraphs 11 and 12 below for additional requirements).
- F. Felony Conviction Notice.
Contractor shall complete Felony Conviction Notification Form. Include this form as part of the Proposal materials submitted.

- G. List of Texas litigation for last five years. If none, provide a signed notarized affidavit stating that the offeror has not been involved in any litigation in Texas from December 1, 2012, to the present (see paragraph 10).
- H. All other information requested in the Information for Offerors Specification Section.
- I. Provide Texas Statutory payment and performance bonds that are A+ United States Treasury listed. Include samples of the current bonds your firm is using written on companies you propose to use for this project.
- J. Provide a sample of a Certificate of Insurance showing all names of issuing companies. It is assumed that coverage's will provide as specified.

6. OFFEROR'S REPRESENTATIONS: By submitting his/her competitive sealed proposal, the offeror represents he/she:

- A. understands and has carefully read all of the Project Documents;
- B. has examined the project site, and is familiar with the conditions under which the work will be performed; and
- C. will comply with the requirements of the project documents.

7. COMPETITIVE SEALED PROPOSALS

- A. Complete the "Competitive Sealed Proposal Form" included in the "Specifications," and labeled "Competitive Sealed Proposal Form", and then place it in an envelope, sealed, and marked as follows:

Proposal No. 2016-03 "Webb County Youth Village Rehabilitation Center"
Proposal may be hand delivered or mailed to:

**Webb County Clerk's Office
County Clerk
1110 Victoria St. Suite 201
Laredo, Texas 78040**

- B. Competitive Sealed Proposals will be received until **2:00 pm** Central Standard/Time, **Thursday, June 16, 2016**. All proposals will be opened and publicly read.

Proposals will be received for the furnishing of all labor, materials and equipment and performing all work required and must be based upon contract documents prepared by Ausland Architects and/or Metaform Studio Architects.

- C. In the event the proposal is mailed, it is the responsibility of the offeror to allow enough time in transit for proposal to be received by owner prior to date and hour of proposal opening. Proposal may be delivered by hand to the Webb County Purchasing Department prior to opening. Telephone or fax proposals or proposal modifications will not be accepted.
- D. Proposals received prior to the advertised hour of opening will be kept securely sealed. The owner's representative whose duty it is to open them will decide when the specified

time has arrived and no proposal received thereafter will be considered. The owner or his representatives will not be responsible for the premature opening of, or the failure to open, a proposal not properly addressed or identified.

- E.** In case of ambiguity or lack of clearness in the stated price in the proposal, the owner will adopt the price written in words.
- F.** Any proposal which is not based upon the drawings and specifications, or which contains any qualification of same, or which is not properly completed and signed by the offeror, may be rejected by Webb County, the owner.

8. EVALUATION OF COMPETITIVE SEALED PROPOSALS

Within **90 days** after the opening of the competitive sealed proposals, the Owner, Webb County shall review all proposals and first see if they contain the information required in Paragraph 5, "Requirements of Competitive Sealed Proposals". If the proposal does, the Owner, Webb County shall evaluate the proposals in accordance with the advertised selection criteria and offerors submission of the following information related to each criteria. The owner reserves the right to waive any irregularities and requirements as long as they do it for all offerors

A. Relevant Project Experience (12 points)

Required Information:

- (1) Submit information indicating the years that the offeror's company has been in business as a Commercial construction firm capable of bonding a single project costing equal to the amount of work the contractor is proposing to complete.
- (2) Chronological list of all of the projects the offeror has completed in the past five (5) years, stating the name of the project, the address of the project, the dollar value, the date the project was completed, project size, the name, address and telephone number of the project architect and engineer, the owner contact for the project, and the project PM and PS. For each project provide the original contract cost, final cost and the number of change orders. Also list the original contract construction time in days and the actual time it took to reach substantial completion and to submit final closeout documents.
- (3) List of all projects offeror is currently working on, stating the name of the project, the address of the project, the dollar value, the start date and the date of the project is to be completed, project size, the name, address and telephone number of the project architect and engineer, the owner contract for the project, and the name of the project's PM and PS.

B. Project Management Ability (12 points)

Required Information:

- (1) The offeror's complete organizational chart showing key team members for this project, and their location (on-site or off-site) during project construction.
- (2) The resumes of the Project Manager (PM), Project Superintendent (PS), and the Assistant Project Superintendents (APS's), and the names of all projects that they completed together.
- (3) Provide a chronologically organized complete list of all projects the PM, PS and APS's have each worked on during the past (5) years, whether or not they were working for the offeror's company at the time. For each project, provide the project name, period of time that it was constructed size (area), cost, contact names and telephone number for both the architectural firm and the owner as well as the project address including the state and county in which the project is located. State the role served by the PM, PS and AP's in each of the projects listed.
- (4) The offeror's current company safety policy and a specific safety plan for this project. Provide the rate your firm is charged for worker's compensation insurance by the State of Texas.

C. Current and Past Performances (10 points), Attach to Proposal form as EXHIBIT C.

The Owners and the Architects reserve the right to contact any current or past project listings. The contractor shall provide evidence in the form of a narrative description, reference letters, bar chart sand any other form of additional information that attests to their past performance and addresses at a minimum items (i) through (vii) listed below. Past performance will be considered in the evaluation process, including but not limited to, the following:

- (i) Ability of contractor to remain on schedule.
- (ii) Cooperation with owner of project and staff.
- (iii) Proper and timely coordination of all trades and support personnel in completing the project.
- (iv) Minimum number of major deficiencies on the substantial completion punch list.
- (v) Minimum number of warranty item call backs during the warranty phase, and warranty responsiveness.
- (vi) Consistent demonstration of commitment to excellence in workmanship.
- (vii) Safety record.

D. Subcontractor and Supplier (26 points)

Required Information:

Provide the list of subcontractor and suppliers as noted on the supplemental proposal form.

Note 1: The list of plumbing, mechanical, electrical and site work subcontractors presented will be considered final and not subject to change whether or not alternates are accepted

Note 2: If notified after the receipt of the Competitive Sealed Proposal, provide the following information within 48 hours Provide a list of subcontractors and material suppliers on your construction project team. For each subcontractor or material supplier indicate the work or materials they will provide. Also indicate the value of the total percentage of the project value that will go to Webb County subcontractors and material suppliers.

E. Price (40 points)

Required Information: The prices on offeror's completed "*Competitive Sealed Proposal Form*"

9. Financial Stability

Provide a current certified audited financial statement (No earlier than August 2013). Also, indicate the total number of staff your firm has employed for each of the past 3 years. Separate each year's total employees into the totals for office or field staff categories.

10. Litigation

Provide a list of all Texas litigation your firm has been involved with for the last five years. If none, provide a signed notarized affidavit stating that the offeror has not been involved in any litigation in Texas from December 1, 2012 to the present. List all current ongoing disputes (those that your firm has had to employ an attorney to act on your behalf) your firm has ongoing with any owner or subcontractor that is related to a construction project. Briefly describe the situation and how you see it being resolved. Please include the Style, Cause No. and the County that the case is pending.

11. Proposal Surety

Each proposal must be accompanied by a Proposal Security ("Bid Bond") on a form similar to AIA document A310 in the amount of five percent of the base proposal amount. This bond shall be paid to the owner in the event that the offeror, if awarded the contract, should fail within (7) days following the award to execute and return the contract, together with the Performance and Payment Bonds with acceptable surety. In lieu of a Bid Bond, as Proposed Security, Owner may accept a deposit in the amount of

five (5) percent of the base proposal amount by cashier's check issued by a bank satisfactory to the owner.

12. Acceptable Surety

“Acceptable surety” is defined as an insurance company, duly authorized to do business in the State of Texas and (licensed by the State of Texas to issue surety bonds and having an acceptable record, in the opinion of Owner, for faithful performance during the proceeding five years of all undertaking to Owner, Notwithstanding any other law to the contrary, the Owner may establish financial criteria for the surety companies that provide payment and performance bonds.

13. Reservation of Rights

Webb County, The Owner, reserves the right to reject any and all competitive sealed Proposals, and to waive any informality or irregularity in proposals, when such rejection or waiver is in the best interest of the Owner. Also, the Owner reserves the right to accept any base proposal, and/or any combination of a base proposals and alternate proposals.

14. Termination of Proposal

No proposal shall be withdrawn or terminated for a period of sixty (90) days subsequent to the opening of proposals without consent of the Owner except that if a proposal is accepted and a contract executed or all proposals rejected. Should your proposal be accepted, the Owner has a right to finalize financing the project and may take up to sixty (90) days after proposal acceptance to enter into a final contract for construction. Should financing not become available, the Owner will notify the selected contractor that the project is abandoned and will not have any financial obligations to the accepted proposal.

15. Pricing

- A. Proposal prices may not be changed after opening of proposal has occurred.
- B. Webb County and its architect may discuss with the selected offeror, options for a scope or time modification and any price change associated with such modification.
- C. Offeror's prices are firm for sixty (90) days after opening of the competitive sealed proposals has occurred.
- D. All prices for supplies and materials shall be quoted F.O.B. Destination.
- E. Where unit prices are requested; the offeror shall state the unit price on the Proposal Form in the appropriate space.

16. Offerors Question About Project Documents

Offerors shall submit any questions regarding the project documents including, but not limited to, the specifications and drawings, in writing, to the project architect for clarification. Offerors should allow a minimum of ten (10) days for a reply.

All changes and/or additions to the project documents shall be done by a written addendum published by the architect to all offerors, and such addendum (s) shall become a part of the offeror's proposal.

All other oral or written interpretations, or explanations, corrections and/or approvals, do not constitute a change to the project documents, and therefore, should not be relied upon as such.

17. Substitutions (PRIOR TO PROPOSAL DATE)

(NOTE: See Specifications Section 011000, Miscellaneous Requirements and Section 016000, Material and Equipment-Substitutions-for information about processing of substitutions after bids are received)

Where a definite product is specified, it is not necessarily the intention to discriminate against other products but rather to set a definite standard and indicate the quality and capacity of equipment found satisfactory for the Owner's use. However, all proposed substitutions must be reviewed and approved by the Owner prior to receipt of proposals and must be listed as approved in written addendum (verbal/oral approvals are not acceptable or binding.) Sufficient information should accompany a proposed substitution to enable the Owner to render a decision. Substitute items shall not deviate in basic construction and performance from the specified item. Proposed substitutions must be submitted for approval minimum of ten days prior to proposal closing. All approved substitutions will be noted in addenda. Oral approvals or approval in any manner, other than written addenda, are not acceptable and will not be recognized. All addenda noting approval of a manufacturer only and not a specific product, are with the requirement that the manufacturer produces a product that meets the original specified item in terms of materials, finishes, gauges and thickness, dimensions, quality, available color selection, etc., unless otherwise stated in this specification.

18. Alternate Manufacturers

Where alternate manufacturers are noted as approved in specification, drawings, addenda, etc. and no specific product or model number is noted, it shall be treated and processed the same as a substitution. The manufacturer is approved; however, the specific item proposed by the manufacturer shall be submitted for approval. The item shall not deviate in basic construction, features, operation, and performance from the specified item. The approved manufacturer's proposed item shall meet the original specified item in terms of materials, finishes, gauges and thickness, dimensions, quality, available color selections, etc. Approved manufacturer's item shall be processed for approval by Owner, Architect/Engineer same as "Substitutions".

19. Sales Tax

Under Ruling No.9, Repairment and Contractor (amended April 3, 1962) Limited Sales, Excise and Use Tax Rules and Regulations, Comptroller of Public Accounts, State of Texas, tangible personal property (materials) becoming a part of improvements and

structures and incorporated in such, under lump sum contracts, are not subject to sales tax when the cost of such materials is segregated from the cost of skill, labor, and all other materials not becoming a part of the improvement of structure. Under the interpretation of this ruling, contract will state not only the lump sum but also the value of materials and value of skill labor, etc. Proposals are to be tendered in lump sum only.

20. Contract Security

Performance and payment Bonds will be required on this project. The successful proposer must deliver to the Owner a fully executed Performance and Payment Bond in an amount of one hundred percent (100%) of the accepted proposal as security for the faithful performance of the contract and payment of all persons performing labor and furnishing materials in connection with this contract. The Performance and Payment Bonds shall meet AIA Document A-311 by a surety Company Licensed, listed, and authorized to issue bonds in the State of Texas by the Texas by the Department of Insurance. The surety company shall also provide such other information as may be necessary to document net worth, stability, total bonding capacity, other projects under coverage and to establish adequate financial capacity for this project. Should the bond amount be in excess of ten percent (10%) of the surety company's capital and surplus, the surety company issuing the bond shall certify that the surety company has acquired reinsurance, in form and amount acceptable to the Owner, to reinsure the portion of the risk that exceeds ten percent (10%) of the surety company's capital and surplus with one or more reinsurers who are duly authorized and admitted to do business in Texas and that amount reinsured by any reinsurer does not exceed ten percent (10%) of the reinsurer's capital and surplus.

The contractor shall require any attorney-in-fact who executed the required bonds in behalf of the surety to affix thereto an original certified and current copy of a Power of Attorney evidencing the authority of such attorney-in-fact to so execute such bonds within the State of Texas indicating the monetary limit of such power and authority.

21. Contract Forms Owner Forms

The latest edition of the following forms, appropriately completed, will be used to execute the contract between the owner and contractor:

AIA Document A312:	Performance Bond
AIA Document A312:	Labor and Material Payment Bond
AIA Document A101-2007:	Standard Form of Agreement Between Owner and Contractor

22. Retainage

Article 5 of the A101-2007, Owner-Contractor Agreement, will allow 95% progress payment for the duration of this contract.

23. Owner endeavor

Whenever the term "Owner" is used in this specification, it shall refer to Webb County, Laredo, Texas. All papers required to be delivered to the Owner, unless otherwise specified, shall be delivered to Webb County Engineering Department, Attention: Mr.

Luis Perez Garcia P.E., 1620 Santa Ursula Ave., Second Floor, Laredo, Texas 78040.
(956) 523.4055.

24. Architect

Whenever the term “Architect” is used in this specification, it shall refer to Ausland Architects, 6626 Silvermine Drive, Suite 700, Austin, Texas 78736, Phone No. (512) 327-0444, Fax No. (512) 301-4909 or Metaform Studio Architects, 6909 Springfield, Suite 107, Laredo, Texas 78041, Phone No. (956) 568-3315.

25. Applicable Law

This agreement shall be governed by the Uniform Commercial Code. Wherever the term “Uniform Commercial Code” is used, it shall be construed as meaning the Uniform Commercial Code as adopted in the State of Texas effective and in force on the date of this agreement.

26. Venue

All parties agree that venue for any litigation arising from this contract/project shall lie in Webb County, Texas.

END OF SECTION

Form of Competitive Sealed Proposal Webb County Youth Village Rehabilitation Center

To: The COUNTY OF WEBB, TEXAS

From:

Contractor

Address: _____

Telephone: _____ E-mail: _____

PROJECT: “Webb County Youth Village Rehabilitation Center”

Attention: Honorable Tano E. Tijerina , Webb County Judge

Pursuant to Notice to Bidders, the undersigned bidder hereby proposes to furnish the labor, materials, and equipment in accordance with the Plans and Specifications, General Conditions of the Agreement, Special Provisions of the Agreement, and Addenda, if any. The proposer binds himself/ herself upon acceptance of his proposal to execute a contract and bonds on the accompanying form for performing and completing the said work within the time stated and as required by the detailed Specifications at the following price listed below.

The Contractor agrees to complete the entire project (including all alternates selected) within **450 calendar days** of the contractor’s receipt of the Notice to Proceed including Base Proposal and all selected Alternates listed below.

Contractor to incorporate into Base Proposal Section 012100 - Price and Payment Procedures Allowances. The Allowances are considered “betterment funds” in addition to work/ items already described and documented in the construction documents and specifications. The base bid price includes all project work except for that work contained within the alternate proposal items.

In submitting this proposal, the undersigned agrees:

1. That the Owner has the right to reject this bid form.
2. To hold my bid open for a period of ninety (**90**) calendar days from date of receipt.
3. To accept the provisions of the instructions to proposers regarding disposition of proposal security.
4. To enter into and execute a contract, if awarded, on the basis of this bid form.
5. To accomplish the work in accordance with Contract Documents. The undersigned further agrees to execute and deliver the contract, performance and payment bonds in the form set forth in these documents within ten (10) days from date of notification of acceptance of the bid, and in case the undersigned fails, refuses or neglects to execute and deliver the contract within the time specified, the undersigned will be considered as having defaulted in the offer to do the work and furnish labor and materials as specified in said bid, and the cashier’s

check (or bid bond) shall be forfeited to Webb County by reason of such failure and such default and said check and the funds represented thereby shall be the property of the Webb County absolutely upon the same conditions and contingencies as to time in default of executing the contract with performance bond and payment bond in the form provided with the Contract Documents in those cases where a bidder's bond has been indicated as acceptable and such bond having been filed. Webb County shall have the immediate right to call upon the principal and sureties to pay the principal sum of said bond.

The undersigned further agrees that the proposal guaranty may be retained by the Webb County.

The undersigned certified that this bid is made in strict conformity with all of the conditions, contingencies, requirements set forth stated in every part of the drawings. Advertisement for Bids, Instructions to Bidders, General Conditions, Special Conditions, and all other parts setting forth the specifications for the performance of the heretofore-described work and without collusion or connection with any other person, partnership, company, firm, association, or corporation offering bids on this work for the following sums or prices to-wit:

Having examined the project documents and agreeing to conform to the project documents, we enclose herewith bid security in the amount of 5% of the Base Proposal Amount and submit the following:

Base Bid Total Price: _____
_____ Dollars (\$ _____)

Base Bid shall include all Allowances (Refer to Section 012200 for Allowances).

Acknowledgment of Addenda: (Please initial and date)

- Addendum No. 1: _____
- Addendum No. 2: _____
- Addendum No. 3: _____
- Addendum No. 4: _____
- Addendum No. 5: _____

The undersigned acknowledges receipt of the following Addenda to the Construction Documents and the provisions and requirements of which the Addenda have been taken into consideration in the preparation of this Proposal.

- Acknowledgment of other documents: (Please initial and date): _____
- Wage Determination: _____
- Labor Provisions: _____
- Affirmative Action Program: _____

ALTERNATES:

Alternate Proposal No. 01 - Walking Trail & Surface

The addition of a walking trail as shown in Architectural and Civil Drawings. The contractor shall include all labor, materials, and equipment.

(Add) _____
_____ Dollars (\$ _____)

Alternate Proposal No. 02 - Proposed Road & Parking Spaces (Adjacent to New Bldg.)

Delete proposed Road & Parking spaces as shown in Civil Engineering drawings. All grading and site preparation shall be included in Base Bid. The contractor shall include all labor, material and equipment in the base bid amount.

(Deduct) _____
_____ Dollars (\$ _____)

Alternate Proposal No. 03 - Warming Kitchen Equipment at Room 116

Delete all kitchen equipment as indicated in Kitchen 116 & Storage 113. Refer to Kitchen Equipment drawings (sheets FS-1.00 thru FS-2.02). Price shall include all necessary equipment as specified for functional kitchen. Contractor shall include all labor, materials, and equipment.

(Deduct) _____
_____ Dollars (\$ _____)

Alternate Proposal No. 04 - JJAEP Cafeteria Finish-out

Delete all interior finish-out of the following: Lobby 101, Restrooms 103 & 104, Kitchen 105, Storage 106, and Dining 107. Include all finishes (walls, floors and ceilings), plumbing fixtures, electrical and mechanical systems. All mechanical equipment shall remain in adjacent space. (Refer Sheet A1.1 & MEP drawings.) Contractor shall include all labor, materials and equipment for shell build out.

(Deduct) _____
_____ Dollars (\$ _____)

Alternate Proposal No. 05 - Kitchen Equipment at Room 105

Delete all kitchen equipment as indicated for Kitchen Room 105. Refer to drawings (sheets FS-1.00 thru FS-2.02). Price shall include all necessary equipment for functional kitchen. Contractor shall include all labor, materials, and equipment.

(Deduct) _____
_____ Dollars (\$ _____)

Alternate Proposal No. 06 - Site Improvements

The addition of new parking spaces (72) as indicated in the construction documents. Provide parking lot light poles, match existing. Refer to Civil Engineering drawings. Contractor shall include all labor, materials, and equipment.

(Add) _____
_____ Dollars (\$ _____)

Alternate Proposal No. 07 - Decorative Iron Fencing

Provide Decorative iron fence as indicated in Construction Documents. Contractor shall include all labor, materials, and equipment.

(Add) _____
_____ Dollars (\$ _____)

Alternate Proposal No.08 - Concrete Benches

Delete exterior concrete benches as indicated. All labor, materials, and equipment shall be included.

(Delete) _____
_____ Dollars (\$ _____)

Bid Notes:

1. All amounts shall be shown in figures and words. In case of discrepancy, the amount shown in words shall govern.
2. Webb County Reserves the right to award the project with any combination of additive alternatives as stated.

PROJECT: "Webb County Youth Village Rehabilitation Center"

PROPOSAL AFFIDAVIT

STATE OF TEXAS §

COUNTY OF WEBB §

_____ being first duly sworn, deposes and says

that he is _____
(a Partner or Officer of the firm of, etc.)

the party making the foregoing proposal , that such proposal is genuine and not collusive or sham; that said Proposer has not colluded, conspired, connived or agreed, directly or indirectly, sought by agreement or collusion, or communication or conference, with any person, to fix the proposal or affiant of any other Proposer, or to fix any overhead, profit or cost element of said proposal price, or of that of any other Proposer, or to secure any advantage against Webb County or any person interested in the proposed Contract; and that all statements in said proposal are true.

Signature of

Proposer, if the Proposer is an individual
Partner, if the Proposer is a Partnership
Officer, if the Proposer is a Corporation

Subscribed and sworn before me this _____ day of _____, 20_____.

Notary Public

My Commission expires

PROPOSAL BOND

Project: “Webb County Youth Village Rehabilitation Center”

KNOW ALL MEN BY THESE PRESENTS, that we, the undersigned

as Principal, and _____ as
Surety, are hereby held and firmly bound unto

as Owner in the penal sum of _____
for payment of which, well and truly to be made, we hereby jointly an severally Proposal
ourselves, our heirs, executors, administrations, successors and assigns.

Signed, this _____ day of _____, 20__.

The condition of the above obligation is such that whereas the Principal has submitted to
_____ a certain Proposal ,
attached hereto and hereby made a part hereof to enter into a Contract in writing for the

Project: “Webb County Youth Village Rehabilitation Center

NOW, THEREFORE,

- (a) If said Proposal shall be rejected, or in the alternate,
- (b) If said Proposal shall be accepted and the Principal shall execute and deliver a Contract in the Form of Contract attached hereto (properly completed in accordance with said Proposal) and shall furnish a bond for his faithful performance of said Contract, and for the payment of all persons performing labor or furnishing materials in connection therewith, and shall in all other respects perform the Agreement created by the acceptance of said Proposal,

then this obligation shall be void, otherwise the same shall remain in force and effect; it being expressly understood and agreed that the liability of the Surety for any and all claims hereunder shall, in no event, exceed the penal amount of this obligation as herein stated.

The Surety, for value received, hereby stipulates and agrees that the obligations of said Surety, and its bonds shall be in no way impaired or affected by any extension of the time within which the Owner may accept such Proposal; and said Surety does hereby waive notice of any such extension.

IN WITNESS WHEREOF, the Principal and the Surety have hereunto set their hands and seals and such of them as are corporations have caused their corporate seals to be hereto affixed and these presents to be signed by their proper officers, the day and year first set fourth herein.

Principal (L.S.)

Surety

By: _____

LIST OF PROPOSED SUBCONTRACTORS AND SUPPLIERS

PROPOSAL OF: _____
(Name of Proposer)

DATE: _____

RE: WEBB COUNTY YOUTH VILLAGE REHABILITATION CENTER

LIST OF PROPOSED SUB-CONTRACTORS/SUPPLIERS

<u>ITEM</u>	<u>NAME OF SUB-CONTRACTOR/SUPPLIER</u> (As applicable)
PERFORMANCE-PAYMENT BONDS	_____
SELECTIVE DEMOLITION	_____
SITE DEMOLITION & CLEARING	_____
SITE UTILITIES	_____
EARTHWORK	_____
IRRIGATION	_____
LANDSCAPING	_____
ASPHALT CONCRETE PAVING	_____
CONCRETE WALKS, CURBS & PAVING	_____
(CAST-IN-PLACE) CONCRETE	_____
MASONRY	_____
STRUCTURAL STEEL FRAMING	_____
STEEL DECKING	_____
METAL ARCHITECTURAL FABRICATIONS	_____
ROUGH CARPENTRY	_____
ARCHITECTURAL WOODWORK	_____
BITUMINOUS WATERPROOFING	_____
STANDING SEAM METAL ROOFING	_____
METAL WALL PANELS	_____

ITEM

NAME OF SUB-CONTRACTOR/SUPPLIER
(As applicable)

FLASHING & SHEET METAL

FLUSH WOOD DOORS

JOINT SEALERS

STEEL DOORS AND FRAMES

FINISH HARDWARE

GLASS & GLAZING

ACCESS PANELS

CERAMIC TILE

ACOUSTICAL CEILINGS

RESILIENT FLOORING

WOOD DANCE FLOORING

PAINTING

TOILET PARTITIONS

TOILET ACCESSORIES

GRAPHIC SIGNAGE

WINDOW TREATMENT

PRE-ENGINEERED METAL BUILDING

MECHANICAL

PLUMBING

ELECTRICAL

CONTROLS

CONTRACTOR'S QUALIFICATION STATEMENT (AIA FORM A305)

DRAFT AIA[®] Document A305[™] - 1986

Contractor's Qualification Statement

The Undersigned certifies under oath that the information provided herein is true and sufficiently complete so as not to be misleading.

SUBMITTED TO:

ADDRESS:

SUBMITTED BY:

NAME:

ADDRESS:

PRINCIPAL OFFICE:

Corporation

Partnership

Individual

Joint Venture

Other

NAME OF PROJECT: (if applicable)

TYPE OF WORK: (file separate form for each Classification of Work)

General Construction

HVAC

Electrical

Plumbing

Other: (Specify)

§ 1 ORGANIZATION

§ 1.1 How many years has your organization been in business as a Contractor?

§ 1.2 How many years has your organization been in business under its present business name?

§ 1.2.1 Under what other or former names has your organization operated?

§ 1.3 If your organization is a corporation, answer the following:

§ 1.3.1 Date of incorporation:

§ 1.3.2 State of incorporation:

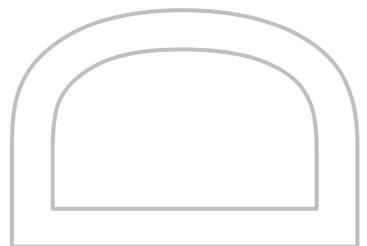
§ 1.3.3 President's name:

ADDITIONS AND DELETIONS:

The author of this document has added information needed for its completion. The author may also have revised the text of the original AIA standard form. An *Additions and Deletions Report* that notes added information as well as revisions to the standard form text is available from the author and should be reviewed.

This document has important legal consequences. Consultation with an attorney is encouraged with respect to its completion or modification.

This form is approved and recommended by the American Institute of Architects (AIA) and The Associated General Contractors of America (AGC) for use in evaluating the qualifications of contractors. No endorsement of the submitting party or verification of the information is made by AIA or AGC.



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§ 1.3.4 Vice-president's name(s)

« »

§ 1.3.5 Secretary's name: « »

§ 1.3.6 Treasurer's name: « »

§ 1.4 If your organization is a partnership, answer the following:

§ 1.4.1 Date of organization: « »

§ 1.4.2 Type of partnership (if applicable): « »

§ 1.4.3 Name(s) of general partner(s)

« »

§ 1.5 If your organization is individually owned, answer the following:

§ 1.5.1 Date of organization: « »

§ 1.5.2 Name of owner:

« »

§ 1.6 If the form of your organization is other than those listed above, describe it and name the principals:

« »

§ 2 LICENSING

§ 2.1 List jurisdictions and trade categories in which your organization is legally qualified to do business, and indicate registration or license numbers, if applicable.

« »

§ 2.2 List jurisdictions in which your organization's partnership or trade name is filed.

« »

§ 3 EXPERIENCE

§ 3.1 List the categories of work that your organization normally performs with its own forces.

« »

§ 3.2 Claims and Suits. (If the answer to any of the questions below is yes, please attach details.)

§ 3.2.1 Has your organization ever failed to complete any work awarded to it?

« »

§ 3.2.2 Are there any judgments, claims, arbitration proceedings or suits pending or outstanding against your organization or its officers?

« »

§ 3.2.3 Has your organization filed any law suits or requested arbitration with regard to construction contracts within the last five years?

« »

§ 3.3 Within the last five years, has any officer or principal of your organization ever been an officer or principal of another organization when it failed to complete a construction contract? (If the answer is yes, please attach details.)

« »

§ 3.4 On a separate sheet, list major construction projects your organization has in progress, giving the name of project, owner, architect, contract amount, percent complete and scheduled completion date.

« »

§ 3.4.1 State total worth of work in progress and under contract:

« »

§ 3.5 On a separate sheet, list the major projects your organization has completed in the past five years, giving the name of project, owner, architect, contract amount, date of completion and percentage of the cost of the work performed with your own forces.

« »

§ 3.5.1 State average annual amount of construction work performed during the past five years:

« »

§ 3.6 On a separate sheet, list the construction experience and present commitments of the key individuals of your organization.

« »

§ 4 REFERENCES

§ 4.1 Trade References:

« »

§ 4.2 Bank References:

« »

§ 4.3 Surety:

§ 4.3.1 Name of bonding company:

« »

§ 4.3.2 Name and address of agent:

« »

§ 5 FINANCING

§ 5.1 Financial Statement.

§ 5.1.1 Attach a financial statement, preferably audited, including your organization's latest balance sheet and income statement showing the following items:

Current Assets (e.g., cash, joint venture accounts, accounts receivable, notes receivable, accrued income, deposits, materials inventory and prepaid expenses);

Net Fixed Assets;

Other Assets;

Current Liabilities (e.g., accounts payable, notes payable, accrued expenses, provision for income taxes, advances, accrued salaries and accrued payroll taxes);

Other Liabilities (e.g., capital, capital stock, authorized and outstanding shares par values, earned surplus and retained earnings).

§ 5.1.2 Name and address of firm preparing attached financial statement, and date thereof:

« »

§ 5.1.3 Is the attached financial statement for the identical organization named on page one?

« »

§ 5.1.4 If not, explain the relationship and financial responsibility of the organization whose financial statement is provided (e.g., parent-subsidiary).

« »

§ 5.2 Will the organization whose financial statement is attached act as guarantor of the contract for construction?

« »

§ 6 SIGNATURE

§ 6.1 Dated at this « » day of « » « »

Name of Organization: « »

By: « »

Title: « »

§ 6.2

« »

M « » being duly sworn deposes and says that the information provided herein is true and sufficiently complete so as not to be misleading.

Subscribed and sworn before me this « » day of « » « »

Notary Public: « »

My Commission Expires: « »

INSURANCE AND BONDING CERTIFICATION

The undersigned, being the President or a Vice President of the Offeror, hereby certifies that the Offeror shall be able to procure and provide to Owner, within the time specified in the Proposal Documents, evidence of insurance and original payment and performance bonds, all in accordance with the requirements set forth in the Proposal Documents.

The undersigned shall reimburse Owner for all damages, costs, and expenses (including reasonable attorneys' fees) which are incurred by Owner and which are related in any way to the falsity of any part of the certification set out herein.

Dated and Effective the ____ day of _____, 2016.

Signature

Printed Name

Position (President or Vice President)

STATE OF TEXAS §
 §
COUNTY OF _____§

This instrument was acknowledged before me on the ____ day of _____,
2016, by _____.

Notary Public State of Texas

My Commission Expires:_____

CERTIFICATE OF INSURANCE

To: WEBB COUNTY _____ Date: _____
Owner

1110 Houston Street; Laredo, Texas 78040

Project: "Webb County Youth Village Rehabilitation Center"

This is to certify that _____

Name & Address of Insured and telephone number

is, at the date of this certificate, insured by this Company with respect to the business operations hereinafter described for the types of insurance and in accordance with the provisions of the standard policies used by this company, and further, hereinafter described. Exceptions to standard policies used by this company, and further, hereinafter described. Exceptions to standard policy noted on reverse side hereof.

TYPE OF INSURANCE

Policy No. _____ Effective _____

Expires: _____

Limits of availability: _____

Workmen's Compensation: _____

Public 1 Person: \$ _____

Liability: _____ 1 Accident: \$ _____

Contingent Liability: _____

Property Damage: _____

Builder's Risk: _____

Automobile: _____

Other: _____

CONTRACTOR'S AND SUBCONTRACTOR'S INSURANCE

In addition to the required bond for this project, the Contractor shall not commence work under this Contract until he/she has obtained all the insurance required under this paragraph and such insurance has been approved by the Owner, nor shall the Contractor allow any subcontractor to commence work on his/her Sub-Contract until the insurance required of the Subcontractor has been so obtained and approved.

a. **Compensation Insurance:** The Contractor shall procure and shall maintain during the life of this Contract Workmen's Compensation Insurance as required by applicable State or Territorial law for all of his/her employees to be engaged in work at the site of the project under this Contract and, in case of any such work sublet, the Contractor shall require the Subcontractor similarly to provide Workmen's Compensation Insurance for all of the latter's employees to be engaged in such work unless such employees are covered by the protection afforded by the Contractor's Workmen's Compensation Insurance. In the case where any class of employees engaged in hazardous work on the project under this Contract and is not protected under the Workmen's Compensation Statute, The Contractor shall provide and shall cause each Subcontractor to provide adequate employee's liability insurance for the protection of such of his/her employee as are not otherwise protected.

b. **Contractor's Public Liability and Property Damage Insurance and Vehicle Liability Insurance:** The Contractor shall procure and shall maintain during the life of his Contract: Contractor's Public Liability Insurance, Contractor's Property Damage Insurance and Vehicle Liability Insurance in the amount of not less than \$200,000 for bodily injury, including accidental death, to any one person and an amount not less than \$300,000 on account of any one occurrence: Property Damage in the amount not less than \$100,000 per occurrence and \$200,000 aggregate; and Vehicle Liability of \$100,000 for any one person or \$200,000 for each occurrence.

c. **Subcontractor's Public Liability and Property Damage Insurance and Vehicle Liability Insurance:** The Contractor shall either (1) require each of his/her Subcontractor to procure and shall maintain during the life of his /her Subcontractor, Subcontractor's Public Liability and Property Damage Insurance and Vehicle Liability Insurance of the type and in the amount specified in Subparagraph b. above or, (2) insure the activities of his/her Subcontractors in his/her policy specified in Subparagraph b. above.

d. **Scope of Insurance and Special Hazards:** The insurance required under Subparagraph b. and c. above shall provide adequate protection for the Contractor and his/her Subcontractor's, respectively, against damage claims which may arise from operations under this Contract, whether such operations be by the insured or by any one directly or indirectly employed by him/her and also against any of the special hazard which may be encountered in the performance of this Contract.

e. **Builder's Risk Insurance (Fire and Extended Coverage):** Unless otherwise provided by the Owner, the Contractor shall procure and shall maintain during the life of this Contract Builder's Risk Insurance (Fire and Extended Coverage on a 100 percent (100%) completed value basis on the insurable portion of the project. The Owner, the Contractor, and Subcontractor (as their interests may appear), shall be named as the Insured.

f. **Proof of Carriage of Insurance:** The Contractor shall furnish the Owner with certificates showing the type, amount, class of operations covered, effective dates and dates of expiration of policies. Such certificates shall also contain substantially the following statement: "The Insurance covered by this certificate will not be cancelled or materially altered, except after ten (10) days written notice has been received by the Owner".

The foregoing policies (do) (do not) cover all subcontractors

Locations covered: _____

Descriptions of Operations covered: _____

The above policies either in the body thereof or by appropriate endorsement provide that they may not be changed or cancelled by the insurer in less than five days after the insured has received written notice of such change or cancellation.

WITNESS:

Name

Address

Contractor/Firm (Typed)

Signature

Signature (Typed)

Title: _____

Address

City/State/Zip Code

Telephone Number:

Fax Number

NON-COLLUSION AFFIDAVIT OF PROPOSER

State of Texas §

County of Webb §

_____, being duly sworn, deposes and says
that:

(1) He (she) is _____ of _____
_____, the Proposer submitting the attached Proposal;

(2) He (she) is fully informed respecting the preparation and contents of the attached Proposal and any and all appurtenances thereof;

(3) Such Proposal is genuine and is not a collusive Proposal;

(4) Neither the said Proposer nor any of its officers, partners, owners, agents, representatives, employees or parties in interest, including this affiant, has in any way colluded, conspired, connived or agreed, directly or indirectly with another Proposer, firm or person to submit a collusive Proposal in connection with the Contract for which the attached Proposal has been submitted or to refrain from proposing in connection with such contract, or has in any manner, directly or indirectly, sought by agreement or collusion or communication or conference with any other Proposer , firm or person to fix the price or prices in the attached Proposal or of any other Proposal, or to fix an overhead, profit or cost element of the Proposal price or the Proposal Bid price of any other Proposer , or to secure through any collusion, conspiracy, connivance or unlawful agreement any advantage against the Owner or any other person interested in the proposed contract; and

(5) The price or prices quoted in the attached Proposal are fair and proper and are not tainted by any collusion, conspiracy, connivance or unlawful agreement on the part of the Proposer or any of its agents, representatives, owners, employees, or parties in interest, including this affiant.

(Title)

Subscribed and sworn to me this _____ day of _____, 19__.

By: _____

Notary Public in and for _____

County, Texas

My commission expires _____

*** END OF SECTION ***

THIS FORM MUST BE INCLUDED WITH RFP-PACKAGE; PLEASE CHECK OFF EACH ITEM AND SIGN

“Competitive Sealed Proposal Checklist”

(Additional Webb County Information Required)

RFP 2016-03: “WEBB COUNTY YOUTH VILLAGE REHABILITATION CENTER”

- Public Notice**
- General Information for Project**
- Specifications**
- Terms and Conditions (Please read)**
- Conflict of Interest Forms (Required)**
- Proof of No Delinquent Tax Owed to Webb County (Required)**
- Proposer Information Form (Required)**
- References (Required)**
- Cover Sheet**
- Felony Conviction Notification**

Signature

COUNTY OF WEBB

Terms and Conditions of Invitations for Bids/Proposals

1. **GENERAL CONDITIONS:**

Proposers/Bidders are required to submit their proposals upon the following expressed conditions:

- (A) Proposers shall thoroughly examine the scope of work and layouts, instructions and all other contract documents.
- (B) Proposers shall make all investigations necessary to thoroughly inform themselves regarding plant and facilities for delivery of materials and equipment as required by the bid conditions. No plea of ignorance by the bidder of conditions that exist or that may hereafter exist as a result of failure to fulfill in every detail the requirements of the contract documents of the County or the compensation of the vendor.
- (C) Proposers is advised that all County contracts are subject to all legal requirements provided for in county, state and federal statutes and regulations.

2. **PREPARATION OF BIDS/PROPOSALS:**

Proposals will be prepared in accordance with the following:

- (A) Unit prices shall be shown and where there is an error in extension of prices, the unit price shall govern.
- (B) Alternate bids will not be considered unless specifically requested within the proposal package.
- (C) Proposed Period of Performance (POP) must be shown and shall include Sundays and holidays.
- (D) Bidders will not include Federal taxes or State of Texas limited sales excise and use taxes in bid prices since the County of Webb is exempt from payment of such taxes. An exemption certificate will be signed where applicable upon request.

3. **DESCRIPTION OF SUPPLIES:**

Any catalog or manufacturer's reference used in describing an item is merely descriptive, and not restrictive, unless otherwise noted, and is used only to

indicate type and quality of material. Bidders are required to state exactly what they intend to furnish otherwise they shall be required to furnish the items as specified.

4. SUBMISSION OF BIDS/PROPOSALS:

- (A) Bids/Proposals and changes thereto shall be enclosed in sealed envelopes addressed to the Webb County Purchasing Agent. The name and address of the bidder, the date of the proposal opening and the material or service bid on shall be placed on the outside of the envelope.
- (B) Bids/Proposals must be submitted in the forms furnished. Electronic bids/proposals will not be considered. Bids/Proposals, however, may be modified by written notice provided such notice is received at the County Clerk's Office before the time and date set for the proposal opening.
- (C) Samples, when required, must be submitted within the time specified, at no expense to the County of Webb. If not destroyed or used up during testing, samples will be returned upon request at the proposer expense.

5. REJECTION OF BIDS/PROPOSALS:

- (A) The Purchasing Agent may reject a bid/proposal if it is deemed to be non responsive and/or provided by not responsible bidder/proposer.
- (B) No bid/ proposal submitted herein shall be considered if the proposer owes any delinquent taxes to the County of Webb at the time proposals are opened. In the event that the successful proposer herein subsequently becomes delinquent in the payment of his or its County taxes, such fact shall constitute grounds for cancellation of the contract.
- (C) No bid/proposal submitted herein shall be considered unless the bidder/proposer warrants that upon execution of a contract with the County of Webb, the bidder/ proposer will not engage in employment practices which have the effect of discriminating against employees or prospective employees because of race, color, sex, creed, disability, or national origin and will submit such report as the County may thereafter require to assure compliance.
- (D) The County may, however, reject all proposals whenever it is deemed in the best interest of the County to do so, and may reject any part of a bid. County may also waive any minor informalities or irregularities in any bid.

6. WITHDRAWAL OF BIDS/PROPOSALS:

Bids/Proposals may not be withdraw after the closing time and date.

7. LATE BIDS/PROPOSALS OR MODIFICATIONS:

Bids/Proposals and modifications received after the time set for the proposal submission will not be considered.

8. CLARIFICATIN OR OBJECTION TO PROPOSAL SPECIFICATIONS:

If any person contemplating submitting a proposal for this contract is in doubt as to the true meaning of the specifications, or other bid/proposal documents or any part thereof, the bidder/proposer may submit to the Purchasing Agent on or before five days prior to scheduled opening a request for clarification. All such requests for information shall be made in writing and the person submitting the request will be responsible for its prompt delivery. Any interpretation of Webb County proposal package specification instructions, if made, will be made only by Addendum duly issued. A copy of such Addendum will be posted on the web-site and email to the vendors list that have received email copy of package. The County will not be responsible for any other explanation or interpretation made or given prior to the award of the contract. Any objections to the specifications and requirements as set forth in this proposal must be filed in writing with the Purchasing Agent on or before five days prior to the scheduled opening.

Where there is a question that will not lead to an addendum, the questions will be made in writing to the Purchasing Department. The answer will be in writing posted on the website for everyone to receive the same response.

9. DELINQUENT TAXES:

All vendors seeking to do business with Webb County must owe no delinquent taxes to the County. Attestation of owing no delinquent taxes will be required. If a vendor owes taxes to Webb County, those taxes should be paid before submitting a proposal.

10. AWARD OF CONTRACT:

- (A) The contract will be awarded to the best qualified according to the bid/proposal criteria and a written award letter will be issue.
 - (1) Award of a bid/proposal requires formal approval by the Commissioners Court.
 - (2) Bid/Proposal contract must also be approved by the Commissioners Court.
 - (3) The written notice to proceed will be for construction contracts provided after all contract documents are signed.

- (D) Prices must be quoted F.O.B. Webb County with all transportation charges prepaid, unless otherwise specified in the Invitation for Bids/Proposals.
- (E) Delivery time will be considered in breaking of tie proposals.
- (F) Period of Performance will commence with written Notice to Proceed.

11. BID BOND

A bid bond in the amount of 5% of the Bid/Proposal issued by an acceptable surety company shall be submitted with each bid. A certified check or Bank Draft payable to the Webb County may be submitted in lieu of the Bid Bond. All such bonds, cashier checks shall be drawn payable to Webb County.

12. PERFORMANCE AND PAYMENT BOND

A Performance Bond is require for construction work if the contract is in excess of \$100,000; and a Payment Bond is require if the construction contract is in excess of \$25,000. The requirement is for all prime contractors which enter into a formal contract with the State, any department, board, agency, municipality, county, school district or any division or subdivision. The failure of the successful bidder/proposer to execute the agreement and supply the required bonds within ten (10) days after the award or within such extended period as Webb County may grant, shall constitute a default and Webb County may, at its option either award the contract to next lowest responsible bidder, or re-advertise for bids/proposals. In either case, Webb County may charge against the bidder the difference between the amount of the bid, and the amount for which a contract is subsequently executed irrespective of whether this difference exceeds the amount of the bid bond. If a more favorable bid is received through re-advertisement, the defaulting bidder shall have no claim against Webb County for a refund.

13. WORKERS' COMPENSATION INSURANCE COVERAGE:

The Workers' Compensation Commission has adopted Rule 110.110 effective with all bids advertised after September 1, 1994. The TWCC has stated that it is aware that a statutory requirement for workers' compensation insurance coverage is not being met. Therefore, Rule 110.110 requires that all bidders be covered under workers' compensation insurance to achieve compliance from both contractor(s) and governmental entities. **Attachment A** is provided in accordance with the requirements on governmental entities. Please read carefully and prepare your bid in full compliance to TWCC Rule 110.110. Failure to provide the required certificates upon submission of a bid could result in your bid being declared non-responsive.

14. REFERENCES:

Webb County requires proposer to supply with this proposal, a list of at least three (3) references where like services have been supplied by their firm. Include name of firm, address, telephone number and name of representative.

15. STATEMENTS:

No oral statement of any person shall modify or otherwise change, or affect the terms conditions, plans and/or specifications stated in the bid/proposal packages.

16. ETHICS:

The proposer shall not accept or offer gifts or anything of value nor enter into any business arrangement with any employee, of the Webb County Purchasing Department.

17. PROPRIETARY INFORMATION:

All materials submitted to the County become public property and are subject to the Texas Open Records Act upon receipt. If a proposer does not desire proprietary information in the proposal to be disclosed, each page must be identified and marked proprietary a time of submittal. The County will, to the extent allowed by law, endeavor to protect such information from disclosure. The final decision as to what information must be disclosed, however, lies with the Texas Attorney General. Failure to identify proprietary information will result in all unmarked sections being deemed non-proprietary and available upon public request.

(Revised 2013)

Webb County

Conflict of Interest Disclosure

Effective January 1, 2006, Chapter 176 of the Texas Local Government Code requires that any vendor or person considering doing business with a local government entity disclose in the Questionnaire Form CIQ, the vendor or person's affiliation or business relationship that might cause a conflict of interest with a local government entity. By law, this questionnaire must be filled with the records administrator of Webb County no later than the 7th business day after the date the person becomes aware of facts that require the statement to be filed. See Section 176.006, Local Government Code. A person commits an offense if the person violates Section 176.006, Local Government Code. An offense under this section is a Class C misdemeanor. The questionnaire may be viewed and printed by following the link before:

By submitting a response to this request, the vendor represents that it is in compliance with the requirements of Chapter 176 of the Texas Local Government Code.

The Webb County Officials who come within Chapter 176 of the Local Government Code relating to filing of Conflict of Interest Questionnaire (Form CIQ) include:

1. Webb County Judge Cayetano "Tano" Tijerina
2. Commissioner Frank Sciaraffa
3. Commissioner Rosaura "Wawi" Tijerina
4. Commissioner John Galo
5. Commissioner Jaime Canales
6. Judge Joe Lopez, Chairman, 49th Judicial District
7. Judge Becky Palomo, 341st Judicial District
8. Judge Monica Notzon, 111th Judicial District

Please send completed forms to the Webb County Clerk's Office located at 1110 Victoria, Suite 201, Laredo, Texas 78040.

CONFLICT OF INTEREST QUESTIONNAIRE

FORM CIQ

For vendor or other person doing business with local governmental entity

This questionnaire reflects changes made to the law by H.B. 1491, 80th Leg., Regular Session.

This questionnaire is being filed in accordance with Chapter 176, Local Government Code by a person who has a business relationship as defined by Section 176.001(1-a) with a local governmental entity and the person meets requirements under Section 176.006(a).

By law this questionnaire must be filed with the records administrator of the local governmental entity not later than the 7th business day after the date the person becomes aware of facts that require the statement to be filed. See Section 176.006, Local Government Code.

A person commits an offense if the person knowingly violates Section 176.006, Local Government Code. An offense under this section is a Class C misdemeanor.

OFFICE USE ONLY

Date Received

1 Name of person who has a business relationship with local governmental entity.

2 Check this box if you are filing an update to a previously filed questionnaire.

(The law requires that you file an updated completed questionnaire with the appropriate filing authority not later than the 7th business day after the date the originally filed questionnaire becomes incomplete or inaccurate.)

3 Name of local government officer with whom filer has employment or business relationship.

Name of Officer

This section (item 3 including subparts A, B, C & D) must be completed for each officer with whom the filer has an employment or other business relationship as defined by Section 176.001(1-a), Local Government Code. Attach additional pages to this Form CIQ as necessary.

A. Is the local government officer named in this section receiving or likely to receive taxable income, other than investment income, from the filer of the questionnaire?

Yes No

B. Is the filer of the questionnaire receiving or likely to receive taxable income, other than investment income, from or at the direction of the local government officer named in this section AND the taxable income is not received from the local governmental entity?

Yes No

C. Is the filer of this questionnaire employed by a corporation or other business entity with respect to which the local government officer serves as an officer or director, or holds an ownership of 10 percent or more?

Yes No

D. Describe each employment or business relationship with the local government officer named in this section.

4

Signature of person doing business with the governmental entity

Date

PROOF OF NO DELINQUENT TAXES OWED TO WEBB COUNTY

Name _____ owes no delinquent property taxes to Webb County.

_____ owes no property taxes as a business in Webb County.
(Business Name)

_____ owes no property taxes as a resident of Webb County.
(Business Owner)

Person who can attest to the above information

*** SIGNED NOTORIZED DOCUMENT AND PROOF OF NO DELINQUENT TAXES TO WEBB COUNTY.**

The State of Texas
County of Webb

Before me, a Notary Public, on this day personally appeared _____, know to me (or proved to me on the oath of _____ to be the person whose name is subscribed to the forgoing instrument and acknowledged to me that he executed the same for the purpose and consideration therein expressed.

Given under my hand and seal of office this ____ day of _____ 2016.

Notary Public, State of Texas

(Print name of Notary Public here)

My commission expires the ____ day of _____ 20__.

Proposer Information

Name of Proposer: _____

Address: _____

City and State _____

Phone: _____

Email Address: _____

Signature of Person Authorized to Sign:

Signature

Print Name

Title

Indicate status as to “Partnership”, “Corporation”, “Land Owner”, etc.

(Date)

Note:

All submissions relative to these RFP shall become the property of Webb County and are nonreturnable.

If any further information is required please call the Webb County Interim Purchasing Agent, Leticia Gutierrez, at (956)523-4127 or Contract Administrator, Amanda Del Toro, at (956)-523-5936.

References

Name of Firm	Address	Phone	Name of Contact

FELONY CONVICTION NOTIFICATION

STATE OF TEXAS
COUNTY OF WEBB

FROM: _____
(Name of Contractor)

RE: The Contract entered into the ____ day of _____ 20____, between the
above mentioned parties for the construction of the WEBB COUNTY YOUTH VILLAGE REHABILITATION CENTER

Webb County
(Owner)

I, the undersigned agent for the firm named below, certify that the information concerning notification of felony convictions has been reviewed by me and the following information furnished is true to the best of my knowledge.

Authorized Company Official's Name (Printed):

A. My firm is a publicly-held corporation; therefore, this reporting requirement is not applicable.

Signature of Company Official:

B. My firm is not owned nor operated by anyone who has been convicted of a felony.

Signature of Company Official:

C. My firm is owned or operated by the following individual(s) who has/have been convicted of a felony:

Name of Felon(s):

Details of Conviction(s):

Signature of Company Official:

IN WITNESS WHEREOF, the undersigned has signed and sealed this instrument this _____
day of _____, 20____.

Name of Contractor

By _____
Authorized Signature

Title: _____

BEFORE ME, a Notary Public, on this day personally appeared _____, known to me to
be the person whose name is subscribed to the foregoing instrument, after being duly sworn, deposed and
said that the facts stated are true. Given under my hand and seal of office this _____ day of _____
_____, 20____.

Notary Public, State of Texas

Printed Name of Notary Public

NOTICE TO PROPOSER

THESE CONTRACT DOCUMENTS (A101-2007, A201-2007, A201/SC-2007) ARE DRAFT DOCUMENTS NOT FINAL DOCUMENTS AND ARE FOR REFERENCE PURPOSES ONLY. ALL TERMS AND CONDITIONS EXPRESSED THEREIN ARE SUBJECT TO CHANGE AND ARE NOT AN OFFER OR INDICATION OF FINAL INSTRUMENTS. WEBB COUNTY, IN ITS SOLE DISCRETION, RESERVES THE RIGHT TO MAKE CHANGES, MODIFICATIONS OR DELETIONS TO ANY TERM/S OR CONDITIONS, SET FORTH IN THESE DRAFT CONTRACTS, IT DEEMS APPROPRIATE OR NECESSARY.

EXHIBIT "A"
AIA DOCUMENT A101-2007
STANDARD FORM OF AGREEMENT BETWEEN OWNER AND
CONTRACTOR WHERE THE BASIS OF PAYMENT IS A STIPULATED SUM

DRAFT AIA® Document A101™ - 2007

Standard Form of Agreement Between Owner and Contractor where the basis of payment is a Stipulated Sum

AGREEMENT made as of the « » day of « » in the year « »
(In words, indicate day, month and year.)

BETWEEN the Owner:
(Name, legal status, address and other information)

« »
« »
« »
« »

and the Contractor:
(Name, legal status, address and other information)

« »
« »
« »
« »

for the following Project:
(Name, location and detailed description)

«project name»
« »
« »

The Architect:
(Name, legal status, address and other information)

« »
« »
« »
« »

The Owner and Contractor agree as follows.

ADDITIONS AND DELETIONS:
The author of this document has added information needed for its completion. The author may also have revised the text of the original AIA standard form. An *Additions and Deletions Report* that notes added information as well as revisions to the standard form text is available from the author and should be reviewed.

This document has important legal consequences. Consultation with an attorney is encouraged with respect to its completion or modification.

AIA Document A201™-2007, General Conditions of the Contract for Construction, is adopted in this document by reference. Do not use with other general conditions unless this document is modified.

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TABLE OF ARTICLES

- 1 THE CONTRACT DOCUMENTS
- 2 THE WORK OF THIS CONTRACT
- 3 DATE OF COMMENCEMENT AND SUBSTANTIAL COMPLETION
- 4 CONTRACT SUM
- 5 PAYMENTS
- 6 DISPUTE RESOLUTION
- 7 TERMINATION OR SUSPENSION
- 8 MISCELLANEOUS PROVISIONS
- 9 ENUMERATION OF CONTRACT DOCUMENTS
- 10 INSURANCE AND BONDS

ARTICLE 1 THE CONTRACT DOCUMENTS

The Contract Documents consist of this Agreement, Conditions of the Contract (General, Supplementary and other Conditions), Drawings, Specifications, Addenda issued prior to execution of this Agreement, other documents listed in this Agreement and Modifications issued after execution of this Agreement, all of which form the Contract, and are as fully a part of the Contract as if attached to this Agreement or repeated herein. The Contract represents the entire and integrated agreement between the parties hereto and supersedes prior negotiations, representations or agreements, either written or oral. An enumeration of the Contract Documents, other than a Modification, appears in Article 9.

ARTICLE 2 THE WORK OF THIS CONTRACT

The Contractor shall fully execute the Work described in the Contract Documents, except as specifically indicated in the Contract Documents to be the responsibility of others.

ARTICLE 3 DATE OF COMMENCEMENT AND SUBSTANTIAL COMPLETION

§ 3.1 The date of commencement of the Work shall be the date of this Agreement unless a different date is stated below or provision is made for the date to be fixed in a notice to proceed issued by the Owner.

(Insert the date of commencement if it differs from the date of this Agreement or, if applicable, state that the date will be fixed in a notice to proceed.)

« »

If, prior to the commencement of the Work, the Owner requires time to file mortgages and other security interests, the Owner's time requirement shall be as follows:

« »

§ 3.2 The Contract Time shall be measured from the date of commencement.

§ 3.3 The Contractor shall achieve Substantial Completion of the entire Work not later than « » (« ») days from the date of commencement, or as follows:

(Insert number of calendar days. Alternatively, a calendar date may be used when coordinated with the date of commencement. If appropriate, insert requirements for earlier Substantial Completion of certain portions of the Work.)

« »

Portion of Work

Substantial Completion Date

, subject to adjustments of this Contract Time as provided in the Contract Documents.
(Insert provisions, if any, for liquidated damages relating to failure to achieve Substantial Completion on time or for bonus payments for early completion of the Work.)

« »

ARTICLE 4 CONTRACT SUM

§ 4.1 The Owner shall pay the Contractor the Contract Sum in current funds for the Contractor's performance of the Contract. The Contract Sum shall be « » (\$ « »), subject to additions and deductions as provided in the Contract Documents.

§ 4.2 The Contract Sum is based upon the following alternates, if any, which are described in the Contract Documents and are hereby accepted by the Owner:
(State the numbers or other identification of accepted alternates. If the bidding or proposal documents permit the Owner to accept other alternates subsequent to the execution of this Agreement, attach a schedule of such other alternates showing the amount for each and the date when that amount expires.)

« »

§ 4.3 Unit prices, if any:
(Identify and state the unit price; state quantity limitations, if any, to which the unit price will be applicable.)

Item	Units and Limitations	Price Per Unit (\$0.00)
------	-----------------------	-------------------------

§ 4.4 Allowances included in the Contract Sum, if any:
(Identify allowance and state exclusions, if any, from the allowance price.)

Item	Price
------	-------

ARTICLE 5 PAYMENTS

§ 5.1 PROGRESS PAYMENTS

§ 5.1.1 Based upon Applications for Payment submitted to the Architect by the Contractor and Certificates for Payment issued by the Architect, the Owner shall make progress payments on account of the Contract Sum to the Contractor as provided below and elsewhere in the Contract Documents.

§ 5.1.2 The period covered by each Application for Payment shall be one calendar month ending on the last day of the month, or as follows:

« »

§ 5.1.3 Provided that an Application for Payment is received by the Architect not later than the « » day of a month, the Owner shall make payment of the certified amount to the Contractor not later than the « » day of the « » month. If an Application for Payment is received by the Architect after the application date fixed above, payment shall be made by the Owner not later than « » (« ») days after the Architect receives the Application for Payment.
(Federal, state or local laws may require payment within a certain period of time.)

§ 5.1.4 Each Application for Payment shall be based on the most recent schedule of values submitted by the Contractor in accordance with the Contract Documents. The schedule of values shall allocate the entire Contract Sum among the various portions of the Work. The schedule of values shall be prepared in such form and supported by such data to substantiate its accuracy as the Architect may require. This schedule, unless objected to by the Architect, shall be used as a basis for reviewing the Contractor's Applications for Payment.

§ 5.1.5 Applications for Payment shall show the percentage of completion of each portion of the Work as of the end of the period covered by the Application for Payment.

§ 5.1.6 Subject to other provisions of the Contract Documents, the amount of each progress payment shall be computed as follows:

- .1 Take that portion of the Contract Sum properly allocable to completed Work as determined by multiplying the percentage completion of each portion of the Work by the share of the Contract Sum allocated to that portion of the Work in the schedule of values, less retainage of « » percent (« » %). Pending final determination of cost to the Owner of changes in the Work, amounts not in dispute shall be included as provided in Section 7.3.9 of AIA Document A201™–2007, General Conditions of the Contract for Construction;
- .2 Add that portion of the Contract Sum properly allocable to materials and equipment delivered and suitably stored at the site for subsequent incorporation in the completed construction (or, if approved in advance by the Owner, suitably stored off the site at a location agreed upon in writing), less retainage of « » percent (« » %);
- .3 Subtract the aggregate of previous payments made by the Owner; and
- .4 Subtract amounts, if any, for which the Architect has withheld or nullified a Certificate for Payment as provided in Section 9.5 of AIA Document A201–2007.

§ 5.1.7 The progress payment amount determined in accordance with Section 5.1.6 shall be further modified under the following circumstances:

- .1 Add, upon Substantial Completion of the Work, a sum sufficient to increase the total payments to the full amount of the Contract Sum, less such amounts as the Architect shall determine for incomplete Work, retainage applicable to such work and unsettled claims; and
(Section 9.8.5 of AIA Document A201–2007 requires release of applicable retainage upon Substantial Completion of Work with consent of surety, if any.)
- .2 Add, if final completion of the Work is thereafter materially delayed through no fault of the Contractor, any additional amounts payable in accordance with Section 9.10.3 of AIA Document A201–2007.

§ 5.1.8 Reduction or limitation of retainage, if any, shall be as follows:

(If it is intended, prior to Substantial Completion of the entire Work, to reduce or limit the retainage resulting from the percentages inserted in Sections 5.1.6.1 and 5.1.6.2 above, and this is not explained elsewhere in the Contract Documents, insert here provisions for such reduction or limitation.)

« »

§ 5.1.9 Except with the Owner's prior approval, the Contractor shall not make advance payments to suppliers for materials or equipment which have not been delivered and stored at the site.

§ 5.2 FINAL PAYMENT

§ 5.2.1 Final payment, constituting the entire unpaid balance of the Contract Sum, shall be made by the Owner to the Contractor when

- .1 the Contractor has fully performed the Contract except for the Contractor's responsibility to correct Work as provided in Section 12.2.2 of AIA Document A201–2007, and to satisfy other requirements, if any, which extend beyond final payment; and
- .2 a final Certificate for Payment has been issued by the Architect.

§ 5.2.2 The Owner's final payment to the Contractor shall be made no later than 30 days after the issuance of the Architect's final Certificate for Payment, or as follows:

« »

ARTICLE 6 DISPUTE RESOLUTION

§ 6.1 INITIAL DECISION MAKER

The Architect will serve as Initial Decision Maker pursuant to Section 15.2 of AIA Document A201–2007, unless the parties appoint below another individual, not a party to this Agreement, to serve as Initial Decision Maker.

(If the parties mutually agree, insert the name, address and other contact information of the Initial Decision Maker, if other than the Architect.)

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§ 6.2 BINDING DISPUTE RESOLUTION

For any Claim subject to, but not resolved by, mediation pursuant to Section 15.3 of AIA Document A201–2007, the method of binding dispute resolution shall be as follows:

(Check the appropriate box. If the Owner and Contractor do not select a method of binding dispute resolution below, or do not subsequently agree in writing to a binding dispute resolution method other than litigation, Claims will be resolved by litigation in a court of competent jurisdiction.)

Arbitration pursuant to Section 15.4 of AIA Document A201–2007

Litigation in a court of competent jurisdiction

Other (Specify)

<< >>

ARTICLE 7 TERMINATION OR SUSPENSION

§ 7.1 The Contract may be terminated by the Owner or the Contractor as provided in Article 14 of AIA Document A201–2007.

§ 7.2 The Work may be suspended by the Owner as provided in Article 14 of AIA Document A201–2007.

ARTICLE 8 MISCELLANEOUS PROVISIONS

§ 8.1 Where reference is made in this Agreement to a provision of AIA Document A201–2007 or another Contract Document, the reference refers to that provision as amended or supplemented by other provisions of the Contract Documents.

§ 8.2 Payments due and unpaid under the Contract shall bear interest from the date payment is due at the rate stated below, or in the absence thereof, at the legal rate prevailing from time to time at the place where the Project is located.

(Insert rate of interest agreed upon, if any.)

<< >> % << >>

§ 8.3 The Owner’s representative:

(Name, address and other information)

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<< >>
<< >>
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<< >>

§ 8.4 The Contractor’s representative:

(Name, address and other information)

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<< >>
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<< >>

<< >>
<< >>

§ 8.5 Neither the Owner's nor the Contractor's representative shall be changed without ten days written notice to the other party.

§ 8.6 Other provisions:

<< >>

ARTICLE 9 ENUMERATION OF CONTRACT DOCUMENTS

§ 9.1 The Contract Documents, except for Modifications issued after execution of this Agreement, are enumerated in the sections below.

§ 9.1.1 The Agreement is this executed AIA Document A101–2007, Standard Form of Agreement Between Owner and Contractor.

§ 9.1.2 The General Conditions are AIA Document A201–2007, General Conditions of the Contract for Construction.

§ 9.1.3 The Supplementary and other Conditions of the Contract:

Document	Title	Date	Pages

§ 9.1.4 The Specifications:

(Either list the Specifications here or refer to an exhibit attached to this Agreement.)

<< >>

Section	Title	Date	Pages

§ 9.1.5 The Drawings:

(Either list the Drawings here or refer to an exhibit attached to this Agreement.)

<< >>

Number	Title	Date

§ 9.1.6 The Addenda, if any:

Number	Date	Pages

Portions of Addenda relating to bidding requirements are not part of the Contract Documents unless the bidding requirements are also enumerated in this Article 9.

§ 9.1.7 Additional documents, if any, forming part of the Contract Documents:

- 1 AIA Document E201™–2007, Digital Data Protocol Exhibit, if completed by the parties, or the following:

<< >>

- 2 Other documents, if any, listed below:

(List here any additional documents that are intended to form part of the Contract Documents. AIA Document A201–2007 provides that bidding requirements such as advertisement or invitation to bid, Instructions to Bidders, sample forms and the Contractor's bid are not part of the Contract

Documents unless enumerated in this Agreement. They should be listed here only if intended to be part of the Contract Documents.)

<< >>

ARTICLE 10 INSURANCE AND BONDS

The Contractor shall purchase and maintain insurance and provide bonds as set forth in Article 11 of AIA Document A201–2007.

(State bonding requirements, if any, and limits of liability for insurance required in Article 11 of AIA Document A201–2007.)

Type of insurance or bond

Limit of liability or bond amount (\$0.00)

This Agreement entered into as of the day and year first written above.

OWNER (Signature)

CONTRACTOR (Signature)

<< >><< >>

<< >><< >>

(Printed name and title)

(Printed name and title)

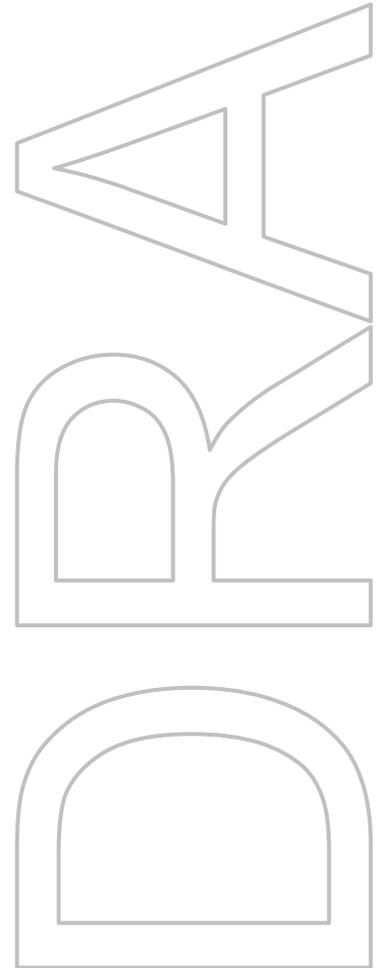


EXHIBIT "B"
AIA DOCUMENT A201-2007
GENERAL CONDITIONS OF THE CONTRACT

DRAFT AIA® Document A201™ - 2007

General Conditions of the Contract for Construction

for the following PROJECT:

(Name and location or address)

«project name»

« »

THE OWNER:

(Name, legal status and address)

« »« »

« »

THE ARCHITECT:

(Name, legal status and address)

« »« »

« »

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ARTICLE 1 GENERAL PROVISIONS

§ 1.1 BASIC DEFINITIONS

§ 1.1.1 THE CONTRACT DOCUMENTS

The Contract Documents are enumerated in the Agreement between the Owner and Contractor (hereinafter the Agreement) and consist of the Agreement, Conditions of the Contract (General, Supplementary and other Conditions), Drawings, Specifications, Addenda issued prior to execution of the Contract, other documents listed in the Agreement and Modifications issued after execution of the Contract. A Modification is (1) a written amendment to the Contract signed by both parties, (2) a Change Order, (3) a Construction Change Directive or (4) a written order for a minor change in the Work issued by the Architect. Unless specifically enumerated in the Agreement, the Contract Documents do not include the advertisement or invitation to bid, Instructions to Bidders, sample forms, other information furnished by the Owner in anticipation of receiving bids or proposals, the Contractor's bid or proposal, or portions of Addenda relating to bidding requirements.

§ 1.1.2 THE CONTRACT

The Contract Documents form the Contract for Construction. The Contract represents the entire and integrated agreement between the parties hereto and supersedes prior negotiations, representations or agreements, either written or oral. The Contract may be amended or modified only by a Modification. The Contract Documents shall not be construed to create a contractual relationship of any kind (1) between the Contractor and the Architect or the Architect's consultants, (2) between the Owner and a Subcontractor or a Sub-subcontractor, (3) between the Owner and the Architect or the Architect's consultants or (4) between any persons or entities other than the Owner and the Contractor. The Architect shall, however, be entitled to performance and enforcement of obligations under the Contract intended to facilitate performance of the Architect's duties.

§ 1.1.3 THE WORK

The term "Work" means the construction and services required by the Contract Documents, whether completed or partially completed, and includes all other labor, materials, equipment and services provided or to be provided by the Contractor to fulfill the Contractor's obligations. The Work may constitute the whole or a part of the Project.

§ 1.1.4 THE PROJECT

The Project is the total construction of which the Work performed under the Contract Documents may be the whole or a part and which may include construction by the Owner and by separate contractors.

§ 1.1.5 THE DRAWINGS

The Drawings are the graphic and pictorial portions of the Contract Documents showing the design, location and dimensions of the Work, generally including plans, elevations, sections, details, schedules and diagrams.

§ 1.1.6 THE SPECIFICATIONS

The Specifications are that portion of the Contract Documents consisting of the written requirements for materials, equipment, systems, standards and workmanship for the Work, and performance of related services.

§ 1.1.7 INSTRUMENTS OF SERVICE

Instruments of Service are representations, in any medium of expression now known or later developed, of the tangible and intangible creative work performed by the Architect and the Architect's consultants under their respective professional services agreements. Instruments of Service may include, without limitation, studies, surveys, models, sketches, drawings, specifications, and other similar materials.

§ 1.1.8 INITIAL DECISION MAKER

The Initial Decision Maker is the person identified in the Agreement to render initial decisions on Claims in accordance with Section 15.2 and certify termination of the Agreement under Section 14.2.2.

§ 1.2 CORRELATION AND INTENT OF THE CONTRACT DOCUMENTS

§ 1.2.1 The intent of the Contract Documents is to include all items necessary for the proper execution and completion of the Work by the Contractor. The Contract Documents are complementary, and what is required by one shall be as binding as if required by all; performance by the Contractor shall be required only to the extent consistent with the Contract Documents and reasonably inferable from them as being necessary to produce the indicated results.

§ 1.2.2 Organization of the Specifications into divisions, sections and articles, and arrangement of Drawings shall not control the Contractor in dividing the Work among Subcontractors or in establishing the extent of Work to be performed by any trade.

§ 1.2.3 Unless otherwise stated in the Contract Documents, words that have well-known technical or construction industry meanings are used in the Contract Documents in accordance with such recognized meanings.

§ 1.3 CAPITALIZATION

Terms capitalized in these General Conditions include those that are (1) specifically defined, (2) the titles of numbered articles or (3) the titles of other documents published by the American Institute of Architects.

§ 1.4 INTERPRETATION

In the interest of brevity the Contract Documents frequently omit modifying words such as “all” and “any” and articles such as “the” and “an,” but the fact that a modifier or an article is absent from one statement and appears in another is not intended to affect the interpretation of either statement.

§ 1.5 OWNERSHIP AND USE OF DRAWINGS, SPECIFICATIONS AND OTHER INSTRUMENTS OF SERVICE

§ 1.5.1 The Architect and the Architect’s consultants shall be deemed the authors and owners of their respective Instruments of Service, including the Drawings and Specifications, and will retain all common law, statutory and other reserved rights, including copyrights. The Contractor, Subcontractors, Sub-subcontractors, and material or equipment suppliers shall not own or claim a copyright in the Instruments of Service. Submittal or distribution to meet official regulatory requirements or for other purposes in connection with this Project is not to be construed as publication in derogation of the Architect’s or Architect’s consultants’ reserved rights.

§ 1.5.2 The Contractor, Subcontractors, Sub-subcontractors and material or equipment suppliers are authorized to use and reproduce the Instruments of Service provided to them solely and exclusively for execution of the Work. All copies made under this authorization shall bear the copyright notice, if any, shown on the Instruments of Service. The Contractor, Subcontractors, Sub-subcontractors, and material or equipment suppliers may not use the Instruments of Service on other projects or for additions to this Project outside the scope of the Work without the specific written consent of the Owner, Architect and the Architect’s consultants.

§ 1.6 TRANSMISSION OF DATA IN DIGITAL FORM

If the parties intend to transmit Instruments of Service or any other information or documentation in digital form, they shall endeavor to establish necessary protocols governing such transmissions, unless otherwise already provided in the Agreement or the Contract Documents.

ARTICLE 2 OWNER

§ 2.1 GENERAL

§ 2.1.1 The Owner is the person or entity identified as such in the Agreement and is referred to throughout the Contract Documents as if singular in number. The Owner shall designate in writing a representative who shall have express authority to bind the Owner with respect to all matters requiring the Owner’s approval or authorization. Except as otherwise provided in Section 4.2.1, the Architect does not have such authority. The term “Owner” means the Owner or the Owner’s authorized representative.

§ 2.1.2 The Owner shall furnish to the Contractor within fifteen days after receipt of a written request, information necessary and relevant for the Contractor to evaluate, give notice of or enforce mechanic’s lien rights. Such information shall include a correct statement of the record legal title to the property on which the Project is located, usually referred to as the site, and the Owner’s interest therein.

§ 2.2 INFORMATION AND SERVICES REQUIRED OF THE OWNER

§ 2.2.1 Prior to commencement of the Work, the Contractor may request in writing that the Owner provide reasonable evidence that the Owner has made financial arrangements to fulfill the Owner’s obligations under the Contract. Thereafter, the Contractor may only request such evidence if (1) the Owner fails to make payments to the Contractor as the Contract Documents require; (2) a change in the Work materially changes the Contract Sum; or (3) the Contractor identifies in writing a reasonable concern regarding the Owner’s ability to make payment when due. The Owner shall furnish such evidence as a condition precedent to commencement or continuation of the Work or the portion of the Work affected by a material change. After the Owner furnishes the evidence, the Owner shall not materially vary such financial arrangements without prior notice to the Contractor.

§ 2.2.2 Except for permits and fees that are the responsibility of the Contractor under the Contract Documents, including those required under Section 3.7.1, the Owner shall secure and pay for necessary approvals, easements, assessments and charges required for construction, use or occupancy of permanent structures or for permanent changes in existing facilities.

§ 2.2.3 The Owner shall furnish surveys describing physical characteristics, legal limitations and utility locations for the site of the Project, and a legal description of the site. The Contractor shall be entitled to rely on the accuracy of information furnished by the Owner but shall exercise proper precautions relating to the safe performance of the Work.

§ 2.2.4 The Owner shall furnish information or services required of the Owner by the Contract Documents with reasonable promptness. The Owner shall also furnish any other information or services under the Owner's control and relevant to the Contractor's performance of the Work with reasonable promptness after receiving the Contractor's written request for such information or services.

§ 2.2.5 Unless otherwise provided in the Contract Documents, the Owner shall furnish to the Contractor one copy of the Contract Documents for purposes of making reproductions pursuant to Section 1.5.2.

§ 2.3 OWNER'S RIGHT TO STOP THE WORK

If the Contractor fails to correct Work that is not in accordance with the requirements of the Contract Documents as required by Section 12.2 or repeatedly fails to carry out Work in accordance with the Contract Documents, the Owner may issue a written order to the Contractor to stop the Work, or any portion thereof, until the cause for such order has been eliminated; however, the right of the Owner to stop the Work shall not give rise to a duty on the part of the Owner to exercise this right for the benefit of the Contractor or any other person or entity, except to the extent required by Section 6.1.3.

§ 2.4 OWNER'S RIGHT TO CARRY OUT THE WORK

If the Contractor defaults or neglects to carry out the Work in accordance with the Contract Documents and fails within a ten-day period after receipt of written notice from the Owner to commence and continue correction of such default or neglect with diligence and promptness, the Owner may, without prejudice to other remedies the Owner may have, correct such deficiencies. In such case an appropriate Change Order shall be issued deducting from payments then or thereafter due the Contractor the reasonable cost of correcting such deficiencies, including Owner's expenses and compensation for the Architect's additional services made necessary by such default, neglect or failure. Such action by the Owner and amounts charged to the Contractor are both subject to prior approval of the Architect. If payments then or thereafter due the Contractor are not sufficient to cover such amounts, the Contractor shall pay the difference to the Owner.

ARTICLE 3 CONTRACTOR

§ 3.1 GENERAL

§ 3.1.1 The Contractor is the person or entity identified as such in the Agreement and is referred to throughout the Contract Documents as if singular in number. The Contractor shall be lawfully licensed, if required in the jurisdiction where the Project is located. The Contractor shall designate in writing a representative who shall have express authority to bind the Contractor with respect to all matters under this Contract. The term "Contractor" means the Contractor or the Contractor's authorized representative.

§ 3.1.2 The Contractor shall perform the Work in accordance with the Contract Documents.

§ 3.1.3 The Contractor shall not be relieved of obligations to perform the Work in accordance with the Contract Documents either by activities or duties of the Architect in the Architect's administration of the Contract, or by tests, inspections or approvals required or performed by persons or entities other than the Contractor.

§ 3.2 REVIEW OF CONTRACT DOCUMENTS AND FIELD CONDITIONS BY CONTRACTOR

§ 3.2.1 Execution of the Contract by the Contractor is a representation that the Contractor has visited the site, become generally familiar with local conditions under which the Work is to be performed and correlated personal observations with requirements of the Contract Documents.

§ 3.2.2 Because the Contract Documents are complementary, the Contractor shall, before starting each portion of the Work, carefully study and compare the various Contract Documents relative to that portion of the Work, as well as the information furnished by the Owner pursuant to Section 2.2.3, shall take field measurements of any existing conditions related to that portion of the Work, and shall observe any conditions at the site affecting it. These obligations are for the purpose of facilitating coordination and construction by the Contractor and are not for the purpose of discovering errors, omissions, or inconsistencies in the Contract Documents; however, the Contractor shall promptly report to the Architect any errors, inconsistencies or omissions discovered by or made known to the Contractor as a request for information in such form as the Architect may require. It is recognized that the Contractor's review is made in the Contractor's capacity as a contractor and not as a licensed design professional, unless otherwise specifically provided in the Contract Documents.

§ 3.2.3 The Contractor is not required to ascertain that the Contract Documents are in accordance with applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of public authorities, but the Contractor shall promptly report to the Architect any nonconformity discovered by or made known to the Contractor as a request for information in such form as the Architect may require.

§ 3.2.4 If the Contractor believes that additional cost or time is involved because of clarifications or instructions the Architect issues in response to the Contractor's notices or requests for information pursuant to Sections 3.2.2 or 3.2.3, the Contractor shall make Claims as provided in Article 15. If the Contractor fails to perform the obligations of Sections 3.2.2 or 3.2.3, the Contractor shall pay such costs and damages to the Owner as would have been avoided if the Contractor had performed such obligations. If the Contractor performs those obligations, the Contractor shall not be liable to the Owner or Architect for damages resulting from errors, inconsistencies or omissions in the Contract Documents, for differences between field measurements or conditions and the Contract Documents, or for nonconformities of the Contract Documents to applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities.

§ 3.3 SUPERVISION AND CONSTRUCTION PROCEDURES

§ 3.3.1 The Contractor shall supervise and direct the Work, using the Contractor's best skill and attention. The Contractor shall be solely responsible for, and have control over, construction means, methods, techniques, sequences and procedures and for coordinating all portions of the Work under the Contract, unless the Contract Documents give other specific instructions concerning these matters. If the Contract Documents give specific instructions concerning construction means, methods, techniques, sequences or procedures, the Contractor shall evaluate the jobsite safety thereof and, except as stated below, shall be fully and solely responsible for the jobsite safety of such means, methods, techniques, sequences or procedures. If the Contractor determines that such means, methods, techniques, sequences or procedures may not be safe, the Contractor shall give timely written notice to the Owner and Architect and shall not proceed with that portion of the Work without further written instructions from the Architect. If the Contractor is then instructed to proceed with the required means, methods, techniques, sequences or procedures without acceptance of changes proposed by the Contractor, the Owner shall be solely responsible for any loss or damage arising solely from those Owner-required means, methods, techniques, sequences or procedures.

§ 3.3.2 The Contractor shall be responsible to the Owner for acts and omissions of the Contractor's employees, Subcontractors and their agents and employees, and other persons or entities performing portions of the Work for, or on behalf of, the Contractor or any of its Subcontractors.

§ 3.3.3 The Contractor shall be responsible for inspection of portions of Work already performed to determine that such portions are in proper condition to receive subsequent Work.

§ 3.4 LABOR AND MATERIALS

§ 3.4.1 Unless otherwise provided in the Contract Documents, the Contractor shall provide and pay for labor, materials, equipment, tools, construction equipment and machinery, water, heat, utilities, transportation, and other facilities and services necessary for proper execution and completion of the Work, whether temporary or permanent and whether or not incorporated or to be incorporated in the Work.

§ 3.4.2 Except in the case of minor changes in the Work authorized by the Architect in accordance with Sections 3.12.8 or 7.4, the Contractor may make substitutions only with the consent of the Owner, after evaluation by the Architect and in accordance with a Change Order or Construction Change Directive.

§ 3.4.3 The Contractor shall enforce strict discipline and good order among the Contractor's employees and other persons carrying out the Work. The Contractor shall not permit employment of unfit persons or persons not properly skilled in tasks assigned to them.

§ 3.5 WARRANTY

The Contractor warrants to the Owner and Architect that materials and equipment furnished under the Contract will be of good quality and new unless the Contract Documents require or permit otherwise. The Contractor further warrants that the Work will conform to the requirements of the Contract Documents and will be free from defects, except for those inherent in the quality of the Work the Contract Documents require or permit. Work, materials, or equipment not conforming to these requirements may be considered defective. The Contractor's warranty excludes remedy for damage or defect caused by abuse, alterations to the Work not executed by the Contractor, improper or insufficient maintenance, improper operation, or normal wear and tear and normal usage. If required by the Architect, the Contractor shall furnish satisfactory evidence as to the kind and quality of materials and equipment.

§ 3.6 TAXES

The Contractor shall pay sales, consumer, use and similar taxes for the Work provided by the Contractor that are legally enacted when bids are received or negotiations concluded, whether or not yet effective or merely scheduled to go into effect.

§ 3.7 PERMITS, FEES, NOTICES AND COMPLIANCE WITH LAWS

§ 3.7.1 Unless otherwise provided in the Contract Documents, the Contractor shall secure and pay for the building permit as well as for other permits, fees, licenses, and inspections by government agencies necessary for proper execution and completion of the Work that are customarily secured after execution of the Contract and legally required at the time bids are received or negotiations concluded.

§ 3.7.2 The Contractor shall comply with and give notices required by applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities applicable to performance of the Work.

§ 3.7.3 If the Contractor performs Work knowing it to be contrary to applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of public authorities, the Contractor shall assume appropriate responsibility for such Work and shall bear the costs attributable to correction.

§ 3.7.4 **Concealed or Unknown Conditions.** If the Contractor encounters conditions at the site that are (1) subsurface or otherwise concealed physical conditions that differ materially from those indicated in the Contract Documents or (2) unknown physical conditions of an unusual nature, that differ materially from those ordinarily found to exist and generally recognized as inherent in construction activities of the character provided for in the Contract Documents, the Contractor shall promptly provide notice to the Owner and the Architect before conditions are disturbed and in no event later than 21 days after first observance of the conditions. The Architect will promptly investigate such conditions and, if the Architect determines that they differ materially and cause an increase or decrease in the Contractor's cost of, or time required for, performance of any part of the Work, will recommend an equitable adjustment in the Contract Sum or Contract Time, or both. If the Architect determines that the conditions at the site are not materially different from those indicated in the Contract Documents and that no change in the terms of the Contract is justified, the Architect shall promptly notify the Owner and Contractor in writing, stating the reasons. If either party disputes the Architect's determination or recommendation, that party may proceed as provided in Article 15.

§ 3.7.5 If, in the course of the Work, the Contractor encounters human remains or recognizes the existence of burial markers, archaeological sites or wetlands not indicated in the Contract Documents, the Contractor shall immediately suspend any operations that would affect them and shall notify the Owner and Architect. Upon receipt of such notice, the Owner shall promptly take any action necessary to obtain governmental authorization required to resume the operations. The Contractor shall continue to suspend such operations until otherwise instructed by the Owner but shall continue with all other operations that do not affect those remains or features. Requests for adjustments in the Contract Sum and Contract Time arising from the existence of such remains or features may be made as provided in Article 15.

§ 3.8 ALLOWANCES

§ 3.8.1 The Contractor shall include in the Contract Sum all allowances stated in the Contract Documents. Items covered by allowances shall be supplied for such amounts and by such persons or entities as the Owner may direct,

but the Contractor shall not be required to employ persons or entities to whom the Contractor has reasonable objection.

§ 3.8.2 Unless otherwise provided in the Contract Documents,

- .1 Allowances shall cover the cost to the Contractor of materials and equipment delivered at the site and all required taxes, less applicable trade discounts;
- .2 Contractor's costs for unloading and handling at the site, labor, installation costs, overhead, profit and other expenses contemplated for stated allowance amounts shall be included in the Contract Sum but not in the allowances; and
- .3 Whenever costs are more than or less than allowances, the Contract Sum shall be adjusted accordingly by Change Order. The amount of the Change Order shall reflect (1) the difference between actual costs and the allowances under Section 3.8.2.1 and (2) changes in Contractor's costs under Section 3.8.2.2.

§ 3.8.3 Materials and equipment under an allowance shall be selected by the Owner with reasonable promptness.

§ 3.9 SUPERINTENDENT

§ 3.9.1 The Contractor shall employ a competent superintendent and necessary assistants who shall be in attendance at the Project site during performance of the Work. The superintendent shall represent the Contractor, and communications given to the superintendent shall be as binding as if given to the Contractor.

§ 3.9.2 The Contractor, as soon as practicable after award of the Contract, shall furnish in writing to the Owner through the Architect the name and qualifications of a proposed superintendent. The Architect may reply within 14 days to the Contractor in writing stating (1) whether the Owner or the Architect has reasonable objection to the proposed superintendent or (2) that the Architect requires additional time to review. Failure of the Architect to reply within the 14 day period shall constitute notice of no reasonable objection.

§ 3.9.3 The Contractor shall not employ a proposed superintendent to whom the Owner or Architect has made reasonable and timely objection. The Contractor shall not change the superintendent without the Owner's consent, which shall not unreasonably be withheld or delayed.

§ 3.10 CONTRACTOR'S CONSTRUCTION SCHEDULES

§ 3.10.1 The Contractor, promptly after being awarded the Contract, shall prepare and submit for the Owner's and Architect's information a Contractor's construction schedule for the Work. The schedule shall not exceed time limits current under the Contract Documents, shall be revised at appropriate intervals as required by the conditions of the Work and Project, shall be related to the entire Project to the extent required by the Contract Documents, and shall provide for expeditious and practicable execution of the Work.

§ 3.10.2 The Contractor shall prepare a submittal schedule, promptly after being awarded the Contract and thereafter as necessary to maintain a current submittal schedule, and shall submit the schedule(s) for the Architect's approval. The Architect's approval shall not unreasonably be delayed or withheld. The submittal schedule shall (1) be coordinated with the Contractor's construction schedule, and (2) allow the Architect reasonable time to review submittals. If the Contractor fails to submit a submittal schedule, the Contractor shall not be entitled to any increase in Contract Sum or extension of Contract Time based on the time required for review of submittals.

§ 3.10.3 The Contractor shall perform the Work in general accordance with the most recent schedules submitted to the Owner and Architect.

§ 3.11 DOCUMENTS AND SAMPLES AT THE SITE

The Contractor shall maintain at the site for the Owner one copy of the Drawings, Specifications, Addenda, Change Orders and other Modifications, in good order and marked currently to indicate field changes and selections made during construction, and one copy of approved Shop Drawings, Product Data, Samples and similar required submittals. These shall be available to the Architect and shall be delivered to the Architect for submittal to the Owner upon completion of the Work as a record of the Work as constructed.

§ 3.12 SHOP DRAWINGS, PRODUCT DATA AND SAMPLES

§ 3.12.1 Shop Drawings are drawings, diagrams, schedules and other data specially prepared for the Work by the Contractor or a Subcontractor, Sub-subcontractor, manufacturer, supplier or distributor to illustrate some portion of the Work.

§ 3.12.2 Product Data are illustrations, standard schedules, performance charts, instructions, brochures, diagrams and other information furnished by the Contractor to illustrate materials or equipment for some portion of the Work.

§ 3.12.3 Samples are physical examples that illustrate materials, equipment or workmanship and establish standards by which the Work will be judged.

§ 3.12.4 Shop Drawings, Product Data, Samples and similar submittals are not Contract Documents. Their purpose is to demonstrate the way by which the Contractor proposes to conform to the information given and the design concept expressed in the Contract Documents for those portions of the Work for which the Contract Documents require submittals. Review by the Architect is subject to the limitations of Section 4.2.7. Informational submittals upon which the Architect is not expected to take responsive action may be so identified in the Contract Documents. Submittals that are not required by the Contract Documents may be returned by the Architect without action.

§ 3.12.5 The Contractor shall review for compliance with the Contract Documents, approve and submit to the Architect Shop Drawings, Product Data, Samples and similar submittals required by the Contract Documents in accordance with the submittal schedule approved by the Architect or, in the absence of an approved submittal schedule, with reasonable promptness and in such sequence as to cause no delay in the Work or in the activities of the Owner or of separate contractors.

§ 3.12.6 By submitting Shop Drawings, Product Data, Samples and similar submittals, the Contractor represents to the Owner and Architect that the Contractor has (1) reviewed and approved them, (2) determined and verified materials, field measurements and field construction criteria related thereto, or will do so and (3) checked and coordinated the information contained within such submittals with the requirements of the Work and of the Contract Documents.

§ 3.12.7 The Contractor shall perform no portion of the Work for which the Contract Documents require submittal and review of Shop Drawings, Product Data, Samples or similar submittals until the respective submittal has been approved by the Architect.

§ 3.12.8 The Work shall be in accordance with approved submittals except that the Contractor shall not be relieved of responsibility for deviations from requirements of the Contract Documents by the Architect's approval of Shop Drawings, Product Data, Samples or similar submittals unless the Contractor has specifically informed the Architect in writing of such deviation at the time of submittal and (1) the Architect has given written approval to the specific deviation as a minor change in the Work, or (2) a Change Order or Construction Change Directive has been issued authorizing the deviation. The Contractor shall not be relieved of responsibility for errors or omissions in Shop Drawings, Product Data, Samples or similar submittals by the Architect's approval thereof.

§ 3.12.9 The Contractor shall direct specific attention, in writing or on resubmitted Shop Drawings, Product Data, Samples or similar submittals, to revisions other than those requested by the Architect on previous submittals. In the absence of such written notice, the Architect's approval of a resubmission shall not apply to such revisions.

§ 3.12.10 The Contractor shall not be required to provide professional services that constitute the practice of architecture or engineering unless such services are specifically required by the Contract Documents for a portion of the Work or unless the Contractor needs to provide such services in order to carry out the Contractor's responsibilities for construction means, methods, techniques, sequences and procedures. The Contractor shall not be required to provide professional services in violation of applicable law. If professional design services or certifications by a design professional related to systems, materials or equipment are specifically required of the Contractor by the Contract Documents, the Owner and the Architect will specify all performance and design criteria that such services must satisfy. The Contractor shall cause such services or certifications to be provided by a properly licensed design professional, whose signature and seal shall appear on all drawings, calculations, specifications, certifications, Shop Drawings and other submittals prepared by such professional. Shop Drawings and other submittals related to the Work designed or certified by such professional, if prepared by others, shall bear such professional's written approval when submitted to the Architect. The Owner and the Architect shall be entitled

to rely upon the adequacy, accuracy and completeness of the services, certifications and approvals performed or provided by such design professionals, provided the Owner and Architect have specified to the Contractor all performance and design criteria that such services must satisfy. Pursuant to this Section 3.12.10, the Architect will review, approve or take other appropriate action on submittals only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents. The Contractor shall not be responsible for the adequacy of the performance and design criteria specified in the Contract Documents.

§ 3.13 USE OF SITE

The Contractor shall confine operations at the site to areas permitted by applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities and the Contract Documents and shall not unreasonably encumber the site with materials or equipment.

§ 3.14 CUTTING AND PATCHING

§ 3.14.1 The Contractor shall be responsible for cutting, fitting or patching required to complete the Work or to make its parts fit together properly. All areas requiring cutting, fitting and patching shall be restored to the condition existing prior to the cutting, fitting and patching, unless otherwise required by the Contract Documents.

§ 3.14.2 The Contractor shall not damage or endanger a portion of the Work or fully or partially completed construction of the Owner or separate contractors by cutting, patching or otherwise altering such construction, or by excavation. The Contractor shall not cut or otherwise alter such construction by the Owner or a separate contractor except with written consent of the Owner and of such separate contractor; such consent shall not be unreasonably withheld. The Contractor shall not unreasonably withhold from the Owner or a separate contractor the Contractor's consent to cutting or otherwise altering the Work.

§ 3.15 CLEANING UP

§ 3.15.1 The Contractor shall keep the premises and surrounding area free from accumulation of waste materials or rubbish caused by operations under the Contract. At completion of the Work, the Contractor shall remove waste materials, rubbish, the Contractor's tools, construction equipment, machinery and surplus materials from and about the Project.

§ 3.15.2 If the Contractor fails to clean up as provided in the Contract Documents, the Owner may do so and Owner shall be entitled to reimbursement from the Contractor.

§ 3.16 ACCESS TO WORK

The Contractor shall provide the Owner and Architect access to the Work in preparation and progress wherever located.

§ 3.17 ROYALTIES, PATENTS AND COPYRIGHTS

The Contractor shall pay all royalties and license fees. The Contractor shall defend suits or claims for infringement of copyrights and patent rights and shall hold the Owner and Architect harmless from loss on account thereof, but shall not be responsible for such defense or loss when a particular design, process or product of a particular manufacturer or manufacturers is required by the Contract Documents, or where the copyright violations are contained in Drawings, Specifications or other documents prepared by the Owner or Architect. However, if the Contractor has reason to believe that the required design, process or product is an infringement of a copyright or a patent, the Contractor shall be responsible for such loss unless such information is promptly furnished to the Architect.

§ 3.18 INDEMNIFICATION

§ 3.18.1 To the fullest extent permitted by law the Contractor shall indemnify and hold harmless the Owner, Architect, Architect's consultants, and agents and employees of any of them from and against claims, damages, losses and expenses, including but not limited to attorneys' fees, arising out of or resulting from performance of the Work, provided that such claim, damage, loss or expense is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the Work itself), but only to the extent caused by the negligent acts or omissions of the Contractor, a Subcontractor, anyone directly or indirectly employed by them or anyone for whose acts they may be liable, regardless of whether or not such claim, damage, loss or expense is caused in part by a party indemnified hereunder. Such obligation shall not be construed to negate, abridge, or reduce

other rights or obligations of indemnity that would otherwise exist as to a party or person described in this Section 3.18.

§ 3.18.2 In claims against any person or entity indemnified under this Section 3.18 by an employee of the Contractor, a Subcontractor, anyone directly or indirectly employed by them or anyone for whose acts they may be liable, the indemnification obligation under Section 3.18.1 shall not be limited by a limitation on amount or type of damages, compensation or benefits payable by or for the Contractor or a Subcontractor under workers' compensation acts, disability benefit acts or other employee benefit acts.

ARTICLE 4 ARCHITECT

§ 4.1 GENERAL

§ 4.1.1 The Owner shall retain an architect lawfully licensed to practice architecture or an entity lawfully practicing architecture in the jurisdiction where the Project is located. That person or entity is identified as the Architect in the Agreement and is referred to throughout the Contract Documents as if singular in number.

§ 4.1.2 Duties, responsibilities and limitations of authority of the Architect as set forth in the Contract Documents shall not be restricted, modified or extended without written consent of the Owner, Contractor and Architect. Consent shall not be unreasonably withheld.

§ 4.1.3 If the employment of the Architect is terminated, the Owner shall employ a successor architect as to whom the Contractor has no reasonable objection and whose status under the Contract Documents shall be that of the Architect.

§ 4.2 ADMINISTRATION OF THE CONTRACT

§ 4.2.1 The Architect will provide administration of the Contract as described in the Contract Documents and will be an Owner's representative during construction until the date the Architect issues the final Certificate for Payment. The Architect will have authority to act on behalf of the Owner only to the extent provided in the Contract Documents.

§ 4.2.2 The Architect will visit the site at intervals appropriate to the stage of construction, or as otherwise agreed with the Owner, to become generally familiar with the progress and quality of the portion of the Work completed, and to determine in general if the Work observed is being performed in a manner indicating that the Work, when fully completed, will be in accordance with the Contract Documents. However, the Architect will not be required to make exhaustive or continuous on-site inspections to check the quality or quantity of the Work. The Architect will not have control over, charge of, or responsibility for, the construction means, methods, techniques, sequences or procedures, or for the safety precautions and programs in connection with the Work, since these are solely the Contractor's rights and responsibilities under the Contract Documents, except as provided in Section 3.3.1.

§ 4.2.3 On the basis of the site visits, the Architect will keep the Owner reasonably informed about the progress and quality of the portion of the Work completed, and report to the Owner (1) known deviations from the Contract Documents and from the most recent construction schedule submitted by the Contractor, and (2) defects and deficiencies observed in the Work. The Architect will not be responsible for the Contractor's failure to perform the Work in accordance with the requirements of the Contract Documents. The Architect will not have control over or charge of and will not be responsible for acts or omissions of the Contractor, Subcontractors, or their agents or employees, or any other persons or entities performing portions of the Work.

§ 4.2.4 COMMUNICATIONS FACILITATING CONTRACT ADMINISTRATION

Except as otherwise provided in the Contract Documents or when direct communications have been specially authorized, the Owner and Contractor shall endeavor to communicate with each other through the Architect about matters arising out of or relating to the Contract. Communications by and with the Architect's consultants shall be through the Architect. Communications by and with Subcontractors and material suppliers shall be through the Contractor. Communications by and with separate contractors shall be through the Owner.

§ 4.2.5 Based on the Architect's evaluations of the Contractor's Applications for Payment, the Architect will review and certify the amounts due the Contractor and will issue Certificates for Payment in such amounts.

§ 4.2.6 The Architect has authority to reject Work that does not conform to the Contract Documents. Whenever the Architect considers it necessary or advisable, the Architect will have authority to require inspection or testing of the

Work in accordance with Sections 13.5.2 and 13.5.3, whether or not such Work is fabricated, installed or completed. However, neither this authority of the Architect nor a decision made in good faith either to exercise or not to exercise such authority shall give rise to a duty or responsibility of the Architect to the Contractor, Subcontractors, material and equipment suppliers, their agents or employees, or other persons or entities performing portions of the Work.

§ 4.2.7 The Architect will review and approve, or take other appropriate action upon, the Contractor's submittals such as Shop Drawings, Product Data and Samples, but only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents. The Architect's action will be taken in accordance with the submittal schedule approved by the Architect or, in the absence of an approved submittal schedule, with reasonable promptness while allowing sufficient time in the Architect's professional judgment to permit adequate review. Review of such submittals is not conducted for the purpose of determining the accuracy and completeness of other details such as dimensions and quantities, or for substantiating instructions for installation or performance of equipment or systems, all of which remain the responsibility of the Contractor as required by the Contract Documents. The Architect's review of the Contractor's submittals shall not relieve the Contractor of the obligations under Sections 3.3, 3.5 and 3.12. The Architect's review shall not constitute approval of safety precautions or, unless otherwise specifically stated by the Architect, of any construction means, methods, techniques, sequences or procedures. The Architect's approval of a specific item shall not indicate approval of an assembly of which the item is a component.

§ 4.2.8 The Architect will prepare Change Orders and Construction Change Directives, and may authorize minor changes in the Work as provided in Section 7.4. The Architect will investigate and make determinations and recommendations regarding concealed and unknown conditions as provided in Section 3.7.4.

§ 4.2.9 The Architect will conduct inspections to determine the date or dates of Substantial Completion and the date of final completion; issue Certificates of Substantial Completion pursuant to Section 9.8; receive and forward to the Owner, for the Owner's review and records, written warranties and related documents required by the Contract and assembled by the Contractor pursuant to Section 9.10; and issue a final Certificate for Payment pursuant to Section 9.10.

§ 4.2.10 If the Owner and Architect agree, the Architect will provide one or more project representatives to assist in carrying out the Architect's responsibilities at the site. The duties, responsibilities and limitations of authority of such project representatives shall be as set forth in an exhibit to be incorporated in the Contract Documents.

§ 4.2.11 The Architect will interpret and decide matters concerning performance under, and requirements of, the Contract Documents on written request of either the Owner or Contractor. The Architect's response to such requests will be made in writing within any time limits agreed upon or otherwise with reasonable promptness.

§ 4.2.12 Interpretations and decisions of the Architect will be consistent with the intent of, and reasonably inferable from, the Contract Documents and will be in writing or in the form of drawings. When making such interpretations and decisions, the Architect will endeavor to secure faithful performance by both Owner and Contractor, will not show partiality to either and will not be liable for results of interpretations or decisions rendered in good faith.

§ 4.2.13 The Architect's decisions on matters relating to aesthetic effect will be final if consistent with the intent expressed in the Contract Documents.

§ 4.2.14 The Architect will review and respond to requests for information about the Contract Documents. The Architect's response to such requests will be made in writing within any time limits agreed upon or otherwise with reasonable promptness. If appropriate, the Architect will prepare and issue supplemental Drawings and Specifications in response to the requests for information.

ARTICLE 5 SUBCONTRACTORS

§ 5.1 DEFINITIONS

§ 5.1.1 A Subcontractor is a person or entity who has a direct contract with the Contractor to perform a portion of the Work at the site. The term "Subcontractor" is referred to throughout the Contract Documents as if singular in number and means a Subcontractor or an authorized representative of the Subcontractor. The term "Subcontractor" does not include a separate contractor or subcontractors of a separate contractor.

§ 5.1.2 A Sub-subcontractor is a person or entity who has a direct or indirect contract with a Subcontractor to perform a portion of the Work at the site. The term “Sub-subcontractor” is referred to throughout the Contract Documents as if singular in number and means a Sub-subcontractor or an authorized representative of the Sub-subcontractor.

§ 5.2 AWARD OF SUBCONTRACTS AND OTHER CONTRACTS FOR PORTIONS OF THE WORK

§ 5.2.1 Unless otherwise stated in the Contract Documents or the bidding requirements, the Contractor, as soon as practicable after award of the Contract, shall furnish in writing to the Owner through the Architect the names of persons or entities (including those who are to furnish materials or equipment fabricated to a special design) proposed for each principal portion of the Work. The Architect may reply within 14 days to the Contractor in writing stating (1) whether the Owner or the Architect has reasonable objection to any such proposed person or entity or (2) that the Architect requires additional time for review. Failure of the Owner or Architect to reply within the 14-day period shall constitute notice of no reasonable objection.

§ 5.2.2 The Contractor shall not contract with a proposed person or entity to whom the Owner or Architect has made reasonable and timely objection. The Contractor shall not be required to contract with anyone to whom the Contractor has made reasonable objection.

§ 5.2.3 If the Owner or Architect has reasonable objection to a person or entity proposed by the Contractor, the Contractor shall propose another to whom the Owner or Architect has no reasonable objection. If the proposed but rejected Subcontractor was reasonably capable of performing the Work, the Contract Sum and Contract Time shall be increased or decreased by the difference, if any, occasioned by such change, and an appropriate Change Order shall be issued before commencement of the substitute Subcontractor’s Work. However, no increase in the Contract Sum or Contract Time shall be allowed for such change unless the Contractor has acted promptly and responsively in submitting names as required.

§ 5.2.4 The Contractor shall not substitute a Subcontractor, person or entity previously selected if the Owner or Architect makes reasonable objection to such substitution.

§ 5.3 SUBCONTRACTUAL RELATIONS

By appropriate agreement, written where legally required for validity, the Contractor shall require each Subcontractor, to the extent of the Work to be performed by the Subcontractor, to be bound to the Contractor by terms of the Contract Documents, and to assume toward the Contractor all the obligations and responsibilities, including the responsibility for safety of the Subcontractor’s Work, which the Contractor, by these Documents, assumes toward the Owner and Architect. Each subcontract agreement shall preserve and protect the rights of the Owner and Architect under the Contract Documents with respect to the Work to be performed by the Subcontractor so that subcontracting thereof will not prejudice such rights, and shall allow to the Subcontractor, unless specifically provided otherwise in the subcontract agreement, the benefit of all rights, remedies and redress against the Contractor that the Contractor, by the Contract Documents, has against the Owner. Where appropriate, the Contractor shall require each Subcontractor to enter into similar agreements with Sub-subcontractors. The Contractor shall make available to each proposed Subcontractor, prior to the execution of the subcontract agreement, copies of the Contract Documents to which the Subcontractor will be bound, and, upon written request of the Subcontractor, identify to the Subcontractor terms and conditions of the proposed subcontract agreement that may be at variance with the Contract Documents. Subcontractors will similarly make copies of applicable portions of such documents available to their respective proposed Sub-subcontractors.

§ 5.4 CONTINGENT ASSIGNMENT OF SUBCONTRACTS

§ 5.4.1 Each subcontract agreement for a portion of the Work is assigned by the Contractor to the Owner, provided that

- .1 assignment is effective only after termination of the Contract by the Owner for cause pursuant to Section 14.2 and only for those subcontract agreements that the Owner accepts by notifying the Subcontractor and Contractor in writing; and
- .2 assignment is subject to the prior rights of the surety, if any, obligated under bond relating to the Contract.

When the Owner accepts the assignment of a subcontract agreement, the Owner assumes the Contractor’s rights and obligations under the subcontract.

§ 5.4.2 Upon such assignment, if the Work has been suspended for more than 30 days, the Subcontractor's compensation shall be equitably adjusted for increases in cost resulting from the suspension.

§ 5.4.3 Upon such assignment to the Owner under this Section 5.4, the Owner may further assign the subcontract to a successor contractor or other entity. If the Owner assigns the subcontract to a successor contractor or other entity, the Owner shall nevertheless remain legally responsible for all of the successor contractor's obligations under the subcontract.

ARTICLE 6 CONSTRUCTION BY OWNER OR BY SEPARATE CONTRACTORS

§ 6.1 OWNER'S RIGHT TO PERFORM CONSTRUCTION AND TO AWARD SEPARATE CONTRACTS

§ 6.1.1 The Owner reserves the right to perform construction or operations related to the Project with the Owner's own forces, and to award separate contracts in connection with other portions of the Project or other construction or operations on the site under Conditions of the Contract identical or substantially similar to these including those portions related to insurance and waiver of subrogation. If the Contractor claims that delay or additional cost is involved because of such action by the Owner, the Contractor shall make such Claim as provided in Article 15.

§ 6.1.2 When separate contracts are awarded for different portions of the Project or other construction or operations on the site, the term "Contractor" in the Contract Documents in each case shall mean the Contractor who executes each separate Owner-Contractor Agreement.

§ 6.1.3 The Owner shall provide for coordination of the activities of the Owner's own forces and of each separate contractor with the Work of the Contractor, who shall cooperate with them. The Contractor shall participate with other separate contractors and the Owner in reviewing their construction schedules. The Contractor shall make any revisions to the construction schedule deemed necessary after a joint review and mutual agreement. The construction schedules shall then constitute the schedules to be used by the Contractor, separate contractors and the Owner until subsequently revised.

§ 6.1.4 Unless otherwise provided in the Contract Documents, when the Owner performs construction or operations related to the Project with the Owner's own forces, the Owner shall be deemed to be subject to the same obligations and to have the same rights that apply to the Contractor under the Conditions of the Contract, including, without excluding others, those stated in Article 3, this Article 6 and Articles 10, 11 and 12.

§ 6.2 MUTUAL RESPONSIBILITY

§ 6.2.1 The Contractor shall afford the Owner and separate contractors reasonable opportunity for introduction and storage of their materials and equipment and performance of their activities, and shall connect and coordinate the Contractor's construction and operations with theirs as required by the Contract Documents.

§ 6.2.2 If part of the Contractor's Work depends for proper execution or results upon construction or operations by the Owner or a separate contractor, the Contractor shall, prior to proceeding with that portion of the Work, promptly report to the Architect apparent discrepancies or defects in such other construction that would render it unsuitable for such proper execution and results. Failure of the Contractor so to report shall constitute an acknowledgment that the Owner's or separate contractor's completed or partially completed construction is fit and proper to receive the Contractor's Work, except as to defects not then reasonably discoverable.

§ 6.2.3 The Contractor shall reimburse the Owner for costs the Owner incurs that are payable to a separate contractor because of the Contractor's delays, improperly timed activities or defective construction. The Owner shall be responsible to the Contractor for costs the Contractor incurs because of a separate contractor's delays, improperly timed activities, damage to the Work or defective construction.

§ 6.2.4 The Contractor shall promptly remedy damage the Contractor wrongfully causes to completed or partially completed construction or to property of the Owner or separate contractors as provided in Section 10.2.5.

§ 6.2.5 The Owner and each separate contractor shall have the same responsibilities for cutting and patching as are described for the Contractor in Section 3.14.

§ 6.3 OWNER'S RIGHT TO CLEAN UP

If a dispute arises among the Contractor, separate contractors and the Owner as to the responsibility under their respective contracts for maintaining the premises and surrounding area free from waste materials and rubbish, the Owner may clean up and the Architect will allocate the cost among those responsible.

ARTICLE 7 CHANGES IN THE WORK

§ 7.1 GENERAL

§ 7.1.1 Changes in the Work may be accomplished after execution of the Contract, and without invalidating the Contract, by Change Order, Construction Change Directive or order for a minor change in the Work, subject to the limitations stated in this Article 7 and elsewhere in the Contract Documents.

§ 7.1.2 A Change Order shall be based upon agreement among the Owner, Contractor and Architect; a Construction Change Directive requires agreement by the Owner and Architect and may or may not be agreed to by the Contractor; an order for a minor change in the Work may be issued by the Architect alone.

§ 7.1.3 Changes in the Work shall be performed under applicable provisions of the Contract Documents, and the Contractor shall proceed promptly, unless otherwise provided in the Change Order, Construction Change Directive or order for a minor change in the Work.

§ 7.2 CHANGE ORDERS

§ 7.2.1 A Change Order is a written instrument prepared by the Architect and signed by the Owner, Contractor and Architect stating their agreement upon all of the following:

- .1 The change in the Work;
- .2 The amount of the adjustment, if any, in the Contract Sum; and
- .3 The extent of the adjustment, if any, in the Contract Time.

§ 7.3 CONSTRUCTION CHANGE DIRECTIVES

§ 7.3.1 A Construction Change Directive is a written order prepared by the Architect and signed by the Owner and Architect, directing a change in the Work prior to agreement on adjustment, if any, in the Contract Sum or Contract Time, or both. The Owner may by Construction Change Directive, without invalidating the Contract, order changes in the Work within the general scope of the Contract consisting of additions, deletions or other revisions, the Contract Sum and Contract Time being adjusted accordingly.

§ 7.3.2 A Construction Change Directive shall be used in the absence of total agreement on the terms of a Change Order.

§ 7.3.3 If the Construction Change Directive provides for an adjustment to the Contract Sum, the adjustment shall be based on one of the following methods:

- .1 Mutual acceptance of a lump sum properly itemized and supported by sufficient substantiating data to permit evaluation;
- .2 Unit prices stated in the Contract Documents or subsequently agreed upon;
- .3 Cost to be determined in a manner agreed upon by the parties and a mutually acceptable fixed or percentage fee; or
- .4 As provided in Section 7.3.7.

§ 7.3.4 If unit prices are stated in the Contract Documents or subsequently agreed upon, and if quantities originally contemplated are materially changed in a proposed Change Order or Construction Change Directive so that application of such unit prices to quantities of Work proposed will cause substantial inequity to the Owner or Contractor, the applicable unit prices shall be equitably adjusted.

§ 7.3.5 Upon receipt of a Construction Change Directive, the Contractor shall promptly proceed with the change in the Work involved and advise the Architect of the Contractor's agreement or disagreement with the method, if any, provided in the Construction Change Directive for determining the proposed adjustment in the Contract Sum or Contract Time.

§ 7.3.6 A Construction Change Directive signed by the Contractor indicates the Contractor's agreement therewith, including adjustment in Contract Sum and Contract Time or the method for determining them. Such agreement shall be effective immediately and shall be recorded as a Change Order.

§ 7.3.7 If the Contractor does not respond promptly or disagrees with the method for adjustment in the Contract Sum, the Architect shall determine the method and the adjustment on the basis of reasonable expenditures and savings of those performing the Work attributable to the change, including, in case of an increase in the Contract Sum, an amount for overhead and profit as set forth in the Agreement, or if no such amount is set forth in the Agreement, a reasonable amount. In such case, and also under Section 7.3.3.3, the Contractor shall keep and present, in such form as the Architect may prescribe, an itemized accounting together with appropriate supporting data. Unless otherwise provided in the Contract Documents, costs for the purposes of this Section 7.3.7 shall be limited to the following:

- .1 Costs of labor, including social security, old age and unemployment insurance, fringe benefits required by agreement or custom, and workers' compensation insurance;
- .2 Costs of materials, supplies and equipment, including cost of transportation, whether incorporated or consumed;
- .3 Rental costs of machinery and equipment, exclusive of hand tools, whether rented from the Contractor or others;
- .4 Costs of premiums for all bonds and insurance, permit fees, and sales, use or similar taxes related to the Work; and
- .5 Additional costs of supervision and field office personnel directly attributable to the change.

§ 7.3.8 The amount of credit to be allowed by the Contractor to the Owner for a deletion or change that results in a net decrease in the Contract Sum shall be actual net cost as confirmed by the Architect. When both additions and credits covering related Work or substitutions are involved in a change, the allowance for overhead and profit shall be figured on the basis of net increase, if any, with respect to that change.

§ 7.3.9 Pending final determination of the total cost of a Construction Change Directive to the Owner, the Contractor may request payment for Work completed under the Construction Change Directive in Applications for Payment. The Architect will make an interim determination for purposes of monthly certification for payment for those costs and certify for payment the amount that the Architect determines, in the Architect's professional judgment, to be reasonably justified. The Architect's interim determination of cost shall adjust the Contract Sum on the same basis as a Change Order, subject to the right of either party to disagree and assert a Claim in accordance with Article 15.

§ 7.3.10 When the Owner and Contractor agree with a determination made by the Architect concerning the adjustments in the Contract Sum and Contract Time, or otherwise reach agreement upon the adjustments, such agreement shall be effective immediately and the Architect will prepare a Change Order. Change Orders may be issued for all or any part of a Construction Change Directive.

§ 7.4 MINOR CHANGES IN THE WORK

The Architect has authority to order minor changes in the Work not involving adjustment in the Contract Sum or extension of the Contract Time and not inconsistent with the intent of the Contract Documents. Such changes will be effected by written order signed by the Architect and shall be binding on the Owner and Contractor.

ARTICLE 8 TIME

§ 8.1 DEFINITIONS

§ 8.1.1 Unless otherwise provided, Contract Time is the period of time, including authorized adjustments, allotted in the Contract Documents for Substantial Completion of the Work.

§ 8.1.2 The date of commencement of the Work is the date established in the Agreement.

§ 8.1.3 The date of Substantial Completion is the date certified by the Architect in accordance with Section 9.8.

§ 8.1.4 The term "day" as used in the Contract Documents shall mean calendar day unless otherwise specifically defined.

§ 8.2 PROGRESS AND COMPLETION

§ 8.2.1 Time limits stated in the Contract Documents are of the essence of the Contract. By executing the Agreement the Contractor confirms that the Contract Time is a reasonable period for performing the Work.

§ 8.2.2 The Contractor shall not knowingly, except by agreement or instruction of the Owner in writing, prematurely commence operations on the site or elsewhere prior to the effective date of insurance required by Article 11 to be

furnished by the Contractor and Owner. The date of commencement of the Work shall not be changed by the effective date of such insurance.

§ 8.2.3 The Contractor shall proceed expeditiously with adequate forces and shall achieve Substantial Completion within the Contract Time.

§ 8.3 DELAYS AND EXTENSIONS OF TIME

§ 8.3.1 If the Contractor is delayed at any time in the commencement or progress of the Work by an act or neglect of the Owner or Architect, or of an employee of either, or of a separate contractor employed by the Owner; or by changes ordered in the Work; or by labor disputes, fire, unusual delay in deliveries, unavoidable casualties or other causes beyond the Contractor's control; or by delay authorized by the Owner pending mediation and arbitration; or by other causes that the Architect determines may justify delay, then the Contract Time shall be extended by Change Order for such reasonable time as the Architect may determine.

§ 8.3.2 Claims relating to time shall be made in accordance with applicable provisions of Article 15.

§ 8.3.3 This Section 8.3 does not preclude recovery of damages for delay by either party under other provisions of the Contract Documents.

ARTICLE 9 PAYMENTS AND COMPLETION

§ 9.1 CONTRACT SUM

The Contract Sum is stated in the Agreement and, including authorized adjustments, is the total amount payable by the Owner to the Contractor for performance of the Work under the Contract Documents.

§ 9.2 SCHEDULE OF VALUES

Where the Contract is based on a stipulated sum or Guaranteed Maximum Price, the Contractor shall submit to the Architect, before the first Application for Payment, a schedule of values allocating the entire Contract Sum to the various portions of the Work and prepared in such form and supported by such data to substantiate its accuracy as the Architect may require. This schedule, unless objected to by the Architect, shall be used as a basis for reviewing the Contractor's Applications for Payment.

§ 9.3 APPLICATIONS FOR PAYMENT

§ 9.3.1 At least ten days before the date established for each progress payment, the Contractor shall submit to the Architect an itemized Application for Payment prepared in accordance with the schedule of values, if required under Section 9.2, for completed portions of the Work. Such application shall be notarized, if required, and supported by such data substantiating the Contractor's right to payment as the Owner or Architect may require, such as copies of requisitions from Subcontractors and material suppliers, and shall reflect retainage if provided for in the Contract Documents.

§ 9.3.1.1 As provided in Section 7.3.9, such applications may include requests for payment on account of changes in the Work that have been properly authorized by Construction Change Directives, or by interim determinations of the Architect, but not yet included in Change Orders.

§ 9.3.1.2 Applications for Payment shall not include requests for payment for portions of the Work for which the Contractor does not intend to pay a Subcontractor or material supplier, unless such Work has been performed by others whom the Contractor intends to pay.

§ 9.3.2 Unless otherwise provided in the Contract Documents, payments shall be made on account of materials and equipment delivered and suitably stored at the site for subsequent incorporation in the Work. If approved in advance by the Owner, payment may similarly be made for materials and equipment suitably stored off the site at a location agreed upon in writing. Payment for materials and equipment stored on or off the site shall be conditioned upon compliance by the Contractor with procedures satisfactory to the Owner to establish the Owner's title to such materials and equipment or otherwise protect the Owner's interest, and shall include the costs of applicable insurance, storage and transportation to the site for such materials and equipment stored off the site.

§ 9.3.3 The Contractor warrants that title to all Work covered by an Application for Payment will pass to the Owner no later than the time of payment. The Contractor further warrants that upon submittal of an Application for Payment all Work for which Certificates for Payment have been previously issued and payments received from the

Owner shall, to the best of the Contractor's knowledge, information and belief, be free and clear of liens, claims, security interests or encumbrances in favor of the Contractor, Subcontractors, material suppliers, or other persons or entities making a claim by reason of having provided labor, materials and equipment relating to the Work.

§ 9.4 CERTIFICATES FOR PAYMENT

§ 9.4.1 The Architect will, within seven days after receipt of the Contractor's Application for Payment, either issue to the Owner a Certificate for Payment, with a copy to the Contractor, for such amount as the Architect determines is properly due, or notify the Contractor and Owner in writing of the Architect's reasons for withholding certification in whole or in part as provided in Section 9.5.1.

§ 9.4.2 The issuance of a Certificate for Payment will constitute a representation by the Architect to the Owner, based on the Architect's evaluation of the Work and the data comprising the Application for Payment, that, to the best of the Architect's knowledge, information and belief, the Work has progressed to the point indicated and that the quality of the Work is in accordance with the Contract Documents. The foregoing representations are subject to an evaluation of the Work for conformance with the Contract Documents upon Substantial Completion, to results of subsequent tests and inspections, to correction of minor deviations from the Contract Documents prior to completion and to specific qualifications expressed by the Architect. The issuance of a Certificate for Payment will further constitute a representation that the Contractor is entitled to payment in the amount certified. However, the issuance of a Certificate for Payment will not be a representation that the Architect has (1) made exhaustive or continuous on-site inspections to check the quality or quantity of the Work, (2) reviewed construction means, methods, techniques, sequences or procedures, (3) reviewed copies of requisitions received from Subcontractors and material suppliers and other data requested by the Owner to substantiate the Contractor's right to payment, or (4) made examination to ascertain how or for what purpose the Contractor has used money previously paid on account of the Contract Sum.

§ 9.5 DECISIONS TO WITHHOLD CERTIFICATION

§ 9.5.1 The Architect may withhold a Certificate for Payment in whole or in part, to the extent reasonably necessary to protect the Owner, if in the Architect's opinion the representations to the Owner required by Section 9.4.2 cannot be made. If the Architect is unable to certify payment in the amount of the Application, the Architect will notify the Contractor and Owner as provided in Section 9.4.1. If the Contractor and Architect cannot agree on a revised amount, the Architect will promptly issue a Certificate for Payment for the amount for which the Architect is able to make such representations to the Owner. The Architect may also withhold a Certificate for Payment or, because of subsequently discovered evidence, may nullify the whole or a part of a Certificate for Payment previously issued, to such extent as may be necessary in the Architect's opinion to protect the Owner from loss for which the Contractor is responsible, including loss resulting from acts and omissions described in Section 3.3.2, because of

- .1 defective Work not remedied;
- .2 third party claims filed or reasonable evidence indicating probable filing of such claims unless security acceptable to the Owner is provided by the Contractor;
- .3 failure of the Contractor to make payments properly to Subcontractors or for labor, materials or equipment;
- .4 reasonable evidence that the Work cannot be completed for the unpaid balance of the Contract Sum;
- .5 damage to the Owner or a separate contractor;
- .6 reasonable evidence that the Work will not be completed within the Contract Time, and that the unpaid balance would not be adequate to cover actual or liquidated damages for the anticipated delay; or
- .7 repeated failure to carry out the Work in accordance with the Contract Documents.

§ 9.5.2 When the above reasons for withholding certification are removed, certification will be made for amounts previously withheld.

§ 9.5.3 If the Architect withholds certification for payment under Section 9.5.1.3, the Owner may, at its sole option, issue joint checks to the Contractor and to any Subcontractor or material or equipment suppliers to whom the Contractor failed to make payment for Work properly performed or material or equipment suitably delivered. If the Owner makes payments by joint check, the Owner shall notify the Architect and the Architect will reflect such payment on the next Certificate for Payment.

§ 9.6 PROGRESS PAYMENTS

§ 9.6.1 After the Architect has issued a Certificate for Payment, the Owner shall make payment in the manner and within the time provided in the Contract Documents, and shall so notify the Architect.

§ 9.6.2 The Contractor shall pay each Subcontractor no later than seven days after receipt of payment from the Owner the amount to which the Subcontractor is entitled, reflecting percentages actually retained from payments to the Contractor on account of the Subcontractor's portion of the Work. The Contractor shall, by appropriate agreement with each Subcontractor, require each Subcontractor to make payments to Sub-subcontractors in a similar manner.

§ 9.6.3 The Architect will, on request, furnish to a Subcontractor, if practicable, information regarding percentages of completion or amounts applied for by the Contractor and action taken thereon by the Architect and Owner on account of portions of the Work done by such Subcontractor.

§ 9.6.4 The Owner has the right to request written evidence from the Contractor that the Contractor has properly paid Subcontractors and material and equipment suppliers amounts paid by the Owner to the Contractor for subcontracted Work. If the Contractor fails to furnish such evidence within seven days, the Owner shall have the right to contact Subcontractors to ascertain whether they have been properly paid. Neither the Owner nor Architect shall have an obligation to pay or to see to the payment of money to a Subcontractor, except as may otherwise be required by law.

§ 9.6.5 Contractor payments to material and equipment suppliers shall be treated in a manner similar to that provided in Sections 9.6.2, 9.6.3 and 9.6.4.

§ 9.6.6 A Certificate for Payment, a progress payment, or partial or entire use or occupancy of the Project by the Owner shall not constitute acceptance of Work not in accordance with the Contract Documents.

§ 9.6.7 Unless the Contractor provides the Owner with a payment bond in the full penal sum of the Contract Sum, payments received by the Contractor for Work properly performed by Subcontractors and suppliers shall be held by the Contractor for those Subcontractors or suppliers who performed Work or furnished materials, or both, under contract with the Contractor for which payment was made by the Owner. Nothing contained herein shall require money to be placed in a separate account and not commingled with money of the Contractor, shall create any fiduciary liability or tort liability on the part of the Contractor for breach of trust or shall entitle any person or entity to an award of punitive damages against the Contractor for breach of the requirements of this provision.

§ 9.7 FAILURE OF PAYMENT

If the Architect does not issue a Certificate for Payment, through no fault of the Contractor, within seven days after receipt of the Contractor's Application for Payment, or if the Owner does not pay the Contractor within seven days after the date established in the Contract Documents the amount certified by the Architect or awarded by binding dispute resolution, then the Contractor may, upon seven additional days' written notice to the Owner and Architect, stop the Work until payment of the amount owing has been received. The Contract Time shall be extended appropriately and the Contract Sum shall be increased by the amount of the Contractor's reasonable costs of shut-down, delay and start-up, plus interest as provided for in the Contract Documents.

§ 9.8 SUBSTANTIAL COMPLETION

§ 9.8.1 Substantial Completion is the stage in the progress of the Work when the Work or designated portion thereof is sufficiently complete in accordance with the Contract Documents so that the Owner can occupy or utilize the Work for its intended use.

§ 9.8.2 When the Contractor considers that the Work, or a portion thereof which the Owner agrees to accept separately, is substantially complete, the Contractor shall prepare and submit to the Architect a comprehensive list of items to be completed or corrected prior to final payment. Failure to include an item on such list does not alter the responsibility of the Contractor to complete all Work in accordance with the Contract Documents.

§ 9.8.3 Upon receipt of the Contractor's list, the Architect will make an inspection to determine whether the Work or designated portion thereof is substantially complete. If the Architect's inspection discloses any item, whether or not included on the Contractor's list, which is not sufficiently complete in accordance with the Contract Documents so that the Owner can occupy or utilize the Work or designated portion thereof for its intended use, the Contractor shall, before issuance of the Certificate of Substantial Completion, complete or correct such item upon notification by the Architect. In such case, the Contractor shall then submit a request for another inspection by the Architect to determine Substantial Completion.

§ 9.8.4 When the Work or designated portion thereof is substantially complete, the Architect will prepare a Certificate of Substantial Completion that shall establish the date of Substantial Completion, shall establish responsibilities of the Owner and Contractor for security, maintenance, heat, utilities, damage to the Work and insurance, and shall fix the time within which the Contractor shall finish all items on the list accompanying the Certificate. Warranties required by the Contract Documents shall commence on the date of Substantial Completion of the Work or designated portion thereof unless otherwise provided in the Certificate of Substantial Completion.

§ 9.8.5 The Certificate of Substantial Completion shall be submitted to the Owner and Contractor for their written acceptance of responsibilities assigned to them in such Certificate. Upon such acceptance and consent of surety, if any, the Owner shall make payment of retainage applying to such Work or designated portion thereof. Such payment shall be adjusted for Work that is incomplete or not in accordance with the requirements of the Contract Documents.

§ 9.9 PARTIAL OCCUPANCY OR USE

§ 9.9.1 The Owner may occupy or use any completed or partially completed portion of the Work at any stage when such portion is designated by separate agreement with the Contractor, provided such occupancy or use is consented to by the insurer as required under Section 11.3.1.5 and authorized by public authorities having jurisdiction over the Project. Such partial occupancy or use may commence whether or not the portion is substantially complete, provided the Owner and Contractor have accepted in writing the responsibilities assigned to each of them for payments, retainage, if any, security, maintenance, heat, utilities, damage to the Work and insurance, and have agreed in writing concerning the period for correction of the Work and commencement of warranties required by the Contract Documents. When the Contractor considers a portion substantially complete, the Contractor shall prepare and submit a list to the Architect as provided under Section 9.8.2. Consent of the Contractor to partial occupancy or use shall not be unreasonably withheld. The stage of the progress of the Work shall be determined by written agreement between the Owner and Contractor or, if no agreement is reached, by decision of the Architect.

§ 9.9.2 Immediately prior to such partial occupancy or use, the Owner, Contractor and Architect shall jointly inspect the area to be occupied or portion of the Work to be used in order to determine and record the condition of the Work.

§ 9.9.3 Unless otherwise agreed upon, partial occupancy or use of a portion or portions of the Work shall not constitute acceptance of Work not complying with the requirements of the Contract Documents.

§ 9.10 FINAL COMPLETION AND FINAL PAYMENT

§ 9.10.1 Upon receipt of the Contractor's written notice that the Work is ready for final inspection and acceptance and upon receipt of a final Application for Payment, the Architect will promptly make such inspection and, when the Architect finds the Work acceptable under the Contract Documents and the Contract fully performed, the Architect will promptly issue a final Certificate for Payment stating that to the best of the Architect's knowledge, information and belief, and on the basis of the Architect's on-site visits and inspections, the Work has been completed in accordance with terms and conditions of the Contract Documents and that the entire balance found to be due the Contractor and noted in the final Certificate is due and payable. The Architect's final Certificate for Payment will constitute a further representation that conditions listed in Section 9.10.2 as precedent to the Contractor's being entitled to final payment have been fulfilled.

§ 9.10.2 Neither final payment nor any remaining retained percentage shall become due until the Contractor submits to the Architect (1) an affidavit that payrolls, bills for materials and equipment, and other indebtedness connected with the Work for which the Owner or the Owner's property might be responsible or encumbered (less amounts withheld by Owner) have been paid or otherwise satisfied, (2) a certificate evidencing that insurance required by the Contract Documents to remain in force after final payment is currently in effect and will not be canceled or allowed to expire until at least 30 days' prior written notice has been given to the Owner, (3) a written statement that the Contractor knows of no substantial reason that the insurance will not be renewable to cover the period required by the Contract Documents, (4) consent of surety, if any, to final payment and (5), if required by the Owner, other data establishing payment or satisfaction of obligations, such as receipts, releases and waivers of liens, claims, security interests or encumbrances arising out of the Contract, to the extent and in such form as may be designated by the Owner. If a Subcontractor refuses to furnish a release or waiver required by the Owner, the Contractor may furnish a bond satisfactory to the Owner to indemnify the Owner against such lien. If such lien remains unsatisfied after payments are made, the Contractor shall refund to the Owner all money that the Owner may be compelled to pay in discharging such lien, including all costs and reasonable attorneys' fees.

§ 9.10.3 If, after Substantial Completion of the Work, final completion thereof is materially delayed through no fault of the Contractor or by issuance of Change Orders affecting final completion, and the Architect so confirms, the Owner shall, upon application by the Contractor and certification by the Architect, and without terminating the Contract, make payment of the balance due for that portion of the Work fully completed and accepted. If the remaining balance for Work not fully completed or corrected is less than retainage stipulated in the Contract Documents, and if bonds have been furnished, the written consent of surety to payment of the balance due for that portion of the Work fully completed and accepted shall be submitted by the Contractor to the Architect prior to certification of such payment. Such payment shall be made under terms and conditions governing final payment, except that it shall not constitute a waiver of claims.

§ 9.10.4 The making of final payment shall constitute a waiver of Claims by the Owner except those arising from

- .1 liens, Claims, security interests or encumbrances arising out of the Contract and unsettled;
- .2 failure of the Work to comply with the requirements of the Contract Documents; or
- .3 terms of special warranties required by the Contract Documents.

§ 9.10.5 Acceptance of final payment by the Contractor, a Subcontractor or material supplier shall constitute a waiver of claims by that payee except those previously made in writing and identified by that payee as unsettled at the time of final Application for Payment.

ARTICLE 10 PROTECTION OF PERSONS AND PROPERTY

§ 10.1 SAFETY PRECAUTIONS AND PROGRAMS

The Contractor shall be responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the performance of the Contract.

§ 10.2 SAFETY OF PERSONS AND PROPERTY

§ 10.2.1 The Contractor shall take reasonable precautions for safety of, and shall provide reasonable protection to prevent damage, injury or loss to

- .1 employees on the Work and other persons who may be affected thereby;
- .2 the Work and materials and equipment to be incorporated therein, whether in storage on or off the site, under care, custody or control of the Contractor or the Contractor's Subcontractors or Sub-subcontractors; and
- .3 other property at the site or adjacent thereto, such as trees, shrubs, lawns, walks, pavements, roadways, structures and utilities not designated for removal, relocation or replacement in the course of construction.

§ 10.2.2 The Contractor shall comply with and give notices required by applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities bearing on safety of persons or property or their protection from damage, injury or loss.

§ 10.2.3 The Contractor shall erect and maintain, as required by existing conditions and performance of the Contract, reasonable safeguards for safety and protection, including posting danger signs and other warnings against hazards, promulgating safety regulations and notifying owners and users of adjacent sites and utilities.

§ 10.2.4 When use or storage of explosives or other hazardous materials or equipment or unusual methods are necessary for execution of the Work, the Contractor shall exercise utmost care and carry on such activities under supervision of properly qualified personnel.

§ 10.2.5 The Contractor shall promptly remedy damage and loss (other than damage or loss insured under property insurance required by the Contract Documents) to property referred to in Sections 10.2.1.2 and 10.2.1.3 caused in whole or in part by the Contractor, a Subcontractor, a Sub-subcontractor, or anyone directly or indirectly employed by any of them, or by anyone for whose acts they may be liable and for which the Contractor is responsible under Sections 10.2.1.2 and 10.2.1.3, except damage or loss attributable to acts or omissions of the Owner or Architect or anyone directly or indirectly employed by either of them, or by anyone for whose acts either of them may be liable, and not attributable to the fault or negligence of the Contractor. The foregoing obligations of the Contractor are in addition to the Contractor's obligations under Section 3.18.

§ 10.2.6 The Contractor shall designate a responsible member of the Contractor's organization at the site whose duty shall be the prevention of accidents. This person shall be the Contractor's superintendent unless otherwise designated by the Contractor in writing to the Owner and Architect.

§ 10.2.7 The Contractor shall not permit any part of the construction or site to be loaded so as to cause damage or create an unsafe condition.

§ 10.2.8 INJURY OR DAMAGE TO PERSON OR PROPERTY

If either party suffers injury or damage to person or property because of an act or omission of the other party, or of others for whose acts such party is legally responsible, written notice of such injury or damage, whether or not insured, shall be given to the other party within a reasonable time not exceeding 21 days after discovery. The notice shall provide sufficient detail to enable the other party to investigate the matter.

§ 10.3 HAZARDOUS MATERIALS

§ 10.3.1 The Contractor is responsible for compliance with any requirements included in the Contract Documents regarding hazardous materials. If the Contractor encounters a hazardous material or substance not addressed in the Contract Documents and if reasonable precautions will be inadequate to prevent foreseeable bodily injury or death to persons resulting from a material or substance, including but not limited to asbestos or polychlorinated biphenyl (PCB), encountered on the site by the Contractor, the Contractor shall, upon recognizing the condition, immediately stop Work in the affected area and report the condition to the Owner and Architect in writing.

§ 10.3.2 Upon receipt of the Contractor's written notice, the Owner shall obtain the services of a licensed laboratory to verify the presence or absence of the material or substance reported by the Contractor and, in the event such material or substance is found to be present, to cause it to be rendered harmless. Unless otherwise required by the Contract Documents, the Owner shall furnish in writing to the Contractor and Architect the names and qualifications of persons or entities who are to perform tests verifying the presence or absence of such material or substance or who are to perform the task of removal or safe containment of such material or substance. The Contractor and the Architect will promptly reply to the Owner in writing stating whether or not either has reasonable objection to the persons or entities proposed by the Owner. If either the Contractor or Architect has an objection to a person or entity proposed by the Owner, the Owner shall propose another to whom the Contractor and the Architect have no reasonable objection. When the material or substance has been rendered harmless, Work in the affected area shall resume upon written agreement of the Owner and Contractor. By Change Order, the Contract Time shall be extended appropriately and the Contract Sum shall be increased in the amount of the Contractor's reasonable additional costs of shut-down, delay and start-up.

§ 10.3.3 To the fullest extent permitted by law, the Owner shall indemnify and hold harmless the Contractor, Subcontractors, Architect, Architect's consultants and agents and employees of any of them from and against claims, damages, losses and expenses, including but not limited to attorneys' fees, arising out of or resulting from performance of the Work in the affected area if in fact the material or substance presents the risk of bodily injury or death as described in Section 10.3.1 and has not been rendered harmless, provided that such claim, damage, loss or expense is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the Work itself), except to the extent that such damage, loss or expense is due to the fault or negligence of the party seeking indemnity.

§ 10.3.4 The Owner shall not be responsible under this Section 10.3 for materials or substances the Contractor brings to the site unless such materials or substances are required by the Contract Documents. The Owner shall be responsible for materials or substances required by the Contract Documents, except to the extent of the Contractor's fault or negligence in the use and handling of such materials or substances.

§ 10.3.5 The Contractor shall indemnify the Owner for the cost and expense the Owner incurs (1) for remediation of a material or substance the Contractor brings to the site and negligently handles, or (2) where the Contractor fails to perform its obligations under Section 10.3.1, except to the extent that the cost and expense are due to the Owner's fault or negligence.

§ 10.3.6 If, without negligence on the part of the Contractor, the Contractor is held liable by a government agency for the cost of remediation of a hazardous material or substance solely by reason of performing Work as required by the Contract Documents, the Owner shall indemnify the Contractor for all cost and expense thereby incurred.

§ 10.4 EMERGENCIES

In an emergency affecting safety of persons or property, the Contractor shall act, at the Contractor's discretion, to prevent threatened damage, injury or loss. Additional compensation or extension of time claimed by the Contractor on account of an emergency shall be determined as provided in Article 15 and Article 7.

ARTICLE 11 INSURANCE AND BONDS

§ 11.1 CONTRACTOR'S LIABILITY INSURANCE

§ 11.1.1 The Contractor shall purchase from and maintain in a company or companies lawfully authorized to do business in the jurisdiction in which the Project is located such insurance as will protect the Contractor from claims set forth below which may arise out of or result from the Contractor's operations and completed operations under the Contract and for which the Contractor may be legally liable, whether such operations be by the Contractor or by a Subcontractor or by anyone directly or indirectly employed by any of them, or by anyone for whose acts any of them may be liable:

- .1 Claims under workers' compensation, disability benefit and other similar employee benefit acts that are applicable to the Work to be performed;
- .2 Claims for damages because of bodily injury, occupational sickness or disease, or death of the Contractor's employees;
- .3 Claims for damages because of bodily injury, sickness or disease, or death of any person other than the Contractor's employees;
- .4 Claims for damages insured by usual personal injury liability coverage;
- .5 Claims for damages, other than to the Work itself, because of injury to or destruction of tangible property, including loss of use resulting therefrom;
- .6 Claims for damages because of bodily injury, death of a person or property damage arising out of ownership, maintenance or use of a motor vehicle;
- .7 Claims for bodily injury or property damage arising out of completed operations; and
- .8 Claims involving contractual liability insurance applicable to the Contractor's obligations under Section 3.18.

§ 11.1.2 The insurance required by Section 11.1.1 shall be written for not less than limits of liability specified in the Contract Documents or required by law, whichever coverage is greater. Coverages, whether written on an occurrence or claims-made basis, shall be maintained without interruption from the date of commencement of the Work until the date of final payment and termination of any coverage required to be maintained after final payment, and, with respect to the Contractor's completed operations coverage, until the expiration of the period for correction of Work or for such other period for maintenance of completed operations coverage as specified in the Contract Documents.

§ 11.1.3 Certificates of insurance acceptable to the Owner shall be filed with the Owner prior to commencement of the Work and thereafter upon renewal or replacement of each required policy of insurance. These certificates and the insurance policies required by this Section 11.1 shall contain a provision that coverages afforded under the policies will not be canceled or allowed to expire until at least 30 days' prior written notice has been given to the Owner. An additional certificate evidencing continuation of liability coverage, including coverage for completed operations, shall be submitted with the final Application for Payment as required by Section 9.10.2 and thereafter upon renewal or replacement of such coverage until the expiration of the time required by Section 11.1.2. Information concerning reduction of coverage on account of revised limits or claims paid under the General Aggregate, or both, shall be furnished by the Contractor with reasonable promptness.

§ 11.1.4 The Contractor shall cause the commercial liability coverage required by the Contract Documents to include (1) the Owner, the Architect and the Architect's consultants as additional insureds for claims caused in whole or in part by the Contractor's negligent acts or omissions during the Contractor's operations; and (2) the Owner as an additional insured for claims caused in whole or in part by the Contractor's negligent acts or omissions during the Contractor's completed operations.

§ 11.2 OWNER'S LIABILITY INSURANCE

The Owner shall be responsible for purchasing and maintaining the Owner's usual liability insurance.

§ 11.3 PROPERTY INSURANCE

§ 11.3.1 Unless otherwise provided, the Owner shall purchase and maintain, in a company or companies lawfully authorized to do business in the jurisdiction in which the Project is located, property insurance written on a builder's

risk “all-risk” or equivalent policy form in the amount of the initial Contract Sum, plus value of subsequent Contract Modifications and cost of materials supplied or installed by others, comprising total value for the entire Project at the site on a replacement cost basis without optional deductibles. Such property insurance shall be maintained, unless otherwise provided in the Contract Documents or otherwise agreed in writing by all persons and entities who are beneficiaries of such insurance, until final payment has been made as provided in Section 9.10 or until no person or entity other than the Owner has an insurable interest in the property required by this Section 11.3 to be covered, whichever is later. This insurance shall include interests of the Owner, the Contractor, Subcontractors and Sub-subcontractors in the Project.

§ 11.3.1.1 Property insurance shall be on an “all-risk” or equivalent policy form and shall include, without limitation, insurance against the perils of fire (with extended coverage) and physical loss or damage including, without duplication of coverage, theft, vandalism, malicious mischief, collapse, earthquake, flood, windstorm, falsework, testing and startup, temporary buildings and debris removal including demolition occasioned by enforcement of any applicable legal requirements, and shall cover reasonable compensation for Architect’s and Contractor’s services and expenses required as a result of such insured loss.

§ 11.3.1.2 If the Owner does not intend to purchase such property insurance required by the Contract and with all of the coverages in the amount described above, the Owner shall so inform the Contractor in writing prior to commencement of the Work. The Contractor may then effect insurance that will protect the interests of the Contractor, Subcontractors and Sub-subcontractors in the Work, and by appropriate Change Order the cost thereof shall be charged to the Owner. If the Contractor is damaged by the failure or neglect of the Owner to purchase or maintain insurance as described above, without so notifying the Contractor in writing, then the Owner shall bear all reasonable costs properly attributable thereto.

§ 11.3.1.3 If the property insurance requires deductibles, the Owner shall pay costs not covered because of such deductibles.

§ 11.3.1.4 This property insurance shall cover portions of the Work stored off the site, and also portions of the Work in transit.

§ 11.3.1.5 Partial occupancy or use in accordance with Section 9.9 shall not commence until the insurance company or companies providing property insurance have consented to such partial occupancy or use by endorsement or otherwise. The Owner and the Contractor shall take reasonable steps to obtain consent of the insurance company or companies and shall, without mutual written consent, take no action with respect to partial occupancy or use that would cause cancellation, lapse or reduction of insurance.

§ 11.3.2 BOILER AND MACHINERY INSURANCE

The Owner shall purchase and maintain boiler and machinery insurance required by the Contract Documents or by law, which shall specifically cover such insured objects during installation and until final acceptance by the Owner; this insurance shall include interests of the Owner, Contractor, Subcontractors and Sub-subcontractors in the Work, and the Owner and Contractor shall be named insureds.

§ 11.3.3 LOSS OF USE INSURANCE

The Owner, at the Owner’s option, may purchase and maintain such insurance as will insure the Owner against loss of use of the Owner’s property due to fire or other hazards, however caused. The Owner waives all rights of action against the Contractor for loss of use of the Owner’s property, including consequential losses due to fire or other hazards however caused.

§ 11.3.4 If the Contractor requests in writing that insurance for risks other than those described herein or other special causes of loss be included in the property insurance policy, the Owner shall, if possible, include such insurance, and the cost thereof shall be charged to the Contractor by appropriate Change Order.

§ 11.3.5 If during the Project construction period the Owner insures properties, real or personal or both, at or adjacent to the site by property insurance under policies separate from those insuring the Project, or if after final payment property insurance is to be provided on the completed Project through a policy or policies other than those insuring the Project during the construction period, the Owner shall waive all rights in accordance with the terms of Section 11.3.7 for damages caused by fire or other causes of loss covered by this separate property insurance. All separate policies shall provide this waiver of subrogation by endorsement or otherwise.

§ 11.3.6 Before an exposure to loss may occur, the Owner shall file with the Contractor a copy of each policy that includes insurance coverages required by this Section 11.3. Each policy shall contain all generally applicable conditions, definitions, exclusions and endorsements related to this Project. Each policy shall contain a provision that the policy will not be canceled or allowed to expire, and that its limits will not be reduced, until at least 30 days' prior written notice has been given to the Contractor.

§ 11.3.7 WAIVERS OF SUBROGATION

The Owner and Contractor waive all rights against (1) each other and any of their subcontractors, sub-subcontractors, agents and employees, each of the other, and (2) the Architect, Architect's consultants, separate contractors described in Article 6, if any, and any of their subcontractors, sub-subcontractors, agents and employees, for damages caused by fire or other causes of loss to the extent covered by property insurance obtained pursuant to this Section 11.3 or other property insurance applicable to the Work, except such rights as they have to proceeds of such insurance held by the Owner as fiduciary. The Owner or Contractor, as appropriate, shall require of the Architect, Architect's consultants, separate contractors described in Article 6, if any, and the subcontractors, sub-subcontractors, agents and employees of any of them, by appropriate agreements, written where legally required for validity, similar waivers each in favor of other parties enumerated herein. The policies shall provide such waivers of subrogation by endorsement or otherwise. A waiver of subrogation shall be effective as to a person or entity even though that person or entity would otherwise have a duty of indemnification, contractual or otherwise, did not pay the insurance premium directly or indirectly, and whether or not the person or entity had an insurable interest in the property damaged.

§ 11.3.8 A loss insured under the Owner's property insurance shall be adjusted by the Owner as fiduciary and made payable to the Owner as fiduciary for the insureds, as their interests may appear, subject to requirements of any applicable mortgagee clause and of Section 11.3.10. The Contractor shall pay Subcontractors their just shares of insurance proceeds received by the Contractor, and by appropriate agreements, written where legally required for validity, shall require Subcontractors to make payments to their Sub-subcontractors in similar manner.

§ 11.3.9 If required in writing by a party in interest, the Owner as fiduciary shall, upon occurrence of an insured loss, give bond for proper performance of the Owner's duties. The cost of required bonds shall be charged against proceeds received as fiduciary. The Owner shall deposit in a separate account proceeds so received, which the Owner shall distribute in accordance with such agreement as the parties in interest may reach, or as determined in accordance with the method of binding dispute resolution selected in the Agreement between the Owner and Contractor. If after such loss no other special agreement is made and unless the Owner terminates the Contract for convenience, replacement of damaged property shall be performed by the Contractor after notification of a Change in the Work in accordance with Article 7.

§ 11.3.10 The Owner as fiduciary shall have power to adjust and settle a loss with insurers unless one of the parties in interest shall object in writing within five days after occurrence of loss to the Owner's exercise of this power; if such objection is made, the dispute shall be resolved in the manner selected by the Owner and Contractor as the method of binding dispute resolution in the Agreement. If the Owner and Contractor have selected arbitration as the method of binding dispute resolution, the Owner as fiduciary shall make settlement with insurers or, in the case of a dispute over distribution of insurance proceeds, in accordance with the directions of the arbitrators.

§ 11.4 PERFORMANCE BOND AND PAYMENT BOND

§ 11.4.1 The Owner shall have the right to require the Contractor to furnish bonds covering faithful performance of the Contract and payment of obligations arising thereunder as stipulated in bidding requirements or specifically required in the Contract Documents on the date of execution of the Contract.

§ 11.4.2 Upon the request of any person or entity appearing to be a potential beneficiary of bonds covering payment of obligations arising under the Contract, the Contractor shall promptly furnish a copy of the bonds or shall authorize a copy to be furnished.

ARTICLE 12 UNCOVERING AND CORRECTION OF WORK

§ 12.1 UNCOVERING OF WORK

§ 12.1.1 If a portion of the Work is covered contrary to the Architect's request or to requirements specifically expressed in the Contract Documents, it must, if requested in writing by the Architect, be uncovered for the Architect's examination and be replaced at the Contractor's expense without change in the Contract Time.

§ 12.1.2 If a portion of the Work has been covered that the Architect has not specifically requested to examine prior to its being covered, the Architect may request to see such Work and it shall be uncovered by the Contractor. If such Work is in accordance with the Contract Documents, costs of uncovering and replacement shall, by appropriate Change Order, be at the Owner's expense. If such Work is not in accordance with the Contract Documents, such costs and the cost of correction shall be at the Contractor's expense unless the condition was caused by the Owner or a separate contractor in which event the Owner shall be responsible for payment of such costs.

§ 12.2 CORRECTION OF WORK

§ 12.2.1 BEFORE OR AFTER SUBSTANTIAL COMPLETION

The Contractor shall promptly correct Work rejected by the Architect or failing to conform to the requirements of the Contract Documents, whether discovered before or after Substantial Completion and whether or not fabricated, installed or completed. Costs of correcting such rejected Work, including additional testing and inspections, the cost of uncovering and replacement, and compensation for the Architect's services and expenses made necessary thereby, shall be at the Contractor's expense.

§ 12.2.2 AFTER SUBSTANTIAL COMPLETION

§ 12.2.2.1 In addition to the Contractor's obligations under Section 3.5, if, within one year after the date of Substantial Completion of the Work or designated portion thereof or after the date for commencement of warranties established under Section 9.9.1, or by terms of an applicable special warranty required by the Contract Documents, any of the Work is found to be not in accordance with the requirements of the Contract Documents, the Contractor shall correct it promptly after receipt of written notice from the Owner to do so unless the Owner has previously given the Contractor a written acceptance of such condition. The Owner shall give such notice promptly after discovery of the condition. During the one-year period for correction of Work, if the Owner fails to notify the Contractor and give the Contractor an opportunity to make the correction, the Owner waives the rights to require correction by the Contractor and to make a claim for breach of warranty. If the Contractor fails to correct nonconforming Work within a reasonable time during that period after receipt of notice from the Owner or Architect, the Owner may correct it in accordance with Section 2.4.

§ 12.2.2.2 The one-year period for correction of Work shall be extended with respect to portions of Work first performed after Substantial Completion by the period of time between Substantial Completion and the actual completion of that portion of the Work.

§ 12.2.2.3 The one-year period for correction of Work shall not be extended by corrective Work performed by the Contractor pursuant to this Section 12.2.

§ 12.2.3 The Contractor shall remove from the site portions of the Work that are not in accordance with the requirements of the Contract Documents and are neither corrected by the Contractor nor accepted by the Owner.

§ 12.2.4 The Contractor shall bear the cost of correcting destroyed or damaged construction, whether completed or partially completed, of the Owner or separate contractors caused by the Contractor's correction or removal of Work that is not in accordance with the requirements of the Contract Documents.

§ 12.2.5 Nothing contained in this Section 12.2 shall be construed to establish a period of limitation with respect to other obligations the Contractor has under the Contract Documents. Establishment of the one-year period for correction of Work as described in Section 12.2.2 relates only to the specific obligation of the Contractor to correct the Work, and has no relationship to the time within which the obligation to comply with the Contract Documents may be sought to be enforced, nor to the time within which proceedings may be commenced to establish the Contractor's liability with respect to the Contractor's obligations other than specifically to correct the Work.

§ 12.3 ACCEPTANCE OF NONCONFORMING WORK

If the Owner prefers to accept Work that is not in accordance with the requirements of the Contract Documents, the Owner may do so instead of requiring its removal and correction, in which case the Contract Sum will be reduced as appropriate and equitable. Such adjustment shall be effected whether or not final payment has been made.

ARTICLE 13 MISCELLANEOUS PROVISIONS

§ 13.1 GOVERNING LAW

The Contract shall be governed by the law of the place where the Project is located except that, if the parties have selected arbitration as the method of binding dispute resolution, the Federal Arbitration Act shall govern Section 15.4.

§ 13.2 SUCCESSORS AND ASSIGNS

§ 13.2.1 The Owner and Contractor respectively bind themselves, their partners, successors, assigns and legal representatives to covenants, agreements and obligations contained in the Contract Documents. Except as provided in Section 13.2.2, neither party to the Contract shall assign the Contract as a whole without written consent of the other. If either party attempts to make such an assignment without such consent, that party shall nevertheless remain legally responsible for all obligations under the Contract.

§ 13.2.2 The Owner may, without consent of the Contractor, assign the Contract to a lender providing construction financing for the Project, if the lender assumes the Owner's rights and obligations under the Contract Documents. The Contractor shall execute all consents reasonably required to facilitate such assignment.

§ 13.3 WRITTEN NOTICE

Written notice shall be deemed to have been duly served if delivered in person to the individual, to a member of the firm or entity, or to an officer of the corporation for which it was intended; or if delivered at, or sent by registered or certified mail or by courier service providing proof of delivery to, the last business address known to the party giving notice.

§ 13.4 RIGHTS AND REMEDIES

§ 13.4.1 Duties and obligations imposed by the Contract Documents and rights and remedies available thereunder shall be in addition to and not a limitation of duties, obligations, rights and remedies otherwise imposed or available by law.

§ 13.4.2 No action or failure to act by the Owner, Architect or Contractor shall constitute a waiver of a right or duty afforded them under the Contract, nor shall such action or failure to act constitute approval of or acquiescence in a breach there under, except as may be specifically agreed in writing.

§ 13.5 TESTS AND INSPECTIONS

§ 13.5.1 Tests, inspections and approvals of portions of the Work shall be made as required by the Contract Documents and by applicable laws, statutes, ordinances, codes, rules and regulations or lawful orders of public authorities. Unless otherwise provided, the Contractor shall make arrangements for such tests, inspections and approvals with an independent testing laboratory or entity acceptable to the Owner, or with the appropriate public authority, and shall bear all related costs of tests, inspections and approvals. The Contractor shall give the Architect timely notice of when and where tests and inspections are to be made so that the Architect may be present for such procedures. The Owner shall bear costs of (1) tests, inspections or approvals that do not become requirements until after bids are received or negotiations concluded, and (2) tests, inspections or approvals where building codes or applicable laws or regulations prohibit the Owner from delegating their cost to the Contractor.

§ 13.5.2 If the Architect, Owner or public authorities having jurisdiction determine that portions of the Work require additional testing, inspection or approval not included under Section 13.5.1, the Architect will, upon written authorization from the Owner, instruct the Contractor to make arrangements for such additional testing, inspection or approval by an entity acceptable to the Owner, and the Contractor shall give timely notice to the Architect of when and where tests and inspections are to be made so that the Architect may be present for such procedures. Such costs, except as provided in Section 13.5.3, shall be at the Owner's expense.

§ 13.5.3 If such procedures for testing, inspection or approval under Sections 13.5.1 and 13.5.2 reveal failure of the portions of the Work to comply with requirements established by the Contract Documents, all costs made necessary by such failure including those of repeated procedures and compensation for the Architect's services and expenses shall be at the Contractor's expense.

§ 13.5.4 Required certificates of testing, inspection or approval shall, unless otherwise required by the Contract Documents, be secured by the Contractor and promptly delivered to the Architect.

§ 13.5.5 If the Architect is to observe tests, inspections or approvals required by the Contract Documents, the Architect will do so promptly and, where practicable, at the normal place of testing.

§ 13.5.6 Tests or inspections conducted pursuant to the Contract Documents shall be made promptly to avoid unreasonable delay in the Work.

§ 13.6 INTEREST

Payments due and unpaid under the Contract Documents shall bear interest from the date payment is due at such rate as the parties may agree upon in writing or, in the absence thereof, at the legal rate prevailing from time to time at the place where the Project is located.

§ 13.7 TIME LIMITS ON CLAIMS

The Owner and Contractor shall commence all claims and causes of action, whether in contract, tort, breach of warranty or otherwise, against the other arising out of or related to the Contract in accordance with the requirements of the final dispute resolution method selected in the Agreement within the time period specified by applicable law, but in any case not more than 10 years after the date of Substantial Completion of the Work. The Owner and Contractor waive all claims and causes of action not commenced in accordance with this Section 13.7.

ARTICLE 14 TERMINATION OR SUSPENSION OF THE CONTRACT

§ 14.1 TERMINATION BY THE CONTRACTOR

§ 14.1.1 The Contractor may terminate the Contract if the Work is stopped for a period of 30 consecutive days through no act or fault of the Contractor or a Subcontractor, Sub-subcontractor or their agents or employees or any other persons or entities performing portions of the Work under direct or indirect contract with the Contractor, for any of the following reasons:

- .1 Issuance of an order of a court or other public authority having jurisdiction that requires all Work to be stopped;
- .2 An act of government, such as a declaration of national emergency that requires all Work to be stopped;
- .3 Because the Architect has not issued a Certificate for Payment and has not notified the Contractor of the reason for withholding certification as provided in Section 9.4.1, or because the Owner has not made payment on a Certificate for Payment within the time stated in the Contract Documents; or
- .4 The Owner has failed to furnish to the Contractor promptly, upon the Contractor's request, reasonable evidence as required by Section 2.2.1.

§ 14.1.2 The Contractor may terminate the Contract if, through no act or fault of the Contractor or a Subcontractor, Sub-subcontractor or their agents or employees or any other persons or entities performing portions of the Work under direct or indirect contract with the Contractor, repeated suspensions, delays or interruptions of the entire Work by the Owner as described in Section 14.3 constitute in the aggregate more than 100 percent of the total number of days scheduled for completion, or 120 days in any 365-day period, whichever is less.

§ 14.1.3 If one of the reasons described in Section 14.1.1 or 14.1.2 exists, the Contractor may, upon seven days' written notice to the Owner and Architect, terminate the Contract and recover from the Owner payment for Work executed, including reasonable overhead and profit, costs incurred by reason of such termination, and damages.

§ 14.1.4 If the Work is stopped for a period of 60 consecutive days through no act or fault of the Contractor or a Subcontractor or their agents or employees or any other persons performing portions of the Work under contract with the Contractor because the Owner has repeatedly failed to fulfill the Owner's obligations under the Contract Documents with respect to matters important to the progress of the Work, the Contractor may, upon seven additional days' written notice to the Owner and the Architect, terminate the Contract and recover from the Owner as provided in Section 14.1.3.

§ 14.2 TERMINATION BY THE OWNER FOR CAUSE

§ 14.2.1 The Owner may terminate the Contract if the Contractor

- .1 repeatedly refuses or fails to supply enough properly skilled workers or proper materials;
- .2 fails to make payment to Subcontractors for materials or labor in accordance with the respective agreements between the Contractor and the Subcontractors;
- .3 repeatedly disregards applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of a public authority; or

- 4 otherwise is guilty of substantial breach of a provision of the Contract Documents.

§ 14.2.2 When any of the above reasons exist, the Owner, upon certification by the Initial Decision Maker that sufficient cause exists to justify such action, may without prejudice to any other rights or remedies of the Owner and after giving the Contractor and the Contractor's surety, if any, seven days' written notice, terminate employment of the Contractor and may, subject to any prior rights of the surety:

- .1 Exclude the Contractor from the site and take possession of all materials, equipment, tools, and construction equipment and machinery thereon owned by the Contractor;
- .2 Accept assignment of subcontracts pursuant to Section 5.4; and
- .3 Finish the Work by whatever reasonable method the Owner may deem expedient. Upon written request of the Contractor, the Owner shall furnish to the Contractor a detailed accounting of the costs incurred by the Owner in finishing the Work.

§ 14.2.3 When the Owner terminates the Contract for one of the reasons stated in Section 14.2.1, the Contractor shall not be entitled to receive further payment until the Work is finished.

§ 14.2.4 If the unpaid balance of the Contract Sum exceeds costs of finishing the Work, including compensation for the Architect's services and expenses made necessary thereby, and other damages incurred by the Owner and not expressly waived, such excess shall be paid to the Contractor. If such costs and damages exceed the unpaid balance, the Contractor shall pay the difference to the Owner. The amount to be paid to the Contractor or Owner, as the case may be, shall be certified by the Initial Decision Maker, upon application, and this obligation for payment shall survive termination of the Contract.

§ 14.3 SUSPENSION BY THE OWNER FOR CONVENIENCE

§ 14.3.1 The Owner may, without cause, order the Contractor in writing to suspend, delay or interrupt the Work in whole or in part for such period of time as the Owner may determine.

§ 14.3.2 The Contract Sum and Contract Time shall be adjusted for increases in the cost and time caused by suspension, delay or interruption as described in Section 14.3.1. Adjustment of the Contract Sum shall include profit. No adjustment shall be made to the extent

- .1 that performance is, was or would have been so suspended, delayed or interrupted by another cause for which the Contractor is responsible; or
- .2 that an equitable adjustment is made or denied under another provision of the Contract.

§ 14.4 TERMINATION BY THE OWNER FOR CONVENIENCE

§ 14.4.1 The Owner may, at any time, terminate the Contract for the Owner's convenience and without cause.

§ 14.4.2 Upon receipt of written notice from the Owner of such termination for the Owner's convenience, the Contractor shall

- .1 cease operations as directed by the Owner in the notice;
- .2 take actions necessary, or that the Owner may direct, for the protection and preservation of the Work; and
- .3 except for Work directed to be performed prior to the effective date of termination stated in the notice, terminate all existing subcontracts and purchase orders and enter into no further subcontracts and purchase orders.

§ 14.4.3 In case of such termination for the Owner's convenience, the Contractor shall be entitled to receive payment for Work executed, and costs incurred by reason of such termination, along with reasonable overhead and profit on the Work not executed.

ARTICLE 15 CLAIMS AND DISPUTES

§ 15.1 CLAIMS

§ 15.1.1 DEFINITION

A Claim is a demand or assertion by one of the parties seeking, as a matter of right, payment of money, or other relief with respect to the terms of the Contract. The term "Claim" also includes other disputes and matters in question between the Owner and Contractor arising out of or relating to the Contract. The responsibility to substantiate Claims shall rest with the party making the Claim.

§ 15.1.2 NOTICE OF CLAIMS

Claims by either the Owner or Contractor must be initiated by written notice to the other party and to the Initial Decision Maker with a copy sent to the Architect, if the Architect is not serving as the Initial Decision Maker. Claims by either party must be initiated within 21 days after occurrence of the event giving rise to such Claim or within 21 days after the claimant first recognizes the condition giving rise to the Claim, whichever is later.

§ 15.1.3 CONTINUING CONTRACT PERFORMANCE

Pending final resolution of a Claim, except as otherwise agreed in writing or as provided in Section 9.7 and Article 14, the Contractor shall proceed diligently with performance of the Contract and the Owner shall continue to make payments in accordance with the Contract Documents. The Architect will prepare Change Orders and issue Certificates for Payment in accordance with the decisions of the Initial Decision Maker.

§ 15.1.4 CLAIMS FOR ADDITIONAL COST

If the Contractor wishes to make a Claim for an increase in the Contract Sum, written notice as provided herein shall be given before proceeding to execute the Work. Prior notice is not required for Claims relating to an emergency endangering life or property arising under Section 10.4.

§ 15.1.5 CLAIMS FOR ADDITIONAL TIME

§ 15.1.5.1 If the Contractor wishes to make a Claim for an increase in the Contract Time, written notice as provided herein shall be given. The Contractor's Claim shall include an estimate of cost and of probable effect of delay on progress of the Work. In the case of a continuing delay, only one Claim is necessary.

§ 15.1.5.2 If adverse weather conditions are the basis for a Claim for additional time, such Claim shall be documented by data substantiating that weather conditions were abnormal for the period of time, could not have been reasonably anticipated and had an adverse effect on the scheduled construction.

§ 15.1.6 CLAIMS FOR CONSEQUENTIAL DAMAGES

The Contractor and Owner waive Claims against each other for consequential damages arising out of or relating to this Contract. This mutual waiver includes

- .1 damages incurred by the Owner for rental expenses, for losses of use, income, profit, financing, business and reputation, and for loss of management or employee productivity or of the services of such persons; and
- .2 damages incurred by the Contractor for principal office expenses including the compensation of personnel stationed there, for losses of financing, business and reputation, and for loss of profit except anticipated profit arising directly from the Work.

This mutual waiver is applicable, without limitation, to all consequential damages due to either party's termination in accordance with Article 14. Nothing contained in this Section 15.1.6 shall be deemed to preclude an award of liquidated damages, when applicable, in accordance with the requirements of the Contract Documents.

§ 15.2 INITIAL DECISION

§ 15.2.1 Claims, excluding those arising under Sections 10.3, 10.4, 11.3.9, and 11.3.10, shall be referred to the Initial Decision Maker for initial decision. The Architect will serve as the Initial Decision Maker, unless otherwise indicated in the Agreement. Except for those Claims excluded by this Section 15.2.1, an initial decision shall be required as a condition precedent to mediation of any Claim arising prior to the date final payment is due, unless 30 days have passed after the Claim has been referred to the Initial Decision Maker with no decision having been rendered. Unless the Initial Decision Maker and all affected parties agree, the Initial Decision Maker will not decide disputes between the Contractor and persons or entities other than the Owner.

§ 15.2.2 The Initial Decision Maker will review Claims and within ten days of the receipt of a Claim take one or more of the following actions: (1) request additional supporting data from the claimant or a response with supporting data from the other party, (2) reject the Claim in whole or in part, (3) approve the Claim, (4) suggest a compromise, or (5) advise the parties that the Initial Decision Maker is unable to resolve the Claim if the Initial Decision Maker lacks sufficient information to evaluate the merits of the Claim or if the Initial Decision Maker concludes that, in the Initial Decision Maker's sole discretion, it would be inappropriate for the Initial Decision Maker to resolve the Claim.

§ 15.2.3 In evaluating Claims, the Initial Decision Maker may, but shall not be obligated to, consult with or seek information from either party or from persons with special knowledge or expertise who may assist the Initial Decision Maker in rendering a decision. The Initial Decision Maker may request the Owner to authorize retention of such persons at the Owner's expense.

§ 15.2.4 If the Initial Decision Maker requests a party to provide a response to a Claim or to furnish additional supporting data, such party shall respond, within ten days after receipt of such request, and shall either (1) provide a response on the requested supporting data, (2) advise the Initial Decision Maker when the response or supporting data will be furnished or (3) advise the Initial Decision Maker that no supporting data will be furnished. Upon receipt of the response or supporting data, if any, the Initial Decision Maker will either reject or approve the Claim in whole or in part.

§ 15.2.5 The Initial Decision Maker will render an initial decision approving or rejecting the Claim, or indicating that the Initial Decision Maker is unable to resolve the Claim. This initial decision shall (1) be in writing; (2) state the reasons therefor; and (3) notify the parties and the Architect, if the Architect is not serving as the Initial Decision Maker, of any change in the Contract Sum or Contract Time or both. The initial decision shall be final and binding on the parties but subject to mediation and, if the parties fail to resolve their dispute through mediation, to binding dispute resolution.

§ 15.2.6 Either party may file for mediation of an initial decision at any time, subject to the terms of Section 15.2.6.1.

§ 15.2.6.1 Either party may, within 30 days from the date of an initial decision, demand in writing that the other party file for mediation within 60 days of the initial decision. If such a demand is made and the party receiving the demand fails to file for mediation within the time required, then both parties waive their rights to mediate or pursue binding dispute resolution proceedings with respect to the initial decision.

§ 15.2.7 In the event of a Claim against the Contractor, the Owner may, but is not obligated to, notify the surety, if any, of the nature and amount of the Claim. If the Claim relates to a possibility of a Contractor's default, the Owner may, but is not obligated to, notify the surety and request the surety's assistance in resolving the controversy.

§ 15.2.8 If a Claim relates to or is the subject of a mechanic's lien, the party asserting such Claim may proceed in accordance with applicable law to comply with the lien notice or filing deadlines.

§ 15.3 MEDIATION

§ 15.3.1 Claims, disputes, or other matters in controversy arising out of or related to the Contract except those waived as provided for in Sections 9.10.4, 9.10.5, and 15.1.6 shall be subject to mediation as a condition precedent to binding dispute resolution.

§ 15.3.2 The parties shall endeavor to resolve their Claims by mediation which, unless the parties mutually agree otherwise, shall be administered by the American Arbitration Association in accordance with its Construction Industry Mediation Procedures in effect on the date of the Agreement. A request for mediation shall be made in writing, delivered to the other party to the Contract, and filed with the person or entity administering the mediation. The request may be made concurrently with the filing of binding dispute resolution proceedings but, in such event, mediation shall proceed in advance of binding dispute resolution proceedings, which shall be stayed pending mediation for a period of 60 days from the date of filing, unless stayed for a longer period by agreement of the parties or court order. If an arbitration is stayed pursuant to this Section 15.3.2, the parties may nonetheless proceed to the selection of the arbitrator(s) and agree upon a schedule for later proceedings.

§ 15.3.3 The parties shall share the mediator's fee and any filing fees equally. The mediation shall be held in the place where the Project is located, unless another location is mutually agreed upon. Agreements reached in mediation shall be enforceable as settlement agreements in any court having jurisdiction thereof.

§ 15.4 ARBITRATION

§ 15.4.1 If the parties have selected arbitration as the method for binding dispute resolution in the Agreement, any Claim subject to, but not resolved by, mediation shall be subject to arbitration which, unless the parties mutually agree otherwise, shall be administered by the American Arbitration Association in accordance with its Construction Industry Arbitration Rules in effect on the date of the Agreement. A demand for arbitration shall be made in writing, delivered to the other party to the Contract, and filed with the person or entity administering the arbitration. The

party filing a notice of demand for arbitration must assert in the demand all Claims then known to that party on which arbitration is permitted to be demanded.

§ 15.4.1.1 A demand for arbitration shall be made no earlier than concurrently with the filing of a request for mediation, but in no event shall it be made after the date when the institution of legal or equitable proceedings based on the Claim would be barred by the applicable statute of limitations. For statute of limitations purposes, receipt of a written demand for arbitration by the person or entity administering the arbitration shall constitute the institution of legal or equitable proceedings based on the Claim.

§ 15.4.2 The award rendered by the arbitrator or arbitrators shall be final, and judgment may be entered upon it in accordance with applicable law in any court having jurisdiction thereof.

§ 15.4.3 The foregoing agreement to arbitrate and other agreements to arbitrate with an additional person or entity duly consented to by parties to the Agreement shall be specifically enforceable under applicable law in any court having jurisdiction thereof.

§ 15.4.4 CONSOLIDATION OR JOINDER

§ 15.4.4.1 Either party, at its sole discretion, may consolidate an arbitration conducted under this Agreement with any other arbitration to which it is a party provided that (1) the arbitration agreement governing the other arbitration permits consolidation, (2) the arbitrations to be consolidated substantially involve common questions of law or fact, and (3) the arbitrations employ materially similar procedural rules and methods for selecting arbitrator(s).

§ 15.4.4.2 Either party, at its sole discretion, may include by joinder persons or entities substantially involved in a common question of law or fact whose presence is required if complete relief is to be accorded in arbitration, provided that the party sought to be joined consents in writing to such joinder. Consent to arbitration involving an additional person or entity shall not constitute consent to arbitration of any claim, dispute or other matter in question not described in the written consent.

§ 15.4.4.3 The Owner and Contractor grant to any person or entity made a party to an arbitration conducted under this Section 15.4, whether by joinder or consolidation, the same rights of joinder and consolidation as the Owner and Contractor under this Agreement.

SUTX2014-051 07/21/2014

	Rates	Fringes
BRICKLAYER.....	\$ 16.17	0.00
CARPENTER.....	\$ 14.15	2.42
CEMENT MASON/CONCRETE FINISHER...	\$ 12.46	0.00
ELECTRICIAN.....	\$ 18.44	4.53
INSULATOR - MECHANICAL (Duct, Pipe & Mechanical System Insulation).....	\$ 14.04	4.79
IRONWORKER, REINFORCING.....	\$ 12.01	0.00
IRONWORKER, STRUCTURAL.....	\$ 15.04	4.34
LABORER: Common or General.....	\$ 9.20	0.00
LABORER: Mason Tender - Brick...	\$ 10.00	0.00
LABORER: Mason Tender - Cement/Concrete.....	\$ 10.89	0.96
LABORER: Pipelayer.....	\$ 11.00	3.47
LABORER: Roof Tearoff.....	\$ 10.06	0.00
OPERATOR: Backhoe/Excavator/Trackhoe.....	\$ 14.04	1.01
OPERATOR: Bobcat/Skid Steer/Skid Loader.....	\$ 13.93	0.00
OPERATOR: Bulldozer.....	\$ 18.29	1.31
OPERATOR: Drill.....	\$ 16.22	0.34
OPERATOR: Forklift.....	\$ 14.83	0.00
OPERATOR: Grader/Blade.....	\$ 13.07	0.00
OPERATOR: Loader.....	\$ 12.87	0.70
OPERATOR: Mechanic.....	\$ 17.00	0.00
OPERATOR: Paver (Asphalt, Aggregate, and Concrete).....	\$ 16.03	0.00
OPERATOR: Roller.....	\$ 12.70	0.00
PAINTER (Brush, Roller, and Spray).....	\$ 11.27	0.00
PIPEFITTER.....	\$ 15.22	3.16
ROOFER.....	\$ 11.42	0.00

SHEET METAL WORKER (HVAC Duct Installation Only).....	\$ 18.40	2.12
SHEET METAL WORKER, Excludes HVAC Duct Installation.....	\$ 21.13	6.53
TILE FINISHER.....	\$ 11.22	0.00
TILE SETTER.....	\$ 12.15	0.00
TRUCK DRIVER: Dump Truck.....	\$ 12.39	1.18
TRUCK DRIVER: Flatbed Truck.....	\$ 19.65	8.57
TRUCK DRIVER: Semi-Trailer Truck.....	\$ 12.50	0.00
TRUCK DRIVER: Water Truck.....	\$ 12.00	4.11

WELDERS - Receive rate prescribed for craft performing operation to which welding is incidental.

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Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clauses (29CFR 5.5 (a) (1) (ii)).

The body of each wage determination lists the classification and wage rates that have been found to be prevailing for the cited type(s) of construction in the area covered by the wage determination. The classifications are listed in alphabetical order of "identifiers" that indicate whether the particular rate is a union rate (current union negotiated rate for local), a survey rate (weighted average rate) or a union average rate (weighted union average rate).

Union Rate Identifiers

A four letter classification abbreviation identifier enclosed in dotted lines beginning with characters other than "SU" or "UAVG" denotes that the union classification and rate were prevailing for that classification in the survey. Example: PLUM0198-005 07/01/2014. PLUM is an abbreviation identifier of the union which prevailed in the survey for this classification, which in this example would be Plumbers. 0198 indicates the local union number or district council number where applicable, i.e., Plumbers Local 0198. The next number, 005 in the example, is an internal number used in processing the wage determination. 07/01/2014 is the effective date of the most current negotiated rate, which in this example is July 1, 2014.

Union prevailing wage rates are updated to reflect all rate changes in the collective bargaining agreement (CBA) governing this classification and rate.

Survey Rate Identifiers

Classifications listed under the "SU" identifier indicate that no one rate prevailed for this classification in the survey and the published rate is derived by computing a weighted average rate based on all the rates reported in the survey for that classification. As this weighted average rate includes all rates reported in the survey, it may include both union and non-union rates. Example: SULA2012-007 5/13/2014. SU indicates the rates are survey rates based on a weighted average calculation of rates and are not majority rates. LA indicates the State of Louisiana. 2012 is the year of survey on which these classifications and rates are based. The next number, 007 in the example, is an internal number used in producing the wage determination. 5/13/2014 indicates the survey completion date for the classifications and rates under that identifier.

Survey wage rates are not updated and remain in effect until a new survey is conducted.

Union Average Rate Identifiers

Classification(s) listed under the UAVG identifier indicate that no single majority rate prevailed for those classifications; however, 100% of the data reported for the classifications was union data. EXAMPLE: UAVG-OH-0010 08/29/2014. UAVG indicates that the rate is a weighted union average rate. OH indicates the state. The next number, 0010 in the example, is an internal number used in producing the wage determination. 08/29/2014 indicates the survey completion date for the classifications and rates under that identifier.

A UAVG rate will be updated once a year, usually in January of each year, to reflect a weighted average of the current negotiated/CBA rate of the union locals from which the rate is based.

WAGE DETERMINATION APPEALS PROCESS

1.) Has there been an initial decision in the matter? This can be:

- * an existing published wage determination
- * a survey underlying a wage determination
- * a Wage and Hour Division letter setting forth a position on a wage determination matter
- * a conformance (additional classification and rate) ruling

On survey related matters, initial contact, including requests for summaries of surveys, should be with the Wage and Hour Regional Office for the area in which the survey was conducted because those Regional Offices have responsibility for the Davis-Bacon survey program. If the response from this initial

contact is not satisfactory, then the process described in 2.) and 3.) should be followed.

With regard to any other matter not yet ripe for the formal process described here, initial contact should be with the Branch of Construction Wage Determinations. Write to:

Branch of Construction Wage Determinations
Wage and Hour Division
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

2.) If the answer to the question in 1.) is yes, then an interested party (those affected by the action) can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7). Write to:

Wage and Hour Administrator
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

The request should be accompanied by a full statement of the interested party's position and by any information (wage payment data, project description, area practice material, etc.) that the requestor considers relevant to the issue.

3.) If the decision of the Administrator is not favorable, an interested party may appeal directly to the Administrative Review Board (formerly the Wage Appeals Board). Write to:

Administrative Review Board
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

4.) All decisions by the Administrative Review Board are final.

=====

END OF GENERAL DECISION



GEOTECHNICAL ENGINEERING REPORT

**WEBB COUNTY YOUTH VILLAGE REHABILITATION CENTER
111 CAMINO NUEVO ROAD, HIGHWAY 359
LOT 1, BLOCK 1, LAS BLANCAS SUBDIVISION, UNIT 2
LAREDO, WEBB COUNTY, TEXAS**

Prepared for:

Webb County
1620 Santa Ursula, 2nd Floor
Laredo, TX 78040

Attn.: Antonio Alderete

The Geotechnical Report was developed separately by the Owner and is provided herewith for Bidder's information only. The Architect is not responsible for any conclusions derived by the bidder's from this information.

Submitted By:



www.howlandcompanies.com

7615 N. Bartlett Avenue | P.O. Box 451128 (78045) | Laredo, TX 78041 | P. 956.722.4411 | F. 956.722.5414
TBPE Firm Registration No. F-4097 | TBPLS Firm Registration No. 100464-00



Report No: 39485
December 23, 2015

Webb County
1620 Santa Ursula, 2nd Floor
Laredo, TX 78040

Attn.: Antonio Alderete
Project Manager

Sent Via E-Mail to aalderete@webbcountytx.gov

**Subject: Geotechnical Report – Webb County Youth Village Rehabilitation Center
111 Camino Nuevo Road, Highway 359
Lot 1, Block 1, Las Blancas Subdivision, Unit 2
Laredo, Webb County, Texas**

Dear Mr. Alderete:

Howland Engineering and Surveying Co., Inc. (Howland) is pleased to submit the enclosed geotechnical engineering study for the above referenced project to be located in Laredo, Texas. This report addresses the field exploration and laboratory testing procedures and results along with our recommendations for site preparation and foundation and pavement recommendations.

This report was conducted in general accordance with our proposal on August 27, 2015 and authorized by you.

We appreciate the opportunity to be of service to you in this phase of the project. Please call us if you have any questions or if we may be of further service.

Sincerely,

Howland Engineering and Surveying Co.
TBPE Firm Registration No. F-4097

Roberto P. Martinez Jr.


Roberto P. Martinez Jr., P.E.
Project Engineer



Sergio Galindo, Jr., E.I.T.
Project Manager

Copies Submitted: 1 (above) 12.28.15

www.howlandcompanies.com

7615 N. Bartlett Avenue | P.O. Box 451128 (78045) | Laredo, TX 78041 | P. 956.722.4411 | F. 956.722.5414
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Relevant Information About Your Geotechnical Engineering Report

INTRODUCTION

On December 1, 2015, Howland conducted a geotechnical investigation for the proposed Webb County Youth Village Rehabilitation Center in Laredo, Texas.

We understand the project will consist of constructing an additional approximate 19,300-SF two-story building and a basketball court with landscaping along with a loop driveway and a future commuter parking area consisting of 72 parking stalls at the approximate (~18.01 AC) tract. The proposed project is located at 111 Camino Nuevo Road, Lot 1, Block 1, Las Blancas Subdivision, Unit 2.

The project parking areas will consist of HMAC pavement for the parking area and loop driveway and concrete for the driveway entrances accessing the loop driveway. The anticipated foundation is a conventional reinforced slab-on-grade consisting of a rigid foundation system.

The anticipated loads are considered light to moderate for the two-story facility.

PURPOSE AND SCOPE

The purpose of this exploration was to determine the stratification and engineering properties of the soil and to develop recommendations for site preparation and provide foundation and pavement recommendations with compaction requirements for the proposed construction of the above referenced project.

The scope of this exploration includes the following: 1) a field investigation phase for determining the surface conditions (slope & drainage) and subsurface conditions obtaining representative soil samples for classification and testing, 2) a laboratory testing program designed to establish pertinent engineering properties of subsurface soils encountered, and 3) a compilation and evaluation of field and laboratory data in order to develop foundation and pavement recommendations.

FIELD INVESTIGATION

The site was explored by drilling three (3) 25-ft soil test borings within the proposed building footprint and six (6) 5-ft soil test borings within the proposed loop driveway and parking area. The borehole locations were specified by Howland with a preliminary layout.

The borings were advanced using a mobile B-53 drilling rig utilizing continuous flight solid stem augers. Samples of the materials encountered were obtained by split barrel sampling in conjunction with automatic standard penetration testing. The test boring logs are presented in the appendix along with descriptions of the test methods. The field sampling and testing were performed in substantial compliance with applicable ASTM standards D-1586.

LABORATORY TESTING

The soil samples were examined and visually classified by our senior laboratory technician and samples representative of the various soil strata encountered were selected for laboratory testing. Twenty-six (26) sets of Atterberg limits, moisture content and percent fines tests were performed to assist in classifying the soils and to provide indicators of soil behavior. The test results are presented on the boring logs and the test procedures are described in the appendix.

GENERAL SITE AND SUBSURFACE CONDITIONS

Site Physiography

The planned development will be located at the northeast corner from the intersection of Camino Nuevo Road and Texas State Highway 359 within Lot 1, Block 1, Las Blancas Subdivision, Unit 2.

The site topography is of regular gradient sloping down to the west - southwest end. The approximate existing grades range from 595' to 580' from northeast corner of the lot to the southwest end. The terrain drains southwest towards Camino Nuevo Road. Native vegetation along with landscaping were observed at the at the time of drilling.

Site Geology

Bureau of Economic Geology The University of Texas at Austin

The “Geologic Atlas of Texas”, Laredo Sheet, indicates the Yegua Formation, Ey underlie the site with adjacent Alluvium, Qal.

The Yegua Formation, Ey, typically consists of clay and sandstone; mostly clay, lignitic, sandy, bentonitic, silty, mostly well laminated; interbedded with seams and/or layers of sandstones mostly quartz, some shert, fine grained, indurated to friable, calcareous, glauconitic, massive, laminated, crossbedded. The Yegua Formation is about 400 feet thick with ferruginous soil and some fossil wood.

Alluvium, Qal, are floodplain deposits typically consisting of clay, sands, silts and gravels.

A cursory review of available geologic maps of this area indicates that several faults are located in the general area of the site; however, faults in the area of Laredo are considered inactive. Therefore, seismic risk should be noted as low.

2006 International Building Code (IBC) Seismic Criteria

A cursory review of available United States Geological Survey (USGS) seismic hazard maps of this area indicates the site to be located within an area of lowest seismic hazard potential. Faults located in the general area of Laredo, Texas are considered inactive. Based on our knowledge of the deeper strata encountered in the area the site seismic soil classification is considered a Type C. The following table from the 2006 International Building Code (IBC) illustrates the site class definitions.

TABLE 1613.5.2**SITE CLASS DEFINITIONS**

SITE CLASS	SOIL PROFILE NAME	AVERAGE PROPERTIES IN TOP 100 feet, SEE SECTION 1613.5.5		
		Soil Shear Wave Velocity, \bar{v}_s , (ft/s)	Standard Penetration Resistance, N	Soil Undrained Shear Strength, f_u , (psf)
A	Hard rock	$\bar{v}_s > 5,000$	N/A	N/A
B	Rock	$2,500 < \bar{v}_s \leq 5,000$	N/A	N/A
C	Very dense soil and soft rock	$1,200 < \bar{v}_s \leq 2,500$	$N > 50$	$f_u \geq 2,000$
D	Stiff soil profile	$600 \leq \bar{v}_s \leq 1,200$	$15 \leq N \leq 50$	$1,000 \leq f_u \leq 2,000$
E	Soft soil profile	$\bar{v}_s < 600$	$N < 15$	$f_u < 1,000$
E	—	Any profile with more than 10 feet of soil having the following characteristics: Plasticity index $PI > 20$, Moisture content $w \geq 40\%$, and Undrained shear strength $f_u < 500$ psf		
F	—	Any profile containing soils having one or more of the following characteristics: Soils vulnerable to potential failure or collapse under seismic loading such as liquefiable soils, quick and highly sensitive clays, collapsible weakly cemented soils. Peats and/or highly organic clays ($H > 10$ feet of peat and/or highly organic clay where H = thickness of soil) Very high plasticity clays ($H > 25$ feet with plasticity index $PI > 75$) Very thick soft/medium stiff clays ($H > 120$ feet)		

For SI: 1 foot = 304.8 mm, 1 square foot = 0.0929 m², 1 pound per square foot = 0.0479 kPa. N/A = Not applicable

Subsurface Stratigraphy

The subsurface Stratigraphy at this site encountered various conditions that can be described by three (3) generalized strata described below. The stratum has been identified by grouping soils that possess similar physical and engineering characteristics following the guidelines, presented in the ASTM D-2487 (Unified Soil Classification System). The lines designating the interfaces between strata on the boring logs represent approximate boundaries.

- *Sandy Lean Clay, Lean Clay, Lean Clay with Sand* – Stiff, very stiff, very stiff to hard, hard (strongly cemented), light brown, brown to pinkish, pinkish sandy lean clay, lean clay, and lean clay with sand soils were encountered in all bores at various depths except for P-2, P-3 and P-4.

The soil samples tested from these stratums had liquid limits ranging from 32 to 49, plasticity index ranging from 15 to 27 with fines fractions ranging from 52% to 90%. This soil is classified as medium plasticity, CL, soils under the Unified Soil Classification System.

The consistency of these stratums is stiff to hard (strongly cemented) based on automatic standard penetration resistance test values of 10 blows per foot of penetration to 10 blows for 0" inches of penetration.

- *Fat Clay* – Hard (cemented), hard, very stiff, very stiff to hard, pinkish to greenish, pinkish fat clay soils were encountered from the approximate ~15' depth to bore termination (~25') depth at bore B-3, from the approximate 2' depth to bore termination (~5') depth at bore P-1, and from the surface to bore termination (~5') at bores P-2, P-3 and P-4.

The soil samples tested from these stratums had liquid limits ranging from 51 to 55, plasticity index ranging from 28 to 32 with fines fractions ranging from 86% to 96%. This soil is classified as high plasticity, CH, soils under the Unified Soil Classification System.

The consistency of this stratum is very stiff to hard (cemented) based on automatic standard penetration resistance test values of 16 blows per foot of penetration to 50 blows for 3" of penetration.

- *Clayey Sand with Gravel* – Medium dense, brown clayey sand with gravel soils were encountered at bore B-2 from the approximate ~5' to the approximate ~9' depth.

The soil sample tested from this stratum had a liquid of 33, plasticity index of 17 with fines fractions of 45%. This soil is classified as low plasticity, SC, soils under the Unified Soil Classification System.

The consistency of this stratum is medium dense based on automatic standard penetration resistance test values of 30 blows per foot of penetration.

The above descriptions are generalized to highlight the major subsurface stratification. The boring logs should be consulted for specific information at each boring location.

Groundwater

Groundwater was encountered during the drilling operations at bore B-3. The initial groundwater level readings were recorded at 22' and the 24-hour groundwater monitoring was recorded at 22'. The recovered soil samples contained generally dry soil moisture condition at the upper and lower strata during our subsurface investigation.

It should be noted that groundwater levels usually will fluctuate with seasonal variations in rainfall, during the construction process and surface water run-off. The short-term field observations are not a complete evaluation of the subsurface water levels at this location. The Contractor should check the subsurface water conditions prior to excavation activities.

Potential Vertical Rise (PVR)

Potential vertical soil movements have been estimated using the Texas Department of Transportation test method TEX-124-E, Potential Vertical Rise. This method utilizes the soils in-situ moisture conditions and plasticity characteristics within the active zone. It is estimated that depth of the active zone in this area is approximately fifteen feet. The potential vertical rise is expressed in inches and hence is the latent or potential ability of a soil material to swell, at a given density, moisture, and loading condition.

When the soil material is exposed to capillary or surface water an increase in elevation (heave) of the upper surface along with anything resting on it is plausible. The soils encountered at the site exhibit a medium to high shrink / swell potential. Estimated PVR values are calculated at a range as follows:

Building	PVR Range (in)	
	<i>Low</i>	<i>High</i>
Building Area	1.26"	1.90"
Loop/Driveway Area	1.08"	1.25"
Parking Area	1.06"	1.40"

Please note the analysis is based on approximate depth of bores

Please note that the above reported values represent total vertical in-situ movements and does not take into account movements by uncontrolled water sources such as poor drainage, migration of subsurface water from off-site locations and utility line leaks.

FOUNDATION EVALUATION AND RECOMMENDATIONS

General

In general, the exploration and testing of the soil samples indicated a consistency of soil conditions with stiff to hard (strongly cemented), medium dense sandy lean clay, lean clay, lean clay with sand, and fat clay soils with isolated clayey sand with gravel soils. The soils encountered at the site exhibit a medium to high shrink / swell potential.

In regard to soil consistency, our borings did encounter cemented and strongly cemented layers of soils at B-1 at the approximate ~19½' and ~24' depths, at B-2 at the approximate ~18½' depth to bore termination (~25') depth, and at B-3 at the approximate ~18½' and 24½' depths. Due to the long distance spacing between boreholes, possible isolated cemented soils may be encountered while trenching between our borings.

This may result in construction constraints during trenching. The Contractor should be equipped with special power equipment for its removal, if required.

Groundwater was initially observed at bore B-3 at the approximate 22' depths and the after 24-hours ground monitoring depth was recorded at 22'. Each excavation should be kept dry during the preparation of the subgrade until the utility installation is completed.

Due to the long distance spacing between boreholes, the extent of subsurface groundwater depth and locations between our borings is not certain. However, the Contractor should provide and maintain adequate dewatering equipment to remove and dispose of all surface and groundwater, if encountered.

This report may not reflect the exact variations of the subsurface conditions throughout the site. The nature and extent of variations across the site may not become evidence until construction commences. If variations then appear evident, it may be essential to reevaluate our recommendations after performing on-site observations and test to establish the engineering significance of such variations.

Based on our understanding, the project will have cut and fill areas throughout the project site. Site preparation recommendations for the proposed building pad area are included in the following section.

Site Preparation for Building Area

Site preparation for the building area should consist initially of clearing the surface of any existing vegetation at least 5' beyond the building footprint. Depth of clearing may vary depending on the existing conditions of the site.

This work shall consist of cutting, removing from the ground and properly disposing trees, stumps, brush, roots, weeds and construction debris, if any, and other materials that will interfere with the work or are considered objectionable.

Removal of trees and shrubs shall include the removal of stumps and roots greater than 3" in diameter. Grubbing shall include removal of stumps and 3" roots to 2' below finished grade elevations. Burning is not permitted on the subject property and all waste material and unsuitable materials should be disposed of legally.

In efforts to reduce the Potential Vertical Rise (PVR) within the building footprint, we recommend to over-excavate 5' and discard the existing in-situ soils and subsequently backfill utilizing select fill material. The subsurface stratigraphy at this site encountered high plasticity soils throughout the drilling operation.

The exposed subgrade after 5' of over-excavation shall be scarified to a depth of 6" and watered and compacted to 95% of maximum dry density determined in accordance with Standard Proctor (ASTM D-698) at ± 2% of optimum moisture.

The backfill for the select fill in 6" lifts should not be less than 95% of maximum dry density determined in accordance with Standard Proctor (ASTM D-698) at ± 2% of optimum moisture content as specified by the foundation engineer. Any fill material lifts not meeting the required compaction specification must be reworked and compacted until the specified density is achieved.

Select fill needed for the building pads should be low plasticity sandy lean clay, clayey sand, or granular base material ($7 \leq PI \leq 18$) with a liquid limit $LL \leq 40$. Specifications for fill and placement are attached.

Selection and Placement of Fill

Select fill material will be required to accomplish the finish floor elevation as determined in the civil plans as follows:

Building	Ext. Grades Range		Est. Finish Floor Elevation	Prop. Fill/Cut Range	
	Low	High		Lower	Upper
Building Area	588.5	592.1'	591.0'	2.5'	-1.1'

Based on preliminary information from Howland Engineering and Surveying Co., Inc.

The soil compaction for the select fill in 6" lifts should not be less than 95% of maximum dry density determined in accordance with Standard Proctor (ASTM D-698) at ± 2% of optimum moisture content as specified by the foundation engineer. Any fill material lifts not meeting the required compaction specification must be reworked and compacted until the specified density is achieved.

Select fill needed for the building pads should be low plasticity sandy lean clay, clayey sand, or granular base material ($7 \leq PI \leq 18$) with a liquid limit $LL \leq 40$. Specifications for fill and placement are attached.

The building pad should be constructed to the specified final pad elevation using this method. The following sections offer additional recommendations for foundation design.

Foundation Recommendations

The following is our recommendations based on the proposed preliminary information.

Shallow Foundation

The proposed building may be founded on a conventional reinforced slab-on-grade rigid foundation system consisting of exterior and interior grade beams.

A method to design a slab-on-grade foundation system is the Wire Reinforcement Institute (WRI) criteria. Based on the geotechnical bore of the subsurface stratigraphy encountered, the following is recommended:

Building	Design PI	Allowable Bearing Capacity (PSF)	
		TL	DL + LT LL
Building Area	22	2,500	1,650

Total Load (TL) w/ Factor of Safety of 2

Dead Load plus Long Term Live Load (DL + LT LL) w/ Factor of Safety of 3

Allowable Bearing Capacity Values based on Modified Soil Condition

The beam and footings widths and depths may vary depending on the total load. The final foundation design should be designed by a professional engineer in accordance with standard engineering practices to account for the approximate soil bearing pressures, the encountered potential vertical rise and plasticity indexes of the soils.

Vapor Barrier

A vapor barrier is sheeting material placed under a ground level concrete slab in order to reduce the transmission of water vapor from the soils below the foundation up through the concrete slab. Placement of concrete directly on the soil will require wetting of the soil adding further moisture. We recommend a vapor barrier be used where moisture can migrate upward from below the slab and cause damage to those areas which will contain moisture sensitive equipment or that will receive a floor covering or surface-hardening agent.

Utilities

Slab-on-ground foundations are designed to move vertically with underlying soil movements and to deflect or bend within certain limits. It is, therefore, inadvisable to embed utility lines, heating ducts or other conduits in the slab.

Pipes should pass vertically through the slab and be provided with expansion joints. Service lines should pass beneath the foundation system.

Drainage and Landscaping

Backfills adjacent to foundation walls should be non-swelling, low permeable material. Non-swelling material minimizes the forces exerted on walls, while low permeable backfill minimizes infiltration of surface water through the backfill into the foundation soil.

Site grading should direct surface runoff waters away from the foundation in order to reduce non-uniform moisture changes in the bearing soils. Excessive collection of surface water near part of the foundation will increase differential soil movements. Flower beds adjacent to the foundation are not recommended.

The most commonly used technique is grading of a positive slope away from the structures. The slope should be adequate to promote rapid runoff and to avoid collecting ponded water near the structure, which could migrate down the foundation/soil interface. These slopes should be, greater than 1% and preferably 5% within 10 feet of the foundation.

Maintenance programs are directed toward promoting uniform soil moisture beneath the foundation. A typical program consists of the following:

- Maintain a positive slope of about 5% around the structure for drainage and elimination of water catch areas.
- Maintenance of original drainage channels and installation of new channels as necessary.
- Maintenance of gutters around the roof and diversion of runoff away from the structure.
- Elimination of heavy vegetation within 10 to 15 feet of the foundation or 1 to 1.5 times the height of mature trees.
- Uniform limited watering around the structure during droughts to replace lost moisture.

TOPSOIL

Topsoil should be friable clay loam surface soil found in a depth of no less than 4". Satisfactory topsoil should be free of subsoil, clay lumps, stones larger than 2" in diameter and without weeds, roots, and other objectionable material. The topsoil should be stockpiled and covered to prevent wind and rain erosion. The unsuitable or excess topsoil should be disposed of properly.

TRENCH RECOMMENDATIONS

General

In general, the exploration and testing of the soil samples indicated a consistency of soil conditions with medium to high plasticity, stiff to hard (strongly cemented), medium dense sandy lean clay, lean clay, lean clay with sand, fat clay and clayey sand with gravel soils.

This report may not reflect the exact variations of the subsurface conditions throughout the site. The nature and extent of variations across the site may not become evidence until construction commences. If variations then appear evident, it may be essential to reevaluate our recommendations after performing on-site observations and test to establish the engineering significance of such variations.

Trench Excavations

In regard to groundwater, groundwater was observed at bore B-3 at the approximate ~22' depth during our drilling operations. Each excavation should be kept dry during the preparation of the subgrade until the utility installation is completed.

Due to the long distance spacing between boreholes, the extent of subsurface groundwater depth and locations between our borings is not certain. However, the Contractor should provide and maintain adequate dewatering equipment to remove and dispose of all surface and groundwater, if encountered.

In regard to soil consistency, our borings did encounter cemented and strongly cemented layers of soils at B-1 at the approximate ~19½' and ~24' depths, at B-2 at the approximate ~18½' depth to bore termination (~25') depth, and at B-3 at the approximate ~18½' and 24½' depths. Due to the long distance spacing between boreholes, possible isolated cemented soils may be encountered while trenching between our borings.

This may result in construction constraints during trenching. The Contractor should be equipped with special power equipment for its removal, if required.

The utility trenching, safety and backfill considerations are included in the following section.

Trench Safety Guidelines

Occupational Safety and Health Administration (OSHA) Safety and Health Standards contained in the Section 1926.652 of Title 29, Code of Federal Regulations (29 CFR) require that all trenches in excess of five (5) feet deep be shored or appropriately sloped or benched unless the trench sidewalls are comprised of solid rock.

Based on our laboratory results, the soils encountered at the boring locations should be considered primarily a *Type A* soils which means cohesive soils; i.e., clay, silty clay, sandy clay, clay loam, and in some cases silty loam and sandy clay loam.

If during the construction process dissimilar soils are encountered, then the following soil types should be considered. Cemented soils; i.e., caliche and hardpan are also considered *Type A* according to OSHA soil classification guidelines.

If soils are granular cohesion-less similar to crushed rock or fissured then *Type B* is the appropriate classification and if groundwater or water seepage is present in these strata then *Type C* is the appropriate classification.

Please note that the Contractor is responsible for development of the excavation plan which will meet all city, state and federal requirements with regard to trench safety.

Utility Trench Backfill Methods

Contractor shall conform to the local building requirements. Please see the latest City of Laredo "*Utility Trench Backfill Methods*" in the City's web site (www.cityoflaredo.com) as a method. The design team is to verify the latest specifications of the City of Laredo at date of design insurance.

PAVEMENT RECOMMENDATIONS

General

Specific tests to determine the soil parameters for pavements for pavement design were not within the scope of this study. However, the following recommendations are based on the soil test results and our experience with pavements in areas with similar subsoil conditions. The minimum pavement section recommended for the parking areas are discussed in the following paragraphs.

Subgrade Preparation

Site preparation for the pavement area should consist initially of clearing the surface of the existing vegetation and any other miscellaneous debris arising after site clearance. Depth of clearing may vary depending on the existing conditions of the site. Due to the disturbance of the surface soils during clearing activities, we recommend re-working a minimum of 8" of exposed subgrade soil.

The proposed parking area and loop/driveway should consist initially of clearing the surface of the remaining existing vegetation and any other miscellaneous debris arising after site clearance.

Based on our understanding, throughout the pavement areas, there will be cut and fill operations. Should there be areas with less than 1' of fill material and no geogrid option be selected, please ensure that a minimum of 12" of suitable subgrade material for the pavement areas be low plasticity sandy lean clay, clayey sand, or granular base material ($7 \leq PI \leq 20$) with a liquid limit $LL \leq 40$.

The preparation of the exposed subgrade should consist of reworking the surface to the 8" depth by watering and re-compacting the soils to a minimum of 95% of the Standard Proctor (ASTM D-698) or TxDOT Method TEX 114-E, $\pm 2\%$ of optimum moisture.

The preparation of natural finish ground in areas to be filled should consist of reworking the surface to the 6" depth by watering and re-compacting the soils to a minimum of 95% of the Standard Proctor (ASTM D-698) or TxDOT Method TEX 114-E, $\pm 2\%$ of optimum moisture in 6" lifts or less.

The fill material should be watered and compacted in lifts not to exceed 6" to 95% of the Standard Proctor (ASTM D-698) or TxDOT Method TEX 114-E, $\pm 2\%$ of optimum moisture. All lifts not meeting the required compaction must be reworked and compacted until the specified density is achieved.

Flexible Pavement

Resulting pavement sections are as follows:

Pavement Component	Material Thickness, in			
	Crushed Limestone		Pit Run (Caliche)	
	Parking Lot	Loop Driveway	Parking Lot	Loop Driveway
Hot Mix Asphaltic Concrete	2"	2.5"	2"	2.5"
Flexible Base (Type A, Grade 1-2)	8"	12"	No	No
Flexible Base (Type B, Grade 1-2)	No	No	10"	14"
Geogrid*	Yes*	Yes*	Yes*	Yes*
Moisture Conditioned Subgrade	8"	8"	8"	8"

* - Please note Geogrid is not required if minimum requirements for Subgrade Preparation are met.

Hot Mix Asphaltic Concrete Pavement: The Hot Mix Asphaltic Concrete (HMAC) shall meet the requirements set forth by the Texas Department of Highways (TXDOT) Specifications, Item 340, using Type "C" or "D" mix. The asphaltic concrete should be compacted to a minimum of 1.5% below the optimum density of the laboratory density as determined using TxDOT, Tex 206-F test method or ASTM D-1560 (Hveem or Marshall Method).

Flexible Base Material (Crushed Limestone): The base should meet the requirements of the TXDOT specifications for Item 247, Type A, Grade 1 – 2. The base should be compacted to at least 98 % of the maximum dry density as determined by the Modified Proctor (ASTM D-1557) or TxDOT Method TEX 113-E, at ± 2 % of optimum moisture content.

Flexible Base Material (Caliche): The base should meet the requirements of the TXDOT specifications for Item 247, Type B, Grade 1 – 2. The base should be compacted to at least 98% of the maximum dry density as determined by the Modified Proctor (ASTM D-1557) or TxDOT Method TEX 113-E, at ± 2 % of optimum moisture content.

Mechanically Stabilized Layer (MSL): The geogrid can increase the effective strength of a pavement structure or an unpaved working surface through the composite of a high performance geogrid and granular fill to form a mechanically stabilized layer (MSL). The geogrid is placed directly below the granular fill for reinforcement in an effort to increase the bearing strength of the subbase soils. Based on the soil information above, we recommend the Tensar® TriAx® TX5, Tensar® BX Type 1® or TerraGrid® RX1200.

Moisture Conditioned Subgrade: The subgrade should be moisture conditioned by re-working the surface to the 8" depth by watering and compacting the soils to a minimum of 95% of the maximum dry density as determined by Standard Proctor (ASTM D-698) or TxDOT Method TEX 114-E, at ± 2 % of the optimum moisture.

Rigid Pavement

Concrete pavement is also considered as an alternative option for the vehicle parking, entrances, and drive lanes. The following is our recommendation:

Pavement Component	Material Thickness, in	
	<i>Drive Lanes and Parking Areas</i>	<i>Entrances, Drive Lanes and Dumpster Pad</i>
Concrete Pavement	6"	7"
Moisture Conditioned Subgrade	8"	8"

Portland Cement Concrete: The concrete should have a maximum slump of $4\frac{1}{2}'' \pm 1''$. The concrete should have a minimum 28-day compressive strength of 3,500 psi. The design assumes doweled or keyed joints, temperature and flexural reinforcing steel of #4 @ 12" o.c.e.w. and adequate control, expansion and construction joints.

Moisture Conditioned Subgrade: The subgrade should be moisture conditioned by reworking the surface to the 8" depth by watering and re-compacting the soils to a minimum of 95% of the maximum dry density as determined by Standard Proctor (ASTM D-698) or TxDOT Method TEX 114-E, at $\pm 2\%$ of the optimum moisture content.

All joints should be sealed as per manufacture recommendations. A control joint spacing of no more than ten (10) feet is recommended. Since rainfall is light, no special provisions for drainage, such as permeable base course is necessary.

Drainage Considerations

Proper perimeter drainage is extremely important and should be provided so infiltration of surface water from unpaved areas surrounding the pavement is minimized. Improper drainage which allows saturation of the pavement subgrade will greatly reduce the performance and expected service life of the pavement systems, even when the system is constructed using either typical pavement sections or design recommendations based on site-specific soils testing.

Surface and subsurface drainage considerations crucial to the performance of pavements at this site include, but are not limited, to the following:

- The installation of landscape beds or islands in the pavement areas is not recommended. Above grade planter boxes with drainage discharge directly into storm sewers should be considered if landscaping features are desired. Drainage discharge directly onto the top of the pavement may be considered; however, may pose a maintenance problem.
- Any man-made subsurface or known natural seepage at the site as to influence moisture contents within the subgrade should be intercepted by drainage ditches or below grade French drains.
- Final site grading should eliminate isolated depressions adjacent to curbs which may allow surface water to pond and infiltrate into the underlying soils. Concrete curbs should be constructed to a sufficient depth to reduce infiltration of water beneath the curbs.
- Pavement surfaces should be maintained to minimize surface ponding and to provide proper sealing of any developing cracks. These measures will help reduce infiltration of surface water downward through the pavement section.

LIMITATIONS

The evaluation and recommendations submitted in this report are based, in part, upon the information obtained from the nine (9) soil test borings. The nature and extent of variations in soil conditions between or beyond the borings may not become evident until actual construction. It is also noted that the transition lines shown on the boring logs are approximate and the actual transitions may be gradual. Also, this report does not consider environmental opinions.

If changes in the nature or design of the project are planned, the conclusions and recommendations in this report should be reviewed by the soils engineer and, if necessary, modified. Soil samples recovered for laboratory testing will be retained for a period of 30 days and then, unless we are directed otherwise, will be discarded.

This report has been prepared for the exclusive use of Webb County and their design team for specific application to the proposed Webb County Youth Village Rehabilitation Center in Laredo, Texas in accordance to generally accepted foundation engineering practices. No other warranty, expressed or implied, is made. Additional information regarding the limitations and use of geotechnical engineering reports is included in the appendix.

LOG OF BORING NUMBER B-1

PROJECT: Webb County Youth Village Rehabilitation Center
CLIENT: Webb County
PROJECT LOCATION: Lot 1, Block 1, Las Blancas Subdivision, Unit 2
BORING LOCATION: As Per Plan
DRILLER: Hugo Rendon
DRILLING METHOD: Straight Flight Auger

REPORT NO.: 39485
DATE: December 1, 2015
ELEVATION: NA
WEATHER: Mostly Cloudy and Cool
LOGGED BY: J. Reyes
AFTER 24 HOURS: NR

DEPTH TO WATER INITIAL: NE

Depth (Feet)	Samples	N / (QP)	Soil Symbol	Description of Stratum	Minus 200 (%)	Moisture Content (%)	Atterberg Limits (%)			qu (TSF)	UNIT DRY WT (PCF)
							Liquid Limit L.L.	Plastic Limit P.L.	Plastic. Index P.I.		
1	P1	2		Stiff, Light Brown Lean Clay (CL)	85	17	49	22	27		
2		3									
3		7									
4	P2	6		Vary Stiff, Brown to Pinkish Sandy Lean Clay with Traces of Gravel (CL)	52	10	36	18	18		
5		9									
6		11									
7	P3	6		Very Stiff to Hard, Pinkish Lean Clay with Calcareous Deposits (CL)	88	14	46	21	25		
8		8									
9		13									
10	P4	13									
11		20									
12		20									
13	P5	11									
14		20									
15		30									
16	P6	8		Hard, Pinkish Lean Clay with Sand and Calcareous Particles Strongly Cemented at 19½' and 24' (CL)							
19		38									
20		50/3"									
21	P7	12									
22		50/1"									
23											
24											
25					74	9	34	16	18		
BORING TERMINATED											

P = Standard Penetration Resistance (BL/FT)
 Qp = Pocket Penetrometer Test (TSF)
 qu = Unconfined Compressive Strength Test
 ST = Shelby Tube Sample

NE = Not Encountered
 NR = Not Required
 NA = Not Applicable
 ND = Not Determined

LOG OF BORING NUMBER B-2

PROJECT: Webb County Youth Village Rehabilitation Center
CLIENT: Webb County
PROJECT LOCATION: Lot 1, Block 1, Las Blancas Subdivision, Unit 2
BORING LOCATION: As Per Plan
DRILLER: Hugo Rendon
DRILLING METHOD: Straight Flight Auger

REPORT NO.: 39485
DATE: December 1, 2015
ELEVATION: NA
WEATHER: Mostly Cloudy and Cool
LOGGED BY: J. Reyes
AFTER 24 HOURS: NR

DEPTH TO WATER INITIAL: NE

Depth (Feet)	Samples	N / (QP)	Soil Symbol	Description of Stratum	Minus 200 (%)	Moisture Content (%)	Atterberg Limits (%)			qu (TSF)	UNIT DRY WT (PCF)
							Liquid Limit L.L.	Plastic Limit P.L.	Plastic Index P.I.		
1	P1	6	[Hatched Pattern]	Very Stiff, Light Brown Lean Clay with Sand (CL)	75	13	45	21	24		
2		8									
3		9									
4	P2	6									
5		9 13									
6	P3	13 16 14	[Dotted Pattern]	Medium Dense, Brown Clayey Sand with Gravel (SC)	45	6	33	16	17		
7											
8											
9											
10	P4	8									
11		9 15									
12	P5	13 15 22									
13											
14											
15											
16	P6	10/0"	[Hatched Pattern]	Hard, Pinkish Lean Clay with Sand and Calcareous Particles Strongly Cemented from 18½' to 25' (CL)	75	8	32	17	15		
17											
18											
19											
20											
21	P7	50/2"									
22											
23											
24											
25											
BORING TERMINATED											

P = Standard Penetration Resistance (BL/FT)
 Qp = Pocket Penetrometer Test (TSF)
 qu = Unconfined Compressive Strength Test
 ST = Shelby Tube Sample

NE = Not Encountered
 NR = Not Required
 NA = Not Applicable
 ND = Not Determined

LOG OF BORING NUMBER B-3

PROJECT: Webb County Youth Village Rehabilitation Center
CLIENT: Webb County
PROJECT LOCATION: Lot 1, Block 1, Las Blancas Subdivision, Unit 2
BORING LOCATION: As Per Plan
DRILLER: Hugo Rendon
DRILLING METHOD: Straight Flight Auger

REPORT NO.: 39485
DATE: December 1, 2015
ELEVATION: NA
WEATHER: Mostly Cloudy and Cool
LOGGED BY: J. Reyes
AFTER 24 HOURS: 22'

DEPTH TO WATER INITIAL: 22'

Depth (Feet)	Samples	N / (QP)	Soil Symbol	Description of Stratum	Minus 200 (%)	Moisture Content (%)	Atterberg Limits (%)			qu (TSF)	UNIT DRY WT (PCF)								
							Liquid Limit	Plastic Limit	Plastic Index										
							L.L.	P. L.	P. I.										
1	P1	7	CL	Very Stiff, Light Brown Lean Clay with Sand	72	12	41	20	21										
2		10																	
3		11																	
4	P2	5																	
5		10																	
6		8																	
7	P3	5	Very Stiff to Hard, Pinkish Lean Clay with Calcareous Deposits	90	15	42	21	21											
8		8																	
9		12																	
10	P4	7																	
11		8																	
12		13																	
13	P5	10	CL	87	12	37	18	19											
14		19																	
15		28																	
16	P6	50/3"									Hard, Pinkish to Greenish Fat Clay with Calcareous Deposits								
17																			
18																			
19																			
20																			
21																			
22	P7	26	CH	92	14	55	23	32											
23		46																	
24		50/5"																	
25																			
											BORING TERMINATED								

P = Standard Penetration Resistance (BL/FT)
 Qp = Pocket Penetrometer Test (TSF)
 qu = Unconfined Compressive Strength Test
 ST = Shelby Tube Sample

NE = Not Encountered
 NR = Not Required
 NA = Not Applicable
 ND = Not Determined

LOG OF BORING NUMBER P-1

PROJECT: Webb County Youth Village Rehabilitation Center
CLIENT: Webb County
PROJECT LOCATION: Lot 1, Block 1, Las Blancas Subdivision, Unit 2
BORING LOCATION: As Per Plan
DRILLER: Hugo Rendon
DRILLING METHOD: Straight Flight Auger

REPORT NO.: 39485
DATE: December 1, 2015
ELEVATION: NA
WEATHER: Mostly Cloudy and Cool
LOGGED BY: J. Reyes
AFTER 24 HOURS: NR

DEPTH TO WATER INITIAL: NE

Depth (Feet)	Samples	N / (QP)	Soil Symbol	Description of Stratum	Minus 200 (%)	Moisture Content (%)	Atterberg Limits (%)			qu (TSF)	UNIT DRY WT (PCF)
							Liquid Limit L.L.	Plastic Limit P. L.	Plastic. Index P. I.		
1	P1	6		Very Stiff, Light Brown Lean Clay with Sand (CL)	76	11	44	21	23		
2		8									
3	P2	9 15 23		Hard, Pinkish Fat Clay with Calcareous Deposits (CH)	87	16	53	23	30		
4											
5											
6				BORING TERMINATED							
7											
8											
9											
10											
11											
12											
13											
14											
15											
16											
17											
18											
19											
20											
21											
22											
23											
24											
25											

P = Standard Penetration Resistance (BL/FT)
 Qp = Pocket Penetrometer Test (TSF)
 qu = Unconfined Compressive Strength Test
 ST = Shelby Tube Sample

NE = Not Encountered
 NR = Not Required

NA = Not Applicable
 ND = Not Determined

LOG OF BORING NUMBER P-2

PROJECT: Webb County Youth Village Rehabilitation Center
CLIENT: Webb County
PROJECT LOCATION: Lot 1, Block 1, Las Blancas Subdivision, Unit 2
BORING LOCATION: As Per Plan
DRILLER: Hugo Rendon
DRILLING METHOD: Straight Flight Auger

REPORT NO.: 39485
DATE: December 1, 2015
ELEVATION: NA
WEATHER: Mostly Cloudy and Cool
LOGGED BY: J. Reyes
AFTER 24 HOURS: NR

DEPTH TO WATER INITIAL: NE

Depth (Feet)	Samples	N / (QP)	Soil Symbol	Description of Stratum	Minus 200 (%)	Moisture Content (%)	Atterberg Limits (%)			qu (TSF)	UNIT DRY WT (PCF)	
							Liquid Limit L.L.	Plastic Limit P. L.	Plastic. Index P. I.			
1	P1	5	[Soil Symbol]	Very Stiff, Pinkish Fat Clay with Calcareous Deposits	86	13	51	23	28			
2		8										
3		8										
4	P2	8										
5		10										(CH)
6				BORING TERMINATED								
7												
8												
9												
10												
11												
12												
13												
14												
15												
16												
17												
18												
19												
20												
21												
22												
23												
24												
25												

P = Standard Penetration Resistance (BL/FT)
 Qp = Pocket Penetrometer Test (TSF)
 qu = Unconfined Compressive Strength Test
 ST = Shelby Tube Sample

NE = Not Encountered
 NR = Not Required

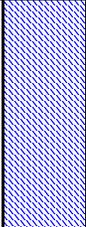
NA = Not Applicable
 ND = Not Determined

LOG OF BORING NUMBER P-3

PROJECT: Webb County Youth Village Rehabilitation Center
CLIENT: Webb County
PROJECT LOCATION: Lot 1, Block 1, Las Blancas Subdivision, Unit 2
BORING LOCATION: As Per Plan
DRILLER: Hugo Rendon
DRILLING METHOD: Straight Flight Auger

REPORT NO.: 39485
DATE: December 1, 2015
ELEVATION: NA
WEATHER: Mostly Cloudy and Cool
LOGGED BY: J. Reyes
AFTER 24 HOURS: NR

DEPTH TO WATER INITIAL: NE

Depth (Feet)	Samples	N / (QP)	Soil Symbol	Description of Stratum	Minus 200 (%)	Moisture Content (%)	Atterberg Limits (%)			qu (TSF)	UNIT DRY WT (PCF)
							Liquid Limit	Plastic Limit	Plastic. Index		
							L.L.	P. L.	P. I.		
1	P1	9		Very Stiff, Pinkish Fat Clay with Calcareous Deposits	89	16	52	23	29		
2		10									
3		8									
4	P2	8									
5		11									
		18		(CH)	96	15	55	24	31		
6				BORING TERMINATED							
7											
8											
9											
10											
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13											
14											
15											
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21											
22											
23											
24											
25											

P = Standard Penetration Resistance (BL/FT)
 Qp = Pocket Penetrometer Test (TSF)
 qu = Unconfined Compressive Strength Test
 ST = Shelby Tube Sample

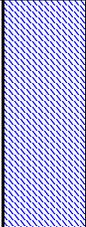
NE = Not Encountered NA = Not Applicable
 NR = Not Required ND = Not Determined

LOG OF BORING NUMBER P-4

PROJECT: Webb County Youth Village Rehabilitation Center
CLIENT: Webb County
PROJECT LOCATION: Lot 1, Block 1, Las Blancas Subdivision, Unit 2
BORING LOCATION: As Per Plan
DRILLER: Hugo Rendon
DRILLING METHOD: Straight Flight Auger

REPORT NO.: 39485
DATE: December 1, 2015
ELEVATION: NA
WEATHER: Mostly Cloudy and Cool
LOGGED BY: J. Reyes
AFTER 24 HOURS: NR

DEPTH TO WATER INITIAL: NE

Depth (Feet)	Samples	N / (QP)	Soil Symbol	Description of Stratum	Minus 200 (%)	Moisture Content (%)	Atterberg Limits (%)			qu (TSF)	UNIT DRY WT (PCF)
							Liquid Limit	Plastic Limit	Plastic. Index		
							L.L.	P. L.	P. I.		
1	P1	13		Very Stiff to Hard, Pinkish Fat Clay with Calcareous Deposits	90	15	54	25	29		
2		12									
3		19									
4	P2	7									
5		8									
		11		(CH)	90	17	53	23	30		
6				BORING TERMINATED							
7											
8											
9											
10											
11											
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21											
22											
23											
24											
25											

P = Standard Penetration Resistance (BL/FT)
 Qp = Pocket Penetrometer Test (TSF)
 qu = Unconfined Compressive Strength Test
 ST = Shelby Tube Sample

NE = Not Encountered
 NR = Not Required

NA = Not Applicable
 ND = Not Determined

LOG OF BORING NUMBER P-5

PROJECT: Webb County Youth Village Rehabilitation Center
CLIENT: Webb County
PROJECT LOCATION: Lot 1, Block 1, Las Blancas Subdivision, Unit 2
BORING LOCATION: As Per Plan
DRILLER: Hugo Rendon
DRILLING METHOD: Straight Flight Auger

REPORT NO.: 39485
DATE: December 1, 2015
ELEVATION: NA
WEATHER: Mostly Cloudy and Cool
LOGGED BY: J. Reyes
AFTER 24 HOURS: NR

DEPTH TO WATER INITIAL: NE

Depth (Feet)	Samples	N / (QP)	Soil Symbol	Description of Stratum	Minus 200 (%)	Moisture Content (%)	Atterberg Limits (%)			qu (TSF)	UNIT DRY WT (PCF)
							Liquid Limit L.L.	Plastic Limit P. L.	Plastic. Index P. I.		
1	P1	6		Very Stiff, Pinkish Lean Clay with Sand	71	14	47	22	25		
2		9									
3		9									
4	P2	6									
5		5									
5		6	(CL)	77	16	46	21	25			
6				BORING TERMINATED							
7											
8											
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10											
11											
12											
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16											
17											
18											
19											
20											
21											
22											
23											
24											
25											

P = Standard Penetration Resistance (BL/FT)
 Qp = Pocket Penetrometer Test (TSF)
 qu = Unconfined Compressive Strength Test
 ST = Shelby Tube Sample

NE = Not Encountered
 NR = Not Required

NA = Not Applicable
 ND = Not Determined

LOG OF BORING NUMBER P-6

PROJECT: Webb County Youth Village Rehabilitation Center
CLIENT: Webb County
PROJECT LOCATION: Lot 1, Block 1, Las Blancas Subdivision, Unit 2
BORING LOCATION: As Per Plan
DRILLER: Hugo Rendon
DRILLING METHOD: Straight Flight Auger

REPORT NO.: 39485
DATE: December 1, 2015
ELEVATION: NA
WEATHER: Mostly Cloudy and Cool
LOGGED BY: J. Reyes
AFTER 24 HOURS: NR

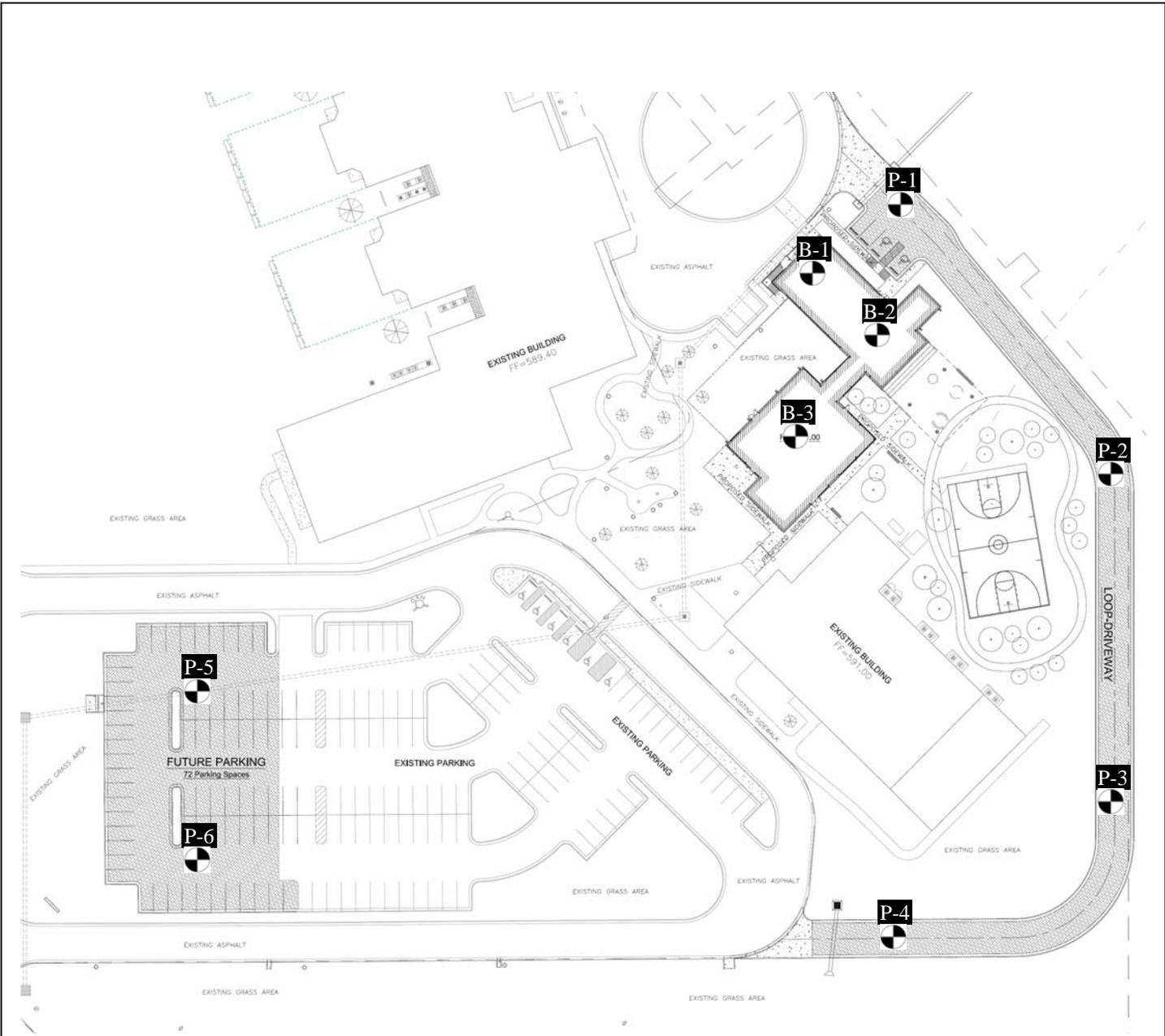
DEPTH TO WATER INITIAL: NE

Depth (Feet)	Samples	N / (QP)	Soil Symbol	Description of Stratum	Minus 200 (%)	Moisture Content (%)	Atterberg Limits (%)			qu (TSF)	UNIT DRY WT (PCF)
							Liquid Limit L.L.	Plastic Limit P. L.	Plastic. Index P. I.		
1	P1	2		Stiff, Pinkish Lean Clay with Sand	81	22	46	21	25		
2		4									
3		8									
4	P2	4									
5		7									
		8		(CL)	81	15	46	21	25		
6				BORING TERMINATED							
7											
8											
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24											
25											

P = Standard Penetration Resistance (BL/FT)
 Qp = Pocket Penetrometer Test (TSF)
 qu = Unconfined Compressive Strength Test
 ST = Shelby Tube Sample

NE = Not Encountered
 NR = Not Required

NA = Not Applicable
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WEBB COUNTY YOUTH VILLAGE REHABILITATION CENTER



APPROXIMATE TEST BORING LOCATION PLAN

PROJECT: Webb County Youth Village Rehabilitation Center

LOCATION: LAREDO, WEBB COUNTY, TX
REPORT NUMBER: 39485



7615 N. Bartlett Avenue
Laredo, TX 78041
P. 956.722.4411 | F. 956.722.5414

TBPE Firm Registration No. F-4097
TBPLS Firm Registration No. 100464-00
www.howlandcompanies.com

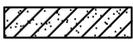
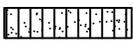
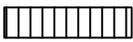
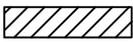
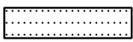
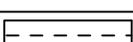


View southeast toward bore B-2



View north toward bore P-5

SYMBOLS AND TERMS USED ON BORING LOGS

UNIFIED SOIL CLASSIFICATION SYSTEM			
GRAVELS More than half of coarse fraction larger than No. 4 sieve size		GW	Well graded gravels or sand and gravel mixture, little or no fines.
		GP	Poorly graded gravels or sand and gravel mixture, little or no fines.
		GM	Silty gravels, poorly graded gravel-sand-silt mixture
		GC	Clayey gravels, poorly graded gravel-sand-clay mixtures.
SANDS More than half of coarse fraction smaller than No. 4 sieve size		SW	Well graded sand or gravelly sands, little or no fines.
		SP	Poorly graded sand or gravelly sands, little or no fines.
		SM	Silty sands, poorly graded sand-silt mixtures
		SC	Clayey sands, poorly graded sand-clay mixtures.
SILTS AND CLAYS More than half of coarse fraction smaller than No. 4 sieve size		ML	Inorganic silts and very fine sands of low to medium plasticity.
		CL	Inorganic clays of low to medium plasticity.
		OL	Organic silts and organic silty clays of low plasticity.
SILTS AND CLAYS Liquid Limit more than 50%		MH	Inorganic silts and very fine sands of low to medium plasticity.
		CH	Inorganic clays of low to medium plasticity.
		OH	Organic silts and organic silty clays of low plasticity.
HIGHLY ORGANIC SOILS		Pt	Peats and other highly organic soils.

TYPE OF TEST OR SAMPLE	
A - Auger Sample. P - Split Barrel Sample with Standard Penetration Test.	C - Rotary Coring Sample. S - Thin wall Tube (Shelby Tube) Sample. T - THD Cone Penetrometer Test.

CONSISTENCY OF SOILS			
Sand		Clay	
Descriptive Term	"N" Value (BL/LF)	Descriptive Term	"N" Value (BL/LF)
Very Loose	0 - 4	Very Soft	Less than 2
Loose	4 - 10	Soft	2 - 4
Medium Dense	10 - 30	Firm	4 - 8
Dense	30 - 50	Stiff	8 - 15
Very Dense	Greater than 50	Very stiff	15 - 30
		Hard	Greater than 30

FIELD AND LABORATORY TESTING PROCEDURES

(TEST PROCEDURES ARE PRESENTED FOR INFORMATIONAL PURPOSES)

FIELD TESTING

A. Boring Procedure between Samples

The borehole is extended downward, between samples, by continuous flight, hollow or solid stem augers or by rotary drilling techniques using bentonite drilling fluid or water.

B. Penetration Test and Split-Barrel Sampling of Soils (ASTM D-1586)

This sampling method consists of driving a 2 inch outside diameter split barrel sampler using a 140 pound hammer freely falling through a distance of 30 inches. The sampler is first seated 6 inches into the material to be sampled and then driven an additional 12 inches. The number of blows required to drive the sampler the final 12 inches is known as the Standard Penetration Resistance. Recovered samples are first classified as to color and texture by the driller. Later, in the laboratory, the driller's field classification is reviewed by the soils engineer who examines each sample.

C. Thin-walled Tube Geotechnical Sampling of Soils (ASTM D-1587)

This method consists of pushing thin walled steel tubes, usually 3 inches in diameter, into the soils to be sampled using hydraulic or other means. Cohesive soils are usually sampled in this manner and relatively undisturbed samples are recovered.

D. Soil Investigation and Sampling by Auger Borings (ASTM D-1452)

This method consists of augering a hole and removing representative soil samples from the auger flight or bit at 5 foot intervals or with each change in the substrata. Disturbed samples are obtained and this method is, therefore, limited to situations where it is satisfactory to determine the approximate subsurface profile.

E. Diamond Core Drilling for Site Investigation (ASTM D-2113)

This method consists of advancing a hole into hard strata by rotating a single or double tube core barrel equipped with a cutting bit. Diamond, tungsten carbide, or other cutting agents may be used for the bit. Wash water is used to remove the cuttings and to cool the bit. Normally, a 2 inch outside diameter by 1-3/8 inch inside diameter (NX) coring bit is used unless otherwise noted. The rock or hard material recovered within core barrel is examined in the field and in the laboratory and the core samples are stored in partitioned boxes. The core recovery is the length of material recovered and is expressed as a percentage of the total distance penetrated.

LABORATORY TESTING

A. Atterberg Limits: Liquid Limit, Plastic Limit and Plasticity Index of Soils (ASTM D-4318, TEX 104-E, 105-E and 106-E)

Atterberg Limits determine the soil's plasticity characteristics. The soil's Plasticity Index (PI) is representative of this characteristic and is the difference between the Liquid Limit (LL) and the Plastic Limit (PL). The LL is the moisture content at which the soil will flow as a heavy viscous fluid. The PL is the moisture content at which the soil begins to lose its plasticity. The test results are presented on the boring logs adjacent to the appropriate sampling information.

B. Particle Size Analysis of Soils (Minus 200) (ASTM D-422 and TEX 110-E)

Grain size analysis tests are performed to determine the particle size and distribution of the samples tested. The grain size distribution of the soils coarser than the Standard Number 200 sieve was determined by passing the sample through a standard set of nested sieves. The test results are presented on the boring logs.

C. Laboratory Determination of Water (Moisture) Content of Soil and Rock (ASTM D-2216 and TEX 103-E)

The moisture content of soil is defined as the ratio, expressed as a percentage, of the weight of water in a given soil mass to the weight of solid particles. It is determined by measuring the wet and oven dry weights of a soil sample. The test results are presented on the boring logs.

D. Unconfined Compressive Strength of Cohesive Soil (ASTM D-2166)

The unconfined compressive strength of soil is determined by placing a section of an undisturbed sample into a loading frame and applying an axial load until the sample fails in shear. The test results are presented on the boring logs adjacent to the appropriate sampling information.

E. California Bearing Ratio (CBR) of Lab Compacted Soils (ASTM D-1883)

The CBR test is performed by compacting soil in a six inch diameter mold at the desired density, soaking the sample for four days under a surcharge load approximating the pavement weight and then testing the soil in punching shear. A two inch diameter piston is forced into the soil to determine the resistance to penetration. The CBR is the ratio of the actual load required to produce 0.1 inches of penetration to that producing the same penetration in a standard crushed stone.

F. Swell Test (ASTM D-4546)

The Swell Test is performed by compacting soil in a steel mold at varying moisture contents. Layers are compacted using a hammer weight and number of blows per layer which vary with the different test procedures. ASTM D-698, D-1557, TEX-113-E and 114-E. The data is plotted and the maximum unit weight and optimum moisture content determined. The test results are given in the appendix with a notation of the test method used.

G. Compaction Tests (ASTM D-698, D-1557, TEX 113E or 114-E)

The compaction test is performed by compacting soil in a steel mold at varying moisture contents. Layers are compacted using a hammer weight and number of blows per layer which vary with the different test procedures, ASTM D-698, D-1557, TEX-113-E and 114-E. The data is plotted and the maximum unit weight and optimum moisture content determined. The test results are given in the appendix with a notation of the test method used.

RECOMMENDED SPECIFICATIONS FOR PLACEMENT OF COMPACTED SELECT FILL

1. General

The soils engineer shall be the owners' representative to control the placement of compacted fill. The soils engineer shall approve the subgrade preparation, the fill materials, the method of placement and compaction; and shall give written approval of the completed fill.

2. Preparation of Existing Ground

All topsoil, plants and other organic material shall be removed. The exposed surface shall be scarified, moistened if necessary, and compacted in the manner specified for subsequent layers of fill.

3. Select Fill Material

Fill shall have a liquid limit of 40 or less and a Plasticity Index between 7 and 18. The fill shall contain no organic or other perishable material, and no stones larger than two (2) inches. The soils engineer shall approve select fill material.

4. Placing Fill

Fill materials shall be placed in horizontal layers not exceeding six (6) inches thickness after compaction. Successive loads of material shall be dumped so as to secure even distribution avoiding the formation of layers or lenses of dissimilar materials. The contractor shall route his hauling equipment to distribute travel evenly over the fill area.

5. Compaction of Fill

- a. Moisture Control: The moisture content of the fill material shall be distributed uniformly throughout each layer of the material. The allowable range of moisture content during compaction shall be within plus two (+2) and minus two (-2) percentage points of the optimum moisture content. The contractor may be directed to add necessary moisture to the material either in the borrow area or upon the fill surface or to dry the material, as directed by the soils engineer. The drying of cohesive soils between lifts to moisture contents less than seventy percent (70 %) of optimum before the placement of subsequent lifts shall be avoided or the fill reworked at the proper moisture content.

- b. Compaction: The material in each layer shall be compacted to obtain proper densities. Compaction by the hauling equipment alone will not be considered sufficient. Structural fills, including pavement subgrade, sub base and base, shall be compacted to densities equivalent to the percentages of the Standard Proctor (ASTM D-698) or the Modified Proctor (ASTM D-1557) maximum dry density listed in Table I. The Texas Department of Highways and Public Transportation Method TEX-113-E compaction test, which varies the compactive effort with soil type, may be substituted for the Standard or Modified Proctor methods and the percentages listed in table I used.

Recommended Specifications for Placement of Compacted Select Fill (Cont.'d)

TABLE I		
AREA	PERCENT COMPACTION	
	Fine Grained Soils ASTM D-698 Standard Proctor	Coarse Grained Soils ASTM D-1557 Modified Proctor
Within five (5) feet of building lines, under footings floor slabs, slab-on-grade foundations and structures attached to buildings (i.e. walls, patios, steps)	95	95 +
More than five (5) feet beyond building lines, under walks, and fill areas to be landscaped	90	90
Pavement subgrade and subbase, including lime treated soils	95	95 +
Flexible Base	N/A	98

Soils classified as coarse grained soils are those with more than fifty (50) percent, by weight, retained on the No. 200 Standard Sieve and with plasticity index of less than 4.

6. Compaction Testing

A qualified testing laboratory in accordance with recognized procedures for making such tests shall perform Field density tests for the determination of the compaction of the fill. A representative number of tests shall be made in each compacted lift at locations selected by the soils engineer or his representative. For general structural and paving fills, we suggest one test per 3,000 square feet per lift with a minimum of four (4) tests per lift.

Important Information about Your Geotechnical Engineering Report

Subsurface problems are a principal cause of construction delays, cost overruns, claims, and disputes.

While you cannot eliminate all such risks, you can manage them. The following information is provided to help.

Geotechnical Services Are Performed for Specific Purposes, Persons, and Projects

Geotechnical engineers structure their services to meet the specific needs of their clients. A geotechnical engineering study conducted for a civil engineer may not fulfill the needs of a construction contractor or even another civil engineer. Because each geotechnical engineering study is unique, each geotechnical engineering report is unique, prepared *solely* for the client. No one except you should rely on your geotechnical engineering report without first conferring with the geotechnical engineer who prepared it. *And no one — not even you — should apply the report for any purpose or project except the one originally contemplated.*

Read the Full Report

Serious problems have occurred because those relying on a geotechnical engineering report did not read it all. Do not rely on an executive summary. Do not read selected elements only.

A Geotechnical Engineering Report Is Based on A Unique Set of Project-Specific Factors

Geotechnical engineers consider a number of unique, project-specific factors when establishing the scope of a study. Typical factors include: the client's goals, objectives, and risk management preferences; the general nature of the structure involved, its size, and configuration; the location of the structure on the site; and other planned or existing site improvements, such as access roads, parking lots, and underground utilities. Unless the geotechnical engineer who conducted the study specifically indicates otherwise, do not rely on a geotechnical engineering report that was:

- not prepared for you,
- not prepared for your project,
- not prepared for the specific site explored, or
- completed before important project changes were made.

Typical changes that can erode the reliability of an existing geotechnical engineering report include those that affect:

- the function of the proposed structure, as when it's changed from a parking garage to an office building, or from a light industrial plant to a refrigerated warehouse,

- elevation, configuration, location, orientation, or weight of the proposed structure,
- composition of the design team, or
- project ownership.

As a general rule, *always* inform your geotechnical engineer of project changes—even minor ones—and request an assessment of their impact. *Geotechnical engineers cannot accept responsibility or liability for problems that occur because their reports do not consider developments of which they were not informed.*

Subsurface Conditions Can Change

A geotechnical engineering report is based on conditions that existed at the time the study was performed. *Do not rely on a geotechnical engineering report* whose adequacy may have been affected by: the passage of time; by man-made events, such as construction on or adjacent to the site; or by natural events, such as floods, earthquakes, or groundwater fluctuations. *Always* contact the geotechnical engineer before applying the report to determine if it is still reliable. A minor amount of additional testing or analysis could prevent major problems.

Most Geotechnical Findings Are Professional Opinions

Site exploration identifies subsurface conditions only at those points where subsurface tests are conducted or samples are taken. Geotechnical engineers review field and laboratory data and then apply their professional judgment to render an opinion about subsurface conditions throughout the site. Actual subsurface conditions may differ—sometimes significantly—from those indicated in your report. Retaining the geotechnical engineer who developed your report to provide construction observation is the most effective method of managing the risks associated with unanticipated conditions.

A Report's Recommendations Are *Not* Final

Do not overrely on the construction recommendations included in your report. *Those recommendations are not final*, because geotechnical engineers develop them principally from judgment and opinion. Geotechnical engineers can finalize their recommendations only by observing actual

subsurface conditions revealed during construction. *The geotechnical engineer who developed your report cannot assume responsibility or liability for the report's recommendations if that engineer does not perform construction observation.*

A Geotechnical Engineering Report Is Subject to Misinterpretation

Other design team members' misinterpretation of geotechnical engineering reports has resulted in costly problems. Lower that risk by having your geotechnical engineer confer with appropriate members of the design team after submitting the report. Also retain your geotechnical engineer to review pertinent elements of the design team's plans and specifications. Contractors can also misinterpret a geotechnical engineering report. Reduce that risk by having your geotechnical engineer participate in prebid and preconstruction conferences, and by providing construction observation.

Do Not Redraw the Engineer's Logs

Geotechnical engineers prepare final boring and testing logs based upon their interpretation of field logs and laboratory data. To prevent errors or omissions, the logs included in a geotechnical engineering report should *never* be redrawn for inclusion in architectural or other design drawings. Only photographic or electronic reproduction is acceptable, *but recognize that separating logs from the report can elevate risk.*

Give Contractors a Complete Report and Guidance

Some owners and design professionals mistakenly believe they can make contractors liable for unanticipated subsurface conditions by limiting what they provide for bid preparation. To help prevent costly problems, give contractors the complete geotechnical engineering report, *but* preface it with a clearly written letter of transmittal. In that letter, advise contractors that the report was not prepared for purposes of bid development and that the report's accuracy is limited; encourage them to confer with the geotechnical engineer who prepared the report (a modest fee may be required) and/or to conduct additional study to obtain the specific types of information they need or prefer. A prebid conference can also be valuable. *Be sure contractors have sufficient time* to perform additional study. Only then might you be in a position to give contractors the best information available to you, while requiring them to at least share some of the financial responsibilities stemming from unanticipated conditions.

Read Responsibility Provisions Closely

Some clients, design professionals, and contractors do not recognize that geotechnical engineering is far less exact than other engineering disciplines. This lack of understanding has created unrealistic expectations that

have led to disappointments, claims, and disputes. To help reduce the risk of such outcomes, geotechnical engineers commonly include a variety of explanatory provisions in their reports. Sometimes labeled "limitations" many of these provisions indicate where geotechnical engineers' responsibilities begin and end, to help others recognize their own responsibilities and risks. *Read these provisions closely.* Ask questions. Your geotechnical engineer should respond fully and frankly.

Geoenvironmental Concerns Are Not Covered

The equipment, techniques, and personnel used to perform a *geoenvironmental* study differ significantly from those used to perform a *geotechnical* study. For that reason, a geotechnical engineering report does not usually relate any geoenvironmental findings, conclusions, or recommendations; e.g., about the likelihood of encountering underground storage tanks or regulated contaminants. *Unanticipated environmental problems have led to numerous project failures.* If you have not yet obtained your own geoenvironmental information, ask your geotechnical consultant for risk management guidance. *Do not rely on an environmental report prepared for someone else.*

Obtain Professional Assistance To Deal with Mold

Diverse strategies can be applied during building design, construction, operation, and maintenance to prevent significant amounts of mold from growing on indoor surfaces. To be effective, all such strategies should be devised for the *express purpose* of mold prevention, integrated into a comprehensive plan, and executed with diligent oversight by a professional mold prevention consultant. Because just a small amount of water or moisture can lead to the development of severe mold infestations, a number of mold prevention strategies focus on keeping building surfaces dry. While groundwater, water infiltration, and similar issues may have been addressed as part of the geotechnical engineering study whose findings are conveyed in this report, the geotechnical engineer in charge of this project is not a mold prevention consultant; ***none of the services performed in connection with the geotechnical engineer's study were designed or conducted for the purpose of mold prevention. Proper implementation of the recommendations conveyed in this report will not of itself be sufficient to prevent mold from growing in or on the structure involved.***

Rely on Your ASFE-Member Geotechnical Engineer for Additional Assistance

Membership in ASFE/The Best People on Earth exposes geotechnical engineers to a wide array of risk management techniques that can be of genuine benefit for everyone involved with a construction project. Confer with you ASFE-member geotechnical engineer for more information.



8811 Colesville Road/Suite G106, Silver Spring, MD 20910
Telephone: 301/565-2733 Facsimile: 301/589-2017
e-mail: info@asfe.org www.asfe.org

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SECTION 000100INDEX OF DOCUMENTS

1.1 LIST OF DRAWINGS & SPECIFICATIONS

- A. Drawings: Drawings consist of the Contract Drawings and other drawings listed on the Table of Contents page of the separately bound drawing set titled **Webb County Youth Village Rehabilitation Center** dated **April 7, 2016**, as modified by subsequent Addenda and Contract modifications.
- B. List of Drawings & Specifications: Project Manual consists of the following Specifications, Contract Drawings and other drawings of type indicated:

BIDDING & CONTRACT CONDITIONS	(DIVISION 0)
GENERAL CONSTRUCTION SPECIFICATIONS	(DIVISION 1 THRU 14)
PLUMBING, MECHANICAL, & ELECTRICAL SPECIFICATIONS	(DIVISION 21 THRU 28)

ARCHITECTURAL

- A0.0 - Cover Sheet
- A1.0 - Index to Drawings & Abbreviations
- AC.1 - Building Code Analysis
- AG.1 - Accessibility Standards
- AG.2 - Accessibility Standards
- AG.3 - Accessibility Standards
- A1.1 - Composite Site Plan - Alternates
- A1.2 - Architectural Site Plan
- A1.3 - Planting & Irrigation Details
- A2.1 - First Floor Plan
- A2.2 - Second Floor Plan
- A2.3 - Schedules
- A2.4 - Exterior Door & Window Elevations
- A2.5 - Interior Door & Window Elevations
- A2.6 - Door Details
- A2.6.1 - Interior Door Details
- A2.7 - Storefront Details
- A2.7.1 - Door & Window Details
- A2.8 - Partition (Wall) Types
- A2.9 - Plan Details
- A2.10 - Plan Details
- A3.1 - Exterior Elevations
- A3.2 - Exterior Elevations
- A3.3 - Exterior Elevations / Building Sections
- A4.1 - Building Sections
- A4.2 - Building Sections
- A4.2.1 - Building Sections
- A4.3 - Wall Sections
- A4.4 - Wall Sections
- A4.5 - Wall Sections
- A4.6 - Wall Sections
- A4.7 - Wall Sections
- A4.8 - Wall Sections Details
- A4.9 - Wall Sections Details
- A4.10 - Wall Sections Details
- A5.1 - Enlarged Toilet Plan & Elevations
- A5.2 - Enlarged Toilet Plan & Elevations

- A5.3 - Enlarged Floor Plans
- A5.4 - Enlarged Elevator Plans
- A5.5 - Millwork Elevations
- A5.6 - Millwork Details
- A5.7.1 - Exterior Stair Plans & Elevations
- A5.7.2 - Exterior Stair Plans & Elevations
- A5.8 - Interior Seating/ Stair Plans & Sections
- A5.8.1 - Stair Details
- A5.9 - Site Details
- A6.1 - Roof Plan
- A6.2 - Roof Details
- A7.1 - RCP First Floor
- A7.2 - RCP Second Floor
- A7.3 - RCP Details

STRUCTURAL

- S1.1 - General Notes & Typical Foundation Details
- S1.2 - Typical CMU Wall Details
- S1.3 - Typical Metal Stud Wall Details
- S-2 - Foundation Details
- S-3 - Second Floor/ Low Roof Framing Plan
- S-4 - High Roof Framing Plan
- SD-1.1 - Foundation Details
- SD-1.2 - Foundation Details
- SD-1.3 - Foundation Details
- SD-2.1 - Framing Details
- SD-2.2 - Framing Details
- SD-3.1 - Framing Details

MECHANICAL

- M1.1 - Mechanical First Floor Plan
- M1.2 - Mechanical Second Floor Plan
- M2.1 - Mechanical Legend
- M3.1 - Mechanical Details/ Schedules

ELECTRICAL

- ES.1 - Electrical Site Plan
- E1.1 - Electrical Lighting First Floor Plan
- E1.2 - Electrical Lighting Second Floor Plan
- E2.1 - Electrical Power First Floor Plan
- E2.2 - Electrical Power Second Floor Plan
- E3.1 - Electrical Special System
- E3.2 - Electrical Special System
- E4.1 - Electrical Legend/ Schedules
- E5.1 - Electrical Riser/ Schedules
- E5.2 - Electrical Panel Details
- E6.1 - Electrical Details
- E6.2 - Electrical Details

PLUMBING

- P1.1 - Plumbing Sewer & Vent Floor Plan
- P2.1 - Plumbing Domestic Water Floor Plan
- P3.1 - Plumbing Schedule
- P4.1 - Plumbing Details
- P4.2 - Plumbing Details

FIRE PROTECTION

- FP1.1 - Fire Protection Plan/ Details
- FP1.2 - Fire Protection Floor Plan

CIVIL

- C.01 - Site Plan
- C.02 - General Notes
- C.03 - Demolition Plan
- C.04 - Survey Control Plan
- C.05 - Dimensional Plan
- C.06 - Finished Grading Plan
- C.07 - Finished Grading Plan (Spots)
- C.08 - Loop Driveways, Profile & Paving Details
- C.09 - Curb Ramp Details
- C.10 - Storm Drainage Area Map
- C.11 - Storm Drainage Details
- C.12 - Utility Distribution Plan
- C.13 - Utility Details
- C.14 - Storm Water Pollution Prevention Plan
- C.15 - Storm Water Pollution Prevention Details

FOOD SERVICE

- FS-1.00 - Food Service Equipment Schedule
- FS-1.01 - Food Service Equipment Plan
- FS-1.02 - Food Service Equipment Plumbing Plan
- FS-1.03 - Food Service Equipment Electrical Plan
- FS-1.04 - Food Service Exhaust Plan
- FS-2.01 - Food Service Equipment Plan
- FS-2.02 - Food Service Equipment Plan

END OF DOCUMENT 000100

SECTION 010000

SUMMARY

PART 1 – GENERAL

1.1 SUMMARY

A. Section Includes:

1. Project information.
2. Work Covered by Contract Documents.
3. Work under separate contracts.
4. Access to site.
5. Coordination with occupants.
6. Work restrictions.
7. Specification and drawing conventions.
8. Miscellaneous provisions.

B. Related Requirements

1. Section 015000 "Temporary Facilities and Controls" for limitations and procedures governing temporary use of Owners Facilities.

1.2 PROJECT INFORMATION

A. Project Identification "Webb County Youth Village Rehabilitation Center".
Project Location: 111 Camino Nuevo Road, Highway 359
Laredo, Webb County, Texas

B. Owner: Webb County

C. Owner's Representative: Ms. Leticia Gutierrez
Interim Purchasing Agent
110 Washington St., Suite 101
Laredo, TX 78040
(956) 523.4125

D. Architects: Ausland Architects
6626 Silvermine Dr., Suite 700
Austin Texas 78736
(512). 327.0444
In Association with:
Metaform Studio Architects
6909 Springfield Ave. Suite 107
Laredo, Texas 78041
(956) 568.3315

1.3 WORK COVERED BY CONTRACT DOCUMENTS

A. The Work of Project is defined by the Contact Document and consists of the following:

The project is a new Rehabilitation Center on the Youth Village Campus, to provide sixteen

(16)beds, educational spaces, counseling offices, dining area and other associated spaces, including any open canopy area with slab and raised steps. A basketball court and cafeteria for the JJAEP. Increased parking lot addition and work also includes site work and mechanical, electrical and plumbing. Estimated budget for this project is \$2,400,000.00. Provide all other necessary work as indicated in the Construction Documents and as required to execute the project. The basketball court will have construction started in 45 days after contract is signed.

B. Type of Contract

1. Project will be constructed under a Single Prime Contract.

1.4 WORK UNDER SEPARATE CONTRACTS:

- A. General: Cooperate fully with separate contractors so work on those contracts may be carried out smoothly, without interfering with or delaying work under this Contract with work performed under separate contracts.

1.5 ACCESS TO SITE:

- A. General: Contractor shall have full use of Project site for construction operations during Construction period. Contractor's use of Project site is limited only by Owner's right to perform work or to retain other contractors on portions of Project.

1.6 WORK RESTRICTIONS:

- A. Work Restrictions: General: Comply with restrictions on construction operations.

1. Comply with limitations on use of public street and with other requirements of authorities have jurisdiction.

- B. Existing Utility Interruptions: Do not interrupt utilities serving facilities occupied by owner or others unless permitted under the following conditions and then only after providing temporary utility services according to requirements indicated:

1. Notify Owner not less than two days in advance of proposed utility interruptions
2. Obtain Owner's written permission before proceeding with disruptive operations

- C. Nonsmoking Building: Smoking is not permitted within the building or within 25 feet (8m) of entrances, operable windows, or outdoor-air intakes.

- D. Controlled Substances: Use of tobacco products and other controlled substances on project site is not permitted.

1.7 SPECIFICATION AND DRAWING CONVENTIONS

- A. Specification Content: The Specifications use certain conventions for the style of language

and the intended meaning of certain terms, words, and phrases when used in particular situations. These Conventions are as follows:

1. Imperative mood and streamlined are generally used in the Specifications. The words "shall", "shall be", or "shall comply with", depending on the context, are implied where a colon (;) is used in the sentence or phrase.
2. Specification requirements are to be performed by Contractor unless specifically stated otherwise.

B. Division 01 General Requirements:

Requirements of Sections in Division 01 apply to the Work of all sections in the Specifications.

C. Drawing Coordination: Requirements for materials and products identified on Drawings are described in detail in the Specifications. One or more of the following are used on Drawings to identify materials and products:

- 1 Terminology: Materials and products are identified by the typical generic terms and used in individual Specifications Sections.
- 2 Abbreviations: Materials and products are identified by abbreviations as scheduled on Drawings.
- 3 Keynoting: Materials and products are identified by reference keynotes referencing Specification Section numbers found in this Project Manual.

PART 2 – PRODUCTS (Not Used)

PART 3 – EXECUTION (Not Used)

END OF SECTION 010000

SECTION 011600CONTRACTOR REQUIREMENTS

1. TEMPORARY FACILITIES

- A. Electrical Facilities: Contractor shall furnish and install all electrical service connections necessary for use during construction. The contractor will be allowed to make temporary connections to the school building's existing electrical service as long as the capacity to do so exists. In the event that it doesn't, the contractor is responsible for securing temporary service as needed to accomplish the project. All costs (including utility company costs), associated with the installation and removal of all temporary construction electrical connections for power and lighting will be the responsibility of the contractor. The owner will pay for all electrical service costs during construction.
- D. Water Service: Contractor shall furnish and install all water connections necessary for use during construction. Water needed for site related construction as well as building pad construction is to be provided and paid for by the contractor.
- E. Sanitary Facilities: Contractor will provide chemical toilets. No use of existing on-site toilets is permitted.
- F. Trash Dumpster: Contractor shall provide steel dumpster containers for trash and shall clean building and site on a daily basis to keep building work area and site free of trash and debris. If contractor fails to keep site and building clean, the Owner will perform cleaning service and all expenses incurred will be back-charged to Contractor.
- G. Meet all City of Laredo, Webb County, TCEQ, and all other local, state, and federal construction related requirements.

2. BUILDING PERMITS, INSPECTION TESTS AND DEPOSITS

- 1) Owner will pay for all permanent water meter fees and impact fees (including water availability fees).
- 2) Contractor shall be responsible for paying for, applying for, and securing all permits, licenses, deposits, construction meters, connecting of temporary utilities, other plan review fees, inspections, and all other fees required.

3. COOPERATION WITH BUILDING OFFICIALS

Cooperate with applicable utility and government officials and inspectors at all times. If such official or inspector deems special inspection necessary, provide assistance and facilities that will expedite inspection.

4. PARKING AND STORAGE

Contractor will designate areas for Contractors/Subs the use on site for parking, material, and equipment storage. At completion of project, the contractor shall clean area, making any repairs as required, to make sure that the site is returned to its original condition. Contractor and Subs shall minimize disruptions to surrounding neighborhood areas.

5. SAFETY

Contractor shall keep building and site clean to facilitate work and safety. Comply with all laws governing safety, specifically the "Occupational Safety and Health Standards (OSHA)". The contractor shall be responsible for initiating, maintaining, and supervising for conformance to all safety programs and precautions necessary for compliance with all local, state, and federal codes and requirements. Architect, Engineers, Owner, and any of their employees and agents are not responsible for, or in any way in charge of, the safety of the work or any contractor or their employees or property.

6. FENCING, BARRICADES AND WARNINGS

Contractor shall provide, install, and service the necessary barricades for the protection of the public as shown in the Contract Documents and as required by local state and federal regulations, codes, and ordinances. Contractor shall install and maintain chain link construction fencing with access gates as necessary around building site.

7. NOTIFICATION

The contractor shall notify the architect at least 48 hours in advance (Monday thru Friday) of concrete pours, roofing installation, start of each new section or classification of work, concealment of plumbing, heating, air conditioning, or electrical work.

8. SCHOOL OPERATIONS/CONSTRUCTION PERSONNEL

A. School will be in operation with all classes full during the majority of the construction.

- 1) Contractor, subcontractors, owner, and architect shall meet weekly to coordinate and schedule any construction activities affecting school operations including quiet days for testing, student/staff holidays, etc.
- 2) Student safety is of utmost importance. Fire and life safety exiting from buildings must be maintained at all times and closely monitored. Review and receive approval for changes in existing conditions with the local fire marshall for each phase of construction. Provide temporary signage as required by the fire marshall.
- 3) Fire arms, drugs, intoxicating beverages, X-rated materials, etc. shall be kept off all school grounds and property. Smoking on school grounds is prohibited.
- 4) The use of tobacco, alcohol, or illegal drugs is specifically prohibited on school property. The Contractor shall inform all construction personnel employed at the site and enforce these requirements.
- 3) Construction workers are not to communicate or interact in anyway with students and staff on site. Only the project superintendent and/or his appointed representatives may communicate with only administrative staff on an as needed basis.

B. Dress and Language Code

- 1) It is the intent to provide an acceptable appearance and manner of the forces to the personnel, visitors, and general public while the contractor's forces are on the project site.
- 2) A dress code shall be in effect for this project. Field forces involved in the construction shall have contractor identification, either on clothing or in the form of badges. It is the intent of the dress code to provide:
 - a. Identification of the contractor and subcontractors work forces. Each worker's hard hat is to have an individual minimum "2" numbers on each side of hat. A log of these assigned numbers is to be turned over to the owner and maintained at the general contractor's trailer.
 - b. An acceptable appearance of the forces to the personnel, visitors, and general public while the contractor's forces are on project site.
 - c. Construction workers are to be fully clothed at all times. Work clothing and protective gear shall comply with all local, state, and federal requirements. Clothing may not display any logos or slogans other than from the company for which the worker is employed.

- 3) A language code shall be in effect for this project. Contractor's forces shall not use offensive, vulgar, or other such unacceptable language or gestures while on the project site.
- 4) Violations of any items listed in A & B are reason to immediately remove the worker permanently from the jobsite.

9. FIELD MEASUREMENTS

The contractor will employ an experienced, competent civil engineer to establish or survey the building lines, elevations, and minimum of two construction phase bench marks. Each contractor shall verify all existing grades, lines, levels, and dimensions at job site.

Before ordering any material or doing any work, each contractor shall verify all measurements and shall be responsible for their correctness. Any differences between the actual dimensions and conditions on the site and those indicated on the drawings shall be submitted to the architect for instructions and consideration before proceeding with the work.

10. COORDINATION

Contractor shall be responsible for the proper fitting of all work and for the coordination of the operations of all trades, other contractors, subcontractors, and material suppliers engaged upon or in connection with the work, as well as those of his own employees. Contractor shall coordinate subs and trades performing work in the same area to ensure proper fitting of various components (such as structure, HVAC equipment and duct, electrical, lights and conduit, plumbing work, and finish ceiling). Contractor shall exercise every effort to assure a harmonious, cooperative attitude on the part of all concerned. He shall be prepared to guarantee to each of his subcontractors and foremen all of the dimensions that they may require for the fitting of their own work to adjoining work and shall do, or shall cause his agents to do, all fitting and adjusting necessary to make the several parts of the work come together properly and to fit the work to receive or to be received by the work of other contractors. Contractor shall use tape, isolation pads, or other methods as necessary to isolate dissimilar metals.

11. TESTING

- A. Contractor shall furnish and pay for:
 - 1) Site Contractor: Sieve analysis, plasticity test (Atterberg Limits), Proctor Analysis, and moisture density tests for the select fill and the excavated sub-grade.
 - 2) Concrete Contractor: Concrete mix design and mix design test. Test to be from current stockpiled materials that will be used for construction of this project.
- B. All other testing will be paid for by the Owner. An independent laboratory will be selected by the Owner to perform testing of construction materials to determine that they meet specifications. Test results shall be supplied to the contractor, owner, and architect.
- C. Re-testing: Should the results of the initial laboratory tests indicate that the material or workmanship fails to comply with the requirements of the specification, the work shall be removed and reworked until it does satisfy the requirements. The final results shall be verified acceptable by owner's testing lab test which shall be paid for by the contractor. All re-testing expenses made necessary due to substandard workmanship or materials will be paid for by the Contractor.
- D. Contractor shall supply materials and cooperate with and assist testing lab as required to make tests.

12. TESTING AND OPERATION OF MACHINERY

All mechanical devices, machinery, apparatus, equipment, etc. shall be tested prior to final completion of project and acceptance by owner.

Testing shall be by thoroughly knowledgeable and competent manufacturer's representative. Representative shall instruct owner to properly operate and maintain equipment. Such testing and operation shall not constitute acceptance nor start of Guarantee or Warranty. The contractor is to provide a labeled VHS video tape recording of each owner instruction session. Contractor shall deliver all written operating instructions and equipment manuals to owner and provide copies of transmittals to Architect with record drawings, etc. at end of the contract.

13. SUBSTITUTIONS

- A. The requirements for substitutions do not apply to specified contractor options on products and construction methods. Requested substitutions during proposal period, which have been accepted and noted in addenda, are not subject to the requirements for substitutions as specified herein. Contractor's determination of and compliance with governing regulations and orders issued by governing authorities do not constitute "substitutions" and do not constitute a basis for change orders except as provided for in the Contract Documents. Revisions to contract documents where requested by owner, architect, or engineer, are "changes" not "substitutions". Otherwise, contractor's requests for changes in products, materials, and methods of construction required by contract documents are considered requests for "substitutions" and are subject to requirements thereof.
- B. Requests for Substitutions: Contractor may submit and Owner and Architect will consider, without obligation, to approve substitutions that have not been submitted and approved prior to receipt of proposals. Contractor shall submit substitution request on owner's form. Substitution shall be fully identified for product or method being replaced by substitution, including related specification section and drawing number(s), and fully documented to show compliance with requirements for substitutions. Include product data/drawings, description of methods, samples where applicable, contractor's detailed comparison of significant qualities between specified item and proposed substitution, statement of effect on construction time and coordination with other affected work, cost information or proposal, and contractor's statement that contractor guarantees that proposed substitution will result in overall work equal to or better than work originally indicated.

By making requests for substitutions, the contractor:

1. represents that the contractor has personally investigated the proposed substitute product and determined that it is equal or superior in all respects to that specified;
2. represents that the contractor will provide the same warranty for the substitution that the contractor would for that specified;
3. contractor waives all claims for additional costs related to the substitution which subsequently becomes apparent; and,
4. will coordinate the installation of the accepted substitute making such changes as may be required for the work to be complete in all respects.

14. WATCHMAN

The contractor at his own expense and option, may employ a watchman as deemed necessary to protect or attend their work.

15. OWNER'S OCCUPANCY

The contractor agrees that the owner may award separate contracts for certain items of work and equipment, and place and install as much equipment, furniture, etc., during the progress of the building as is possible before completion of the various parts of the work and shall agree that such placing and installing of equipment, etc., shall not in any way evidence the completion of the work or any portion of it. Contractor shall coordinate his work with that of work by the owner and/or the owner's contractors to insure that each portion of the work can proceed smoothly. Any item noted NIC (Not in Contract) will be provided and installed by the owner.

16. MISCELLANEOUS

- A. Where "similar" is noted in contract documents, the intent is similar not same as. "Similar" conditions require modification to fit the exact condition, coordination of other materials, equipment, etc., additional bracing, blocking, materials and labor as required for complete construction.
- B. Where "typical" is noted in contract documents, the intent is that materials, labor, and total construction shall occur everywhere throughout project where the conditions occur.
- C. Dissimilar metals shall be isolated from each other with tape, packing, isolation pads, or other methods as necessary.
- D. Where "provide" is noted in the contract documents, the intent is that materials, labor, and total construction shall occur at that condition.

17. TOXIC AND HAZARDOUS MATERIALS

Toxic and hazardous materials, including but not limited to products or materials containing formaldehyde, asbestos, ACM's, PCB's, lead, etc. shall not be provided nor installed in any portion of any new construction work. Subcontractors and all contractors will be required to sign a statement to this effect. Subcontractors and General Contractor will be required to sign a statement to this effect. Contractor shall furnish Manufacturer's Safety Data Sheets (MSDS) on all materials and products installed by Contractor on these projects to indicate no asbestos-containing materials have been installed; include as part of Owner's manual.

18. PROGRESS MEETINGS

- A. Architect and Owner will conduct a Pre-Construction meeting to be held in the owner's office prior to start of work. Owner, Architect, Engineers, Contractors, and Subcontractors review and discuss aspects of work (copy of Pre-Construction Agenda is available from Architect's office).
- B. Submit RFI's, submittals, etc. daily as available.
- C. Contractors, Architect, and Owner shall meet at job site on a scheduled weekly basis for coordination, construction progress review, construction document questions and answers, and such other items as required for all parties to help keep project running smoothly and progressing on schedule. Each weekly meeting shall review delay requests (claims for increase in contract time) for rain or any other reason for the previous week.
- D. Contractor shall schedule monthly progress meetings at job site with architect, engineers, owner, and appropriate subcontractors and material suppliers to review:
 - 1) Past month's work and application for payment.
 - 2) Work anticipated to be completed during next month.
 - 3) Updated progress/completion schedules; shop drawings submittals; other required paper work.
 - 4) Requests for information and other coordination question.
 - 5) Record set of documents (contractor and subs shall record as-built conditions, dimensions, location of utilities, notes, etc. onto the record set on a daily basis).
 - 6) Schedule for transmitting of operating instructions/manuals and warranties; other miscellaneous job closeout requirements; job site training sessions for owner's staff by equipment manufacturer representatives; completion of record documents. (Note: All these items must be completed prior to Substantial Completion/acceptance by owner).
- E. Such other meetings as necessary for contractor's coordination and execution to meet time schedules.

20. WORKER'S COMPENSATION

Full compliance with the requirements of the Texas Labor Code 4406.096 to provide worker's compensation insurance is mandatory. The Contractor will be required to provide certificates of coverage for the contractor's employees and retain certificates of coverage on file in accordance with Rule 110.110 adopted by the Texas Workers Compensation Commission. A copy of the provisions of subsection (c) paragraph (7) of this rule is included herein. Additional requirements for insurance are indicated in Document 00700 General Conditions A201 and Document 00800 Supplementary General Conditions.

21. PHASING OF CONSTRUCTION

- A. After award of contract by owner, contractor shall immediately (within 7 days) secure acceptable bonds and insurance so that contractor may begin work after Notice to Proceed is issued by the Owner.
- B. All work shall be completed no later than the date listed on the comprehensive project schedule.

22. PROJECT CLOSEOUT

A. Removal of Temporary Utilities, Facilities, and Controls

- 1) Remove temporary above grade or buried utilities, equipment, facilities, materials prior to Final Application for Payment Inspection.
- 2) Remove underground installations to a minimum depth of 2 ft. Grade site as indicated.
- 3) Clean and repair damage caused by installation or use of temporary work.
- 4) Clean site and remove debris including surplus materials and debris under finish grade.
- 5) Grade entire site to finished grade and appearance.

B. Final Cleaning:

- 1) Execute final cleaning prior to final inspection.
- 2) Clean interior and exterior surfaces exposed to view. Vacuum carpeted and soft surfaces.
- 3) Clean debris from site, roofs, gutters, downspouts, and drainage systems.
- 4) Replace filters of operating equipment.
- 5) Remove waste and surplus materials, rubbish, and construction facilities from the site.

C. Demonstration and Instructions

- 1) Demonstrate operation and maintenance of products to owner's personnel two weeks prior to date of Substantial Completion.
- 2) Demonstrate start-up, operation, control, adjustment, trouble-shooting, servicing, maintenance, and shutdown of each item of equipment at agreed upon times at equipment location.
- 3) Contractor shall include in his Base Bid an 8-hour training session, for each system listed below with an asterick (*) at least two weeks prior to final completion and acceptance of the work by the owner, to instruct and train the owner's personnel in the operation, maintenance, emergency procedures and safety features of the facility and related equipment. For systems indicated without an asterick, include time as required to fully review these systems with owner representation. Training and systems demonstrations shall include, but not be limited to:
 - a. *HVAC systems
 - b. *Plumbing and waste systems and equipment
 - c. Water piping and drainage systems
 - d. Natural gas dispensing systems (if applicable)
 - e. Disinfection of water distribution systems
 - f. *Food service systems and equipment
 - g. *Theatrical systems and equipment

- h. *Fire alarm system
- i. *Hardware- maintenance and repair
- j. *HVAC control system

Two 8-hour training session shall be in a classroom setting and the contractor shall arrange for the installer and/or the manufacturer's representative of the equipment to be present and make available an adequate number of training manuals for each individual attending the training session.

One 8-hour training session shall be a "hands-on" training session in the presence of factory representatives and other trained personnel of the manufacturer.

- a. Complete start-up and shutdown of all equipment.
- b. Complete demonstration of emergency procedures and evacuation.
- c. Complete instructions to operate, service, and maintain noise and vibrations adjustments of the new equipment.
- d. Complete demonstration of all safety features and explanation of state-of-the-art technology of the new equipment.

Contractor shall notify the Owner and Architect, in advance, to schedule a meeting with their respective representatives to set up these training sessions and provide the Owner and Architect with a list of names of the persons who will be conducting the training. At this meeting, the Contractor will present the Owner and Architect with the close-out Maintenance Manuals as described in Section 17600 and Owner and Contractor set the date for these training sessions.

D. Adjusting: Adjust operating products and equipment to ensure smooth and unhindered operation.

E. Owner's Manual

- 1) The contractor is to submit two sets prior to final inspection, bound in 8-1/2 x 11 inch text pages in, three-ring binders, D size, with durable plastic covers.
- 2) Prepare cover with printed title, "OWNER'S MANUAL", title of project, and specification section and listing of work included.
- 3) Internally subdivide the contents with permanent page dividers, logically organized, with tab titling clearly printed under reinforced laminated plastic tabs.
- 4) Contents:
 - a. Directory, listing names, addresses, and telephone numbers of contractor, subcontractors, and major equipment suppliers.
 - b. Project warranties and certificates and lien releases.
 - c. Color selections.
 - d. Submittals, operating and maintenance instructions, parts lists, etc., arranged by Specification Section.

Book 1

Termite Control

Concrete Mix Design

Masonry

Structural Steel (mylar copies with as-built drawings [mylar]).

SBS Modified Bituminous Membrane Roofing

Caulking and Sealants

Wood Doors

Finish Hardware

Glazing

Thresholds and Weatherstripping

Ceramic Tile
 Acoustical Ceilings
 Resilient Floor Covering
 Terrazzo
 Carpet
 Paint
 Miscellaneous Specialties
 Toilet Partitions
 Signage
 Toilet Room Accessories
 Manufacturer's Safety Data Sheets (MSDS)

Book 2

Plumbing
 (power, lighting, data conduit)

Book 3

Electrical

Book 4

HVAC

Book 5

Food Service

- e. If necessary, provide addition books.

F. Warranties:

- 1) Provide duplicate notarized copies.
- 2) Execute and assemble documents from contractor, subcontractors, suppliers, and manufacturers.
- 3) Submit prior to final Application for Payment.

G. Spare Parts and Maintenance Materials

- 1) Provide products, spare parts, maintenance and extra materials in quantities specified in individual specification sections.
- 2) Deliver to project site and place in location as directed; obtain receipt prior to final payment.

H. Contract Closeout Procedures

- 1) Application for "Certificate of Substantial Completion" shall be accompanied by the following:
 - a. City Occupancy Permit.
 - b. Owner's Manual
 - c. Comprehensive list of items to be completed.
- 2) Application for Final Payment shall be accompanied by the following:
 - a. Signed affidavit that payrolls, bills for materials and equipment, and other indebtedness connected with the work have been paid.
 - b. Written release of all claims against Owner.
 - c. Written consent from the Surety that the contractor is due final payment.
 - d. Completion of all items contained in the work.
 - e. Project record set drawings and specifications.
 - f. Completion of all final cleaning items.
 - g. Removal of all temporary facilities.
 - h. Receipt showing delivery of all spare parts and extra products.

25. LIQUIDATED DAMAGES FOR DELAY

- A. Owner and contractor recognize that time is of the essence in this agreement and that owner will suffer financial loss if each substantial completion date, plus any authorized adjustments, are not met. They recognize the delays, expense, and difficulties involved in proving in a legal proceeding the actual losses or damages (including special, indirect, consequential, incidental, and any other losses or damages) suffered by the owner if each substantial completion date is not met. Accordingly and instead of proof of such

losses or damages, owner and contractor agree that as liquidated damages for delay, but not as penalty, contractor shall pay the owner the sum of \$500.00 for each day that expires after the expiration of the time period set forth.

Note: Each phase of work labeled subject to liquidated damages on the phasing schedule (See Sheet A1.1) is subject to liquidated damages separate and beyond other phases. Therefore it is possible that the contractor could pay the owner an accumulated total of liquidated damages for each day multiple phases extend beyond their scheduled completion dates. For example, if two phases subject to liquidated damages extend beyond their completion dates, liquidated damages would total \$500.00/day.

Failure to meet the scheduled completion date for any phase does not relieve the contractor of the responsibility of meeting future completion dates for the remaining project phases yet to be completed.

- B. Extensions of Time: The contractor shall not be charged with liquidated damage for delay if:
1. The delay in the completion of the work arises from unforeseeable causes beyond the control and without the fault or negligence of the contractor including, but not restricted to, acts of God, acts of the public enemy acts of federal, state, or local government in its sovereign capacity, fires, floods, epidemics, quarantines, strikes, freight embargos, and adverse weather conditions not reasonably anticipated.
And
 2. The contractor within two (2) days from the beginning of any such delay, shall notify the architect and owner, in writing, of the causes of delay. Contractor shall provide such documentation, signed affidavit, etc. as required by owner to substantiate claim for delay. Owner's notification shall be acknowledged by initialing and dating by owner's designated representative.
- C. Disputes:
1. No claim by the contractor for additional time shall be allowed unless it be timely presented in writing.
 2. If the Webb County Commissioner's Court of the district should reject the contractor's claim or if the Commissioner's Court should fail to allow the contractor's claim within ninety (90) days after it is filed with the Commissioner's Court, the contractor's administrative remedy under this contract shall be deemed to be exhausted.
 3. No suit shall be brought by the contractor upon this contract or for breach of this contract until his administrative remedy shall have been exhausted nor more than two (2) years after it shall have been exhausted.
 4. During the pendency of any claim, the contractor shall proceed diligently with the work.

**AFFIDAVIT OF
NON-USE OF ASBESTOS**

(Insert name of project): _____

(Insert name of Owner): _____

The undersigned Contractor hereby certifies and affirms that the building materials used for construction by the Contractor or any person or firm representing or represented by the Contractor, do not contain any asbestos materials or any other prohibited materials as defined by laws, rules and regulations promulgated by the Federal Government, The State of Texas, and any governmental organization operating under these entities, except when specifically authorized in writing by the Owner. A copy(s) of that (those) authorization(s), if any is (are) attached.

The undersigned Contractor hereby certifies and affirms that the Contractor shall be totally responsible for any and all costs incurred in removing any asbestos or prohibited materials determined to be part of the building materials as a result of inspection and sample analysis performed by individuals or firms certified to perform asbestos prohibited materials inspection and sample analysis under the laws, rules and regulations of the Federal Government and the State of Texas.

The undersigned Contractor hereby certifies and affirms that the Contractor shall pay for any and all damages resulting from the inability of the Owner to comply with all laws, rules and regulations governing the Asbestos Hazard Emergency Response Act of 1987, and all other laws, rules and regulations governing public buildings.

IN WITNESS WHEREOF, the undersigned has signed and sealed this instrument this _____ day of _____, 20____.

Authorized Signature - Print Name & Title

Company Name: _____

Personally appeared before the undersigned, _____, who, after being sworn, deposes and says that the facts stated in the above certification are true.

_____ for the State of Texas
Notary Public

_____ My Commission Expires
Printed Name of Notary Public

Notary Seal:

CONTRACTOR'S LEAD FREE AFFIDAVIT

I understand that in order to protect students, staff, and public in general from any unnecessary exposure to lead, and to comply with the latest Federal and State regulations, the use of lead containing materials and equipment in all forms in the construction operation of this facilities is prohibited.

I certify that I am familiar with the materials used in the construction of, and incorporated into, the construction described below. I further certify that to the best of my knowledge and belief no lead containing materials were used in the process of constructing or incorporated into the construction of all piping and equipment related to potable drinking water.

DATE: _____

PROJECT NAME: _____

OWNER: _____

JOB DESCRIPTION: _____

CONTRACTOR: _____

CONTRACTOR'S SIGNATURE _____

DATE _____

Failure to complete this certificate constitutes non-compliance with the job specifications and an unacceptable job.

Signed before me this _____ day of _____, 20____.

Notary Public

My Commission Expires: _____

SUBCONTRACTOR'S / MATERIAL SUPPLIER'S AFFIDAVIT

STATE OF TEXAS
COUNTY OF _____

BEFORE ME, the undersigned authority, on this day personally appeared _____
personally known to me to be the person whose name is subscribed hereto, and who, upon his oath deposes and says as
follows: _____

That he, as subcontractor and/or material supplier, furnished certain labor and materials which form a part of certain
improvements constructed on the following property, to wit:

(Insert project name): _____

(Insert name of school district): _____
and that he personally knows that all bills for materials furnished and labor performed in connection with his
subcontract/purchase order on the improvements constructed on the above described property have been fully paid.

He further covenants and guarantees that there are no other person or firms whatsoever (materials, supplies, laborers or
others in any way involved in the furnishing of goods and/or work or labor on his subcontractor and / or materials
purchase order heretofore had, now have, or may hereafter be entitled to any liens or claims against the above set out
property.

He does further agree to hold the Contractor or Owner wholly harmless and/or fully indemnify them against any and all
liens, claims or demands of any or every kind and nature which may in any way arise out of the furnishing of any of the
materials, labor or other services or products in connection with my subcontract and/or supplier of materials.

Name of Subcontractor/Material Supplier

By _____

BEFORE ME, a Notary Public, on this day personally appeared _____, known to me to be
the person whose name is subscribed to the foregoing instrument, after being duly sworn, deposed and said that the facts
stated above are true. Given under my hand and seal of office this _____ day of _____, 20____.

Notary Public, State of Texas

Printed Name of Notary Public

My Commission Expires: _____

**AFFIDAVIT OF
NON-USE OF UREA-FORMALDEHYDE**

(Insert project name): _____

(Insert name of Owner): _____

The undersigned Contractor hereby certifies and affirms that the building materials used for construction by the Contractor or any person or firm representing or represented by the Contractor, do not contain any urea-formaldehyde materials or any other prohibited materials as defined by laws, rules and regulations promulgated by the Federal Government, The State of Texas, and any governmental organization operating under these entities, except when specifically authorized in writing by the Owner. A copy(s) of that (those) authorization(s), if any is (are) attached.

The undersigned Contractor hereby certifies and affirms that the Contractor shall be totally responsible for any and all costs incurred in removing any urea-formaldehyde or prohibited materials determined to be part of the building materials as a result of inspection and sample analysis performed by individuals or firms certified to perform asbestos prohibited materials inspection and sample analysis under the laws, rules and regulations of the Federal Government and the State of Texas.

The undersigned Contractor hereby certifies and affirms that the Contractor shall pay for any and all damages resulting from the inability of the Owner to comply with all laws, rules and regulations governing public buildings

IN WITNESS WHEREOF, the undersigned has signed and sealed this instrument this _____ day of _____, 20____.

Authorized Signature - Print Name & Title

Company Name: _____

Personally appeared before the undersigned, _____, who after being sworn, deposes and says that the facts stated in the above certification are true.

_____ for the State of Texas
Notary Public

_____ My Commission Expires
Printed Name of Notary Public

Notary Seal:

CONTRACTOR'S AFFIDAVIT

STATE OF TEXAS
COUNTY OF _____

FROM: _____
(Name of Contractor)

(Name of Owner)

RE: The Contract entered into the ____ day of _____ 20____, between the above mentioned parties for the construction of (insert project name:)

(Insert name of owner):

1. The undersigned hereby certifies that all work required under the above contract has been performed in accordance with the terms thereof, that all material, men, subcontractors, mechanical and laborers have been paid and satisfied in full, and that there are no outstanding claims of any character arising out of the performance of the Contract which have not been paid and satisfied in full.
2. The undersigned further certifies that (to the best of his knowledge and belief), there are no unsatisfied claims for damages resulting from injury or death to any employees, subcontractors, or the public at large arising out of the performance of the Contract, any suite or claims for any other damage of any kind, nature, or description which might constitute a lien upon the property of the Owner.
3. The undersigned makes this affidavit as specified for the purpose of receiving final payment in full settlement of all claims arising under or by virtue of the Contract, and acceptance of such payment is acknowledge as a release from the Owner from any and all claims arising under or by virtue of the Contract.

IN WITNESS WHEREOF, the undersigned has signed and sealed this instrument this _____ day of _____, 20____.

Name of Contractor

By _____
Authorized Signature

Title: _____

BEFORE ME, a Notary Public, on this day personally appeared _____, known to me to be the person whose name is subscribed to the foregoing instrument, after being duly sworn, deposed and said that the facts stated are true. Given under my hand and seal of office this _____ day of _____, 20____.

Notary Public, State of Texas

Printed Name of Notary Public

My Commission Expires: _____

SECTION 011600CONTRACTOR REQUIREMENTSPART I – GENERAL

1.01 RELATED DOCUMENTS

Drawings and General Provision of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to work of this Section.

1.02 SUMMARY

The following paragraphs contain requirements that apply to the overall accomplishment of the Work. Where specified action is required by this Sections, it is the Contractor's responsibility to perform or to assign such requirement to a Subcontractor and see that it is performed.

1.03 EXAMINATION OF SITE

Proposers shall visit the project site to compare Drawings and Specifications therewith including other work being performed which in any way affects the project. Failure or oversight in any of the above requirements will in no way relieve the successful bidders from responsibility of completing the project in accordance with the drawings and Specifications without additional cost to the Owner.

1.04 START OF WORK

Contractor will start work after receiving notice to proceed.

1.05 GRADES, LINES, LEVELS, AND LAYOUT

All grades and lines shall be established and maintained by the Contractor, who shall be responsible for the same. Immediately upon starting the project, locate and protect all general reference points, lay out work, and verify all grades, lines, levels, and dimensions as shown on the Drawings and report any errors or inconsistencies to the Architect. Contractor shall be responsible for errors resulting from his failure to do so. Verify existing floor heights where new building access locations will be established between the new addition and the existing building if required.

1.06 SUPERVISION AND CONSTRUCTION PROCEDURES

- A. The Contractor shall supervise and direct the work, using his best skill and attention. He shall be sole responsible for all construction means, methods, techniques, sequences and procedures and for coordinating all portions of the work under the Contract.
- B. The Architect will not be responsible for and will not have control or charge of construction means, methods, techniques, sequences or procedures or for safety precautions and programs in connection with the work, and he will not be responsible for the Contractor's failure to carry out the work in accordance with the Contract Documents. The Architect will not be responsible for or have control or charge over the acts or omissions of the Contractor, subcontractors, or any of their agents or employees, or any other persons performing any of the work.

1.07 LOCAL REPRESENTATION FOR CONTRACTORS AND SUBCONTRACTORS

Out of town contractors and subcontractors (firms based more than 100 miles from Laredo, Texas) shall arrange and pay all costs for a representative in this area to handle call-back work during the project guarantee period. This requirement shall not relieve the contractor of his responsibilities as provided elsewhere in the Contract Documents.

1.08 CONTRACTOR'S SUPERINTENDENT

A competent superintendent initially approved by the Architect and Owner shall be kept by the Contractor or at the building site at all times and in continuous employment during the progress of the work, to receive instructions and to act for the Contractor in the accurate laying out and direction of all work. The Owner reserves the right to direct any contractor to replace the superintendent for any reason with another subject to Owner's approval.

1.09 RELATIONSHIP BETWEEN TRADES

The Contractor shall require and be responsible for cooperation and coordination between various Trades and Subcontractors whose work is dependent upon one another. Schedule such work so as to prevent delays in dependent work so that all related work will progress together. Fully inform each Trade or Subcontractor of the relation of his work to other work, and require each to make necessary provisions for the requirements of such other work. No additional compensation for extra work incurred through the lack of cooperation and coordination between various Trades and Subcontractors will be allowed.

1.10 PROTECTION

The Contractor shall assume the responsibility for initiation and maintenance of protective requirements specified under Protections in Section 015000 TEMPORARY FACILITIES AND CONTROL.

1.11 REPAIR OF DAMAGE

The Contractor shall assume responsibility for any loss or damage caused by these operations or any Trade to the Work, or to materials, to adjacent property and existing structures and to persons, and make good any loss, damage or injury without cost to the Owner.

1.12 USE OF STREETS

- A. The Contractor shall conform to government ordinances, rules and/or regulations applicable to the use of streets, roads and sidewalk areas.
- B. The Contractor shall confine entrance and exit to the site by truck route designated on the Drawings, or assigned at pre-construction conference.

1.13 SECURITY

Conform to requirements of public laws, ordinances and regulations and the requirements of insurance carriers concerning security of the site while work is in progress as well as when it has been suspended.

1.14 DOCUMENTS AT THE SITE

- A. Maintain at the site a reference copy of each approved Shop Drawing and of each Drawings, Specification, Addenda, revision and other Modification, in good order and marked currently by note to record each change made during construction on record prints. Drawings shall be clearly marked "RECORD PRINTS" and not used for construction purposes. Mechanical Record Drawings shall show actual CFM rating in each space. Prior to Pre-final Inspection, the information shall be transferred to three mil Mylar reproducibles, titled, dated, labeled "Record Prints", signed by Contractor and Subcontractor(s) and submit both the Mylar and print(s), (including Specifications and Details) to the Architect. Also obtain, when directed, or as necessary to properly execute the work, copies of literature, standards and other data referred to but not included in the Specifications. Such literature for each item of work shall be provided to the Architect in triplicate for distribution. This shall include all installation instructions from all manufactures.
- B. The Record Prints will be observed monthly by the Architect to determine that they are updated. This will be a requirement for issuance of a Certificate for Payment.

1.15 CONSTRUCTION LOADING

- A. General: Concrete slabs on grade and suspended floors have not been designed for heavy loading.
- B. Slabs on Grade: Do not subject slabs on grade to excessive loading by shoring, storage of materials or operation of construction equipment unless adequately protected by planking. Maintenance of slabs in good condition is the responsibility of the Contractor, who shall remove all damaged areas of such slabs and replace them with new work at no cost to the Owner.
- C. Do not load existing roof structure without written prior approval of the projects structural engineer.

1.16 SPECIAL REQUIREMENTS

- A. Construction Storage and Parking: Review TEMPORARY FACILITIES AND CONTROLS Section 015000 and the Drawings for designated areas.
- B. Noise Control: The Contractor shall execute the Work in this Contract as quietly as practicable to avoid unnecessary disturbances.

Any complaints duly registered by the Owner of unacceptable noise levels shall be cause for the use of special precautions and methods of operation by the Contractor to reduce noises to acceptable levels. The Owner shall be the sole judge of the tolerability of noise levels.
- C. Dust Control: Control all dust, to Owner's satisfaction, and meet all city ordinances in the working area and involved portions of site including access roads or drives.
- D. Fire Protection: Contractor shall be responsible for development of fire prevention and protection program for all work at the site. Provide fire extinguishers specified in Section 015000 of this Division of Work. Coordinate and obtain written approval from the local

fire marshall for exit plans and the locations of contractor provided temporary fire extinguishers during construction.

- E. Laying Out The Building: The Contractor will employ an experienced and competent Registered Public Surveyor to lay out the structure(s) and establish a permanent and accessible bench mark from which the grades may be established and checked from time to time during the progress of the work. Before the final building pad is accepted and before the structural slab is cast, the Civil Engineer shall verify the finish slab elevation.

- F. Measurements: Before ordering any material or doing any work, each contractor shall verify all horizontal and vertical measurements at the building and shall be responsible for the correctness of same. The mechanical and electrical subcontractors must verify with the general contractor clearances for systems installation prior to fabrication. Should modifications of systems be required in order to meet all other contract requirements, the contractor must involve the project designer prior to implementing changes to the contract documents. No exchange or compensation will be allowed on account of difference between actual dimensions and measurements indicated on the Drawings. Any difference that may be found shall be submitted to the Construction Manager for clarification by the Architect, for instructions before proceeding with the work.

END OF SECTION 011600

PART 1 - GENERAL

1. RELATED DOCUMENTS

Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division-1 Specification Sections, apply to this Section.

2. SUMMARY

This Section specifies administrative and procedural requirements for project meetings including but not limited to:

Pre-Construction Conference.

Pre-Installation Conferences.

Coordination Meetings.

Progress Meetings.

Pre-Job Meetings.

Construction schedules are specified in Division 013100.

3. PRE-CONSTRUCTION CONFERENCE

Schedule a pre-construction conference and organizational meeting at the Project site or other convenient location no later than 15 days after execution of the Agreement and prior to commencement of construction activities. Conduct the meeting to review responsibilities and personnel assignments.

Attendees: The Owner, Architect and their consultants, the Contractor and its superintendent, major subcontractors, manufacturers, suppliers and other concerned parties shall each be represented at the conference by persons familiar with and authorized to conclude matters relating to the Work.

Agenda: Discuss items of significance that could affect progress including such topics as:

Tentative construction schedule.

Critical Work sequencing.

Designation of responsible personnel.

Procedures for processing field decisions and Change Orders.

Procedures for processing Applications for Payment.

Distribution of Contract Documents.

Submittal of Shop Drawings, Product Data and Samples.

Preparation of record documents.

Use of the premises.

Parking available.

Office, Work and storage areas.

Equipment deliveries and priorities.

Security.

Housekeeping.

Working hours.

Record significant discussions and agreements and disagreements of pre-construction conference, along with the approved schedule. Distribute the record of the meeting to everyone concerned, promptly, including the Owner and Architect.

Do not proceed if the conference cannot be successfully concluded. Initiate whatever actions are necessary to resolve impediments to performance of Work and reconvene the conference at the earliest feasible date.

4. PRE-INSTALLATION CONFERENCES

Conduct a pre-installation conference at the site before each construction activity that requires coordination with other construction. The Installer and representatives of manufacturers and fabricators involved in or affected by the installation, and its coordination or integration with other materials and installations that have preceded or will follow, shall attend the meeting. Advise the Architect of scheduled meeting dates, at least one week in advance.

Review the progress of other construction activities and preparations for the particular activity under consideration at each pre-installation conference, including requirements for:

Contract Documents.

Options.

Related Change Orders.

Purchases.

Deliveries.

Shop Drawings, Product Data and quality control Samples.

Review of Samples.

Review of mock-ups.

Possible conflicts.

Suitability-for-use problems.

Time schedules.

Weather limitations.

Manufacturer's recommendations.

Compatibility of materials.

Acceptability of substrates.

Review structural loading limitations of substrates.

Temporary facilities.

Space and access limitations.

Governing regulations.

Inspection and testing requirements.

Required performance results.

Recording requirements.

Protection.

Record significant discussions and agreements and disagreements of each conference, along with the approved schedule. Distribute the record of the meeting to everyone concerned, promptly, including the Owner and Architect.

Do not proceed if the conference cannot be successfully concluded. Initiate whatever actions are necessary to resolve impediments to performance of Work and reconvene the conference at the earliest feasible date.

5. COORDINATION MEETINGS

Conduct Project coordination meetings at regularly scheduled times convenient for all parties involved. Project coordination meetings are in addition to specific meetings held for other purposes, such as regular progress meetings and special pre-installation meetings.

Request representation at each meeting by every party currently involved in coordination or planning for the construction activities involved.

Record meeting results and distribute copies to everyone in attendance and to others affected by decisions or actions resulting from each meeting.

Notify Owner of all project coordination meetings one week in advance.

6. WEEKLY PROGRESS MEETINGS

Conduct weekly progress meetings at the Project site during the construction period. If all parties agree, reduce the frequency of these meetings to every other week. Coordinate the day and time with the Owner and Architect. The day and time agreed to will remain the same during the construction period. Coordinate dates of meetings with preparation of the payment request.

Attendees: In addition to representatives of the Owner and Architect, each subcontractor, supplier or other entity concerned with current progress or involved in planning, coordination or performance of future activities shall be represented at these meetings by persons familiar with the Project and authorized to take action upon matters relating to progress.

Agenda: Review and correct or approve minutes of the previous progress meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to the current status of the Project.

Contractor's Construction Schedule: Review progress since the last meeting. Determine where each activity is in relation to the Contractor's Construction Schedule, whether on time or ahead or behind schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.

Review the present and future needs of each entity present, including such items as:

Interface requirements.

Time.

Sequences.

Status of submittals, RFIs, ASIs, PRs

Deliveries.

Off-site fabrication problems.

Access.

Site utilization.

Temporary facilities and services.

Hours of Work.

Hazards and risks.

Housekeeping.

Quality and Work standards.

Change Orders.

Documentation of information for payment requests.

Record and report the information reviewed at each meeting.

Reporting: No later than 3 days after each progress meeting date, distribute copies of minutes of the meeting to each party present and to other parties who should have been present. Include a brief summary, in narrative form, of progress since the previous meeting and report.

Schedule Updating: Revise the construction schedule monthly or more often if needed.

7. The contractor shall maintain RFI, ASI, RFP, change order and submittal logs as well as record drawings and shall update all of these at least 24 hours before each scheduled meeting. Contractor shall distribute copies to meeting attendees.

END OF SECTION 012100

SECTION 012200ALLOWANCES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes administrative and procedural requirements governing allowances.
- B. Types of allowances include the following:
 - 1. Contingency allowances.
 - 2. Betterment allowances.
 - 3. Lump sum allowances.

1.2 SELECTION AND PURCHASE

- A. At the earliest practical date after award of the Contract, advise Architect of the date when final selection and purchase of each product or system described by an allowance must be completed to avoid delaying the Work.
- B. At Architect's request, obtain proposals for each allowance for use in making final selections. Include recommendations that are relevant to performing the Work.

1.3 ACTION SUBMITTALS

- A. Submit proposals for purchase of products or systems included in allowances, in the form specified for Change Orders.

1.4 INFORMATIONAL SUBMITTALS

- A. Submit invoices to show cost of products furnished under each allowance. Reconciliation of allowance amounts with actual costs will be by Change Order.
- B. Submit documentation to show labor time and cost for installation of allowance items that include installation as part of the allowance.
- C. Coordinate and process submittals for allowance items in same manner as for other portions of the Work.

1.5 COORDINATION

- A. Coordinate allowance items with other portions of the Work. Furnish templates as required to coordinate installation.

1.6 LUMP SUM AND BETTERMENT ALLOWANCES

- A. Allowance shall include cost to Contractor of specific products and materials ordered by Owner or selected by Architect under allowance and shall include taxes, freight, and delivery to Project site.

- B. Unless otherwise indicated, Contractor's costs for receiving and handling at Project site, labor, installation, overhead and profit, and similar costs related to products and materials selected by Owner and/or Architect under allowance shall be included as part of the Contract Sum and not part of the allowance.
- C. Unused Materials: Return unused materials purchased under an allowance to manufacturer or supplier for credit to Owner, after installation has been completed and accepted.
 - 1. If requested by Architect, retain and prepare unused material for storage by Owner. Deliver unused material to Owner's storage space as directed.

1.7 CONTINGENCY ALLOWANCES

- A. Use the contingency allowance only as directed by the Owner and only by Change Orders that indicate amounts to be charged to the allowance.
- B. Contractor's related costs for products and equipment ordered by Owner under the contingency allowance are included in the allowance and are not part of the Contract Sum. These costs include delivery, installation, taxes, insurance, equipment rental, and similar costs.
- C. Change Orders authorizing use of funds from the contingency allowance will include Contractor's related costs and reasonable overhead and profit margins.
- D. At Project closeout, credit unused amounts remaining in the contingency allowance to Owner by Change Order.

1.8 ADJUSTMENT OF ALLOWANCES

- A. Allowance Adjustment: To adjust allowance amounts, prepare a Change Order proposal based on the difference between purchase amount and the allowance, multiplied by final measurement of work-in-place where applicable. If applicable, include reasonable allowances for cutting losses, tolerances, mixing wastes, normal product imperfections, and similar margins.
 - 1. Include installation costs in purchase amount only where indicated as part of the allowance.
 - 2. If requested, prepare explanation and documentation to substantiate distribution of overhead costs and other margins claimed.
 - 3. Submit substantiation of a change in scope of work, if any, claimed in Change Orders related to unit-cost allowances.
 - 4. Owner reserves the right to establish the quantity of work-in-place by independent quantity survey, measure, or count.
- B. Submit claims for increased costs because of a change in scope or nature of the allowance described in the Contract Documents, whether for the purchase order amount or Contractor's handling, labor, installation, overhead, and profit.
 - 1. Do not include Contractor's or subcontractor's indirect expense in the Change Order cost amount unless it is clearly shown that the nature or extent of work has changed from what could have been foreseen from information in the Contract Documents.
 - 2. No change to Contractor's indirect expense is permitted for selection of higher- or lower-priced materials or systems of the same scope and nature as originally indicated.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine products covered by an allowance promptly on delivery for damage or defects. Return damaged or defective products to manufacturer for replacement.

3.2 PREPARATION

- A. Coordinate materials and their installation for each allowance with related materials and installations to ensure that each allowance item is completely integrated and interfaced with related work.

3.3 SCHEDULE OF ALLOWANCES

- A. The following Allowances are included in the Contract Sum:

- 1. **Allowance No. 01 – Contingency Allowance**

- Include a Contingency Allowance of One Hundred Twenty Thousand Dollars (\$120,000.00) to be used at Owner's discretion. Contingency to include contractor's overhead and profit.

- 2. **Allowance No. 02 – Digital Wallcovering Betterment Allowance**

- Include a digital wallcovering betterment allowance of Ten Thousand Dollars (\$10,000.00) in addition to items included in the specification(s) to be used for the purchase of material and/or design of displays and graphical information. Contractor shall be responsible for the coordination of the work, All graphical information shall be approved by the Owner and Architect. Contractor is to include installation labor in the base bid, contractor's overhead and profit.

END OF SECTION 012100

SECTION 012300

ALTERNATES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes administrative and procedural requirements for alternates.

1.2 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General Supplementary conditions and other Division 1 Specifications Sections, apply to this section.

1.3 DEFINITIONS

- A. Alternate: An amount proposed by bidders and stated on the Bid Form for certain work defined in the bidding requirements that may be added to or deducted from the base bid amount if Owner decides to accept a corresponding change either in the amount of construction to be completed or in the products, materials, equipment, systems, or installation methods described in the Contract Documents.
 - 1. Alternates described in this Section are part of the Work only if enumerated in the Agreement.
 - 2. The cost or credit for each alternate is the net addition to or deduction from the Contract Sum to incorporate alternate into the Work. No other adjustments are made to the Contract Sum.

1.4 PROCEDURES

- A. Coordination: Modify or adjust affected adjacent work as necessary to completely integrate work of the alternate into Project.
 - 1. Include as part of each alternate, miscellaneous devices, accessory objects, and similar items incidental to or required for a complete installation whether or not indicated as part of alternate.
- B. Notification: Immediately following award of the Contract, notify each party involved, in writing, of the status of each alternate. Indicate if alternates have been accepted, rejected, or deferred for later consideration. Include a complete description of negotiated revisions to alternates.
- C. Execute accepted alternates under the same conditions as other work of the Contract.
- D. Schedule: A schedule of alternates is included at the end of this Section. Specification Sections referenced in schedule contain requirements for materials necessary to achieve the work described under each alternate.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 SCHEDULE OF ALTERNATES

A. **Alternate No. 01: Walking Trail & Surface**

1. Alternate: The addition of a walking trail as shown in Architectural and Civil Drawings. The contractor shall include all labor, materials, and equipment.

B. **Alternate No. 02: Proposed Road & Parking Spaces (Adjacent to New Bldg.)**

1. Alternate: Delete proposed Road and Parking spaces as shown in Civil Engineering drawings. All grading and site preparation work shall be included in Base Bid. The contractor shall include all labor, materials, and equipment.

C. **Alternate No. 03: Warming Kitchen Equipment at Room 116**

1. Alternate: Delete all kitchen equipment as indicated in Kitchen 116 & Storage 113. Refer to Kitchen Equipment drawings (sheets FS-1.00 thru FS-2.02). Price shall include all necessary equipment for functional kitchen. Contractor shall include all labor, materials, and equipment.

D. **Alternate No. 04: JJAEP Cafeteria Finish-out**

1. Alternate: Delete all interior finish-out of the following: Lobby 101, Restrooms 103 & 104, Kitchen 105, Storage 106, and Dining 107. Include all finishes (walls, floors and ceilings), plumbing fixtures, electrical and mechanical systems. All mechanical equipment shall remain in adjacent space. (Refer Sheet A1.1 & MEP drawings.) Contractor shall include all labor; materials and equipment for shell build out.

E. **Alternate No. 05: Kitchen Equipment at Room 105**

1. Alternate: Delete all kitchen equipment as indicated for Kitchen Room 105. Refer to drawings (sheets FS-1.00 thru FS-2.02). Price shall include all necessary equipment for functional kitchen. Contractor shall include all labor, materials, and equipment.

F. **Alternate No. 06: Site Improvements**

1. Alternate: The addition of new parking spaces (72) as indicated in the construction documents. Provide parking lot light poles, match existing. Refer to Civil Engineering drawings. Contractor shall include all labor, materials, and equipment.

G. **Alternate No. 07: Decorative Iron Fencing**

1. Alternate: Provide decorative iron fence as indicated in Construction Documents. Contractor shall include all labor, materials, and equipment.

H. **Alternate No. 08: Concrete Benches**

1. Alternate: Delete exterior concrete benches as indicated. All labor, materials, and equipment shall be included.

All alternate bid figures are to be included in the Bid Form

END OF SECTION 012300

SECTION 012500SUBSTITUTION PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes administrative and procedural requirements for substitutions.
- B. Related Requirements:
 - 1. Section 016000 "Material & Equipment" for requirements for submitting comparable product submittals for products by listed manufacturers.

1.2 DEFINITIONS

- A. Substitutions: Changes in products, materials, equipment, and methods of construction from those required by the Contract Documents and proposed by Contractor.

1.3 ACTION SUBMITTALS

- A. Substitution Requests: Submit three copies of each request for consideration. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.
 - 1. Documentation: Show compliance with requirements for substitutions and the following, as applicable:
 - a. Statement indicating why specified product or fabrication or installation cannot be provided, if applicable.
 - b. Coordination information, including a list of changes or revisions needed to other parts of the Work and to construction performed by Owner and separate contractors, that will be necessary to accommodate proposed substitution.
 - c. Detailed comparison of significant qualities of proposed substitution with those of the Work specified. Include annotated copy of applicable Specification Section. Significant qualities may include attributes such as performance, weight, size, durability, visual effect, sustainable design characteristics, warranties, and specific features and requirements indicated. Indicate deviations, if any, from the Work specified.
 - d. Product Data, including drawings and descriptions of products and fabrication and installation procedures.
 - e. Samples, where applicable or requested.
 - f. Certificates and qualification data, where applicable or requested.
 - g. List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners.
 - h. Material test reports from a qualified testing agency indicating and interpreting test results for compliance with requirements indicated.
 - i. Research reports evidencing compliance with building code in effect for Project.
 - j. Detailed comparison of Contractor's construction schedule using proposed substitution with products specified for the Work, including effect on the overall Contract Time. If specified product or method of construction cannot be provided within the Contract Time, include

letter from manufacturer, on manufacturer's letterhead, stating date of receipt of purchase order, lack of availability, or delays in delivery.

- k. Cost information, including a proposal of change, if any, in the Contract Sum.
 - l. Contractor's certification that proposed substitution complies with requirements in the Contract Documents except as indicated in substitution request, is compatible with related materials, and is appropriate for applications indicated.
 - m. Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of failure of proposed substitution to produce indicated results.
2. Architect's Action: If necessary, Architect will request additional information or documentation for evaluation within seven days of receipt of a request for substitution. Architect will notify Contractor of acceptance or rejection of proposed substitution within 15 days of receipt of request, or seven days of receipt of additional information or documentation, whichever is later.
- a. Forms of Acceptance: Change Order, Construction Change Directive, or Architect's Supplemental Instructions for minor changes in the Work.
 - b. Use product specified if Architect does not issue a decision on use of a proposed substitution within time allocated.

1.4 QUALITY ASSURANCE

- A. Compatibility of Substitutions: Investigate and document compatibility of proposed substitution with related products and materials. Engage a qualified testing agency to perform compatibility tests recommended by manufacturers.

PART 2 - PRODUCTS

2.1 SUBSTITUTIONS

- A. Requests for substitutions to be made within 30 days after issuance of notice to proceed. Should any material substitution be rejected, resubmittal shall be made within 15 days after rejection to be considered. Lack of request for substitutions or late requests will require that materials shown and/or specified be provided.
- B. Whenever a material, article or piece of equipment is identified on the Drawings or in the Specification by reference to manufacturers' or vendors' names, trade names, catalogue numbers, or the like, it is so identified for the purpose of establishing a standard, and any material, article or piece of equipment of other manufacturers or vendors which will perform adequately the duties imposed by the general design will be considered equally acceptable provided the material, article, or piece of equipment so proposed is, in the opinion of the Architect, of equal substance, appearance and function. It shall not be purchased or installed by the Contractor without the Architect's written approval.
- C. Requests for substitution, when forwarded by the Contractor to the Architects for review by the Architect, are understood to mean that the Contractor:
 - 1. represents that the contractor has personally investigated all aspects of the propose substitute product and determined that it is equal or superior in all respects to that specified;
 - 2. represents that the Contractor will provide the same warranty for the substitution that the Contractor would for that specified;
 - 3. certifies that the cost data presented is complete and includes all related costs under this Contract except the Architect's redesign costs, and waives all claims for additional costs related to the substitution which subsequently become apparent; and

4. Will coordinate the installation of the accepted substitute, making such changes in other portions of the Work at no additional expense to the Owner as may be required for the Work to be completed in all respects.
- D. Substitutions for Cause: Submit requests for substitution immediately on discovery of need for change, but not later than 15 days prior to time required for preparation and review of related submittals.
1. Conditions: Architect will consider Contractor's request for substitution when the following conditions are satisfied:
 - a. Requested substitution is consistent with the Contract Documents and will produce indicated results.
 - b. Requested substitution will not adversely affect Contractor's construction schedule.
 - c. Requested substitution has received necessary approvals of authorities having jurisdiction.
 - d. Requested substitution is compatible with other portions of the Work.
 - e. Requested substitution has been coordinated with other portions of the Work.
 - f. Requested substitution provides specified warranty.
 - g. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.
- E. Substitutions for Convenience: Not allowed unless otherwise indicated.
- F. Substitutions will not be considered if:
1. They are indicated or implied on Shop Drawing submissions without previous formal request as required above; or
 2. For their implementation, they require a substantial revision of the Contract Documents in order to accommodate their use.
 3. They are not submitted within the time stipulated herein or in accordance with these Specifications.
 4. The Contract documents indicate "No Substitutions Permitted".

PART 3 - EXECUTION (Not Used)

END OF SECTION 012500

SECTION 012600CONTRACT MODIFICATION PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes administrative and procedural requirements for handling and processing Contract modifications.

1.2 MINOR CHANGES IN THE WORK

- A. Architect will issue supplemental instructions authorizing minor changes in the Work, not involving adjustment to the Contract Sum or the Contract Time, on AIA Document G710, "Architect's Supplemental Instructions."

1.3 PROPOSAL REQUESTS

- A. Owner-Initiated Proposal Requests: Architect will issue a detailed description of proposed changes in the Work that may require adjustment to the Contract Sum or the Contract Time. If necessary, the description will include supplemental or revised Drawings and Specifications.
 - 1. Work Change Proposal Requests issued by Architect are not instructions either to stop work in progress or to execute the proposed change.
 - 2. Within time specified in Proposal Request after receipt of Proposal Request, submit a quotation estimating cost adjustments to the Contract Sum and the Contract Time necessary to execute the change.
 - a. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
 - b. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
 - c. Include costs of labor and supervision directly attributable to the change.
 - d. Include an updated Contractor's construction schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.
 - e. Quotation Form: Use forms acceptable to Architect.
- B. Contractor-Initiated Work Change Proposals: If latent or changed conditions require modifications to the Contract, Contractor may initiate a claim by submitting a request for a change to Architect.
 - 1. Include a statement outlining reasons for the change and the effect of the change on the Work. Provide a complete description of the proposed change. Indicate the effect of the proposed change on the Contract Sum and the Contract Time.
 - 2. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
 - 3. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
 - 4. Include costs of labor and supervision directly attributable to the change.

5. Include an updated Contractor's construction schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.
6. Comply with requirements in Section 012500 "Substitution Procedures" if the proposed change requires substitution of one product or system for product or system specified.
7. Work Change Proposal Request Form: Use form acceptable to Architect.

1.4 ADMINISTRATIVE CHANGE ORDERS

- A. Allowance Adjustment: See Section 012100 "Allowances" for administrative procedures for preparation of Change Order Proposal for adjusting the Contract Sum to reflect actual costs of allowances.
- B. Unit-Price Adjustment: See Section 012200 "Unit Prices" for administrative procedures for preparation of Change Order Proposal for adjusting the Contract Sum to reflect measured scope of unit-price work.

1.5 CHANGE ORDER PROCEDURES

- A. On Owner's approval of a Work Changes Proposal Request, Architect will issue a Change Order for signatures of Owner and Contractor on AIA Document G701.

1.6 CONSTRUCTION CHANGE DIRECTIVE

- A. Construction Change Directive: Architect may issue a Construction Change Directive on AIA Document G714. Construction Change Directive instructs Contractor to proceed with a change in the Work, for subsequent inclusion in a Change Order.
 1. Construction Change Directive contains a complete description of change in the Work. It also designates method to be followed to determine change in the Contract Sum or the Contract Time.
- B. Documentation: Maintain detailed records on a time and material basis of work required by the Construction Change Directive.
 1. After completion of change, submit an itemized account and supporting data necessary to substantiate cost and time adjustments to the Contract.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 012600

SECTION 012900PAYMENT PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes administrative and procedural requirements necessary to prepare and process Applications for Payment.
- B. Related Requirements:
 - 1. Section 012200 "Allowances" for procedural requirements governing the handling and processing of allowances.
 - 2. Section 012600 "Contract Modification Procedures" for administrative procedures for handling changes to the Contract.

1.2 SCHEDULE OF VALUES

- A. Coordination: Coordinate preparation of the schedule of values with preparation of Contractor's construction schedule.
 - 1. Coordinate line items in the schedule of values with other required administrative forms and schedules, including the following:
 - a. Application for Payment forms with continuation sheets.
 - b. Submittal schedule.
 - c. Items required to be indicated as separate activities in Contractor's construction schedule.
 - 2. Submit the schedule of values to Architect at earliest possible date but no later than ten (10) days before the date scheduled for submittal of initial Applications for Payment.
- B. Format and Content: Use Project Manual table of contents as a guide to establish line items for the schedule of values. Provide at least one line item for each Specification Section.
 - 1. Identification: Include the following Project identification on the schedule of values:
 - a. Project name and location.
 - b. Name of Architect.
 - c. Architect's project number.
 - d. Contractor's name and address.
 - e. Date of submittal.
 - 2. Arrange schedule of values consistent with format of AIA Document G703.
 - 3. Provide a breakdown of the Contract Sum in enough detail to facilitate continued evaluation of Applications for Payment and progress reports. Coordinate with Project Manual table of contents.
 - a. Include separate line items under principal subcontracts for LEED documentation and other Project closeout requirements.
 - 4. Round amounts to nearest whole dollar; total shall equal the Contract Sum.

5. Provide a separate line item in the schedule of values for each part of the Work where Applications for Payment may include materials or equipment purchased or fabricated and stored, but not yet installed.
6. Provide separate line items in the schedule of values for initial cost of materials, for each subsequent stage of completion, and for total installed value of that part of the Work.
7. Allowances: Provide a separate line item in the schedule of values for each allowance. Show line-item value of unit-cost allowances, as a product of the unit cost, multiplied by measured quantity. Use information indicated in the Contract Documents to determine quantities.
8. Each item in the schedule of values and Applications for Payment shall be complete. Include total cost and proportionate share of general overhead and profit for each item.
 - a. Temporary facilities and other major cost items that are not direct cost of actual work-in-place may be shown either as separate line items in the schedule of values or distributed as general overhead expense, at Contractor's option.
9. Schedule Updating: Update and resubmit the schedule of values before the next Applications for Payment when Change Orders or Construction Change Directives result in a change in the Contract Sum.

1.3 APPLICATIONS FOR PAYMENT

- A. Each Application for Payment shall be consistent with previous applications and payments as certified by Architect and paid for by Owner.
 1. Initial Application for Payment, Application for Payment at time of Substantial Completion, and final Application for Payment involve additional requirements.
- B. Payment Application Times: The date for each progress payment is indicated in the Agreement between Owner and Contractor. The period of construction work covered by each Application for Payment is the period indicated in the Agreement.
- C. Application for Payment Forms: Use AIA Document G702 and AIA Document G703 as form for Applications for Payment.
- D. Application Preparation: Complete every entry on form. Notarize and execute by a person authorized to sign legal documents on behalf of Contractor. Architect will return incomplete applications without action.
 1. Entries shall match data on the schedule of values and Contractor's construction schedule. Use updated schedules if revisions were made.
 2. Include amounts of Change Orders and Construction Change Directives issued before last day of construction period covered by application.
- E. Transmittal: Submit five (5) signed and notarized original copies of each Application for Payment to Architect by a method ensuring receipt within 24 hours. One copy shall include waivers of lien and similar attachments if required.
 1. Transmit each copy with a transmittal form listing attachments and recording appropriate information about application.
- F. Waivers of Mechanic's Lien: With each Application for Payment, submit waivers of mechanic's lien from entities lawfully entitled to file a mechanic's lien arising out of the Contract and related to the Work covered by the payment.

1. Submit partial waivers on each item for amount requested in previous application, after deduction for retainage, on each item.
 2. When an application shows completion of an item, submit conditional final or full waivers.
 3. Owner reserves the right to designate which entities involved in the Work must submit waivers.
 4. Waiver Forms: Submit executed waivers of lien on forms acceptable to Owner.
- G. Initial Application for Payment: Administrative actions and submittals that must precede or coincide with submittal of first Application for Payment include the following:
1. List of subcontractors.
 2. Schedule of values.
 3. Contractor's construction schedule (preliminary if not final).
 4. Schedule of unit prices.
 5. Submittal schedule (preliminary if not final).
 6. List of Contractor's staff assignments.
 7. List of Contractor's principal consultants.
 8. Copies of building permits.
 9. Copies of authorizations and licenses from authorities having jurisdiction for performance of the Work.
 10. Initial progress report.
 11. Report of preconstruction conference.
 12. Certificates of insurance and insurance policies.
- H. Application for Payment at Substantial Completion: After Architect issues the Certificate of Substantial Completion, submit an Application for Payment showing 100 percent completion for portion of the Work claimed as substantially complete.
1. Include documentation supporting claim that the Work is substantially complete and a statement showing an accounting of changes to the Contract Sum.
 2. This application shall reflect Certificates of Partial Substantial Completion issued previously for Owner occupancy of designated portions of the Work.
- I. Final Payment Application: After completing Project closeout requirements, submit final Application for Payment with releases and supporting documentation not previously submitted and accepted, including, but not limited, to the following:
1. Evidence of completion of Project closeout requirements.
 2. Insurance certificates for products and completed operations where required and proof that taxes, fees, and similar obligations were paid.
 3. Updated final statement, accounting for final changes to the Contract Sum.
 4. AIA Document G706-1994, "Contractor's Affidavit of Payment of Debts and Claims."
 5. AIA Document G706A-1994, "Contractor's Affidavit of Release of Liens."
 6. AIA Document G707-1994, "Consent of Surety to Final Payment."
 7. Evidence that claims have been settled.
 8. Final meter readings for utilities, a measured record of stored fuel, and similar data as of date of Substantial Completion or when Owner took possession of and assumed responsibility for corresponding elements of the Work.
 9. Final liquidated damages settlement statement.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 012900

SECTION 013100SCHEDULES, REPORTS AND PAYMENTS

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

Drawings and General Provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to work of this Section.

1.02 DAILY REPORTS

The contractor's field superintendent will prepare a daily report, recording the following information concerning events at the site; and submit duplicate copies to Architect and Owner at regular intervals not exceeding weekly intervals:

- List of Subcontractors at the site.
- Approximate count of personnel at the site
- High/low temperatures, general weather conditions
- Accidents (refer to accident reports)
- Meetings and significant decisions
- Unusual events (refer to special reports)
- Stoppages, delays, shortages, losses
- Meter readings and similar recordings
- Emergency procedures, field orders
- Orders/requests by governing authorities
- Change Orders received, implemented
- Services connected, disconnected
- Equipment or system tests and start-ups
- Partial completions, occupancies
- Materials received (Base, concrete, structural steel, etc.)
- List of visitors
- Tests performed

1.03 PAY REQUESTS (BY CONTRACTOR): SUBJECT TO REVISIONS AT PRE-CONSTRUCTION CONFERENCE

- A. General: Except as otherwise indicated, the progress payment cycle is to be regular. Each application must be consistent with previous applications and payments. Certain applications for payment, such as the initial application, the application at substantial completion, and the final application involve additional requirements.
- B. Payment Application Forms: AIA Form G702 and Contractor-prepared back-up sheets on **AIA Form G703**.
- C. Initial Payment Application: The principal administrative actions and submittals which must precede or coincide with submittal of Contractor's first payment application can be summarized as follows, but not necessarily by way of limitation:
 - 1. Listing of Subcontractors, and principal suppliers and fabricators
 - 2. Contract Price Breakdown (Approval by Architect and Owner)
 - 3. Progress Schedule (preliminary if not final)
 - 4. Initial progress report, including report of pre-construction meeting
- B. Final Payment Application: The administrative actions and submittals which must precede or coincide with submittal of contractor's final payment application can be summarized as follows, but not necessarily by way of limitation:

1. Completion of project closeout requirements
 2. Certificates or approvals required assuring Owner's full access and use of completed work
 3. Warranties (guarantees), maintenance agreements, and similar provisions of Contract Documents
 4. Test/adjust/balance records, maintenance instructions, meter readings, start-up performance reports, and similar change over information germane to Owner's occupancy, use, operation and maintenance of completed work
 5. Submittal of required project construction records to Architect, Subsequent review by Architect and Consultant and, if in order, transmittal to Owner
 6. Change over of door locks and other Contractor's access provisions to Owner's property
 7. Advice to Owner on coordination of shifting insurance coverage's, if any, including proof of extended coverages as required.
 8. Proof, satisfactory to Owner, that fees and similar obligations of Contractor have been paid
 9. Removal of temporary facilities, services, surplus materials, rubbish, and similar elements
 10. Final cleaning of work
 11. Listing of Contractor's incomplete work, recognized as exceptions to Owner's Certificate of Final Acceptance
 12. All items of materials, records, etc. contained in Section 01700, 01710, 01740 and 01750 must be completed. Records, etc. must be submitted in sufficient time for review by Architect, Architect's Consultants, Owner, and any additional reviews deemed necessary by the Owner. Length of time for review will require not less than sixty (60) days. Actual length of time will depend solely on the form and clarity of the materials submitted by the Contractor and
- E. Application Transmittal: Submit three executed copies of each payment application, one copy of which is completed with waivers of lien and similar attachments. Transmit each copy with a transmittal form listing those attachments, and recording appropriate information related to application in a manner acceptable to Owner. Transmit to Architect by means ensuring receipt within 24 hours.
- F. Cash Flow Schedule: With the required Progress Schedule, prepare and submit for approval an Estimated Cash Flow Schedule for the work, detailing the monthly payment requirements anticipated during the course of the work for the entire scheduled construction period for each project at least 10 days prior to first request for payment.

END OF SECTION 01310

SECTION 014100

TESTING LABORATORY SERVICES

PART 1 – GENERAL

1.01 SCOPE

- A. A qualified independent testing laboratory and/or geotechnical engineering service, selected by the Owner, approved by the Architect, and paid by the Owner, will perform the professional testing and laboratory services herein.
- B. The inspecting agency shall make all inspections and perform all tests in accordance with the rules and regulations of the building code, local authorities, Specifications of the ASTM, and these Contract Documents.
- C. Materials and workmanship not meeting the required standards or performance obligations are to be removed and replaced. Replacement and subsequent testing shall be at the expense of the Contractor.
- D. Where the terms “Inspector” and “Laboratory” are used, they mean and refer to an officially designated and accredited inspector of the testing laboratory or geotechnical service engaged by the Owner.
- E. Testing, inspection, and certifications specified in other sections of these Specifications shall be paid by the Contractor, unless otherwise indicated, and shall be by agencies approved by the Architect.
- F. Inspection by laboratory shall not relieve Contractor or Fabricator of his responsibility to furnish materials and workmanship in accordance with the Contract Documents.

1.02 RESPONSIBILITIES OF CONTRACTOR

- A. See respective technical sections for specific requirements.
- B. Deliver to laboratory, without cost to Owner, adequate quantities of representative samples of materials proposed for use which are required to be tested.
- C. Advise laboratory and Architect sufficiently in advance of construction operations allow laboratory to complete any required checks or tests and to assign personnel for field inspection and testing as specified.
- D. Provide adequate facilities for safe storage and proper curing of concrete test samples on project site for the first 24 hours and also for subsequent field curing as required by ASTM Specifications C 31.
- E. Furnish such nominal labor and equipment as required to assist laboratory personnel in obtaining and handling samples at the site and in accessing work for inspection.
- F. Furnish concrete mix designs, in accordance with ACI 301, Section 3.9, made by an independent testing laboratory or qualified concrete supplier. Where mix designs by an independent testing laboratory are required, the laboratory shall be selected and paid by the Contractor.
- G. Obtain required inspections or approvals of the building official. All inspection requests and notifications required by building code are responsibility of Contractor.
- H. Provide current welder certifications for each welder to be employed.

- I. Furnish fabrication/erection inspection and testing of all welds in accordance with AWS D1.1, Chapter 6.
- J. Pre-qualification of all welding procedures to be used in executing the work.
- K. Establishing schedule:
 - 1. By advance discussion with the testing laboratory selected by the Owner, determine the time required for the laboratory to perform its tests and to issue each of its findings.
 - 2. Provide all required time within the construction schedule.
- L. Revising schedule: When changes of construction schedule are necessary during construction, coordinate all such changes with the testing laboratory as required.
- M. Adherence to schedule: When the testing laboratory is ready to test according to the established schedule, but is prevented from testing or taking specimens due to incompleteness of the Work, all extra charges for testing attributable to the delay may be back-charged to the Contractor and shall not be borne by the Owner. Contractor shall be responsible for extra testing fees and any overtime accrued by the testing agency.

1.03 AUTHORITY AND DUTIES OF LABORATORY PERSONNEL

- A. A representative of the testing laboratory, who has reviewed and is familiar with the project and specifications, shall participate in all preconstruction conferences. He shall coordinate material testing and inspection requirements with the Contractor and his subcontractors consistent with the planned construction schedule. The laboratory representative shall attend, throughout the course of the project, such conferences as may be required or requested to address quality control issues.
- B. Laboratory personnel shall inspect and/or test materials, assemblies, specimens, and work performed, including design mixes, methods and techniques and report to the Architect the progress thereof.
- C. If the material furnished and/or work performed fails to meet requirements of Contract Documents, laboratory inspector shall promptly notify both the Contractor and the Architect of such failure.
- D. Laboratory technicians do not act as foremen, or perform other duties for Contractor. Work will be checked as it progresses, but failure to detect any defective work or materials shall not, in any way, prevent later rejection when such defect is discovered.
- E. Laboratory inspector is not authorized to revoke, alter, relax, enlarge, or release any requirement of Contract Documents or to approve or accept any portion of the work, except where such approval is specifically called for in the Specifications.
- F. Comply with all building code requirements for "Special Inspection" whether or not such inspections are specified herein.

1.04 SUBMITTALS

- A. Submit copies of reports of each and every inspection and test as follows: Owner-one, Contractor-two, Architect-one, and Engineer-one.

- B. State in report all details of each inspection and test. Indicate compliance or noncompliance with requirements of the Contract Documents. Also state in report any and all unsatisfactory conditions.
- C. In addition to furnishing a written report, notify the Architect and the Contractor verbally of any uncorrected conditions or failures to comply with the requirements of the Contract Documents.
- D. At completion of each trade or branch of work requiring inspecting and testing, submit a final certificate attesting to satisfactory completion of work and full compliance with requirements of Contract Documents.
- E. Submit copies of test results, sealed by a Registered Engineer, to municipal authorities having jurisdiction, as required.

1.05 REFERENCED STANDARDS

- A. Latest adopted edition of all standards referenced in this Section shall apply, unless noted otherwise. In case of conflict between these Contract Documents and a referenced standard, Contract Documents shall govern. In case of conflict between these Contract Documents and the Building Code, the more stringent shall govern.

END OF SECTION 014100

SECTION 015000TEMPORARY FACILITIES & CONTROLS

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

Drawings and General Provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to work of this Section.

1.02 SUMMARY

Provide the following temporary work as it is required by the documents or by State or Federal laws, ordinances or codes:

- Protection for property and persons
- Field offices
- Storage facilities
- Water, gas, electricity and drainage required for construction operations.
- Telephone for incoming and outgoing communication.
- Scaffolding.
- Hoists.
- Shoring and underpinning.
- Control of water infiltration.
- Project signs.
- Layout of the work.

1.03 TEMPORARY FACILITIES

Provide the following temporary facilities at the project site. Remove temporary facilities when they are no longer needed.

Contractor's Office: The contractor will provide and maintain a field office on the premises. The office will contain a copy of all plans and specifications, a copy of all Shop Drawings, and correspondence concerning the project. Provide a conference space for project meetings. Maintain on site a copier and fax machine for jobsite use.

Storage: Subcontractors shall provide and maintain suitable, substantial, watertight storage facilities in which to store materials which would be damaged by the weather. Storage space shall be of sufficient size to hold all such materials required on the site at one time, and if storage space is an outside building, it shall have floors raised at least 6 inches above the ground, on heavy joists or sleepers. Provide fenced areas for storage of materials and workmen's parking of the sizes and at locations designated on the Drawings. Should the Contractor or subcontractor require additional storage area beyond that indicated on the Drawings, he shall arrange for such storage facilities off-site, at no expense to the Owner. Contractor may use areas within the immediate construction area for storage only with the approval of the Owner's Representative. However, such approval will not be given if such storage encumbers the working space, loads the structure prematurely, or exceeds the design live load for the specified area of the structure.

Fire Extinguishers: The Contractor shall provide prominently located multi-purpose type portable extinguishers, at least one in each wing on each floor and elsewhere as directed by the local fire marshal.

Telephones: The Contractor shall provide his own telephone facilities, to be located in the Field Offices. The Contractor shall pay for cost of installation. Telephones shall remain in service until the final completion of the job.

1.04 PROTECTIONS

- A. Site: Unless specified or directed otherwise, carefully protect existing walks, lawns, other buildings, and other work on site, whether specifically indicated on the Drawings or not.
- B. Trees and Shrubs: Protect trees and shrubs that are to remain in place from foliage, trunk and root damage that may result from construction operations. Also, protect such trees and shrubs that are to remain from the following damage:
1. Compaction of root area by equipment or material storage.
 2. Truck damage by removing equipment, material storage, nailing or bolting.
 3. Strangling by tying ropes or guy wires to trunks or large branches.
 4. Poisoning by pouring solvents, gas, paint, etc., on or around trees and roots.
 5. Cutting on roots by excavating, ditching, etc.
 6. Damage of branches by improper pruning.
 7. Drought from failure to water or by cutting or changing normal drainage pattern past roots.
 8. Change of soil pH factor by disposal of lime base materials such as concrete, plaster, etc.
 9. Do not cut roots 1 ½" in diameter or over. All excavation and earthwork within the drip line of trees will be done by hand.
 10. All pruning will be done by Owner.
- C. Streets and Sidewalks: Protect streets, sidewalks, curbs, etc., as necessary to prevent damage to them. Repair any damage caused by these operations. No patching of sidewalks or curbs will be permitted. The entire section between expansion joints in which the damage occurs shall be replaced.

1.05 TRAFFIC MAINTENANCE

- A. Prior to start of work, Contractor shall examine the routing of construction vehicles, and the safeguards and procedures necessary to carry out the work.
- B. In addition, be responsible for and observe the following conditions:
1. Be responsible for controlling construction traffic within and adjacent to the site.
 2. Provide all entrances, lifts and safeguards required or necessary to the progress of the work, and effectively control such traffic to provide minimum hazard to the work and all persons. Contractor shall maintain adequate separation between construction traffic and school related traffic at all occupied campuses.
 3. Route all construction equipment, trucks, and similar vehicles via existing public streets to and from the site as approved by the governing authorities, and on site as indicated on Drawings.
 4. Construct and maintain temporary walks for pedestrians. Keep streets adjacent to the site open to vehicular and pedestrian traffic.
 5. Maintain constant access for police, fire and ambulance service.
- C. Provide and maintain for proper control of traffic and safety of all concerned;
All necessary barricades, suitable and sufficient lights, reflectors and danger signals.
Warning and closure signs, directional and detour signs.
All traffic control devices to be furnished and installed in compliance with the Texas Manual on Uniform Traffic Control Devices as prepared by the State Department of Highways and Public Transportation.

- D. Provide on a 24 hour basis for all restricted and dangerous conditions existing on or adjacent to the site. Illuminate barricades, danger signals, warning signs and obstructions at night. Keep warning lights burning from sunset until sunrise. Contractor and Subs shall minimize disruptions to surrounding neighborhood areas.

1.06 PARKING

- A. Parking for workmen employed on the work shall be in designated on site areas. If not enough parking onsite exists, the contractor shall make provisions for construction workers to park offsite and be transported to and from the project site.

1.07 SCAFFOLDING AND HOISTS

Unless coordinated and scheduled differently by the contractor, each individual subcontractor shall provide or arrange for hoists, derricks, scaffolding, tools, ladders, equipment, apparatus, etc., necessary or required to properly install work.

1.08 SHORING & UNDERPINNING

Unless coordinated and scheduled differently by the contractor, each individual subcontractor shall provide, maintain and be wholly responsible for temporary shoring and underpinning that is necessary to fully protect new and existing work while carrying out operations which may in any way jeopardize foundation, structure, walls, utilities, etc.

1.09 CONTROL OF WATER

- A. Pumping: The Contractor shall provide suitable pumping equipment and keep excavations, pits, and other areas involved free of water that may leak, seep, or rain in. Provide pumping necessary to avoid delay or to protect work on the premises.
- B. Temporary Coverings: When necessary to avoid delay or to protect existing or new work or equipment, the contractor shall provide suitable watertight coverings over stored material, windows, doors, hatchways, and such other openings admitting rain.

1.10 SIGNS

- A. Construct and erect a project sign, identifying the Project, Contractor, Architect, designers and Opening Date in a manner as detailed on Drawings to be furnished by architect after award of bid(s).
- B. Construction: Size of signs (1) shall be 8' x 16', constructed of 3/4" exterior type plywood on a suitable wood frame and mounted with bottom of sign approximately 3' above grade. All anchors, connections, etc. shall be adequate for the required wind loads of the area. Provide temporary power and lighting for this sign.
- C. Other Signs: No other projects signs shall be erected except delivery route designations and those deemed necessary by Owner's Representative. Location and layout of these signs, if required, will be approved by the Architect and Owner. Plan on providing two (2) 4'x8' painted 3/4" signs for these purposes.

END OF SECTION 015000

SECTION 01600

MATERIAL & EQUIPMENT

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

Drawings and General Provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to work of this Section.

1.02 SUMMARY

Conform to all the requirements of this Section concerning materials and equipment for the work.

1.03 CONTRACTOR'S OPTIONS

- A. Reference Standards: When a material is specified by reference standards only, submit any material, made by any manufacturer, that meets the standards. Such materials must be identified on the List of Proposed Subcontractors and Materials required in Section 017500 SUBMITTALS.
- B. Items Specified by Trade Name: Reference to items by specific trade name is made as a basis of quality and function. Equivalent items may be used in their stead; however, the right of determining such quality shall remain with the Architect. The terms “similar to”, “approved”, “or equal”, or similar phrases shall be interpreted similarly.
- C. Multiple Materials: When several materials or manufacturers are specified, they are equally acceptable and the Contractor has the option of submitting any of these listed.
- D. “Or equal” Materials: When one or more materials are specified, followed by the term “Or approved equal”, submit a specified material or submit a request, as required under Substitutions below for use of a material not specified.

1.04 SUBSTITUTIONS

- A. Section 012500 "Substitution Procedures" for requirements for submitting comparable product submittals for products by listed manufacturers

1.05 MATERIALS AND WORK:

Unless otherwise specified, all materials shall be new and both workmanship and materials shall be of the best quality, and the Contractor shall, if required, furnish satisfactory evidence as to the kind and quality of his materials and workmanship. Any work installed which does not meet the requirements of the Contract Documents shall be removed and replaced by work which is in accordance therewith.

1.06 HANDLING MATERIALS

- A. Handle materials so as to permit inspection required by Specifications, regulations and laws. Care for and protect materials, equipment, etc., for this Work upon delivery at the site so as to prevent damage and defacement to them. When a space in the building is used during construction as a shop, storeroom, etc., repair, patch, and/or clean this area as necessary to remove evidence of such use.

- B. Protection: Conform to manufacturer's recommendations for handling and storage of material and equipment to prevent damage to it before it is installed in the Work. Conform to requirements of applicable laws, ordinances and regulations for protective storage of potentially dangerous materials. Cover and protect materials affected by the weather to keep them free from damage during transportation to and handling and storage at the site.
1. Each Contractor shall protect and be responsible for damage to his work from date of Agreement until final payment is made, and shall make good, without cost to the Owner, any damage or loss that may occur during this period. Each Contractor shall handle all materials, so directed, so that it may be inspected by the Architect. All materials affected by the weather shall be covered and protected to keep them free from damage while being transported to the site; when stored at the site, they shall be placed on raised platforms and protected by waterproof covers. Any material damaged by water or other causes shall be removed from the site.
 2. Each piece of equipment or material delivered to the jobsite must be accompanied by recommended protection measures required by manufacturer of the equipment. Should any material be found damaged or in any way contrary to the Contract, this material, no matter in what stage of completion, shall be replaced with new product or repaired to the Owner's satisfaction.

1.07 MANUFACTURER'S INSTRUCTIONS

- A. When Contract Documents require that installation of work shall comply with manufacturer's printed instructions, obtain and distribute copies of such instructions to all parties involved in the installation. Maintain one set of complete instructions at the job site during installation and until completion.
- B. Handle, install, connect, clean, condition and adjust products in strict accord with such instructions and in conformity with specified requirements. Should job conditions or specified requirements conflict with manufacturer's instructions, consult with the Architect and/or Engineer for further instructions. Do not proceed with work without clear instructions. Do not omit any preparatory step or installation procedure unless specifically modified or exempted by Contract Documents.

1.08 ASBESTOS FREE AND NO LEAD MATERIALS REQUIREMENTS

Manufacturer's materials specified or listed in these specifications indicating approval of specific materials for use in the construction of the Project is contingent upon each manufacturer being able to produce said product for use on the project that is (1) free of asbestos materials subject to all of the requirements of "Federal Rules and Regulations EPA CFR 7863.99", (2) free of lead for materials used in construction of potable water systems.

1.09 MAINTENANCE INSTRUCTIONS AND PARTS LISTS

- A. Provide two copies of maintenance instructions and parts lists, bound in a 3-ring binder(s), for all materials and equipment in the project. Labeled to be applied on at least 50# paper shall separate each item of material or equipment. Location of each item shall be noted on cover sheet for each item of material and/or equipment. Cover sheet shall serve as index for each item and contain lists, etc., of each item contained therein. Provide sufficient 2" or 2 1/2" binders for filing to prevent overcrowding. The following information shall be included in each set. If more than one binder is required for one of the referenced headings, they shall be numbered "1 of, 2 of, etc.".

B. Provide one complete copy in digital format of maintenance instructions and parts lists for all materials and equipment in the project.

C. Binders List:

Project Directory

Guarantees (for all material and equipment)

Architectural and Structural Items

Plumbing Materials & Equipment

Mechanical Materials

Mechanical Equipment (include operating instructions)

Electrical Materials

Electrical Fixtures & Equipment

END OF SECTION 016000

SECTION 017100

CLEANING

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

Drawings and General Provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to work of this Section.

1.02 SUMMARY

- A. Keep premises and public properties free from accumulations of waste, debris, and rubbish, caused by operations.
- B. At completion of work, remove waste materials, rubbish, tools, equipment, machinery and surplus materials and clean all exposed surfaces including crawl spaces; leave project clean and ready for occupancy.
- C. Maintain project in accord with State and Local safety, health and insurance standards.

1.03 RELATED WORK IN OTHER SECTIONS

Temporary Protection
Finish Materials: Various other Sections

1.04 GENERAL REQUIREMENTS

Cleaning materials: Use cleaning materials recommended by manufacturer of surface to be cleaned.

1.05 HAZARDS CONTROL

- A. Store volatile waste in covered metal containers, and remove from premises daily.
- B. Prevent accumulation of waste, which creates hazardous conditions. Provide adequate ventilation during use of volatile or noxious substances.

1.06 DISPOSAL

- A. Salvageable materials, including but not limited to, fill, riprap, road materials, etc. identified to be retained by Owner will be delivered to location designated. Remove other waste materials, debris and rubbish from site and legally dispose of in dumpster provided.
- B. Do not burn or bury rubbish and waste materials on project site.
- C. Do not dispose of volatile waste such as mineral spirits, oil, or paint thinner in storm or sanitary drains.
- D. Do not dispose of waste into streams or waterways.
- E. Do not dispose of excess concrete on the project site.

1.07 DUST ABATEMENT

- A. Control objectionable dust caused by operation of vehicles and equipment. Apply water or use other methods, subject to approval of Owner's Representative, to control amount of dust generated.
 - 1. The use of water as dust control method shall be placed a minimum of twice a day or as requested by the Owner.

1.08 SITE CLEANING/APPEARANCE

- A. All walks, drives and streets outside the construction fence shall be kept clean of dirt, mud, debris, building materials, etc. at all times.
- B. The Contractor will immediately clean any mud tracked out of the construction area by vehicles or equipment.
- C. The Contractor will keep the entire construction area clean and at least weekly, conduct a general clean up operation.
- D. The Contractor will keep the grass/weeds cut at all times within limits of construction. Minimum time interval during growing season is two weeks.
- E. Periodically inspect, tighten and realign construction/tree protection fencing.

1.09 CONTAINERS AND HANDLING

Provide on site containers for collection of waste materials, debris and rubbish.
Handle materials in a controlled manner with as few handlings as possible; do not drop or throw materials from heights.

1.10 FINISH WORK

Vacuum clean interior areas when ready to receive finish painting, and continue vacuum cleaning on an as-needed basis until building is ready for beneficial occupancy or final acceptance.

1.11 REPAIRS

Repair, patch and touch up marred surfaces to specified finish to match adjacent surfaces.

END OF SECTION 017100

SECTION 017400WARRANTIES/GUARANTEES

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

Drawings and General Provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to work of this Section.

1.02 SUMMARY

- A. In addition to the requirements of the General Conditions and Supplementary General Conditions of the Contract for Construction, the Contractor and each Subcontractor shall submit to the Owner a written guarantee, prior to release of final payment on a form approved by the Architect, for the work, materials, and equipment for a one (1) year period as specified hereinafter.
- B. All guarantees, including extended guarantees specified hereinafter, shall be addressed to the Owner by name, and submitted to the architect, with other “Records for Owner”, all in binders, properly labeled.
- C. Warranties/guarantees shall include parts, labor, and all other costs required to repair and/or replace items that may malfunction during the Warranty/Guarantee period.
- D. All guarantees shall be for period specified, commencing on date of acceptance of the entire project by the Owner.
- E. Additional guarantee requirements are included, but not limited to, the following: (Contractor(s) shall review the documents and provide all extended Guarantees listed.)

Termite Control	10 years
Membrane Waterproofing	5 years
Joint Sealers	2 years
Wood Doors (Interior)	Life of Installation
Mirror Glazing	5 years
Windows	2 years
Metal Siding Finish	20 years
Sheet Metal & Flashing	2 years
Door Closures	5 years
Carpet	5 years
Air Conditioning & Refrigeration Systems	1 year
HVAC Controls	1 year
Electrical Equipment	1 year

Until receipt of these guarantees, final inspection will not be conducted nor final payment released.

END OF SECTION 017400

SECTION 017500

SUBMITTALS

1. RELATED DOCUMENTS

Drawings and general provisions of contract, including General and Supplementary Conditions and other Division 1 Specification sections, apply to work of this section.

2. DESCRIPTION OF REQUIREMENTS

A. The types of submittal requirements specified in this section include shop drawings, product data, samples and miscellaneous work-related submittals. Individual submittal requirements are specified in applicable sections for each unit of work.

B. Definitions: Work-related submittals of this section are categorized for convenience as follows:

- 1) Shop Drawings include specially prepared technical data for this project including drawings, diagrams, performance curves, data sheets, schedules, templates, patterns, reports, calculations, instructions, measurements, and similar information not in standard printed form for general application to a range of similar projects.
- 2) Product Data includes standard printed information on materials, products, and systems not specifically prepared for this project other than the designation of selections from among available choices printed therein.
- 3) Samples include both fabricated and unfabricated physical examples of materials, products and units of work both as complete units and as smaller portions of units of work either for limited visual inspection or (where indicated) for more detailed testing and analysis.
 - a. Mock-ups are a special form of samples, which are too large or otherwise inconvenient for handling in specified manner for transmittal of sample submittals.
- 4) Miscellaneous submittals related directly to the work (non-administrative) include warranties, maintenance agreements, workmanship bonds, project photographs, survey data and reports, physical work records, quality testing and certifying reports, copies of industry standards, record drawings, field measurement data, operating and maintenance materials, overrun stock, and similar information, devices and materials applicable to the work and not processed as shop drawings, product data or samples.

3. GENERAL SUBMITTAL REQUIREMENTS

A. Scheduling: Where appropriate in administrative submittals (listing of products, manufacturers, suppliers and subcontractors, and in job progress schedule), show principal work-related submittals and time requirements for coordination of submittal activity with related work in each instance.

- 1) Listing: Prepare a separate listing, organized by related specification section number sequence, showing principal work-related submittals and their initial submittal dates as required for coordination of the work. Submit listing within 30 days of date of commencement of the work.

B. Coordination and Sequencing: Coordinate preparation and processing of submittals with performance of the work so that work will not be delayed by submittals. Coordinate and sequence different categories of submittals for same work and for interfacing units of work so that one will not be delayed for coordination of A/E's review with another.

- C. Preparation of Submittals: Provide permanent marking on each submittal to identify project, date, contractor, subcontractor, and consecutively number all submittals using the specification section of the particular item as a prefix, i.e., 08100-1, 08100-2, 10160-3, 10160-4, etc. Note: Also consecutively number each submittal forwarded to the architect. On the top right hand corner of each submittal copy consecutively number each submittal with a ½" high circled number. Do not reuse numbers and do not add prefixes to previously used numbers. Show contractor's executed review and approval marking (contractor's stamp must specifically note contractor's approval of submittal); see sample of contractor's stamp required and provide a 3" x 3" blank area on submittal for Architect/ Engineer's marking. Package each submittal appropriately for transmittal and handling. Submittals which are received from sources other than through contractor's office will be returned by A/E without review.
- D. Transmittal Form: Prepare a draft of special transmittal form for project and submit to architect for acceptance. Provide places to indicate project, date, "to", "from" names of subcontractors, suppliers, manufacturers, required references, category and type of submittal, purpose, description, distribution record (for both transmittal and submittals), and signature of transmitter.
- 1) Provide contractor's certification on form, ready for execution, stating that information submitted complies with requirements of contract documents.
- E. By approving and submitting shop drawings, product data, samples and similar submittals, the contractor represents that the contractor has determined and verified materials, field measurements and field construction criteria related thereto, or will do so, and has checked and coordinated the information contained within such submittals with the requirements of the work and of the contract documents.
- F. Unless noted otherwise, provide six copies of each submittal.
- G. The contractor is to maintain a complete copy of all submittals and project data for the owner. Turn this copy over to the owner along with other final closeout documents. Organize these submittals by division of work and present them to the owner in labeled file boxes.

4. SPECIFIC CATEGORY SUBMITTAL REQUIREMENTS

- A. Shop Drawings: Provide newly-prepared information on reproducible sheets with graphic information at accurate scale (except as otherwise indicated), with name of preparer indicated (firm name). Show dimensions and note which are based on field measurement. Identify materials and products in the work shown. Indicate compliance with standards and special coordination requirements.
- 1) Submittal: One correctable translucent reproducible print and one blue/line or black/line print. Reproducible will be returned.
- B. Product Data: Collect required data into one submittal for each unit of work or system and mark each copy to show which choices and options are applicable to project. Include manufacturer's standard printed recommendations for application and use, compliance with standards, application of labels and seals, notation of field measurements which have been checked, and special coordination requirements. Maintain one set of product data (for each submittal) at project site, available for reference by A/E and others.
- 1) Submittals: Do not submit product data or allow its use on the project until compliance with requirements of contract documents has been confirmed by contractor. Submittal is for information and record unless otherwise indicated. Submit 3 copies, plus number of copies needed for contractor, owner's records, and distribution to others.
- 2) Installer's Copy: Do not proceed with installation of materials, products, or systems until final copy of applicable product data is in possession of installer.

- C. Samples: Provide units identical with final condition of proposed materials or products for the work. Include "range" samples (not less than 3 units) where unavoidable variations must be expected and describe or identify variations between units of each set. Provide full set of optional samples where A/E's selection is required. Prepare samples to match A/E's sample where so indicated. Include information with each sample to show generic description, source or product name and manufacturer, limitations, and compliance with standards. Samples are submitted for review and confirmation of color, pattern, texture and "kind" by A/E. Architect/Engineer will not "test" samples for compliance with other requirements which are, therefore, the exclusive responsibility of the contractor.
- D. Quality Control Set: Maintain returned final set of samples at project site in suitable condition and available for quality control comparisons by Architect/ Engineer and by others.
- 1) Reusable Samples: Returned samples, which are intended or permitted to be incorporated in the work, are so indicated in the individual work sections and must be in undamaged condition at time of use.
- E. Mock-Ups: Mock-ups and similar samples specified in individual work sections are recognized as a special type of sample. Comply with requirements for "samples" to greatest extent possible and process transmittal forms to provide a record of activity.
- F. Inspection and Test Reports: Classify each as either "shop drawing" or "product data", depending upon whether report is uniquely prepared for project or a standard publication of workmanship control testing at point of production; process accordingly.
- G. Warranties: Refer to "products" section for specific general requirements on warranties, product/workmanship bonds, and maintenance agreements. In addition to copies desired for contractor's use, furnish two (2) executed copies, except furnish two (2) additional (confirmed) copies where required for maintenance manuals.
- H. Standards: Where copy submittal is indicated and except where specified integrally with "product data" submittal, submit a single copy for Architect/ Engineer's use. Where workmanship at project site and elsewhere is governed by standard, furnish additional copies to fabricators, installers, and others involved in performance of the work.
- I. Close Out Submittals: Refer to individual work sections and to "close out" sections for specific requirements on submittal of close out information, materials, tools, and similar items.
- 1) Record Document Copies: Furnish one set.
- 2) Maintenance/Operating Manuals: Furnish two (2) bound copies and one (1) digital format copy.
- 3) Materials and Tools: Refer to individual work sections for required quantities of spare parts, extra, and overrun stock, maintenance tools and devices, keys, and similar physical units to be submitted.
- J. General Distribution: Provide additional distribution of submittals (not included in foregoing copy submittal requirements) to subcontractors, suppliers, fabricators, installers, governing authorities, and others as necessary for proper performance of the work. Include such additional copies in transmittal to A/E where required to receive "Action" marking before final distribution. Record distributions on transmittal forms.

5. ARCHITECT/ENGINEERS' REVIEW

- A. Architect/Engineer will review submittal and mark with comments as noted in 5.B., C., or D. When possible, architect will return submittal within two (2) weeks of receipt of submittal and within three (3) weeks for submittals requiring engineer or other consultant review. Where submittal must be held for coordination, architect/engineer will process submittal as soon as possible after all coordination information and material is provided by contractor. NOTE: CONTRACTOR SHALL HOLD ALL COLOR SELECTION SUBMITTALS UNTIL CONTRACTOR CAN SUBMIT ALL COLOR SUBMITTALS AS A PACKAGE FOR ARCHITECT TO PROCESS. A COLOR BOARD PRESENTATION WILL THEN BE PREPARED BY ARCHITECT FOR OWNER'S REVIEW AND APPROVAL; ALLOW FIVE (5) WEEKS FOR THIS PROCESS.
- B. Marking "Reviewed. No Exceptions Noted": Work may proceed provided it complies with contract documents.
- "Reviewed. Exceptions Noted": Work may proceed provided it complies with notations and corrections on submittal and with contract documents.
- C. Marking "Rejected. Returned for Resubmittal": Do not proceed with work. Revise submittal in accordance with contract documents and resubmit without delay to obtain a different marking. Do not allow these submittals to be used in connection with performance of the work.
- D. NOTE: The contractor shall not be relieved of responsibility for deviations from requirements of the contract documents by the architect's approval of shop drawings, product data, samples, or similar submittals unless the contractor has specifically informed the architect, in writing and on the submittal, of such deviation at the time of submittal and the architect has given written approval to the specific deviation. The contractor shall not be relieved of responsibility for errors or omissions in shop drawings, product data, samples, or similar submittals by the architect's approval thereof.

END OF SECTION 017500

SECTION 017600PROJECT CLOSEOUT

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

Drawings and General Provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to work of this Section.

1.02 SUMMARY

Comply with all requirements of the Contract; send notice, furnish warranties, certificates, affidavits and other requirements as specified to complete the Contract.

1.03 RELATED WORK IN OTHER SECTIONS

Record Drawings

Special guarantees: Various other Sections

Final inspection and final payment: General Provisions

Operating and Maintenance Manuals

Keys

1.04 PRE-FINAL INSPECTION

- A. Before requesting pre-final inspection, Contractor shall make a thorough survey of work of all trades and ascertain that all final adjustments have been made and the Work has been completed, and ready for turnover to Owner.
- B. Necessary verbal instructions and demonstrations shall be given to maintenance forces for component parts of the building.
- C. Furnish an updated list of Subcontractors and material suppliers along with names of key personnel, addresses and telephone numbers.
- B. Provide and deliver to designated recipient all items listed hereinafter in the Site Work, General Architect, HVAC, Plumbing and Electrical checklists. Checklists are not intended to be all inclusive. Contractor shall review all Sections to the Specifications, and provide all similar items to the Architect for distribution. Items not contained in these lists shall be brought to the Architect's attention by the Contractor to obtain Architect's direction for delivery.

SITework CHECKLIST**Items (If Applicable)****Deliver To****Receipt To**

- | | | |
|---|------------------------|--|
| 1. Certificate of Non-obligation | Architect | |
| 2. Letter of Guarantee | Architect | |
| 3. Site Work Quantity Verification
By Engineer | Architect
Architect | |
| 4. Plumbing Inspection Green Tag | Architect | |
| 5. As-Built Drawings | Architect | |
| 6. See Brochure (binder) requirements | Architect | |

GENERAL ARCHITECT CHECKLIST

<u>Items (If Applicable)</u>	<u>Deliver To</u>	<u>Receipt To</u>
1.Roof Guarantee	Architect	
2.Certificate of Non-obligation	Architect	
3.Letter Of Guarantee	Architect	
4.Certificate. Of Occupancy	Architect	
5.Master & Grand Master Keys	Owner	
6.Building Keys	Owner	
(Lock combinations if applicable)		
7.As-Built Drawings	Architect	
8.Spare Acoustic Tiles	Owner	Architect
9.Spare Ceramic Tiles	Owner	Architect
10. Spare Vinyl Composition Tiles	Owner	Architect
11.Spare Carpet	Owner	Architect
12.Spare Paint	Owner	Architect
13.Brochures listing brand name and model no. of equipment and hardware, brand type and color of paint, prefinished items, and flooring	Architect	
14.Parts List	Architect	
15.Affidavit of Non-Use of Asbestos	Architect	
16.Manufacturer’s Guarantees	Architect	
17.Maintenance Instructions & Parts List	Architect	
18.See Brochure (binder) Requirements, Section 01600	Architect	
19.Non-Use of Toxic Materials Affidavit	Architect	
20.No Lead Affidavit	Architect	

HVAC CHECKLIST

<u>Items (If Applicable)</u>	<u>Deliver To</u>	<u>Receipt To</u>
1.Certificate of Non-Obligation	Owner-Architect	
2.Letter of Guarantee	Owner-Architect	
3.HVAC Inspection Green Tag	Architect	
4.Equipment Brochures	Architect	
5.Certificates and Reports, including Psychrometric Charts	Architect	
6.As-build Drawings	Architect	
7.Glass Mounted Control Diagrams and Instructions		
8.Changes to Permanent Filters	Building/Owner	Architect
9.Spare Filters	Owner	Architect
10.Maintenance & Operating Manuals	Architect	
11.Special Tools	Owner	Architect
12.Test and Balance Reports	Architect	
13.Parts List	Architect	
14.Spare Parts	Owner	Architect
15.Manufacturer’s Guarantees	Architect	
16.See Brochure (binder) Requirements, Section 01600	Architect	

PLUMBING CHECKLIST

<u>Items (If Applicable)</u>	<u>Deliver To</u>	<u>Receipt To</u>
1. Certificate Of Non-Obligation	Architect	
2. Letter of Guarantee	Architect	
3. Plumbing Inspection Green Tag	Architect	
4. Fixture Brochures	Architect	
5. As-built Drawings	Architect	
6. Sprinkler System Parts (if applicable)	Owner	Architect
7. Sprinkler System As-Built Drawings (if applicable)	Owner	Architect
8. Keys for Hose Bibbs and Faucets	Owner	Architect
9. Manufacturer's Guarantee	Architect	
10. See Brochure (binder) Requirements, Section 01600		

ELECTRIC CHECKLIST

<u>Items (If Applicable)</u>	<u>Deliver To</u>	<u>Receipt To</u>
1. Certificate of Non-Obligation	Architect	
2. Letter of Guarantee	Architect	
3. Electric Inspection Green Tag	Architect	
4. Fixture Brochures	Architect	
5. As-Built Drawings	Architect	
6. Test Reports	Architect	
7. Electric Cabinet Keys	Owner	Architect
8. Key Switch "Keys"	Owner	Architect
9. Tamperproof Fixture tools	Owner	Architect
10. Manufacturer's Guarantees	Architect	
11. See Brochure (binder) Requirements, Section 01600	Architect	

Upon receipt of notice of completion of Work and submittal of all required items from the Contractor, the Architect and the Architect and Owner's Representatives will make a pre-final inspection to determine the status of completion, and add any noted discrepancies and/or omissions to the Contractor's list of items requiring completion or correction for the use of the Contractor. If the Architect or Owner's Representative should not concur in the Contractor's claim of completion, the Contractor will be notified, and shall send a second notice at an appropriate time of completion including a list of corrections made.

1.05 PRE-FINAL INSPECTION

Those in attendance will include the Architect, representatives of the Contractor and the Owner's representative.

1.06 FINAL INSPECTION

Those in attendance at the final inspection will include the Architect, representatives of the Contractor, and the Owner. Failure to satisfactorily complete items will necessitate further reinspections by the Architect and/or other persons above. Cost for further reinspections shall be borne by the Contractor.

1.07 MAINTENANCE MATERIALS

Deliver packaged and labeled maintenance materials as required by the various Specification Sections to a location designated by the Owner.

1.08 BALANCING AND TESTING OF HVAC SYSTEMS

The results shall be certified prior to Final Inspection.

1.09 GUARANTEE INSPECTION

Not less than 30 days before expiration of the one year guarantee period, an inspection of the project will be conducted by the Owner's Representative, Architect and the Contractor, to see if any work is required to make good on guarantees.

Execute promptly such corrective measures as required to eliminate deficiencies under the guarantees. Deficiencies as noted by inspection will automatically lengthen the warrantee or guarantee period until the deficiency is cured.

END OF SECTION 017600

SECTION 021100

SITE CLEARING

PART 1 - GENERAL

1.1. SECTION INCLUDES

- A. Cutting, removing from the ground, and properly disposing of trees, stumps, hedge, brush, roots, logs, weeds, rubbish, sod refuse dumps, sawdust piles, lumbering slash, and other materials within the limits of the right of way or other designated areas that interfere with the work or are considered objectionable.
- B. Selective clearing, preserving existing vegetation, scalping, and the preservation of objects designated to remain Removal of trees, shrubs, and other plant life.
- C. Topsoil excavation.

1.2. RELATED SECTIONS

- A. Document: Geotechnical Report
- B. Section 022110 - Rough Grading

1.3. DEFINITIONS

- A. Clearing. The cutting and removal of all trees, brush, and other objectionable growth, and the removal and disposal of logs, rubbish piles, refuse dumps, sawdust piles, lumbering slash, and other objectionable matter from the surface of the ground in the areas shown on the plans or designated by the Engineer.
- B. Grubbing. The grubbing and removal of all stumps, roots, and other objectionable matter, lying wholly or in part below the surface of the ground.
- C. Selective Clearing. The trimming of selected trees and shrubs, the removal from the ground and disposal of logs, root pods, brush, refuse dumps, and other undesirable debris, and the cutting, removal, and disposal of all undergrowth, stumps, and standing trees, except those trees and shrubs designated to be preserved. The selective clearing areas are shown on the plans, and include all plant materials within the limits of grading activities. Note that the existing trees within the lower level of the project site, within the concrete mow curb are to be protected, and not removed, the grades beneath the trees are to remain as existing as shown on the grading plan.
- D. Preserved Vegetation. Areas of the right-of-way containing trees and brush and designated on the plans as Preserved Vegetation areas shall not be disturbed except as described below.
- E. Scalping. Areas not classified as clearing and grubbing and that are within construction limits shall be scalped, if appropriate. Scalping shall include the removal and disposal of material such as saplings less than 4" in diameter measured 12" above the ground, logs, brush, roots, grass, residue of agricultural crops, refuse dumps, and decayed matter.

1.3. REGULATORY REQUIREMENTS

- A. No storage of petroleum, other chemicals, waste materials, trash, ect., shall be allowed within 100 feet of a wetland.
- B. Coordinate clearing Work with utility companies.

PART 2 - EXECUTION

2.1. PREPARATION

- A. The grading limits on the plans designate the clearing limits.
- B. Trees defined at risk and shown to remain in the drawings, and trees, shall be delineated prior to construction activities by a method acceptable to the owner's representative.

2.2. PROTECTION

- A. Protect trees, plant growth, and features designated to remain, as final landscaping.
- B. Protect bench marks from damage or displacement. Any bench marks damaged by contractor's operations shall be replaced by a Registered Land Surveyor in state of Texas.

2.3. CLEARING AND REMOVAL

- A. Clear areas established within the construction limits and execution of work. The contractor shall exercise caution to not damage at risk trees or trees designated to remain.
- B. Trees, brush, stumps, and other deliterios matter, within the construction limits, and necessary for removal during construction shall be wasted off site.
- C. Should field conditions exist which would warrant damage of a tree at risk, or a tree designated to remain, the contractor shall cease activity in that area and immediately contact the owner's representative for permission to proceed.
- D. Holes remaining after removal of trees, stumps, etc., shall be backfilled with material approved by the Engineer and compacted as directed except in areas to be excavated.
- E. The Contractor shall complete the operation by blading, bulldozing, or other approved methods, so that the project shall be free of holes, ditches, or other abrupt changes in elevations that resulted from the clearing and grubbing operations.

END OF SECTION 021100

SECTION 021150

TREE PROTECTION

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Tree and brush preservation during demolition and construction.

1.2 RELATED SECTIONS

- A. Section 021100 Site Clearing

1.3 DEFINITIONS

- A. Preservation Zone: Area of the project site to remain in existing, natural condition throughout the construction process and project development while preserving existing vegetation and natural features.

PART 2 - EXECUTION

1.2 IDENTIFICATION

- A. Verify delineation of preservation zone with owner prior to clearing of site.

1.3 PRESERVATION ZONE

- A. General Preservation Zone - The preservation zone will be delineated by range survey flagging strung at a height of four feet along the Limits of Construction as defined on the plans. Flagging shall be secured by wrapping around tree trunks at the edge of the preservation zone at intervals of ten feet. Flagging will remain in place until all construction equipment is removed from the site.
- B. Specimen Trees - The preservation zone for specimen trees will be delineated by tree preservation fencing.
- C. All equipment, vehicles, and materials are to be located outside of the preservation zone at all times. Parking or driving of equipment, machinery or vehicles of any type is prohibited within the preservation zone.
- D. No grading, trenching, storage of construction materials, stockpiling of excavation of fill soil, gravel, etc. or release of equipment washout water will occur within the preservation zone.

1.4 TREE REMOVAL

- A. Remove trees within the construction limits in a manner that will not cause damage to protected trees within the preservation zone.
 - 1) Do not allow trees to be removed to fall into protected trees canopies, or onto tree trunks during removal operations.
 - 2) Do not allow trees to be removed to penetrate edge of preservation zone during removal operations.

1.5 TREE PRUNING

- A. All tree pruning operations during the construction process will be performed under the direction of an arborist approved by the project landscape architect. Arborists will have a minimum of three years of tree pruning and preservation experience.
- B. Report any damage to trees due to demolition or construction that are located within the preservation zone to the consulting arborists within 6 hours of occurrence.

1.7 PENALTIES

- A. Trees within the preservation area that are damaged to the extent that replacement is required must be replaced with a single tree or multiple trees that equal the caliper inch of the damaged tree at the cost of the contractor.
 - 1) Magnitude of damage and tree replacement species must be approved by the project landscape architect.

END OF SECTION 021150

SECTION 022110

TERMITE CONTROL

1. SCOPE

Furnish all labor, materials, equipment, etc., required to properly treat soil under entire building area of all new construction and for a distance of three feet (3') outside exterior building line.

2. GENERAL

- A. Chemical shall be registered with Pesticide Regulation Section Plant Pest Control Branch, Agricultural Research Service U.S.D.A. under the Federal Insecticide, Fungicide and Rodenticide Act and approved by U.S. Forest Service U.S.D.A.
- B. Chemicals and concentration shall be acceptable to the Environmental Protection Agency.
- C. Guarantee: Provide five-year written guarantee. Guarantee to be renewable at Owner's option by payment of an annual service fee.

3. DETAIL REQUIREMENTS

Materials for soil treatment shall be Dursban TC. Provide integral dye to facilitate application verification.

4. APPLICATION

Apply in accordance with manufacturer's written instructions on container. Follow all local, state, and federal guidelines. Treatment shall not be made when soil or fill is wet. Treatment on exterior shall be done during initial construction and after all exterior site work is completed.

5. CLEAN UP

Upon completion, remove all rubbish caused by work of this section and leave premises clean.

REQUIREMENTS ON TERMITE TREATMENTS

ALL TERMITE TREATMENTS OR PRETREATS BEING PROVIDED FOR THIS PROJECT MUST BE IN COMPLIANCE WITH ALL STATE, FEDERAL AND LOCAL LAWS. ALL TREATMENTS MUST HAVE A NOTICE POSTED 48 HRS. PRIOR TO THE TREATMENT. ALL NOTICES NEED TO BE POSTED IN THE AREAS TO BE TREATED, ALL APPLICATIONS MUST BE SCHEDULED AT TIMES THAT WOULD ALLOW A 12 HR. RE-ENTRY AFTER THE TREATMENT. A COPY OF THE LABEL OF MATERIALS THAT IS BEING USED, ALONG WITH A COPY OF THE SERVICE REPORT SHOWING THE AMOUNT OF MATERIAL AND THE PERCENTAGE RATE USED, AND THE NECESSARY REPORTS MUST BE FILED WITH WEBB COUNTY LATER THAN 24 HRS. AFTER THE APPLICATION. ALL APPLICATIONS MUST BE CONSISTENT WITH ITS LABELING, AND ALL APPLICATION RATES MUST BE APPLIED IN ACCORDANCE WITH THE LABEL.

PESTICIDE SERVICE REPORT FORM*
For Use of Yellow or Red List Products

CHEMICAL

Common name: _____ Trade name: _____

Formulation: _____

Signal work (check one): ____ CAUTION (Yellow list) ____ WARNING (Red List) ____ DANGER (Red list)

Rate/Concentration to be used: _____

Estimated amount concentrate to be used: _____

SITE TREATED

School/facility name: _____

Description of treatment size: _____

Plants to be treated (if applicable): _____

Size of treatment area (outdoor applications) _____

The following notice, or one containing the same information, must be posted in an area or common access that school staff in the area to be treated "are likely to check on a regular basis at least 48 hours before each planned treatment" [Section 4G (e) of Article 135B-6 of the Texas Revised Civil Statutes}. Such signs must be at least 8 and 1/2 inches by 11 inches in size [Section 595.6 of Title 22, Texas Administrative Code}.

NOTICE OF PEST CONTROL TREATMENT

Application site or area: _____
Date(s) of planned treatment: _____
Time and date when area is safe to reenter: _____

For more information call or contact

(Contractor)

A Consumer Information Sheet may be obtained from the management.

Pest control applicators are licensed by the Texas Structural Pest Control Board. To report a case of suspected misuse of pesticides, or for more information about the laws pertaining to pesticides, contact the Structural Pest Control Board at 9101 FM 1325, Suite 201, Austin, Texas 78758, (512) 835-4066.

For general information about the health effects of pesticides call the National Pesticide Telecommunications Network at 1-800-858-7378.

END OF SECTION 02211

SECTION 022210

ROUGH GRADING

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Provide complete earthwork including removing and storing topsoil, general excavation, excavation for the structure and footing excavation; rough grading; fill and backfill; and finish grading.
- B. Verify existence and location of all existing underground utilities.

1.2 RELATED WORK SPECIFIED ELSEWHERE

- A. Section 021100 - Site Clearing.
- B. Section 021150 - Tree Protection.
- C. Section 029230 - Landscape Grading.

1.3 SAMPLES

Submit samples of materials as required below. Samples of earth materials shall be delivered to job site in sufficient quantity necessary for Owner and laboratory to adequately evaluate the soil.

1.4 REFERENCES

- A. ANSI/ASTM C136 - Sieve Analysis of Fine and Coarse Aggregates.
- B. ANSI/ASTM D698 - Moisture-Density Relations of Soils and Soil-Aggregate Mixture Using 5.5 lb Rammer and 12 inch Drop.
- C. ANSI/ASTM D1556 - Density of Soil in Place by the Sand-Cone Method.
- D. ANSI/ASTM D2922 and D3017 - Density of Soil in Place by the Nuclear Methods.

1.5 BASIS FOR BIDS

Materials at site are expected to be in accordance with materials indicated on logs and test holes included. Bids shall be based on recommendations made in the soils investigation report. Special fill or backfill materials shall be as specified in the soils investigation recommendations or indicated on Drawings. No allowance or extra payments will be made by reason of variation in types of soil encountered or variations in their moisture contents. Additional fill material required shall be furnished and included as a part of the work. Removal of excess or objectionable materials shall be included as a part of the work.

1.6 PROTECTION

- A. Protect trees, shrubs, lawns and other features remaining as a portion of final landscaping.
- B. Protect benchmarks, sidewalks, paving, and curbs from equipment and vehicular traffic.
- C. Protect above and below grade utilities which are to remain. Notify utility companies to verify locations of buried lines near the excavation areas.

- D. Protect excavations by shoring, bracing, sheet piling, underpinning, or other methods required to prevent cave-in or loose soil from falling into excavation.
- E. Underpin adjacent structures which may be damaged by excavation work, including service utilities and pipe chases.
- F. Notify Owner of unexpected subsurface conditions and discontinue affected work in area until notified to resume work.
- G. Protect bottom of excavations and soil adjacent to and beneath foundations from frost.
- H. Grade excavation top perimeter to prevent surface water run-off into excavation.
- I. Provide for removal of water trapped in excavations by either mechanical means or “sloped to drain” grading.

1.7 COORDINATION

- A. Coordinate excavation work with other trades for proper scheduling of work. Accurately record location of utilities to remain prior to beginning work, including horizontal dimensions, inverts and slope gradients.

1.8 TESTING

- A. Will be performed in accordance with the provisions of Section 014100.

PART 2 - PRODUCTS

2.1 STOCKPILING

- A. Material cut from site which is suitable for backfilling may be stored on site, only as directed by the contractor. Fill material required to be hauled in must be delivered as required and directed by the contractor. Location of any stockpiles shall be subject to approval of Owner.

2.2 SURPLUS MATERIALS

- A. Excavated materials not to be used in fills and backfills on this project shall be removed from the site by the city of Laredo. Materials containing rubbish, debris, or other unacceptable materials stock piled on site by the contractor shall be removed from the site by the contractor.

2.3 MATERIALS

- A. General Site Fill: Suitable sandy silt and silty sand homogenous soils, free from organic matter, vegetation, debris, deleterious matter or rocks larger than 3" in diameter, as specified in the soils investigation report, or as otherwise noted.
- B. Select Fill: Suitable homogenous soils, free of organic matter and rock larger than three (3) inches in diameter with a Plasticity Index (P.I.) of between four (4) and fifteen (15), and a maximum liquid limit of 35.
- C. Top Soil: Clean natural topsoil free of vegetation, debris and other deleterious matter. Upper 6" of topsoil stripped may be used.

- D. Backfill Against Walls and Retaining Walls: Granular, free draining, non-cohesive soil with a classification of SM or better. Submit samples and lab analysis for approval.
- E. Granular Fill Under Slabs on Grade and Exterior Concrete Paving: Pit run cushion sand, free of organic matter, clays or other binder materials. Submit samples for approval.
- F. Surplus Material: Remove from site.
- G. Rock: Igneous, metamorphic and sedimentary rock that cannot be excavated without the use of rippers, a jackhammer or hoeram, and all boulders or other detached stones having a volume of .5 cubic yards or more.

PART 3 - EXECUTION

3.1 ROUGH GRADING

- A. Maintain and protect existing utilities which pass through work area. Upon discovery of unknown utility or concealed conditions, discontinue affected work and notify Owner.
- B. The entire building pad areas shall be excavated to a uniform elevation as shown on plans, and replaced with general site fill as defined by Architect's Structural drawings. Overcut planting and lawn areas to allow a layer of topsoil not less than 6" thick. Excavations shall be maintained to drain and shall be kept free of excess water. Ponding of water on site will not be permitted. Remove objectionable and excess materials from site when excavated. Exercise extreme care in grading around existing trees. Do not disturb existing grades around existing trees except as otherwise noted.
- C. Sub-grades for all lawn areas, and planting bed areas shall be placed at a maximum 95% compaction.

3.2 STRUCTURAL EXCAVATION

- A. Locate and mark all existing underground utilities and services before beginning structural excavation.
- B. Provide excavation for structures, pile caps and grade beams, as required for construction, bracing and removal of forms. Machine slope banks to angle of repose or less until shored. Excavation shall not interfere with normal 45 degree angle bearing splay of any foundation. Bottom of excavation shall be reasonable level. Maintain excavation in as near their natural moisture conditions as possible. Fill over-excavated areas under structure bearing surfaces in accordance with Engineer's direction. Over excavation beneath building and paving as required (see soils report) to remove surface soils which contain root and vegetable matter and to insure that exterior footings bear as shown on drawings. Replace with fill material as specified herein.

3.3 FILLS AND BACKFILLS - GENERAL

- A. Verify areas to be backfilled are free of debris, water.
- B. Exercise care in grading/excavation operations to avoid creating unstable (pumping) conditions in the subgrade soils.
- C. Cut out soft areas of subgrade not readily capable of in-situ compaction. Backfill and compact to density equal to requirements for subsequent backfill material.
- D. Site backfill systematically, as early as possible, to allow maximum time for natural settlement. Do not backfill over porous, wet or spongy subgrade surfaces.

- E. Maintain optimum moisture content of backfill materials to attain required compaction density (see soils report).
- F. Make gradual changes in grade. Blend slopes into level areas.

3.4 FILL (UNDER SLABS & FOOTINGS)

- A. Fill Beneath Building Slabs and Footings:
 - 1. Review recommendations of the Geotechnical Investigation to determine extent of undercuts beneath slabs on grade where undesirable soils are encountered, and for all other earthwork.
 - 2. Prevent excessive loss or gain of moisture during construction.
- B. Granular Fill Beneath Other Slabs on Grade and Walks: Place specified material to depth as shown, and tamp to provide solid level surface.

3.5 FILLS (UNDER PAVED AREAS)

- A. Fill Beneath Paved Areas:
 - 1. Review recommendations of the soils report to determine extent of undercuts beneath paving on grade where undesirable soils are encountered.
 - 2. Where undercuts do occur, or additional material is required to achieve desired subgrade, place select fill in loose lifts of 6" thickness and compact each lift to a density of 95% of maximum dry unit weight, determined using Standard Proctor Compaction Test (ASTM D-698), at or slightly above optimum moisture content (see soils report).
 - 3. Prevent excessive loss or gain of moisture during construction.

3.6 FILLS (OUTSIDE PAVED AREAS)

- A. Roughen and loosen filled areas before placing of fill materials. Spread suitable fill materials in uniform layers over area not to exceed 6" thick compaction. Wet and work materials as required for proper compaction and thoroughly mix. Compaction shall be by tamping rollers or by utilizing excavation equipment to spread and compact fill to a uniform density equal to natural density of material before excavating. Areas adjacent to structures, or where compacting equipment cannot effectively work, shall be compacted with approved tampers. Compact filled areas to lines and grades shown, with allowances for a final layer of topsoil at least 6" thick.
- B. Where fill is required at base of existing trees, place a maximum of 4" depth of topsoil.

3.7 BACKFILL

- A. General: After permanent construction is in place, forms and trash removed, waterproofing complete and inspections complete, backfill with approved materials and compact to approximate density of natural ground. Place backfill in layers not exceeding 6" loose depth, and hand or roller compact to compaction required. Water may be added to backfill material as an aid to compaction; however, material shall not be wet to form a mud or paste. Compaction shall be at the percentages described in the Geotechnical Report.
- B. Wall Backfill: Verify that wterproofing is complete, in proper position, and without damage prior to placing backfill. Backfill walls to a minimum width of 24" with specified free draining, non-cohesive soil. Place backfill in loose lifts of 9" thickness and compact each lift to at least 90% standard Proctor density. In the event that this Item B conflicts with the Civil Engineers or Sutructral Specifications, Drawings, or Instructions, their recommendations shall govern.

3.8 SHORING AND BRACING

- A. Provide as necessary to prevent cave-ins and slides, or as a protection for workmen in adjacent construction. Shoring and bracing shall remain in place as long as required for safety and shall be removed only as backfill is placed.

3.9 DRAINAGE AND PUMPING

- A. Provide for surface drainage to keep site free of surface water, and to keep excavation free of water during entire construction period. Provide and operate pumping equipment as required. If seepage is encountered, excavations shall be kept free of water.

3.10 EXPLOSIVES

- A. Use of explosives is strictly prohibited.

3.11 REMOVAL OF CONTAMINATED SOIL

- A. Prior to finish grading; soil contaminated with lime or other contaminates (i.e., rocks, wood, debris, etc.) should be removed from lawn and plant bed areas. Replace with clean, approved topsoil at a minimum of 6 inches. This item also applies to the plantings within the decomposed granite areas, and within the bio-swale areas for the project.

3.12 FINISH GRADING

- A. After rough grading has been completed and site cleared of construction debris, areas disturbed by construction or graded to provide new finish grade shall be covered with a layer of topsoil not less than 4" thick. Reuse stockpiled topsoil cleaned of foreign matter, or provide additional approved topsoil as required. Final grades shall be as shown or as directed by Owner and shall slope away from building and provide drainage for area. Degree of finish shall be that ordinarily obtainable with blade grader or scraper operations. Finish surfaces shall not be more than 0.06 feet above or below established grade elevation.

3.13 PROTECTION, CLEAN-UP AND EXCESS MATERIALS

- A. Protect grades from construction and weather damage, washing, erosion and rutting, and repair such damage that occurs.
- B. Correct any settlement below established grades to prevent ponding of water.
- C. At locations where lime, concrete or other foreign matter has penetrated or been mixed with earth, remove damaged earth and replace with clean topsoil material.
- D. Remove unsuitable stockpiled material, debris, waste, and other material from site and leave work in clean finished condition for final acceptance. Contractor is responsible for disposal of debris and unsuitable materials.

END OF SECTION 022210

SECTION 028100

IRRIGATION

PART I - GENERAL

1.01 SCOPE

- A. The Irrigation contractor shall comply with all local and state mandated irrigation ordinances and codes and will secure all permits. Work shall be performed by a license Irrigation Contractor. License Irrigation contractor shall pay any associated fees unless otherwise noted. All local codes shall prevail over any discrepancies herein and shall be addressed before any construction begins.
- B. Provide complete sprinkler installation drawings as detailed and specified herein, Includes furnishing all labor, materials, and equipment for the proper installation. Work includes but is not limited to:
 - 1. Trenching and backfill
 - 2. Automatic controlled system.
 - 3. Upon completion of installation, supply as-built drawings showing details of construction including location of mainline piping, manual and automatic valves, electrical supply to valves, and specifically exact location of automatic valves.
- B. NOTE: All sleeves as shown on plans will be furnished by General Contractor. Water Meter and electrical power source to be provided by General Contractor.

1.02 RELATED WORK SPECIFIED ELSEWHERE

- A. See Irrigation Plans (if applicable). See plans for controller, heads, and valves.

1.03 APPLICABLE STANDARDS

- A. ASTM – American Society for Testing Materials.
- B. D2464 - Poly (Vinyl Chloride) (PVC) Plastic Pipe Fittings Threaded, Schedule 40
- C. D2466 - Poly (Vinyl Chloride) (PVC) Plastic Pipe Fittings Socket Type, Schedule 40
- D. D2564 -Solvent Cements for Poly (Vinyl Chloride) (PVC) Plastic Pipe Fittings
- E. Standard recommended practice for:
 - 1. D2855 - Making Solvent - Cemented Joints with Poly (Vinyl Chloride) (PVC) Pipe and Fittings.

1.04 MAINTENANCE AND GUARANTEE

- A. Materials and workmanship shall be fully guaranteed for one (1) year after final acceptance.
- C. Provide maintenance of system, including raising and lowering of heads to compensate for lawn growth, cleaning and adjustment of heads, raising and lowering of shrub heads to compensate for shrub growth, for one (1) year after completion of installation.

- C. Guarantee is limited to repair and replacement of defective materials or workmanship, including repair of backfill settlement.

1.05 SUBMITTALS

- A. Use of materials differing in quality, size, or performance from those specified will only be allowed upon written approval of Owner/Landscape Architect. The decision will be based on comparative ability of material or article to perform fully all purposes of mechanics and general design considered to be possessed by item specified. Bidders desiring to make a substitution for specified sprinklers shall submit manufacturer's catalog sheet showing full specification of each type sprinkler proposed as a substitute, including discharge in GPM maximum allowable operating pressure at sprinkler. Approval of substitute sprinkler shall not relieve Contractor of his responsibility to demonstrate that final installed sprinkler system will operate according to intent of originally designed and specified system.
- B. It is the responsibility of the Irrigation Contractor to demonstrate that final installed sprinkler system will operate according to intent of originally designed and specified system. If Irrigation Contractor notes any problems in head spacing or potential coverage, it is his responsibility to notify the Landscape Architect in writing, before proceeding with work. Irrigation Contractor guarantees 100% coverage of all areas to be irrigated.
- C. All work shall be performed by a license Irrigation Contractor.

1.06 TESTING

- A. Perform testing required with other trades, including earthwork, paving, and plumbing, to avoid unnecessary cutting, patching and boring.

1.07 COORDINATION

- A. Coordinate installation with other trades, including earthwork, paving, and plumbing, to avoid unnecessary cutting, patching and boring.

PART 2 - PRODUCTS

2.01 GENERAL

- A. Sprinkler mains: Sprinkler mains are that portion of piping from water source to operating valves. This portion of piping is subject to surges, being a closed portion of sprinkler system. Hydrant lines are considered a part of sprinkler main.
- B. Lateral Piping: Lateral piping is that portion of piping from operating valve to sprinkler heads. This portion of piping is not subject to surges, being an "open end" portion of sprinkler system.

2.02 POLY VINYL CHLORIDE PIPE (PVC PIPE)

- A. PVC pipe shall be manufactured in accordance with commercial standards noted herein.
- B. Marking and Identification: PVC pipe shall be continuously and permanently marked with the following information: manufacturer's name, pipe size, type of pipe, and

material, SDR number, product standard number, and the NSF (National Sanitation Foundation) seal.

- C. PVC Pipe Fittings: Shall be of the same material as the PVC pipe specified and shall be compatible with PVC pipe furnished.
-
- 2.03 COPPER TUBING
 - A. Hard, straight lengths of domestic manufacture only. No copper tube of foreign extrusion or any so called irrigation tubing (thin wall) shall be used.
 - 2.04 COPPER TUBE FITTINGS
 - A. Cast brass or wrought copper, sweat-solder type.
 - 2.05 WIRE
 - A. Type UF with 4-64" insulation which is Underwriter's Laboratory approved for direct underground burial when used in a National Electric Code Class 11 Circuit (30 volts AC or less).
 - 2.06 SCHEDULE 80 PVC NIPPLES
 - A. Composed of Standard Schedule 40 PVC Fittings and PVC meeting noted standards. No clamps or wires may be used.
 - 2.07 MATERIALS - See Irrigation Plan
 - A. Sprinkler heads in lawn area as specified on irrigation note in plan set.
 - B. PVC Pipe: Class 200, SPR 21
Copper Tubing (City Connection): Type "K", 24V Wire: Size 14, Type U.F.
 - C. Electric valves to be all plastic construction as indicated on plans.
 - D. Refer to drawing for backflow prevention requirements and flow valve.

PART 3 - EXECUTION

- 3.01 INSTALLATION - GENERAL
 - A. Staking: Before installation is started, place a stake where each sprinkler is to be located, in accordance with drawing. Staking shall be approved by Landscape Architect before proceeding.
 - B. Excavations: Excavations are unclassified and include earth, loose rock, rock or any combination thereof in wet or dry state. Backfill trenches with material that is suitable for compaction and contains no lumps, clods rock, debris, etc. Special backfill specifications, if furnished take preference over this general specification.
 - C. Backfill: Flood or hand-tamp to prevent after settling. Hand rake trenches and adjoining area to leave grade in as good or better condition than before installation.

3.02 PIPE INSTALLATION

- A. Sprinkler Mains: Install in a four (4") inch wide minimum trench with a minimum of eighteen (18") inches of cover.
- B. Lateral Piping: Install in a four (4") inch wide minimum trench deep enough to allow for installation of sprinkler heads and valves, but in no case, with less than twelve (12") of cover.
- C. Trenching: Remove lumber, rubbish, and large rocks from trenches. Provide firm, uniform bearing for entire length of each pipe line to prevent uneven settlement. Wedging or blocking of pipe will not be permitted. Remove foreign matter or dirt from inside of pipe before welding, and keep piping clean by approved means during and after laying of pipe.

3.03 PVC PIPE AND FITTING ASSEMBLY

- A. Solvent: Use only solvent recommended by manufacturer to make solvent-welded joints. Thoroughly clean pipe and fittings of dirt dust and moisture before applying solvent
- B. PVC to metal connection: Work metal connections first. Use a non-hardening pipe dope such as Permatex No. 2 on threaded PVC adapters into which pipe may be welded.

3.04 COPPER TUBING AND FITTING ASSEMBLY

- A. Clean pipe and fitting thoroughly and lightly sand pipe connections to remove residue from pipe. Attach fittings to tubing in an approved manner using 50-50 soft solid core solder.

3.05 POP-UP SPRAY HEADS

- A. Supply pop-up spray heads in accordance with materials list and plan. Attach sprinkler to lateral piping with a 12" minimum length of 1/2" Flex PVC as manufactured by Excalper, not less than three (3") inches or more than six (6") inches long.

3.06 VALVES

- A. Supply valves in accordance with materials list and sized according to drawings. Install valves in a level position in accordance with Manufacturer's Specifications. See plan for typical installation of electric valve, valve box

3.07 WIRING

- A. Supply wire from the automatic sprinkler controls to the valves. No conduit will be required for U.F. wire unless otherwise noted on the plan. Wire shall be tucked under the piping.
- B. A separate wire is required from the controller to each electric valve. A common neutral wire is also required from each controller to each of the valves.
- C. Bundle multiple wires and tape them together at ten (10') foot intervals. Install ten (10") inch expansion coil at not more than one hundred (100') foot intervals. Make splices waterproof.

3.08 AUTOMATIC SPRINKLER CONTROLLED

- A. Supply in accordance with Irrigation Plan. Install according to manufacturer's recommendations.

3.09 TESTING

- A. Sprinkler Mains: Test sprinkler main only for a period of twelve (12) to fourteen (14) hours under normal pressure. If leaks occur, replace joint or joints and repeat test.
- B. Complete tests prior to backfilling. Sufficient backfill material may be placed in trenches between fittings to insure stability of line under pressure. In each case, leave fittings and couplings open to visual inspection for full period of test.

3.10 FINAL ADJUSTMENT

- A. After installation has been completed, make final adjustment of sprinkler system in preparation for Landscape Architect's final inspection. Completely flush system to remove debris from lines and turning on system. Check sprinklers for proper operation and proper alignment for direction of flow. Check each section of spray heads for operating pressure and balance to other sections by use of flow adjustment and top of each valve. Check nozzling for proper coverage. Prevailing wind conditions may indicate that arch angle of spray should be other than shown on drawings. In this case, change nozzles to provide correct coverage.

END OF SECTION 028100

SECTION 028213

FENCES AND GATES

PART 1 - GENERAL

1.1 SUMMARY- Screen Fencing at Mechanical Units

- A. Section includes:
 - 1. Steel fixed screen, fencing, infill panels
 - 2. Steel posts
 - 3. Steel gates
- B. Related Work
 - 1. Concrete - Section 033000
 - 2. Site Clearing - Section 021100
 - 3. Metal Fabrications - Section 055000

1.2 PERFORMANCE REQUIREMENTS

- A. Loading: Design and size components to withstand dead loads and live loads caused by positive and negative wind loads acting normal to the plane of enclosure including building corners in accordance with ASCE 7, BOCA and OSHA code requirements. Components are also sized in consideration of regional geographic wind characteristics.
- B. TGIC Polyester Powder Coat Finish System
 - 1. Epoxy pre-coat / Color Coat / TGIC Polyester Powder Coat Finish 20-Year Warranty System.

TGIC Polyester Powder Coat Finish System

<u>Test Methods</u>	<u>Powder Properties</u>	<u>Requirement</u>
(Prime coat)	DuPont #ELH503S5	Final TGIC Coating (Gray Morning)
(Test color coat)	DuPont # PFB-603-S9	(Bike Black)
(ASTM D5965-96,C	Specific Gravity	1.29 +/- 0.05
	Theoretical Coverage	1.49 ft 2/lb/mil
ASTM D3451-92, 13	Mass Loss During Cure	less than 1%
	Max. Storage Temp.	75 degrees F.

<u>Test Methods</u>	<u>Coating Properties</u>	<u>Requirement</u>
ASTM D523-89	Gloss at 60 percent	85+
DPC TM 10.219	PCI Powder Smoothness	8
ASTM D2454-95	Overbake Resistance, Time	100%
ASTM D3363-92a	Pencil Hardness	2H
ASTM D2794-93	Dir/Rev Impact, Gardner	160/160in/lbs
ASTM D3359-97	Adhesion, Cross Hatch	5Bpass

ASTM D522-93a	Flexibility, Mandrel	1/8"dia. no fracture
ASTM B117-97	Salt Spray	4,000 hours
UL DTOV2Org.Coatings	Steel Enclosures, Electrical Equipment	Recognized

Application

Electrostatic Spray, 300 degrees F.	Cure Schedule (Time at substrate temp.)
Pretreatment: White Metal Blast (2mil. Min.etch)	
Substrate: 0.032 in. CRS	10 Min. @ 400f.
Film Thickness	8.0-10.0 Mils

1.3 ACTION SUBMITTALS

- A. Product Data: Supply printed materials indicating specified infill pattern design, spacing and component material sizes.
- B. Drawings: Erection and detail shop drawings will be provided showing layout and location of all component parts. Panel sizes, clips, gates, gate hardware, attachment details, base requirements and panel installation bolts will be enumerated on the drawings. Installation bolts will be supplied by the installer (not by manufacturer). Drawings will need to be approved by customer prior to fabrication.
- C. Samples: A sample will be provided for each panel type selected (additional samples available if needed). Each sample approximately 10" x 10" to be coated with the specified 20-year warranty TGIC polyester powder coat finish system. (Sample will be in specified color, if available).
- D. Warranty document. Provide complete manufacturer's finish and workmanship documents.

1.4 QUALITY ASSURANCE

- A. Fabricator qualifications. A firm experienced in producing fencing/infill/gate products similar to those indicated for the Project and with a record of successful in-service performance.
- B. Metal Bar Grating Standards. Comply with applicable requirements as listed below.
 - 1. Non-Heavy Duty Metal Bar Gratings Comply with NAAMM MBG 531, "Metal Bar Grating Manual for Steel, Stainless Steel, and Aluminum Gratings and Stair Treads"
- C. Welding. Manufacturer to utilize quality shop welding procedures according to AWS Structural Welding Code guidelines.

1.5 PROJECT CONDITIONS

- A. Verification of dimensions and layout information for fencing/infill/gates shown on drawings "by others" (not by manufacturer)

1.6 WARRANTY SUMMARY

- A. Materials and workmanship. Manufacturer to warrant the original purchaser of fencing/infill/gate systems to be free from defects in material and workmanship and all fabrications to be in accordance with NAAMM steel fabrication industry tolerances and standards.

Manufacturer to supply written warranty information in accordance with specification requirements.

- B. 20-Year Finish Warranty. When supplied with “BB-20”, 20-year warranty TGIC polyester powder coat finish system (not applied over hot-dip galvanizing), manufacturer guarantees supplied components will not rust, peel or blister for a period of Twenty (20) years from the date of purchase. Damage from accident, improper transport, improper installation, normal finish wear, vandalism or abuse and certain additional items listed on warranty documents are not covered. Warranty is limited to pro-rated value of the coating only, not to exceed original cost of coating. Manufacturer to supply written warranty information in accordance with specification requirements.

PART 2 - PRODUCTS

2.1 MANUFACTURER

- A. Manufacturers: BarnettBates Orsogril® 800-541-3912 (www.barnettbates.com) custom fabrication of required components, or equal as approved by architect.

2.2 MATERIALS

- A. Steel Bar Stock ASTM A36
- B. Steel Tubing ASTM A500, Grade B
- C. Orsogril® Pattern Style pattern as indicated below:
1. BarnettBates Orsogril® Pleione Mid-size square design. *Nominal 2 7/16” x 2 5/8” Grid opening. 1” x 3/32” (25mm x 2.5mm) main bar on 2 7/16” centers, 3/16” diameter round crossbar at 2 5/8” centers.*

2.3 FABRICATION

- A. Electro-forge welding Infill panels electro-forge welded for complete weld penetration of crossbar.
- B. Fabrication per shop drawings All supplied components will be fabricated per detail shop drawings supplied by manufacturer.
- C. NAAMM Prior to shipment, all fabricated components will be analyzed and meet standard NAAMM steel fabrication requirements and tolerances.
- D. OSHA / BOCA Fabricated components, when installed properly will meet applicable OSHA, and/or BOCA loading requirements.

2.4 FINISH

- A. BarnettBates Orsogril® 20-year Warranty Finish System.
 - 1. All supplied components will be finished with this system (or equal if approved by architect).
 - a. All fabricated product to be 100% sandblasted to white metal for removal of scale, oil and debris to create a minimum 2mil etching for proper adhesion.
 - b. Electrostatic application of DuPont Gray Morning epoxy powder primer with 375f. minimum 15 minute duration heat cure for maximum corrosion protection.
 - c. Immediate electrostatic application of DuPont TGIC polyester powder color coat while metal temperature is minimum of 300f. and heat cure for minimum 10 minutes at 400f.
 - d. This process provides an average of 8-10 mils total coating thickness. Coating to withstand more than 4,000 hours salt spray. Exposed Height: 35 feet.
- B. Colors: As selected from the manufacturer's range of standard colors.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas and conditions With installer present, examine area and conditions for a verified survey of property lines and legal boundaries, site clearing, concrete work, steel frame and support structure work (as necessary) earthwork, pavement work and other conditions affecting performance.
 - 1. For ground fencing areas, do not begin installation before final grading is completed.
- B. Proceed with installation Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION - GENERAL

- A. Ground Fence Run Survey and layout according to erection and detail drawings.
 - 1. Posts. Sleeves exceeding post thickness by 2" to be set in concrete to a depth below grade as specified in drawings. Concrete should be at least 6" deeper than posts. Certain conditions require added concrete depth. Posts to be inserted loose in post hole sleeves.
 - 2. Fence Panels. Temporarily block fence panels in position plumb and square at proper fence post and panel height. Use stainless steel hardware to bolt panel-to-post-to-panel. Anti-intruder bolts are recommended when added security is required. Next, properly install permanent grout in post holes to fix permanent fence positioning. Remove blocking after proper cure of grout.
 - 3. Gates. Use sleeves as above, inserted to depth indicated on contract drawings within proper gate post concrete foundations. Block gate posts firmly in position and hang/install gate leafs on post hinge pins. Check/adjust for proper gate leaf clearance and function. When properly positioned and firmly blocked, remove gate leafs from post hinge pins and install permanent grout in fence post holes. Reinstall gate leafs after proper cure of grout. Make final adjustments for proper gate operation. For motor operated gates, coordinate with motor system installer.

B. Security Screening or General “Area Infill” Panel Installation

1. Panels and major components will be numbered per shop drawings. Review numbering system and then properly distribute and stack components (with protective padding between panels) on site for convenient access prior to beginning installation/erection.
 - a. Typical Fabricated Panel. Loose-assemble clip-angle attachment hardware to corner mounting tabs on fabricated panel. Place panel in position at lower-left corner of first installation area. Align and tighten clip-angles to support bottom of panel, positioned level and plumb. Work around panel sides to affix clip angles and gradually tighten bolts to complete first panel installation. Mark and remove clip angles in order to install concrete anchors as necessary prior to reassembly for final panel attachment. Adjust for final positioning by moving bolts within slotted holes. Move to adjoining panel areas and install remaining panels. Re-tighten bolts with panels in final position.

END OF SECTION 028213

SECTION 029230LANDSCAPE GRADING

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Final grade topsoil for finish landscaping.

1.2 RELATED SECTIONS

- A. Section 029300 - Hydraulic Seeding
- B. Section 029500 - Trees, Plants and Ground Cover: Topsoil fill for trees, plants and ground cover.

PART 2 - PRODUCTS

2.1 MATERIAL

- A. Existing Topsoil:
 - 1. Existing topsoil removed/excavated from site and stockpiled.
- B. Supplemental Topsoil:
 - 1. Sandy loam from source approved by Owner; 100 percent passing through 1-inch screen.
 - a. Sand (2,000 mm to 0.50 mm): 40 to 50 percent.
 - Silt (0.050 mm to 0.005 mm): 30 to 40 percent.
 - Clay (0.005 mm and smaller): 10 to 30 percent.
 - 2. Free of subsoil, brush, stumps, roots, organic litter, objectionable weeds, clods, shale, stones 1-inch minimum dimension or larger, or other material harmful to grading, planting, plant growth, or maintenance operations.
 - 3. Presence of vegetative parts of Bermuda grass, Johnson grass, nut grass (*Cyperus rotundus*), and other hard to eradicate weeds or grass will be cause for rejection of topsoil.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify building and trench backfilling have been inspected.

3.2 SUBSTRATE PREPARATION

- A. Apply herbicide, per manufacturer's specifications, to all areas of the project site shown to receive new seeding, sodding, landscape improvements, or mulching.
- B. Eliminate uneven areas and low spots.
- C. Remove debris, roots, branches, stones, in excess of 2 inches in size. Remove subsoil contaminated with petroleum products.
- D. Scarify surface to depth of 3 inches where topsoil is scheduled. Scarify in areas where equipment used for hauling and spreading topsoil has compacted subsoil.

3.3 PLACING TOPSOIL

- A. Place topsoil in 6" lifts maximum in areas where new landscape planting is required. Place topsoil during dry weather.
- B. Place topsoil as required in new parking areas and adjacent to building areas to provide adequate soil for new planting and insure proper drainage. Provide a minimum 4-inch layer of topsoil over all new landscape areas.
- C. Fine grade topsoil to eliminate rough or low areas. Maintain profiles and contour of subgrade.
- D. Remove roots, weeds, rocks, and foreign material while spreading.
- E. Manually spread topsoil close to existing plant life, to prevent damage.
- F. Roll placed topsoil.
- G. Dispose of surplus subsoil and topsoil as directed by Owner.
- H. Leave stockpile area and site clean and raked, ready to receive landscaping.

3.4 TOLERANCES

- A. Top of Topsoil: Plus or minus 1 inches.

3.5 PROTECTION

- A. Protect landscaping and other features remaining as final work.
- B. Protect existing structures, fences, sidewalks, utilities, paving, and curbs.

END OF SECTION 029230

SECTION 029280

SODDING

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK

- A. Provide all materials, labor to install and maintain for the guarantee period all areas sodded.
- B. Related Work Specified Elsewhere:
 - 1. Specifications for Trees, Shrubs and Ground Cover.
 - 2. Specifications for Irrigation System.
- C. Definitions:
 - 1. Sod: Thick matting of growing and living grass on a smooth bed free of foreign material, rocks larger than $\frac{3}{4}$ inch in diameter and weeds.

1.2 QUALITY ASSURANCE

- A. Reference Standards:
 - 1. Official Method of Analysis of the Association of Official Analytical Chemists.
 - 2. American Sod Producers Association (ASPA), Latest edition.
- B. Source Quality Control:
 - 1. The Owner reserves the right to inspect and approve the sod before it is cut and the source of the sod.
 - 2. Inspection of sod at the source does not preclude the right of rejection at the job site.

1.3 SUBMITTALS

- A. Certificates: Grower certification that the sod meets the specification requirements. Submit certification to Owner's representative prior to delivery to the site.
- B. Maintenance Instructions: Submit to Owner's representative prior to the final inspection.

1.4 JOB CONDITIONS

- A. Environmental Requirements:
 - 1. Sodding shall be performed between March 15 and August 15 or as approved by Owner.
 - 2. Frozen sod may not be used nor shall sod be placed on frozen ground.
 - 3. In times of drought, special provisions must be made to prevent the drying of the sod. All provisions shall be approved by Owner's representative.
 - 4. Do not sod when soil is excessively wet or dry.

- B. Protection: Restrict foot and vehicular traffic from sodded areas after laying until final inspection and acceptance.

1.5 GUARANTEE AND MAINTENANCE

- A. Substantial Completion: Sod shall be approved as being in accordance with specifications upon completion of the installation.
- B. Guarantee Period: A stand of grass for 90 days after substantial completion shall be guaranteed.
- C. Maintenance Period:
 - 1. Maintain newly laid sod for 90 days from the date of substantial completion.
 - 2. Any sodded areas that become eroded, damaged or any areas of sod that fail to become established satisfactorily, according to the Owner, shall be repaired and/or replaced at no additional expense to the Owner.
 - 3. Repair construction related damage to other plants or lawns during the maintenance period at no additional expense to the Owner.
 - 4. Maintenance shall consist of, but not be limited to:
 - a. Weeding
 - b. Watering
 - c. Mowing
 - d. Spraying
 - e. Fertilizing
- D. Final Acceptance: Ten days before end of the 90-day maintenance period. The Contractor shall notify the Owner's representative of mutually agreeable final inspection date.

1.6 RESTORATION

- A. The Contractor shall be responsible for repairing any damages done to the site caused by the Contractor at no additional expense to the Owner.

PART 2 - PRODUCTS

2.1 MATERIAL

- A. Sod
 - 1. Species: Common bermudagrass (Cynodon Dactylon).
 - 2. A minimum of 95% of the plants in cut sod shall be bermudagrass. The sod shall be free of weeds or undesirable foreign plants, large stones, roots or other materials which might be detrimental to the development of the sod or to future maintenance.
 - 3. Sod shall be cut with approved sod cutters so that after it is placed, but before it is compacted, it shall have a uniform thickness of not less than 3/4-inch. The sod sections shall be cut in uniform widths, not less than ten inches and in lengths of not less than 18 inches.
 - 4. Sod shall be uniform in color, leaf texture and shoot density.

- B. Fertilizer:
 - 1. Uniform composition
 - 2. Palletized.
 - 3. Containing following minimum percentage of plant food by weight:
 - a. Nitrogen: 16%
 - b. Phosphoric Acid: 8%
 - c. Potash: 8%
 - 4. The fertilizer shall be delivered to the site in bags or other sealed containers, each fully labeled, conforming to the applicable state fertilizer laws, and bearing the name, trade name or trademark and warranty of the producer.
- C. Water: Potable, available on-site. Contractor shall furnish temporary hoses and connections as required.

PART 3 - EXECUTION

3.1 INSPECTION

- A. Contractor shall check that preceding work affecting ground surface is completed, properly graded and drains well.
- B. Contractor shall verify that soil is within allowable range of moisture content.
- C. Contractor shall see that the soil is free of weeds and foreign material immediately before sodding. Remove rocks and stones which are larger than 3/4 -inch in diameter, remove from the site and dispose of in an approved location.
- D. Contractor shall not start work until conditions are satisfactory. To begin work indicates acceptance of conditions.

3.2 PREPARATION

- A. All areas to be sodded are to be bladed and graded smooth. All topsoil shall be incorporated into existing soil. All debris shall be disposed of off the site at an approved location.
- B. Till fertilizer into top two inches of soil at rate of 12 pounds per 1,000 square feet.

3.3 APPLICATION

- A. The sod shall be moist and shall be placed on a moist soil bed.
- B. Sod shall be harvested, delivered and laid within a period of 24 hours, unless a suitable preservation method is approved prior to delivery. Sod not transplanted within this period shall be inspected for acceptance by the Owner's representative prior to its installation.

- C. The sod shall be carefully placed by hand, edge-to-edge (with no gaps), and with staggered joints in rows parallel with the contours. Do not stretch or overlap sod.
- D. The sod shall immediately be pressed firmly into contact with the sod bed by rolling with approved equipment to provide a true and even surface.
- E. Screened soil of acceptable quality shall be used to fill all cracks between pads of sod; however, the quantity of the top dressing soil shall not be so great as to smother the grass.
- F. The surface of the soil in the sod after compaction shall be flush with or just below adjacent paving.
- G. Water sodded areas to a minimum depth of two inches after planting.

3.4 PROTECTION

- A. Immediately after sodding, erect barricades and warning signs as required to protect seeded areas from traffic until sod is established.

3.5 SOD ESTABLISHMENT

- A. Watering:
 - 1. The sod shall be kept moist from the time of its placement until it has become established and its continued growth assured.
 - 2. Watering shall be done at a rate which will avoid erosion and excessive runoff.
- B. Mowing:
 - 1. When grass reaches approximately four inches in height, mow to 2 to 2 1/2 inches in height.
 - 2. Do not cut off more than 40% of grass leaf in single mowing.
 - 3. Remove grass clippings and dispose of off-site.
- D. Repairing: Any areas that become eroded, damaged or any areas of sod that fails to become established satisfactorily, according to the Owner, shall be repaired and/or replaced at no expense to the Owner.

3.6 CLEAN-UP

- A. Remove trash and excess materials from site.
- B. Maintain paved areas in clean condition.
- C. Remove barriers and signs from site at termination of the maintenance period.

END OF SECTION 029280

SECTION 029300

HYDRAULIC SEEDING

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Provide all material and labor to install and maintain for the guarantee period all areas to be seeded and hydromulched.

1.2 RELATED SECTIONS

- A. Section 028100 - Irrigation
- B. Section 029230 - Landscape Grading
- C. Section 029500 - Trees, Shrubs and Ground Cover

1.3 UNIT PRICE- MEASUREMENT AND PAYMENT

- A. Seeded Areas-By the square foot. Includes placing topsoil, fine grading, seeding, water and maintenance to specified time limit.

1.4 DEFINITIONS

- A. The Contractor will be required to establish a stand of turf grass and native grass prior to acceptance of the job. A uniform stand of grass shall be defined as a total coverage of the planting soil by the specified grass or wildflower species to the satisfaction of the Owner. The Contractor is responsible for all watering, weeding, and replanting during the time which is necessary to establish a uniform stand of grass.

1.5 SUBMITTALS

- A. Test Reports: Results of seed purity and germination tests.
- B. Certificates: Manufacturer's certification that seed and mulch meet specification requirements.
- C. File all results and certificates with the Owner prior to the final acceptance.
- D. Maintenance Instructions: Submit to the Owner prior to the final acceptance.
- E. Test Reports: Submit certification of fertilizer analysis.

1.6 QUALITY ASSURANCE

- A. Reference Standards:

Official Method of Analysis of the Association of Official Analytical Chemists.
- B. Source Quality Control: Producer's test for purity and germination of seed, dated within nine months of sowing and submit to Owner.

1.7 JOB CONDITIONS

- A. Environmental Requirements:

1. Do not seed when excessively wet or dry.
 2. Do not perform seeding or hydromulching when wind exceeds 15 mph.
- B. Protection: Restrict foot and vehicular traffic from seeded areas after hydromulching until final inspection and acceptance.

1.8 GUARANTEE AND MAINTENANCE

- A. Provisional Acceptance: Planting shall be approved as being in accordance with specifications upon completion of the installation.
- B. Guarantee Period: A stand of grass within 90 days, after provisional acceptance, shall be guaranteed.
- C. Maintenance Period:
1. Maintain new seeding until entire project is accepted by the Owner.
 2. Reseed during this period as required to meet minimum standards at no additional expense to the Owner.
 3. Repair damage to other plants or lawns during maintenance period at no additional expense to the Owner.
 4. Maintenance shall consist of but not be limited to:
 - a. Weeding
 - b. Watering
 - c. Mowing and edging
 - d. Spraying
 - e. Fertilizing
 - f. Temporary Erosion Control & Erosion Repair
- D. Final Acceptance will be provided by the Owner only upon completion of the entire project and the establishment of a stand of grass as defined herein.

1.9 RESTORATION

The Contractor shall be responsible for repairing any damage done to any existing site improvements caused by the Contractor, at no additional expense to the Owner.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Turf Areas
1. Seed (April 15 until September 15)
 - a. Species: 100% Hulled Common Bermuda Grass (*Cynodon dactylon*) of 98% purity.
 - b. Percent of Live Seed: 85%

- c. Clean, dry, new crop seed.
- d. Free of all weeds.
- 2. Temporary Turf - Seed (September 15 until March 15)
 - a. Species: -100% Rye Grass (*Lolium multiflorum*) of 85% purity
- C. Fertilizer (For Turf Grass Areas Only)
 - 1. Uniform composition.
 - 2. Pelletized.
 - 3. Containing following minimum percentage of plant food by weight:
 - a. Nitrogen: 15% or 16%
 - b. Phosphoric Acid: 4% or 5%
 - c. Potash: 8% or 10%
 - 4. The fertilizer shall be delivered to the site in bags or other convenient containers, each fully labeled, conforming to the applicable state fertilizer laws, and bearing the name, trade name or trademark, and warranty of the producer.
- D. Mulch with Tackifier
 - 1. Maximum Moisture Content.....10% \pm 3%
 - 2. Virgin Wood Fiber Content.....92.2% \pm 0.5% O.D. Basis
 - 3. Tackifier Content.....3% \pm 0.5% O.D. Basis
 - 4. Ash Content.....0.8% \pm 0.2% O.D. Basis
 - 1. PH.....4.8 \pm 0.5
 - 2. Minimum Water Holding Capacity (grams of water per 100 grams of fiber).....1,000
 - 3. Wood fiber shall be dyed green with a biodegradable dye that does not inhibit plant growth.
 - 4. Wood fiber SHALL NOT be produced from recycled material such as sawdust, paper, cardboard, or residue from pulp and paper plants.
 - 5. Wood fiber mulch shall be packaged in units not exceed 100 lbs. The package shall contain current labels, the manufacturer's name and the net weight.
- E. Water: Potable, available on-site. Contractor shall furnish temporary hoses and connections as required.

PART 3 - EXECUTION

3.01 INSPECTION

- A. Contractor shall check that preceding work affecting ground surface is completed.
- B. Contractor shall verify that soil is within allowable range of moisture content.
- C. Contractor shall see that the soil is free of weeds and foreign material immediately before seeding. Remove rocks and stones which are larger than 2 inches in diameter and remove from the site.
- D. Contractor shall not start work until conditions are satisfactory. To begin work indicates acceptance of conditions.

3.02 PREPARATION

- A. All areas to be seeded are to be bladed and graded smooth. All clods shall be removed or incorporated into existing soil and all debris shall be disposed of off the site.
- B. Soil should be watered to a minimum depth of 4 inches at least 48 hours prior to seeding.

3.03 APPLICATION (Hydromulch Seed Only)

- A. Apply hydromulch material with an approved spray applicator equipment suitable for the seed, mulch and stabilizer specified.
- B. Apply materials at the following rates or as approved by the Owner.
 - 1. Mulch with Tackifier 1,600 pounds per acre (36.75 lbs/1000 sf).
 - 2. Fertilizer: 523 pounds per acre (12.0 lbs/1000 sf).
 - 3. Hulled Common Bermuda Grass, 87 pounds per acre (2 lbs/1000 sf).
 - 4. Temporary Turf, 200 pounds per acre (4.5 lbs/1000sf).
- C. Water all hydromulched areas to a minimum depth of 4 inches.

3.04 PROTECTION

Immediately after seeding and hydromulching, erect barricades and warning signs as required to protect seeded areas from traffic until grass is established.

3.05 SEED ESTABLISHMENT

- A. Watering
 - 1. Keep soil moist during seed germination period.
 - 2. Supplement rainfall as required until a stand of grass is established.
- B. Mowing (Turf Areas)
 - 1. When grass reaches 4 inches in height, mow to 2 to 2-1/2 inches in height.

2. Do not cut off more than 40% of grass leaf in single mowing.
 3. Mow using 2 mulching blades, leaving no unsightly piles of grass clippings.
- C. Reseed all bare spots not having a uniform stand of grass at no additional expense to the Owner.
 - D. The Contractor will be required to establish a stand of grass prior to acceptance of the job. A uniform stand of grass shall be defined as a total coverage of the planting soil by the specified turfgrass to the satisfaction of the Owner. The Contractor is responsible for all watering, weeding, weekly mowing and replanting during the time which is necessary to establish a uniform stand of grass.

3.06 CLEANUP

- A. Remove trash and excess materials from project site.
- B. Maintain paved areas in clean condition.
- C. Remove barriers and signs from site at termination of establishment period.

END OF SECTION 029300

SECTION 029400STABILIZED DECOMPOSED GRANITE

PART I – GENERAL

1.01 SUMMARY

- A. This section includes material and labor requirements for construction with decomposed granite or crushed 1/2” minus aggregate pathway with stabilizer binder additive for the following items:
- B.
 - 1. Stabilized aggregate pathway and walking surfaces

1.02 PERFORMANCE REQUIREMENTS

- A. Perform gradation of decomposed granite material or 1/2” minus crushed aggregate in accordance with ASTM C 136 – Method for Sieve Analysis for Fine and Course.

1.03 SUBMITTALS

- A. Products Data: For each product specified. Submit a 5 lb. sample and sieve analysis for grading of decomposed granite or crushed 1/2” aggregate to be sent to Stabilizer Solutions, Inc. or approved equal prior to any construction – (allow 2 week turn around). Must be approved by Landscape Architect and owner.
- B. Shop Drawings: Show details of installation, including plans and sections.

1.04 PROJECT/SITE CONDITIONS

- A. Field Measurements: Each bidder is required to visit the site of the Work to verify the existing conditions. No adjustments will be made to the Contract Sum for variations in the existing conditions.
 - 1. Where surfacing is indicated to fit with other construction, verify dimensions of other construction by field measurements before proceeding with the work.
- B. Environmental Limitations: Do not install decomposed granite or crushed 1/2” minus aggregate paving during rainy conditions or below 40 degrees Fahrenheit and falling.

1.05 QUALITY ASSURANCE

- A. Installer Qualifications: Installer to provide evidence to indicate successful experience in providing decomposed granite or crushed 1/2” minus aggregate surfacing containing Stabilizer binder additive of ability to follow installation instructions.
- B. Mock-ups: Install 4ft. wide x 10ft. long mock-up of decomposed granite or 1/2” minus crushed aggregate surfacing with Stabilizer additive at location as directive by owner’s representative.

1.06 WARRANTY

- A. General Warranty: The special warranty specified in this Article shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by the Contractor under requirements of the Contract Documents.
- B. Warranty Period: Contractor shall provide warranty for performance of product. Contractor shall warranty installation of product for the item of one year from completion.
- C. Contractor shall provide, for a period of sixty-days, unconditional maintenance and repairs as required.

PART 2 – PRODUCTS

2.01 MANUFACTURERS

- A. Stabilizer for crushed aggregate surfaces provided by the following manufacturer:
 1. Stabilizer Solutions, Inc. 33 South 28th St., Phoenix, AZ 85034; phone (602) 225-5900, (800) 336-2468; fax (602) 225-5902; website stabilizersolutions.com; email info@stabilizersolutions.com.
 2. Or approved equal.

2.02 MATERIALS

- A. Decomposed Granite or 1/2” crushed aggregate screenings.
 1. Sand and crushed stone shall consist of inert materials that are hard and durable, with stone free from surface coatings and delirious materials. Gradation requirements shall be as follows:
 2. Crushed Stone Sieve Analysis Percentage of Weight Passing a Square Mesh Sieve AA SHTO T11-82 and T2782.

¼” MINUS AGGREGATE GRADATION

U.S. Sieve No.	Percent Passing by Weight
# 1/2”	100
#4	90-100
#8	75-80
#16	55-65
#30	40-50
#50	25-35
#100	15-20
#200 to	10-15

- 3. Acceptable local supplier list to be provided by Architect.
- B. Stabilizer Binder
 1. Patented, non-toxic, organic binder that is a colorless and odorless concentrated powder that binds decomposed granite or crushed 1/2” minus aggregate.

2.03 EXCESS MATERIALS

- A. Provide owner's authorized rep. with the following excess materials for sue in future decomposed granite or 1/2" minus crushed aggregate surfacing repair: 40 to 50 lb. bags of the aggregate paving blended with proper amounts of Stabilizer.

PART 3 – EXECUTION

3.01 BINDING STABILIZER

- A. Contractor to contact and utilize Collier Materials for the blending of the binding stabilizer with the decomposed granite at 16 lbs. (call manufacturer for exact blend) of Stabilizer per 1 ton of decomposed granite or crushed 1/2" minus aggregate screenings. It is critical that Stabilizer be thoroughly and uniformly mixed throughout decomposed granite or crushed 1/2" minus aggregate screenings. Bucket blending is not acceptable. Blending with a rake or shovel is not acceptable. Blend material dry as water will make the material hard. Note: the use of Binding Stabilizer is only to be used on the path and pedestrian corridors within the project. **DO NOT USE BINDER BLENDED DECOMPOSED GRANITE IN AREAS THAT ARE TO RECEIVE PLANTINGS, OR IN THE AREA BENEATH THE EXISTING TREES. THE USE OF BINDING STABILIZED DECOMPOSED GRANITE IS ONLY TO BE USED IN THE AREAS THAT ARE DESIGNED FOR PEDESTRIAN MOBILITY.**

3.02 PLACEMENT

- A. Prior to placement of the decomposed granite, the sub grading activities must have been completed, and inspected for accurate grade and compaction.
- B. Once the sub grade activities have been completed, the Contractor is to place the aggregate base material. The aggregate base material shall conform to a 19 mm, maximum size, aggregate grading "Class 2 Aggregate Base. Class 2 Aggregate Base shall be free of vegetable matter and other deleterious substances. Coarse Aggregate, Material contained on the No.4 sieve, shall consist of material in accordance with ASTM D421. Prior to the placement of the Aggregate Base, the Contractor shall contact the Landscape Architect for an inspection of the prepared sub grade to inspect that the slopes, drainage pattern, and compaction are in accordance with the plans and specifications. A density of 95% shall be obtained by the Contractor, as provided in the maximum dry density as determined by ASTM D1557. Aggregate Base Course 6" and less in thickness may be spread and compacted in a single layer. For thicknesses greater than 6", the base course aggregate shall be spread and compacted in two or more layers of uniform thickness, not greater than 6". Relative compaction of each layer of compacted aggregate base material shall be not less than 95% as determined by ASTM D1557. The contractor shall perform field tests in accordance with ASTM D2922 to determine compliance with specified requirements for density and compaction of aggregate base material, and with ASTM D3017 to determine moisture content compliance of the installed base course. Testing frequency shall be not less than one test for every 2,000 square feet of base course material, per layer or lift.
- C. Once the sub grade activities and the aggregate base placement has been accomplished, the contractor is to install weed control fabric which shall be manufactured from thermally spun bonded polypropylene fabric, which shall conform to a grab tensile strength of 59 kg minimum, and a grab elongation of 60% maximum. The weed control fabric shall also have a UV resistance rating of 70% at 150 hours minimum, and it's mass shall be at least 102 grams per square meter. The fabric shall be stapled to the compacted cub grade using 50 mm wide, 200 mm length, and 11 guage wire. A sample of the material being provided by the contractor measuring a minimum of 3 square feet, and a copy of the manufacturers product sheet, manufacturers installation instructions, along with a certificate of compliance for the product will be mailed and received by the landscape architect, with at least 5 days notice before installation.

- D. Once items A, B, and C have been accomplished the Contractor can move forward with placement of the decomposed aggregate material.
- E. After pre-blending, place the Stabilized decomposed aggregate or 1/2" crushed aggregate screenings on prepared sub-grade. Level to desired grade and cross section.
- F. Depth of pathways decomposed granite layer – 4" for heavy foot traffic and light vehicles.
- G. Depth of planted decomposed granite layer – 3".

3.03 WATERING

- A. Water heavily for full-depth moisture penetration of the Stabilized pathway profile. Water activates Stabilizer. To achieve saturation of Stabilized pathway profile, 40 gallons of water per 1 ton must be applied. During water application randomly test for depth using a probing device, which reaches full depth.

3.04 COMPACTION

- A. Upon thorough moisture penetration, compact aggregate screenings to 85% relative compaction by equipment such as; a 2 to 4 ton double drum roller or a 1,000 lb. single drum roller. The roller size will depend on the depth of the pathway. DO NOT use a vibratory plate compactor or vibration function on roller as vibration separates large aggregate particles. Do not begin compaction for 6 hours after placement and up to 48 hours.
- B. If surface aggregate dries significantly quicker than subsurface material, lightly mist surface before compaction.
- C. Take care in compacting decomposed granite or crushed 3/8" minus aggregate screenings when adjacent to planting and irrigation systems. Hand tamping with 8" or 10" hand tamp recommended.

3.05 INSPECTION

- A. Finished surface of pathway shall be smooth, uniform and solid. There shall be no evidence of chipping or cracking. Cured and compacted pathway shall be firm throughout profile with no spongy areas. Loose material will not be present on the surface after installation, but may appear after use and according to environmental conditions. Pathway should remain stable underneath the loose granite on top. It is a "natural" looking pathway, yet stable throughout. Any significant irregularities in path surface shall be repaired to the uniformity of entire installation.

3.06 MAINTENANCE

- A. Remove debris, such as paper, grass clippings, leaves or other organic material by mechanically blowing or hand raking the surface as needed. Any plowing program required during winter months shall involve the use of a rubber baffle on the plow blade or wheels on the plow that lifts the blade 1/4" off the paving surface.
- B. During the first year, a minor amount of loose aggregate will appear on the paving surface (1/16" to 1/4"). If this material exceeds a 1/4", redistribute the material over the entire surface. Water thoroughly to the depth of 1". Compact with powder roller of no less than 1000 lbs. This process should be repeated as needed.

- C. If cracking occurs, simply sweep fines into cracks, water thoroughly and hand tamp with an 8” – 10” hand tamp plate.

3.07 REPAIRS

- A. Excavate damaged area to the depth of the Stabilized aggregate and square off sidewalls.
- B. If area is dry, moisten damaged portion lightly.
- C. Pre-bend the dry required amount of Stabilizer powder with the proper amount of aggregate in a concrete mixer.
- D. Add water to the pre-blended aggregate and Stabilizer. Thoroughly moisten mix with 25 to 45 gallons per 1 ton of pre-blended material or to approximately 10% moisture content.
- E. Apply moistened pre-blended aggregate to excavated area to finish grade.
- F. Compact with an 8” to 10” hand tamp or 250 to 300 pound roller. Keep traffix off areas for 12 to 48 hours after repair has been completed.

END OF SECTION 029400

SECTION 029500

TREES, SHRUBS, AND GROUND COVER

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Furnish and install trees, shrubs, ground cover, and soil amendments.
- B. Maintenance.

1.2 UNIT PRICE - MEASUREMENT AND PAYMENT

- A. Plants: By the unit. Includes preparation of planting soil mix, planting, watering and maintenance to specified time period.

1.3 REFERENCES

- A. ANSI Z60.1 - Nursery Stock.
- B. NAA (National Arborist Association) - Pruning Standards for Shade Trees.
- C. American Association of Nurserymen, Inc.; American Standard for Nursery Stock, 1986 (ANSI Publication Z60.1 - 1986)

1.4 DEFINITIONS

- A. Weeds: Include Dandelion, Jimsonweed, Quackgrass, Horsetail, Morning Glory, Rush Grass, Mustard, Lambsquarter, Chickweed, Cress, Crabgrass, Canadian Thistle, Nutgrass, Poison Oak, Blackberry, Tansy Ragwort, Bermuda Grass, Johnson Grass, Poison Ivy, Nut Sedge, Nimble Will, Bindweed, Bent Grass, Wild Garlic, Perennial Sorrel, and Brome Grass.
- B. Plants: Living trees, plants, and ground cover specified in this Section, and described in ANSI Z60.1.

1.5 SUBMITTALS

- A. Certificates
 - 1. Submit fertilizer analysis with invoice.
 - 2. File with Owner prior to material acceptance.
- B. Product Data: Submit list of plant life sources.
- C. Maintenance Instructions: Submit written maintenance schedule for maintaining plant material after completion of job to Owner before final inspection.

1.6 QUALITY ASSURANCE

- A. Nursery Qualifications: Company specializing in growing and cultivating the plants with three years documented experience.
- B. Installer Qualifications: Company specializing in installing and planting the plants with three years documented experience on projects of similar size.
- C. Maintenance Services: Performed by installer.

- D. Pest Control Applicator: Licensed landscape pest control advisor.
- E. Comply with American Joint Committee of Horticultural Nomenclature "Standardized Plant Names", American Association of Nurserymen, Inc. American Standard for Nursery Stock.
- F. Provide plant material as shown on Drawings. Plants shall be subject to inspection and approval by Owner at place of growth or upon delivery to site for conformity to specified requirements.
- G. Samples: Owner reserves right to take and analyze samples of materials. Furnish samples upon request.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Preparation for Delivery

- 1. Balled and Burlapped (BB) Plants
 - a. Dig and prepare for shipment in manner that will not damage roots, branches, shape, and future development after planting.
 - b. Ball with firm, natural ball of soil.
 - c. Wrap ball firmly with burlap.
 - d. Ball Size and Ratios: Conform to American Association of Nurserymen (AAN) standard sizes and plant list, if conflict occurs, notify Owner.
- 2. Pack plant material to protect against climatic, seasonal, and breakage injuries during transit.
- 3. Securely cover plant tops with tarpaulin or canvas to minimize windwhipping and drying. Use antidesiccant upon approval of Owner.
- 4. Pack and ventilate to prevent sweating of plants during transit by rail. Ensure prompt delivery and careful handling to point of delivery at planting job site.

B. Delivery

- 1. Fertilizer and Soil Amendments: Original unopened containers bearing manufacturer's guaranteed chemical analysis, name, trademark and conformance to State law.
- 2. Plants: Provide legible identification labels. Minimum one plant of each species delivered to site shall have identification tag. Do not remove tag until after final inspection.
 - a. Prevent damage to root ball or desiccation of leaves.
 - b. Notify Owner 10 days in advance of delivery.
- 3. Peat Moss: Original, unopened and unbroken packages.

C. Inspect trees, shrubs, and ground cover plants for injury, insect infestation, and trees and shrubs for improper size and shape.

D. Storage

- 1. Protect roots of plant material from drying or other possible injury with soil or acceptable material.
- 2. Store plant material in area which is shaded and protected from weather.
- 3. Maintain and protect plant material not to be planted immediately upon delivery in healthy, vigorous condition.

E. Handling

- 1. Do not drop plants.
- 2. Do not pick up container or balled plants by stem or trunks.
- 3. Lift and handle balled plants from bottom of ball.

1.8 ENVIRONMENTAL REQUIREMENTS

- A. Do not install plant life when ambient temperatures may drop below 35 degrees F (2 degrees C) or rise above 95 degrees F (32 degrees C).
- B. Do not install plant life when wind velocity exceeds 30 mph (48 k/hr).

1.9 SCHEDULING

- A. Install trees, shrubs, and ground cover plants prior to lawn installation.
- B. Coordinate scheduling with underground irrigation system installation.

1.10 WARRANTY

- A. Warrant plant materials to be in healthy, vigorous and attractive growing condition for period of 6 months for shrubs and ground cover and 1 year for trees after Final Acceptance.
- B. Replace plants which die, become diseased or unhealthy, or are otherwise found to be in poor condition, as determined by Owner.
- C. Warranty will not apply to damage or injury to plant materials caused by vandalism, vehicles, and storms.
- D. Replace plants within 15 days of written notification by Owner.

PART 2 - PRODUCTS

2.1 TREES, PLANTS, AND GROUND COVER

- A. Plants:
 - 1. Type and Size: As shown on Drawings.
 - 2. Plants shall have normal habit of growth and shall be sound, healthy, vigorous, and free of insect infestations, plant diseases, sunscalds, windburn, knots, injuries, fresh abrasions of bark, excessive abrasions, or other objectionable disfigurements.
 - 3. Root Conditions of Plants Furnished in Containers: Determine condition by removal of earth from roots of not less than two plants or more than 2 percent of total number of plants of each species or variety. Where container grown plants are from several sources, roots of not less than two plants of each species or variety from each source will be inspected. In case sample plants inspected are found to be defective, Owner reserves right to reject entire lot or lots of plants represented by defective samples. Owner will be sole judge as to acceptability. Plants rendered unsuitable for planting will be considered samples.
 - 4. Root Conditions of Balled and Burlapped Plants: Determine condition by examination of plant balls and removal of 1/3 to 1/2 of burlap covering from not less than two plants or more than 2 percent of the total number of plants of each species or variety. Where balled and burlapped plants are from several sources, balls of not less than two plants of each species or variety from each source will be inspected. In case sample plants inspected are found to be defective, Owner reserves right to reject entire lot or lots of plants represented by defective samples. Owner will be sole judge as to acceptability. Plants rendered unsuitable for planting will be considered samples.
 - 5. Size and shape of plants shall correspond with that normally expected for species and variety of commercially available nursery stock or as shown on Drawings. Overall shape and minimum

acceptable size of plants measured before pruning with branches in normal position shall conform with AAN standards. Plants larger in size than specified may be used with approval of Owner, at no additional cost to Owner. If use of larger plants is approved, ball of earth or spread of roots for each plant will be increased proportionately.

6. Plant material shall be true to botanical and common name and variety.

B. Trees:

1. Weak, thin trunks not capable of support will not be acceptable.
2. Trees with specified trunk caliper of 3 inches or more shall not branch less than 5 feet above finish grade, unless specified as multi-trunk.
3. Trunks:
 - a. Sturdy, with hardened systems and vigorous and fibrous root systems which are not root or pot-bound.
 - b. Single straight trunks unless otherwise shown on Drawings.

C. Nursery Grown and Collected Stock:

1. Provide nursery grown stock except as shown on Drawings or as approved by Landscape Architect; grown under climatic conditions similar to those in locality of project.
2. Provide container grown or balled and burlapped stocks (as indicated on drawings) in vigorous, healthy condition. Plants that are root bound, with root system hardened off, or with damaged root balls will not be acceptable.
3. Balled and burlapped stock will have firm root balls with no loose or fractured soil. Balled and burlapped stock will have been collected and re-balled if necessary no less than 4 months prior to delivery at job site.
4. Use well established liner stock plant material, in removable containers or formed homogeneous soil sections.

2.2 SOIL AND AMENDMENT MATERIALS

A. Imported Topsoil for Prepared Soil Mixtures

1. Sandy loam from source approved by Owner; 100 percent passing through 1-inch screen.
 - a. Sand (2,000 mm to 0.50 mm): 40 to 50 percent.
 - Silt (0.050 mm to 0.005 mm): 30 to 40 percent.
 - Clay (0.005 mm and smaller): 10 to 30 percent.
2. Free of subsoil, brush, stumps, roots, organic litter, objectionable weeds, clods, shale, stones 1-inch minimum dimension or larger, or other material harmful to grading, planting, plant growth, or maintenance operations.
3. Presence of vegetative parts of Bermuda grass, Johnson grass, nut grass (*Cyperus rotundus*), and other hard to eradicate weeds or grass will be cause for rejection of topsoil.

B. Fertilizer: Uniform composition, pelletized; to the following minimum proportions:

1. Nitrogen: 10 percent or 12 percent.
2. Phosphoric Acid: 10 percent or 12 percent.
3. Potash: 10 percent or 12 percent.

C. Organic Soil Conditioner: Soil Building Systems, "Acid Gro Premix"; (214) 239-4777.

D. Sharp Sand: Clean, washed sand, fine to coarse sizes, free of clay lumps or other objectionable materials.

E. Root Activator: Carl Pool Root Activator.

- F. Mulch: Composted shredded cypress bark free of insects, debris, trash, weeds, seeds, and other noxious materials.
- G. Controlled Release Fertilizer Tablets:
 - 1. 21 gram tablets with following percentages of available nutrients by weight:
 - a. Nitrogen: 28 percent.
 - b. Phosphorus: 8 percent.
 - c. Potassium: 4 percent.
 - 2. Product: Sierra Chemical Co., "Agriform".
- H. Peat Moss: Shredded, loose, Canadian, Dutch, or German sphagnum moss; free of lumps, roots, inorganic material or acidic materials; minimum of 85 percent organic material measured by oven dry weight, pH range of 4 to 5; moisture content of 30 percent.
- I. Water: Potable, available on site.

2.3 ACCESSORIES

- A. Steel Edging: 1/8" x 4"; Ryerson, or approved equal.
- B. Guying and Staking Materials: As shown on Drawings.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify established grades are correct; determine locations of underground utilities prior to planting.
- B. Areas shall be free of weed and foreign material prior to planting.
- C. Do not begin planting until deficiencies are corrected, or plants replaced. To begin work indicates acceptance of site conditions.
- D. Saturate soil with water to test drainage.

3.2 PROTECTION

- A. Protect lawn areas from vehicular traffic and from material storage.

3.3 SOIL PREPARATION

- A. Plant Locations and Measurements:
 - 1. Stake outline of planting beds on ground.
 - 2. Stake locations of trees.
 - 3. Place shrubs and ground cover in indicated locations.
 - 4. Notify Owner of discrepancies between plants indicated on Drawings and actual conditions prior to planting.
 - 5. Plant locations will be approved by Owner prior to planting.
- B. Pits

1. Shape: Vertical sides and crowned bottom; Plant pits shall be circular.
 2. Size for Trees: double the width of the root ball, and 6 inches deeper than root ball.
 3. Size for Balled and Burlapped Shrubs: double the width of the root ball, and 4 inches deeper than root ball.
 4. Size for seedling trees: double the width of the root ball and 6 inches deeper than root ball.
 5. Scarify sides of bottom of planting pits to improve root penetration.
- C. Ground Cover and Shrub Beds: Excavate existing soil to depth specified.
- D. Obstructions Below Ground
1. Remove rock or underground obstructions to depth of 6 inches below bottom of plant ball or root, measured when plant is properly set at the required grade.
 2. If underground obstructions cannot be removed, notify Owner for new instructions.
 3. Avoid damaging underground utility lines.
 4. Repair damage to existing utilities.
- E. Final Grades:
1. Minor modification to grade may be required to establish final grade.
 2. Ensure proper drainage of site as determined by Landscape Architect.
 3. Fine grade areas so finished grades shall be 1 inch in lawn and 2 inches in shrub beds, below adjacent paved areas, sidewalks, valve boxes, headers, clean-outs, drains, and manholes, etc.
 4. Surface drainage shall be away from building foundations at 2 percent minimum, for 5-foot minimum.
 5. Fill erosion scars and compact prior to planting.
- F. Disposal of Excess Soil
1. Use acceptable excess excavated topsoil for filling holes, pits, and beds as directed by the Owner.
 2. Dispose of unacceptable or unused excess soil at off-site location as directed by Owner.
- G. Shrub and Ground Cover Beds
1. Preplant Weed Control:
 - a. If live perennial weeds exist on site at beginning of work, spray with nonselective systemic contact herbicide, as recommended and applied by approved licensed landscape pest control advisor and applicator. Leave sprayed plants intact for minimum 15 days to allow systemic kill. Apply herbicide in accordance with manufacturer's instructions.
 - b. Clear and remove existing weeds by scraping or grubbing off plant parts at least ¼-inch below surface of soil over entire area to be planted.
 2. Soil Amendment:
 - a. Subgrade: 10 inches below finish grade. Layer of soil amendments shall be 8 inches deep, leaving finish grade after watering and settling 2 inches below adjacent paved areas. Excavation and fill may be required to achieve grades.
 - 1) Organic Soil Conditioner: 4-inch deep layer.
 - 2) Topsoil: 4-inch deep layer.
 - 3) Fertilizer: 5 pounds per 1000 square feet of bed area.
 - b. Spread amendments uniformly, cultivate thoroughly to light and friable consistency, using mechanical rototiller into top 2 inches of subgrade. Make bed approximately 6-inch total depth of amended soil.
 3. Pre-Emergence Herbicide: Apply at rates recommended by manufacturer. Incorporate into top ½-inch of soil by hand raking.

4. Top 2 inches of areas to be planted shall be free of stones, stumps, or other deleterious matter 1-inch in diameter or larger; free from wire, plaster, or similar objects that hinder planting or maintenance.

H. Planting Mixture for Trees and Pocket Planting of Large Shrubs 5 Gallons and Larger:

1. Topsoil: Two parts.
2. Organic Soil Conditioner: One part.
3. Sharp Sand: One part.
4. Water Release Crystals: Thoroughly incorporate into mixture in accordance with following rates:
 - a. Trees: ½ cup per inch if trunk caliper, measured 6 inches above root ball.
 - b. Shrubs:
 - 1) 1 gallon: 1-1/2 tsp.
 - 2) 2 gallon: 1 tbsp.
 - 3) 3 gallon: 1-1/2 tbsp.
 - 4) 5 gallon: 2-1/2 tbsp.
 - 5) 10 gallon: 5 tbsp.
 - c. Ground cover Beds: 2-1/2 pounds per 100 square feet rototilled 4 inches to 6 inches deep into soil.

I. Seedling Tree Pits:

1. Organic Soil Conditioner: One part
2. Existing Soil: Four parts
3. Water Release Crystals: 2 tablespoons

3.4 PLANTING

- A. Plant during periods when weather and soil conditions are suitable and in accordance with locally accepted practice, or as approved by Owner.
- B. Distribute number of plants which can be planted and watered on same day.
- C. Open containers and remove plants in manner to not break root ball. Plant and water as specified immediately after removal from containers. Do not open containers prior to placing plants in planting area.
- D. Set plants in pits at level shown on Drawings. Set plants plumb and rigidly braced in position until planting mixture has been tamped solidly around plant ball. Thoroughly settle plant by watering and tamping mixture. Rake planting beds level before and after planting. Thoroughly water trees and shrubs. Stake and guy trees as shown on Drawings.
- E. Balled Plants
 1. Place in pit on hand tamped planting mixture.
 2. Place with burlap intact so location of ground line at top of plant ball shall be same as prior to digging.
 3. Remove binding at top of ball and lay burlap back from top _ of plant ball.
 4. Do not pull wrapping from under ball.
 5. Do not plant if ball is cracked or broken before or during planting process or if stem is loose.
 6. Backfill with planting mixture.
- F. Container-Grown Plants
 1. Cut cans on two sides with can cutter.
 2. Do not injure root ball.

3. Remove plants without injury or damage to root balls. Superficially cut edge roots with knife on three sides.
 4. Place in pit on hand tamped planting mixture.
 5. Backfill with planting mixture.
- G. Mulching – decomposed Granite or River Stone
1. Cover watering basins or planting beds evenly with layer of mulch minimum of 3 inches deep, after settlement.
 2. Areas on slopes designated to receive erosion control netting shall not be mulched.
 3. Water immediately after mulching.
 4. Hose down planting area with fine spray to wash mulch off of leaves of plants.
- H. Pruning
1. Prune minimum necessary to remove injured twigs and branches, deadwood, suckers.
 2. Do not prune evergreens, except to remove injured branches.
 3. Pruning shall not exceed _ branching structure.
 4. Make cuts flush leaving no stubs.
 5. Paint cuts over ¾-inch diameter with tree wound paint.
- I. Root Activator: Use on trees as recommended by manufacturer.
- J. Steel Edging: Install as shown on Drawings and in accordance with manufacturer's recommendations.
- K. Staking and Guying: Stake trees immediately after planting as shown on Drawings.
1. Wrap stakes with reflective tape at one foot intervals when tree pits are within 15 feet of pedestrian walks, drives, or parking.
- L. Ground Covers
1. Plant in straight rows and evenly spaced, unless otherwise shown; at intervals shown on Drawings. Use triangular spacing unless otherwise shown on Drawings.
 2. Irrigate immediately after planting until entire area is soaked to full depth of each root ball.
 3. Protect plants after planting. Repair damage to plants caused by trampling or other operations.
- M. Controlled Release Fertilizer: Provide fertilizer tablets in accordance with manufacturer's instructions at following rates:
1. Shrubs, less than 5 gallons: None.
 2. Shrubs, 5 gallons or larger: Two each.
 3. Trees: One tablet per ½-inch of trunk caliper, measured 1 foot above top of root ball.
- N. Watering
1. Water as required when soil moisture is below optimum level for best plant growth.
 2. Coordinate watering with Owner and recommend watering schedule for areas to be watered with landscape irrigation system as well as those to be watered manually.
- O. Pruning: Prune trees or plant materials or trim in accordance with NAA; alter shape with approval of Owner. Removal of branch leaders (TIPS) will not be acceptable.

3.5 CLEANING

- A. Remove trash, excess soil, empty plant containers, and rubbish from property. Repair scars, ruts, or other remarks in ground. Leave ground in neat and orderly condition throughout site.
- B. Wash down paved areas, leaving premises in clean condition.

3.6 ADJUSTING

- A. Trees, plants, and ground cover shall be in healthy growing condition, weed free, pruning complete and staking and guying secure.
- B. Mark materials not conforming to specified requirements as defective and rejected; remove from site and replace with new.
- C. Remove dead, injured, or diseased materials, or materials not true to name or size; replace with new.
- D. Repair damage to trees, plants, ground cover, and lawns.

END OF SECTION 029500

SECTION 102 EXCAVATION AND BACKFILL FOR UTILITIES

D-102.01 SCOPE: This section shall govern all excavation and backfill which will be encountered during the work, and supplements those paragraphs pertaining to excavation in Sections entitled "SPECIFICATIONS FOR SDR 26-GRAVITY SEWER PIPING", "WATER LINE CONSTRUCTION", AND "PVC PIPE WATER CONDUITS & INSTALLATION" of these specifications.

D-102.02 CLASSIFICATION: All excavation for this Project shall be considered unclassified. The Contractor is expected to determine the nature of the work and to make his bid prices reflective of the actual conditions which will be encountered. No claim for extra compensation shall be made by the Contractor due to rock, or other unfavorable excavation conditions encountered during the course of the work.

D-102.03 EXISTING UTILITIES: Before commencing excavation, the Contractor shall notify all utility companies with sufficient lead time, and confirm the location of existing underground lines and conduits in the work area by calling 811.

D-102.04 CLEARING: The Contractor shall do all clearing, grubbing, etc. necessary to complete the work.

D-102.05 DEWATERING: The Contractor shall provide and maintain adequate equipment to remove and dispose of all surface and ground-water entering excavations, trenches, or other parts of the work.

D-102.06 EXCAVATION: Unless otherwise ordered by the Engineer in writing, trench shall be as indicated in the Drawings, and trenching for water lines shall be excavated to a depth of five feet.

D-102.07 SHEETING AND SHORING: Where necessary to protect workmen, the work, or the existing structures, the Contractor shall sheet, brace, and shore the excavation to prevent caving or sliding. This item is further described in Division D, Section 802, entitled "SHEETING AND BRACING".

D-102.08 DISPOSAL OF EXCESS SOIL: Unless otherwise specified, the Contractor shall dispose of all unsuitable or excess excavation spoil daily. Disposal shall be made at a location and in a manner which is acceptable to the Owner.

D-102.09 PIPE ZONE: The "pipe zone" shall mean that portion of the trench which extends from 24 " above the top of the pipe joints to the bottom of the excavation. "Above the pipe zone" shall mean that portion of the trench which shall extend from 24" above the top of the pipe joints to the top of the finished surface.

D-102.10 BLASTING: Shall be prohibited except where allowed in writing by the City and Engineer. The Contractor shall take all necessary precautions as specified in the General Provisions of these Specifications. The Contractor shall be solely responsible for any damage incurred due to blasting.

D-102.11 OVER-EXCAVATION: In the event of over-excavation, the over-excavated depth of the trench shall be filled with the appropriate bedding material.

D-102.12 STABILIZATION: Subgrades for pipe work shall be firm, dense, and thoroughly consolidated. The subgrade shall be free of mud, muck, loose material and debris, and shall remain firm and intact under the workmen's feet.

D-102.13 PIPE EMBEDMENT & PIPE ZONE BACKFILL: The first layer of backfill shall be sufficient to provide a compacted depth of one-half the outside diameter of the barrel. This layer shall be placed by hand and tamped with hand or pneumatic tampers. The rest of the pipe zone shall be placed in a similar manner in layers not to exceed 8" loose measure to the top of the pipe zone. Unless otherwise specified, the embedment and material in the pipe zone shall be zero P.I. sand or gravel material, as specified by the engineer. Select excavation material may be acceptable; however, the contractor shall be required to submit ample sieve analysis results from a reputable independent testing laboratory to the engineer in order to use such materials for embedment. Backfill material containing rock over 3" in any dimension shall not be used in trenches under paved areas. The pipe trench shall be backfilled in a manner so as to prevent future settlement for a period of one year after date of final payment. All secondary backfill material shall be as required on section D-102.14, 1.2.

Before leaving the work at night or any other time, the upper ends of all pipes shall be securely closed with a tight fitting plug and provisions shall be made to keep the line from floating out of place should the trench fill with water. Any damage to the lines from failure to follow these provisions shall be repaired at Contractor's expense.

Provisions must be made at all times to keep the interior of the pipe that has been laid free from dirt, silt, gravel, and any other foreign matter and any such material that is deposited within the pipe from any cause whatsoever must be removed as the work progresses.

D-102.14 BACKFILLING: All trenches and excavations shall be backfilled within 24 hours after pipes are installed therein unless other means of protecting the pipe is directed by the Engineer. At no times, however, shall any backfilling be done until the Engineer has inspected the pipe to be covered. Backfilling requirements:

Materials:

1.1. Initial (primary) backfill to a point of 12 inches above the top of pipe shall be done as follows:

1.1.1. Suitable excavated material placed in uniform lifts not more than 6 inches in depth and shall be compacted to the density specified herein. The maximum dry density and optimum moisture shall be determined as per TxDot Tex-114-E. Test for in place density shall be in accordance with TxDOT Tex-115-E within 24 hours after compaction. Each lift shall be compacted to the required density and moisture as shown below, unless otherwise shown on the plans:

<u>Subgrade Material</u>	<u>Density</u>	<u>Moisture Content</u>
<u>PI < 20</u>	<u>≥ 95 % of Max Dry Density</u>	<u>± 2% of Opt. or greater</u>
<u>PI > 20</u>	<u>≥ 95 % of Max Dry Density</u>	<u>≥ Opt. Moisture</u>

1.1.2. Zero PI Sand. When shown on the plans, backfill the primary trench zone with zero PI sand. Non-plastic material meeting the specifications below will not be required to be tested for density.

OPTION ZERO P.I.
SIEVE ANALYSIS

Passing 3/8" sieve	95-100%
Passing 1/4" sieve	85-100%
Passing No.40 sieve	75-100%
Passing No.80 sieve	20- 90%
Passing No.200 sieve	00- 20%

The sand shall be placed in layers no to exceed 10 inches in depth and lightly tamped to consolidate the mass against pipe and earth surfaces.

There is no separate item for sand, unless shown on the plans as a separate pay item.

1.1.3. Flowable Backfill. When shown on the plans, conform with Division D Section 134.

There is no separate item for sand, unless shown on the plans as a separate pay item.

1.1.4. Select Fill or Flexible Base (gravel, caliche, crushed limestone).

Clean gravel approved by the engineer may be used for backfill from the bottom of the trench to the 12 inches above the top of pipe. The gravel shall be placed in layers no to exceed 10 inches in depth and lightly tamped to consolidate the mass against pipe and earth surfaces.

Flexible base material (caliche, crushed limestone) may be used from the bottom of the trench to 12 inches above the top of the pipe or to the bottom of the street base in lifts no to exceed 8 inches. Material shall contain the required moisture to obtain the density for each layer to no less of 95% of the maximum dry density. There is no separate item for sand, unless shown on the plans as a separate pay item.

1.2. Secondary Backfill. After the initial backfill has been completed at a point of 12 inches above the top of pipe, the material for secondary backfill shall be placed in uniform layers no more than 10 inches in depth (loose measurement) and shall be compacted to the required density specified herein. Excavation material used for secondary backfill shall comply with the following unless shown on the plans:

Secondary Backfill

Under Pavement		
-		
<u>Subgrade Mat.</u>	<u>PI < 20</u>	<u>PI > 20</u>
<u>Density</u>	<u>≥ 95% Max Dry Dens.</u>	<u>≥ 95% Max Dry Dens.</u>
<u>Moisture Cont.</u>	<u>± 2% of Opt. or greater</u>	<u>≥ Opt. Moisture</u>
-		

Within the R.O.W. or Easement		
-		
<u>Subgrade Mat.</u>	<u>PI < 20</u>	<u>PI > 20</u>
<u>Density</u>	<u>≥ 90% Max Dry Dens.</u>	<u>≥ 90% Max Dry Dens.</u>
<u>Moisture Cont.</u>	<u>± 2% of Opt. or greater</u>	<u>≥ Opt. Moisture</u>
-		

(1). Timing of backfill: All trenches and excavation shall be backfilled within twenty-four (24) hours after pipes are installed, unless other means of protecting pipe is directed by the Engineer. At no time, however, shall any backfilling be done until the Engineer has inspected the pipe to be covered. In the case the trench cannot be backfilled, steel plates shall be used to protect the public.

(2). Backfill placement: After the bedding has been prepared and the pipes installed as required by the pertinent specifications, selected materials from excavation or borrow shall be placed along both sides of the pipe equally in uniform layers not exceeding six (6) inches in depth (loose measurement) in the primary backfill zone and ten (10) inches in depth (loose measurement) in the secondary backfill zone, wetted if required, and thoroughly compacted so that on each side of the pipe there shall be a berm of thoroughly compacted material at least as wide as the external diameter of the pipe, except insofar as undisturbed material obtrudes into this area.

(3). Addition to backfill: Whenever excavation is made for installing pipe culverts or sewers across private property or beyond the limits of the embankment, the top soil removed in excavating the trench shall be kept separate and replaced, as nearly as feasible, in its original position, and the entire area involved in the construction operations shall be restored to a presentable condition.

(4). Earth trench: In earth trench, the pipe shall be placed on the natural, undisturbed earth foundation with the trench bottom flat or nearly so. Where rock, shale, or boulders are encountered in the trench, the same shall be removed to a depth of six (6) inches below the grade line and the trench shall be refilled with good, sound earth, gravel, or granular material up to original grade and tamped into place.

(5). Inspection: Prior to the final approval of the utility lines, the Engineer, accompanied by the Contractor's representative, shall make a thorough inspection by appropriate methods of the entire installation. Any indication of defects in material or workmanship or obstruction in the pipe due to the Contractor's negligence shall be corrected by the Contractor without additional

compensation and in a manner as directed by the Engineer.

- ① **GENERAL:** There are five (5) different conditions for backfill of proposed pipe. The plans indicate which condition shall prevail in each section or block of the "pipe route". If the plans do not indicate a backfill condition, Condition "A" shall prevail.

Please refer to the appendix for Utility Trench Backfill Methods.

D-102.15 WATER JETTING: Only in "Condition C" above, and for pipe diameters of 12" or less, and in trenches 8' or less, and only when authority is obtained in writing from the City Engineer, backfill may be compacted with water by use of the jetting method. When using the jetting method, backfill above the pipe zone shall be placed in lifts not to exceed 5 feet. Water jetting shall be delivered under sufficient volume and pressure through an approved jetting hose and pipe nozzle. The jetting hose shall have a minimum inside dimension of two inches (2"). The jetting hose shall be connected to an approved minimum two inches (2") water pump capable of delivering water at the volume and pressure as required by the Engineer. The pipe nozzle shall be of sufficient length to introduce the water at a depth of not less than one foot (1') above the preceding lift. Points of trench jetting shall be staggered along the length of the trench and spaced at not more than three feet (3') on centers. Each five feet (5') lift shall be jetted initially at a depth of not more than one foot (1') above the preceding lift. Sufficient water shall be introduced into the secondary backfill to cause complete subsidence of the backfill and develop free standing water at the surface of each lift. After the final lift has been jetted as approved, twelve (12) hours shall be allowed for the reduction of the materials moisture content. When the backfill moisture content is acceptable for mechanical or pneumatic compaction, the surface shall be compacted to the satisfaction of the Engineer. The surface of the final lift of trenches subject to traffic shall be compacted by ditch tamping equipment.

D-102.16 SITE RESTORATION: The Contractor shall remove and dispose in an acceptable manner of all excess construction material, trash, debris, excess spoil material, etc., from the construction site. All pavement, fences, drainage structures, drainage ditches, and etc., shall be replaced to a condition as good as, or better than, the original structure as existed. The site shall be graded to a smooth well drained condition.

D-102.17 EXISTING GROUND WATER CONDITIONS: Where ground water conditions exist, the following shall apply inclusive of crushed stone or gravel backfilling. No pipe shall be laid in trench containing water. There will be no separate payment for trench dewatering or the materials, equipment, or labor required to reestablish wet trenches to the conditions and specifications required herein. Non-Storm Water Discharge Permit will need to be obtained from the Environmental Services Department.

D-102.18 DISPOSAL OF EXCAVATED MATERIALS: Excavated materials, so far as needed and of a suitable and acceptable character, shall be piled adjacent to the excavations to be used as backfill as required. All excavated material that is unsuitable for backfilling purposes or which is in excess of the amount required or needed to satisfactorily complete the backfill, shall be disposed of daily. The character and suitability of all backfill material shall meet the approval of the Engineer. Desirable top soil, or sod, etc., shall be carefully piled separately from the other excavated material

so that it can be placed in this original position when required. Excavated material shall be handled at all times in such manner as to cause a minimum of inconvenience to public travel and to permit safe and convenient access to private and public properties adjacent to or along the line of the work. In parkways and easements, where it is necessary to deposit excavated materials on lawns during the progress of the work, care shall be taken to prevent damage to such lawns. Where damage is done to such lawns all expense of replacing the lawn shall be borne by the Contractor.

D-102.19 REMOVAL AND REPLACEMENT OF SOD, SHRUBBERY, PLANTS, ETC.:

Where it is necessary to remove the sod, shrubbery, plants, etc., in order to make any excavation for this work, such areas as are backfilled shall have the same sod, shrubbery, plants, etc. replaced in good condition or if necessary to furnish new sod, shrubbery, or plants of the same kind and in good condition, same shall be furnished by the Contractor at his expense.

The sod, where removal is deemed necessary, shall be removed in squares cut out with a sharp spade or other satisfactory tool; the square shall be of such sizes that they may be conveniently handles without breaking. Such sod shall be removed in layers of not less than four inches (4") depth and shall be stored and given proper attention to protect sod from drying out, pending the time of replacement.

If trees and plants shall be removed, this work shall be done in the approved manner as to require protection of roots, branches, etc.; when backfilling is completed the trees and plants shall be replaced in their original position or as near such position as possible.

If irrigation system has to be removed and replaced, refer to Section 806.

D-102.20 PROTECTION OF TREES, PLANTS, SHRUBBERY, ETC.: In developed areas where trees, plants, shrubbery, etc., are adjacent to the line of work, the Contractor shall protect such trees, plants, or shrubbery by wooden boxes, frames, or guards of sufficient strength to prevent any injury from machinery, trucks, or workmen during the prosecution of the work.

D-102.21 Payment. No pay item will be included in the proposal nor direct payment made for excavation and backfill. The cost for placing the material shall be included in the unit price bid for the specific work function.

SECTION 104 PVC WATER PIPE

D-104.01 GENERAL

1. Description

This work shall consist of the construction, complete in place of PVC Water Pipe as specified herein, and in conformity with the lines, grades, dimensions, materials, and design shown on the plans.

D-104.02 PRODUCTS

1. Polyvinyl Chloride Water Pipe

A. GENERAL

All polyvinyl chloride (PVC) water pipe shall be of the rigid (UNPLASTICIZED) type and must bear the National Sanitation Foundation seal of approval for potable water pipe. Each joint of pipe shall consist of single continuous extrusion; bells or other components attached by solvent welding are not acceptable. Pipe shall be pressure rated at 305 psi (DR 14, C-900) as indicated.

Pipe shall have push-on, rubber joints of the bell and spigot type with thickened general bells with rubber gasket joints. The wall thickness of each pipe bell and joint coupling must be greater than the standard pipe barrel thickness. Clearance must be provided in every gasket joint for both lateral pipe deflection and for linear expansion and contraction. Concrete thrust blocking shall be placed behind bends and tees. Concrete support cradles or blocking shall be required for support of all fire hydrants, valves and AWWA C110 fittings; such support shall be provided for AWWA C153 fittings when required by the Engineer.

Pipe installed in any project must be manufactured within last twelve (12) months.

B. APPLICABLE SPECIFICATIONS

Except as modified or supplemented herein, PVC pipe shall meet the following standards:

-DR 14, C-900, Class 305 PVC Pipe to be used for installation of water mains 8" to 12" not deeper than 16 feet unless specifically identified in the plans. The use of 6" diameter is allowed for the Fire Hydrant assembly and other stubouts. All installation methods, testing procedures and backfilling requirements must be followed as per these specifications.

-Fittings used with PVC Pressure pipe shall be AWWA C-110 or AWWA C-153 compact ductile iron mechanical joint fittings manufactured in USA with 316 stainless steel bolts, rods and nuts

-DR 21 for PVC Pressure Pipe, in 2 and 3 inches nominal size,

-DR 18, C905, Class 235, for water mains 16 to 24 inches nominal size. Any pipe greater than 24" requires a separate specification submittal.

Standard sizes, dimensions and tolerances shall be as follows:

Nominal Size (inches)	Outside Avg. (inches)	Diameter Tolerance (inches)	Wall Min. (inches)	Thickness Tolerance (inches)
6	6.900	+0.011	0.493	+0.046
8	9.050	+0.015	0.646	+0.060
12	13.200	+0.015	0.943	+0.088

All pipe 2" and larger must be approved Underwriter's Laboratories for use in buried water supply and fire protection systems.

Concrete steel cylinder pipe: Requires a separate submittal for review and approval by the Utilities Director

C. MATERIAL REQUIREMENTS

All pipe and fittings shall be made from clean, virgin, NSF approved, Class 12454B PVC free of defects. Clean reworked materials generated from the manufacturer's own production may be used within the current limits of the referenced AWWA C-900 or C-905.

D. MARKING

Permanent marking on each joint piece shall include the following at intervals of not more than 5 feet:

- Nominal pipe size and OD base (e.g., 4 CIPS)
- The type of plastic material (e.g., PVC 12454B)
- The Standard Dimension Ratio and the pressure rating in psi for water at 73 F (e.g., DR 14, 200 psi).
- The AWWA designation with which the pipe complies (e.g., AWWA C-900).
- The manufacturer's name or code and the National Sanitation Foundation (NSF) mark.
- Install the marking facing up.

E. TRACER TAPE

For all non-metallic pipe 8" and larger, directly above centerline of the pipe and approximately 18" below finished grade, shall be placed Conductive Tracer Detection Tape. The tape shall be encased in a protective, inert, plastic jacket and color coded in accordance with APWA Uniform Code.

D-104.03 EXECUTION

1. Excavation

Trench all shall be straight. The minimum width of trench excavation shall not be less than the internal diameter of the pipe plus twelve (12") inches. The pipe shall have a minimum cover

of 36" unless shown otherwise on the plans.

2. Embedment Using Gravel or Granular Material

Where rock shale or boulders are encountered in the trench, the same shall be removed to a depth of 6" below the grade line and the trench shall be refilled with sand, gravel, or up to the original grade and tamped into place. Where ground water is found, replace the backfill material with gravel or granular material as shown on the construction plans, otherwise, at least the bedding and primary backfill shall be replaced with gravel or granular material.

3. Pipe Laying

Pipe shall not be laid where the sub-grade is in a condition unsatisfactory to the Engineer. If sub-grade is soft, spongy, or disintegrated, the material shall be removed until a firm, stable and uniform bearing is reached and the sub-grade brought back to grade with suitable materials thoroughly compacted in place. Embedment for the pipe or the pipe itself will NOT be laid in water.

Where pipe is installed beneath railroad tracks, construction clearance to cross under railroad trackage shall be obtained by Contractor or facility owner from proper railroad authorities. Any expense of bracing or support to tracks during excavation operation beneath trackage shall be considered part of the contractor.

Where pipe shall be installed beneath State Highways, construction clearance and other requirements to cross under State Highways shall be obtained from State Highway District Engineer by facility owner.

Proper traffic control devices as per TMUTCD shall be placed and maintained to assure maximum traffic and pedestrian safety, or as directed by Local, Railroad, State Highway authorities or other governing agencies.

Owner will obtain all permits for construction, and will make a formal application for the right to cross canals, railroads, highways, pipe lines etc., Contractor must cooperate fully with all agencies involved while construction in areas controlled by such agencies.

Before pipe is laid, all dirt shall be removed from inside; and all lumps, blisters, excess coal tar, dirt, oil, and grease removed from both inside and outside of pipe.

After pipe is laid, care shall be taken to avoid entrance of dirt, water or small animals by use of tight bulk heads in all openings.

Contractor shall not leave more than 600 linear feet of open trench.

4. Service Saddles

Service saddles shall be of the un-hinged type on PVC Class 900 pipe (size 6" to 12"). The saddle body and bottom is to be of 85-5-5-5 solid brass or as per the latest regulations,

material as per ASTM B-62, single width with a minimum of two (2) silicone bronze bolts and a cc-thread.

Bronze saddles with bronze bolts must meet the latest revision of AWWA specifications for saddles to be used on Class 900 PVC pipes.

-Saddles 6" to 12" are to be Jones J-996, or approved equal.

-Saddles 14" to 16" are to be Jones J-979, or approved equal

On January 4, 2014 the water pipe, fittings and fixtures must comply with the S.3874 Reduction of Lead in Drinking Water Act SEC.2 (d) (1) (A) not containing more than 0.2 percent lead when used with respect to solder and flux and (B) not more than a weighted average of 0.25 percent lead when used with respect to the wetted surfaces of pipes, pipe fittings, plumbing fittings, and fixtures.

For tapping sleeve valves Stainless Steel Saddle including body , bolts and nuts shall be Type 316 as per ASTM A240M (to meet or exceed).

These specifications are not intended to eliminate any material or equipment of equal quality and purpose of that specified, but instead designed to set standards. If the contractor wishes to use equal material or equipment, he shall submit a sample and/or written proof of quality that substitute is of equal or better quality to Engineer and Water Utilities Engineer and shall function as these plans and specifications intend.

5. Pipe Joints

Manufacturer's recommendations shall be followed.

6. Pipe Restraints

- **Mechanical joints:** Refer to Section 132
- **Concrete Thrust Blocks**

Thrust blocks shall be made of concrete and shall only be used where specifically call for in the plans or otherwise indicated by the engineer or inspection, in addition to restraints when the pipe line changes direction, as at tees and bends; changes size, as at reducers (also some crosses and tees); stops, as at dead end; or is expected to develop thrust at valves. The dimensions of the thrust block shall be as per concrete mix used should be of a minimum strength of 2500 psi or as specified by Engineer, dimensions should be.

The size and type of thrust block depends on pressure, pipe size, kind of soil, and the type of fitting. View Concrete thrust block details Drawing No. 104.

Thrust based on 150 psi water pressure. Area based on 2,000 psf soil bearing

	TEE	90 BEND	45 BEND	22 1/2 BEND
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Pipe Size	Thrust (PSF)	Min. Req'd. Area (S.F.)						
6"	5700	3	8055	4	4365	2	2205	1
8"	9870	5	13950	7	7560	4	3825	2
10"	16125	8	22800	12	12360	6	6255	3
12"	22965	12	32460	16	17580	9	8910	5
14"	31155	16	44040	22	23865	12	12090	6
16"	40320	20	57015	29	30885	16	15645	8

7. Storage

Storage of PVC shall be in the shade or shall be covered with a suitable cover. PVC pipe shall not be exposed to the sun longer than 24 hours while being laid.

8. Hydrostatic Tests

All pipe lines constructed under this contract before being accepted shall be tested with a hydraulic test according to *Section 116"Hydrostatic Tests for Pressure Mains"*.

The cost of testing and finding leaks and repairing the same and re-testing, if necessary, shall be at the expense of the Contractor. The water required to fill the lines shall be furnished by the Contractor.

9. Line Disinfection

The completed water line shall be disinfected according to *Section 118"Disinfection of Potable Water Mains"*.

The chlorinated water shall then be discharged from the water line and replaced with fresh potable water.

The Contractor will furnish all labor materials and equipment necessary to complete the proper disinfection of the line and the cost of this operation shall be included in the bid price for installation of the distribution system.

10. Measurement

PVC pipe will be measured for payment in linear feet along the center line of the trench. No

deduction will be made for valves and fittings.

11. Payment

PVC pipe will be paid for at the unit price per linear foot, complete in place, as provided in the proposal and contract. The contract price per linear foot shall be the total compensation for the furnishing of all labor, materials, tools, equipment, and incidentals necessary to complete work, including excavation, granular embedment material, backfill, and disposal of surplus materials, in accordance with the plans and these specifications.

SECTION 110 WATER VALVES

D 110.01 GENERAL

1. Description

This item to consist of valves furnished and installed as indicated. Unless otherwise indicated, all valves 4" and larger shall be AWWA type valves suitable design and fully equipped for service buried in earth, without need for further modification and shall be wrapped with 8 mil polyethylene film with all edges and laps securely taped to provide continuous wrap. Unless otherwise indicated, all valve stems shall be adjusted to situate the operating nut not less than 30" but not more than 36" below the proposed ground or paving surface of the finished project.

D 110.02 PRODUCTS

1. Materials

Contractor shall, as requested by the Utilities Director, submit descriptive information and evidence that materials and equipment Contractor proposes for incorporation into work is of the kind and quality that satisfies the specified functions and quality.

1. Iron Body Gate Valves, 6" to 12" shall comply with AWWA C509, resilient wedge gate valve.
2. Iron Body Gate Valves larger than 12", including Tapping Valve, shall conform to AWWA C515.
3. Stainless Steel Type 316 Tapping Sleeve:
 - a. Mechanical Joint end outlet and neck conforming to type 316 Stainless steel. The valve inlet flange shall have a machined projection or raised face complying with MSS SP-60 for accurate alignment to the mating recess in the tapping sleeve flange. Seat rings and body casting shall be over-sized as required to accommodate full size cutters; the outlet end shall be constructed and drilled to allow the drilling machine adapter to be attached directly to the valve.
 - b. Test plug ¾" NPT shall be stainless steel type 316
 - c. Body, bolts, nuts shall be stainless steel type 316, nuts coated to prevent galling.
 - d. SBR Body gasket to be full circumferential with hydro mechanical outlet seal, bridge plate to be stainless steel type 316.
4. Samples, Inspection and Testing Requirements.

All tests and inspections called for by the applicable standards shall be performed by the manufacturer. Upon request, results of these tests shall be made available to the City.
5. Other Requirements:

Each submittal shall be accompanied by:

 - Complete data covering the operator, including type and size, model number, etc., the manufacturer's name and address of his nearest service facility, the numbers of turns to fully open and close the valve, detailed instruction for calibrating the limit stops for open and closed positions and any other information which may be necessary to operate and maintain the operator.
 - Complete dimensional data and installation instructions for the valve assembly as it is to be installed, including the operator.

- Complete replacement parts lists and drawings, identifying every part from both the valve and operator.

2. Valves

1.
 - a. *Stem Seals*: All valves shall be approved O-ring type stem seals. At least two O-rings shall be in contact with the valve stem where it penetrates the valve body. All Valves must open counter clock and close clock wise.
 - b. *Operation*: All valves shall be approved O-ring type stem seals. At least two O-rings shall be in contact with the valve stem where it penetrates the valve body.
 - c. *Gearing*: Valves shall gear and, when necessary for proper bury depth and cover, shall be horizontal bevel-gear type enclosed in a lubricated gear case.
 - d. *Bypass*: Unless otherwise indicated, 16" and larger gate valve shall be equipped with a by pass of the non-rising stem type which meets the same AWWA standard required for the main valve.
 - e. *Valve Ends*: Valve ends shall be push-on, flanged or mechanical joint, as indicted or approved.
 - f. *Gear Case*: All geared valves shall have enclosed gear cases of the extended type, attached to the valve bonnet in a manner that makes it possible to replace the stem seal without disassembly and without disturbing the gears, bearing or gear lubricant. Gear cases shall be designed and fabricated with an opening to atmosphere so that water leakage past the stem seal does not enter the gear case.
 - g. *Valve Body*: Valves in 16" and larger sizes installed in the horizontal position shall have bronze rollers, tracks, scrapers, etc.
 - h. *Bolts*: The valves shall have bolts and nuts for the stuffing box and bonnet with the following compositions: type 316 stainless steel, nuts coated to prevent galling
 - i. *Stem*: The valve stem shall be made of bronze ASTM B-132 alloy C67600 bar stock material. The stem shall have at least one "anti-friction" thrust washer above and below the stem collar to reduce operating torque. Valves with cast stems or two piece stem collars are not acceptable.
 - j. *Body thickness*: The valve body, bonnet, stuffing box, and disc shall be composed of ASTM A-126 Class B grey iron or ASTM A395. The body and bonnet shall also adhere to the minimum wall thickness as set forth in Table 2, section 4.3.1 of AWWA C509.
 - k. *Resilient wedge*: The valve disc and guide lugs must be fully encapsulated in SBR ASTM D2000 rubber material. Guide caps of an acetal bearing material shall be placed over solid guide lugs to prevent abrasion and to reduce the operating torque.
 - l. *Coatings*: The valves shall have all internal and external ferrous surfaces coated with a fusion bonded thermosetting powder epoxy coating of 10 mils nominal thickness. The coating shall conform to AWWA C550.
 - m. The valve type shall be NRS (non-rising stem) or OS&Y (outside screw & yoke) as specified
 - n. The valve shall have an arrow cast on the operating nut or hand wheel showing opening direction. The direction of opening shall be as specified.
 - o. The NRS valves shall be provided with a 2" square operating nut and OS&Y valves shall be provided with a hand wheel. The bolt that attaches the operating nut to the stem shall be recessed into the operating nut so as not to interfere with valve wrench operation.
 - m. *Warranty*: The valves shall be warranted by the manufacturer against defects in materials or workmanship for a period of ten (10) years from the date of manufacture. The manufacturing facility for the valves must have current ISO certification.

D 110.03 EXECUTION

1. Construction Methods

1. Setting Valves

Unless otherwise indicated, main valves, blow-off valves and piping shall be set and jointed in the manner described for cleaning, laying, and jointing pipe.

Unless otherwise indicated, valves shall be set at the locations shown on the drawings as piping is being laid and such that their location does not conflict with other appurtenances such as curb ramps. A concrete or steel support shall be provided for each valve. Valves shall be installed so the tops of operating stems will be at the proper elevation required for the piping at the location indicated above but not exceeding 5ft. in depth. Valve boxes and valve stem casings shall be firmly supported and maintained, centered and aligned plum over the valve or operating stem, with the top of the box or casing installed flush with the finished ground or pavement in existing streets, and installed with the top of the box or casing approximately 6" below the standard street subgrade in streets which are excavated for paving construction or where such excavation is scheduled or elsewhere as directed by the Engineer.

2. Protective Covering

Unless otherwise indicated, all flanges, nuts, bolts, threaded outlets and all other steel component shall be coal tar coated and shall be wrapped with standard 8 mil (minimum) low density polyethylene film or 4 mil (minimum) cross laminated high-density polyethylene meeting ANSI/AWWA Specification C-105 current, with all edges and laps taped securely to provide a continuous and watertight wrap. Repair all punctures of the polyethylene, including those caused in the placement of bedding aggregates, with duct tape to restore the continuous protective rap before backfilling.

3. Valve Box, Casing and Cover.

Stems of all buried valves shall be protected by valve box assemblies. Valve box castings shall conform to ASTM A48, Class 30B. Testing shall be verified by the manufacturer. Valve box extension shall be as per manufacturer recommendations. Valve boxes shall be two piece, cast iron, screw type. The drop cover shall be lettered "WATER". A 24"x24"x6" thick minimum concrete collar around the valve box shall be provided.

D 110.04 MEASUREMENT

All types of valves will be measured per each complete assembly.

D 110.05 PAYMENT

Payment shall be full compensation in accordance with the pay item seen in the bid, for excavation, furnishing, hauling and placing valves and barrel extensions including all incidental and subsidiary material and work; preparing, shaping, dewatering, shoring of trenches, bedding, placing, adjusting to grade, couplings, sleeves, concrete support, joint restraints, valve stem extenders, concrete collars complete in place, and compacting backfill materials and for all other incidentals necessary to complete the installation, as indicated, complete in place.

SECTION 112 FIRE HYDRANTS

D-112.01 TYPE OF HYDRANT All fire hydrants shall be Dry Barrel, Traffic Model (break away), Post Type having Compression Type Main Valves (5 1/4" opening), closing with line pressure. Hydrants shall be cast-iron, fully bronze mounted, working pressure of 200 psi, test pressure of 400 psi, anything buried below the buried line shall be 316 stainless steel bolts and nuts, anything above may be 304 stainless steel bolts and nuts, all nuts coated to prevent galling and shall conform and be in accordance with the latest specifications and revisions of American Water Works Association (AWWA) Standard C-502 for Fire Hydrants for ordinary water works service, except for supplementary requirements contained herein.

D-112.02 DESIGN OF HYDRANT Hydrants shall be Mueller Company A423 Super Centurion with safety crash flange or approved equal.

D-112.03 FUNCTIONAL REQUIREMENTS Design Working Pressure shall be 200 psi (test pressure 400 psi). All parts shall conform to the required dimensions and shall be free from defects that could prevent proper functioning of the hydrant. All castings shall be clean and sound without defects that will weaken their structure or impair their service.

Inlet shall be side connection hub end for mechanical joint (ANSI A21.11 - current). Shoe shall be rigidly designed to prevent breakage, with harnessing lugs for joint restraint.

Lower Barrel shall be rigid to assure above ground break at traffic feature. Bury length of hydrant shall be 3 1/2 feet hydrant lead pipe may be elbowed up from main using restrained joints; flanged joints in lead pipes are not allowed. Flange type connections between hydrant shoe, barrel sections and bonnet shall have minimum 6- Stainless Steel Type 316 bolts and nuts for the underground fittings and Stainless Steel Type 304 for the above ground connections, all nuts coated to prevent galling.

Hydrant Main Valve shall be 5 1/4 inch I.D. Valve stem design shall meet requirements of AWWA C502, with operating nut turning clockwise to close. Operating nut shall be pentagonal - 1 1/2 inch (point to flat) at base, and 1 7/16" at top - 1 inch minimum height. Seat ring shall be bronze (bronze to bronze threading), and shall be removable with light weight stem wrench. Valve mechanisms shall be flushed with each operation of valve; there shall be a minimum of two (2) drain ports.

Traffic feature shall have replaceable break-away Stainless Steel stem coupling-held to stem by readily removable type 304 stainless steel fastenings. Break-away flange or frangible lugs shall be designed to assure above ground break. Break-away or frangible bolts will not be acceptable.

Outlet nozzles shall be located approximately 18" above ground. Each hydrant shall have two (2) 2 1/2 inch nozzles 180 degrees apart with National (American) Standard Fire Hose Coupling Screw Thread NFPA 1963 and one (1) 4 1/2 inch pumper nozzle with national standard thread. Nozzles shall be threaded or cam-locked, O-ring sealed, and shall have type 304 stainless steel locking devices. Nozzle caps (without chains) and cap gaskets shall be furnished on the hydrant. The cap nut shall have the same configuration as the operating nut.

Hydrant shall have Dry-Top Construction, factory lubricated oil or grease with the lubricant plug readily accessible.

Hydrant shall have double O-ring seals in a bronze stem sheath housing to assure separation of lubricant for water and shall have a weather seal, to provide complete weather protection.

D-112.04 VALVE FACING The main valve of the hydrant shall be SBR Rubber with a 90 Durometer hardness. The hydrant shall be equipped with a travel stop device located in the top of the hydrant which terminates the downward travel of the main rod. Travel stop devices in the form of a stop in the elbow of the hydrant which could allow the main rod to be put into compression if the hydrant is "over opened" will not be permitted.

D-112.05 LOWER BARREL SECTION The lower barrel section shall be made to conform with the section thickness requirements of AWWA Specification C-502-1973, or the latest revision thereof, and can be furnished in Gray Iron or Ductile Iron. Screwed on flanges are not acceptable.

D-112.06 HYDRANT ADJUSTMENT The hydrant must be capable of accommodating an extension piece at the ground line without shutting down the hydrant or excavating. No more than two (2) fire hydrant extensions will be permitted.

D-112.07 OPERATING NUT Hydrant operating nut and cap nuts shall be pentagonal shape 1 1/2" point to flat NST unless otherwise specified. The operating nut shall be a combination weather shield and functional operating device that will protect all operating parts from excessive moisture intrusion by means of an "O" ring seal.

D-112.08 BREAK-AWAY STEMS Break-away stem coupling shall be of stainless steel; its retaining pins, bolts, nuts, etc., of type 316 stainless steel, nuts shall be coated to prevent galling.

D-112.09 SETTING FIRE HYDRANTS Fire hydrants shall be located in a manner to provide accessibility and in such a manner that the possibility of damage from vehicles or conflict with pedestrian travel will be minimized. Unless otherwise directed, the setting of any hydrant shall conform to the construction drawings.

All hydrants shall stand plumb; those near curbs shall have the 4 1/2" nozzle facing the curb and perpendicular to it. The hydrant bury mark shall be located at ground or other finish grade; nozzles of all new hydrants shall be approximately 18" above grade. Lower barrel length shall not exceed 5 feet. No more than two (2) fire hydrant extensions will be permitted unless approved by the Utilities Engineer. Each hydrant assembly shall be connected to the water main by an anchor tee fully restrained, 6" ductile iron or PVC pipe fully restrained; a restrained 6" gate valve as per Section 110 shall be installed in the line for individual shutoff of each new hydrant.

The bonnet of the Fire hydrants on mains under construction shall be painted white. When the mains are accepted and placed in service this hydrant shall be repainted to original color.

D-112.10 SUPPLEMENTAL DETAILS

A. HYDRANT OUTLET: Each hydrant shall have two (2) 2 1/2" hose nozzles and one (1) 4 1/2"

pumper with National Standard Threads.

B. DIRECTION OF OPENING: Hydrant shall open by turning to the left (counterclockwise) and shall close by turning to the right (clockwise).

C. DRAIN OPENING: Each hydrant shall have two (2) external drain ports. Drain valve mechanisms that include springs or rods are not acceptable.

D. PAINT: The exterior surface of the hydrant shall be coated with a coating that shall meet or exceed the requirements of Federal Specification TT-C-494b. A second coat of water based or oil based enamel paint red in color will then be applied from the top of the hydrant to a point 18 to 20 inches below the center line of the pumper nozzle or down to the traffic safety flange connection at the ground line.

All interior surfaces, machined surfaces, such as the threaded portion of the stem or stem nut, which must fit closely with the adjacent parts, shall be coated with a coating that shall meet or exceed Federal Specification TT-C-494b. Stem surfaces contained within a lubricant reservoir and not in contact with potable water may be free of coating.

The interior and exterior of the hydrant shoe shall be coated with a fusion-bonded epoxy having a nominal dry film thickness of 8 mils, conforming to ANSI/AWWA C550-01, and certified to NSF 61.

E. IDENTIFICATION TAG: A brass identification tag shall be provided to each hydrant that is connected to a water main of 16" diameter or bigger. The tag shall be bolted down at the bonnet and the diameter of the main line shall be engraved.

F. FH MARKERS: Raised blue pavement markers shall be provided on public and private streets to indicate the locations of the fire hydrants. These markers shall be placed just off center to the side the fire hydrant is located.

D-112.11 MEASUREMENT Fire hydrants will be measured per each complete assembly.

D-112.12 PAYMENT Fire hydrants installation shall be paid for at the unit price bid per each, including fittings between the main line and the fire hydrant, anchor tee, gate valve, joint restraints, piping, brass identification tag, polyethylene wrapping, setting, adjusting to grade, and other appurtenances necessary for proper operation.

SECTION 116 HYDROSTATIC TESTS FOR PRESSURE MAINS

D-116.01 GENERAL

1. Summary

A. Measurement and Payment

1. Separate payment will not be made for hydrostatic testing of water mains. Include costs for testing, repair of defects, and retesting required in this section in appropriate unit prices bid for water line construction.
2. The costs associated with purchase of water to fill proposed lines for flushing, disinfecting, chlorination, dechlorination, and hydrostatic testing shall be paid by the Contractor. Said costs shall be subsidiary to the unit price bid for construction of appropriate size of water line.

2. Quality Assurance

- A. Contractor shall perform hydrostatic tests on water lines in accordance to AWWA C600-93 and these specifications. Hydrostatic test must be performed in the presence of the City of Laredo Utilities Inspector.

3. Submittals

- A. Submit in accordance with the Standard General Conditions and Supplementary Conditions.
- B. Copies of all testing results shall be submitted to the Engineer prior to acceptance of piping system.

D-116.02 PRODUCTS

1. Water

- A. Water used to fill proposed lines, for flushing, for disinfection, and testing of lines shall be potable water from the City of Laredo. Contractor shall coordinate and contract with the City for a temporary construction meter to be located off an existing fire hydrant, if available; otherwise a temporary fire hydrant shall be furnished by the Contractor.

D-116.03 EXECUTION

1. General

- A. Conduct pressure and leakage tests in accordance with Section 3 of AWWA C600 of these specifications. Contractor must notify City of Laredo Utilities Engineer 48 hours prior to pressure and leakage testing.
- B. Commence test procedures when following conditions met.
 1. Pipe section to be tested is clean and free of dirt, sand, or other foreign material.
 2. Pipe outlets plugged with test plugs. Plugs, pipes, fittings, and valves secured to prevent blowouts.
 3. Value of applied test pressure checked at each point in test section to ensure it does not exceed maximum allowable pressure of pipes, valves, fittings, and

appurtenances.

- C. Safety: Perform pressure testing in accordance with OSHA requirements and in manner protecting worker, bystanders, and adjacent property.
- D. Correct leaks defects, and retest until acceptable results obtained.

D-116.04 PRESSURE TESTS

- A. Test pressures shall be as follows:
 - 1. Water Main Test Pressure: 150 psi at highest elevation in test section.
- B. Test Procedure:
 - 1. Add water to expel air.
 - 2. Pressurizing equipment shall include regulator set to avoid over pressurizing and damaging otherwise acceptable line.
 - 3. Make test connection, subject main to normal water pressure, and examine for leaks.
 - 4. Apply test pressure by means of force pump of design and capacity that required pressure can be applied and maintained without interruption for duration of test.
 - 5. Measure test pressure by means of tested and properly calibrated pressure gauge.
 - 6. Maintain initial test pressure for sufficient length of time to permit inspecting piping under test, but not less than 30 min.
 - 7. In case repairs are required, repeat pressure test until pipe installation conforms to specified requirements.
 - 8. Perform final test at required test pressure for 4 hrs.
- C. Water main considered to have failed pressure test if applied pressure drops 1 psi.

D-116.05 LEAKAGE TEST

- A. Conduct pressure test and initial leakage test concurrently. Final leakage test may be waived by Engineer if found unnecessary to add water during duration of final pressure test.
- B. Leakage defined as quantity of water to be supplied into newly laid pipe, or section thereof, necessary to maintain specified leakage test pressure after main has been filled with water and entrapped air expelled.
 - 1. Leakage shall not exceed number of gph as determined by following formula for rubber-sealed joints.

$$L = \frac{ND(P)^{1/2}}{7,400}$$

Where:

- L= allowable leakage in gallons per hour
- N= number of joints under test
- D= nominal diameter of main in inches
- P= average pressure in lbs./sq. in. gauge during leakage test

2. If section under test contains joints of various diameter allowable leakage will be sum of computed leakage for each size of joint.

C. Test Procedure:

1. Submit test section to approximately 150 psi gauge pressure at highest elevation of water main under test.
2. Conduct final leakage test for 4 hours.
3. Repair defects and retest until acceptable results obtained.

D-116.06 MEASUREMENT AND PAYMENT

There will no separate measurement or payment for Hydrostatic Tests for Pressure Mains, all cost shall be included in the various bid items involved.

SECTION 118
DISINFECTION OF POTABLE WATER MAINS

D 118.01 GENERAL**1. Summary****A. Section Includes:**

1. Requirements for disinfection of new water mains and existing water mains which has been relocated or contaminated by construction operations.

B. Measurement and Payment:

1. Include cost of work specified in this section in unit prices bid for construction of appropriate water line.
2. Costs associated with purchasing of water to fill proposed line, for flushing, disinfecting, chlorination, dechlorination, and hydrostatic testing shall be paid for by the Contractor. Said costs are subsidiary to the unit price bid for construction of appropriate size water line.

2. References**A. American Water Works Association (AWWA):**

1. AWWA C651-92- Standard for disinfecting water main.

3. Submittals

- A. Prior to starting disinfection work, furnish detailed outline of proposed sequence operation, manner of filling and flushing units, source and quality of water to be used, and disposal of wasted water.
- B. Submit in accordance with the Standard General Conditions and Supplementary Conditions.
- C. Copies of all test results shall be submitted to the Engineer prior to acceptance of piping system.

4. Quality Assurance**A. Regulatory Requirements:**

1. Disinfection work shall be acceptable to Engineer, and to the City of Laredo Regulations. All testing must be performed at the presence of the City of Laredo Utilities Inspector.

B. Source Quality Assurance:

1. Perform work in connection with disinfection under direction of experienced supervisor.
2. Use equipment in proper working condition and adequate for specified work.

D 118.02 PRODUCTS**1. Chlorine**

- A. Chlorine gas-water solution or direct chlorine feed is preferred for disinfection.
- B. Use of high test calcium hypochlorite or tablet method of disinfection shall be approved by the Engineer.
- C. Tablet form calcium hypochlorite may be used only for water mains up to 12" in dia. and less

than 2,500 ft in length.

2. Water

- A. Water used to fill proposed lines, for flushing, and for disinfection and testing of lines shall be potable water from the City of Laredo. Contractor shall coordinate and contract with the City for a temporary construction meter to be located off and existing fire hydrant, if available, otherwise a temporary fire hydrant shall be furnished by the Contractor.

D 118.03 EXECUTION

1. General

- A. Method of disinfection for water containment devices and piping systems shall conform to AWWA C 651. Contractor must notify City of Laredo Utilities Engineer 48 hours prior to disinfecting a pipe.

2. Chlorine Preparation

- A. Liquid Chlorine:
1. Apply chlorine gas-water solution by means of solution feed chlorinating device of, if approved by Engineer, dry gas may be fed directly through proper devices for regulating rate of flow and providing effective diffusion of gas into water within unit being treated.
 2. Provide chlorinating devices for feeding solutions of chlorine gas that prevent backflow of water into chlorine cylinder.
- B. Calcium Hypochlorite:
1. Prepare granular calcium hypochlorite as water mixture before introduction into unit. Make dry powder into paste and thin to approximately 1% chlorine solution.
 2. To prepare chlorine solution, add 1 lb. of calcium hypochlorite (65% to 70% available to 7 1/2 gal of water.

3. Pipeline Preparation

- A. After pressure and leakage tests complete, flush units thoroughly to remove foreign material.
- B. Release entrapped air at high points and fill units with disinfecting agent and water to allow disinfecting agent to come in contact with interior surfaces.
- C. If complete venting cannot be accomplished through available outlets, provide necessary corporation cocks and vent piping.

4. Application of Disinfectant

- A. Point of Application:
1. Apply chlorinating agent at supply end of unit being disinfected.
 2. For pipes, apply disinfectant through corporation cock installed in top of pipe.
 3. Place tablets in accordance with AWWA C651.
- B. Rate of Application:
1. Introduce water at controlled rate in order to regulate chlorine dosage.

2. Proportion rate of chlorine mixture flow to rate of water entering unit so chlorine dose applied produces at least 25 mg/l chlorine residual after period of 24 hrs.
 3. Method of determining rate of flow of water into unit being disinfected shall be approved by Engineer.
- C. Isolating Systems:
1. Keep chlorine gas-water disinfecting solution and contaminated water from flowing into units previously chlorinated and flushed.
- D. Quality:
1. Retain chlorinated water in unit long enough to destroy nonspore-forming bacteria.
 2. Minimum retention period shall be 24 hrs with chlorine residual at end of this period of not less than 25 mg/l (ppm)
- E. Disinfecting Valves:
1. Operate valves and appurtenances while line or unit is being disinfected to ensure surfaces of valves are disinfected.
- F. Swabbing:
1. Flush and swap pipe, fittings or valves that must be placed in service immediately with 5% solution of calcium hypochlorite immediately prior assembly.
 2. Secure approval from Engineer before using this method of disinfection.
- G. Valve Operation:
- Valves proposed for construction shall be operated by Contractor. Existing City valve shall be operated by City personnel only. Contractor shall coordinate opening or closing of City valves and the isolation of City water lines with the City of Laredo Water Utilities.

5. Final Flushing and Test

- A. Following chlorination, flush unit or system until replacement water in system is proven to be comparable in quality to water which will enter unit or system.
- B. Laboratory tests shall be performed at the City of Laredo Testing Labs and samples will be taken by the City of Laredo Water Utilities Inspector.
- C. Repetition of Flushing and Testing:
 1. If initial treatment results in unsatisfactory bacterial test, repeat disinfection until satisfactory results obtained.
- D. Prevent entry of contaminated water into previously disinfected units or systems.
- E. Contractor shall discharge water at acceptable chlorine level. Any cost associated with de-chlorination shall be paid by Contractor.

D-118.04 MEASUREMENT AND PAYMENT

There will no separate measurement or payment for Disinfection of Potable Water Mains, all cost shall be included in the various bid items involved.

SECTION 120
CONCRETE ENCASEMENT, CRADLES, SADDLES, AND COLLARS

D-120.01 DESCRIPTION: This Item shall govern for placing concrete encasement, cradles, saddles, and collars, when called for the Project plans or as directed by the Engineer.

D-120.02 MATERIALS: Concrete: All concrete shall, at a minimum, conform to the provisions of TxDOT Specifications, (Item 421) 2004 edition or latest revision, "Concrete" (Class B) or shall be of the class noted on the plans.

D-120.03 CONSTRUCTION METHODS:

- 1. Concrete Encasement:** When concrete encasement is show on the plans or when directed by the Engineer, the trench shall be excavated and fine graded to a depth conforming with details and sections shown on the plans. The pipe shall be supported by precast concrete blocks of the same strength as the concrete for encasement and securely tied down to prevent floatation. Encasement shall then be placed to a depth and width conforming with details and sections shown on the plans.
- 2. Concrete Cradles:** When concrete cradles are shown on the plans or when called for by the Engineer, the trench shall be prepared and the pipe supported in the same manner as described in this specification and shall be constructed in accordance with details and sections shown on the plans.
- 3. Concrete Saddles:** When shown on the plans or when directed by the Engineer, pipe to receive concrete saddle shall be backfilled in accordance with TxDOT (Item No. 402) "Excavation, Trenching, and Backfill" to the spring line and concrete placed for a depth and width conforming with details and sections shown on the plans.
- 4. Concrete Collars:** When shown on the plans or when directed by the Engineer, concrete collars shall be constructed in accordance with details and sections shown on the plans.

D-120.04 MEASUREMENT: "Concrete Encasement, Cradles, Saddles, and Collars", will be measured by the cubic yard of accepted work, complete in place. Reinforcing, if required, shall not be measured for payment.

D-120.05 PAYMENT: There will be no separate payment for Concrete Encasement, Cradles, Saddles, and Collars; all materials, manipulation, labor, tools, equipment, and incidentals necessary to complete the work shall be included in the various bid items involved.

SECTION 122 ADJUSTING VALVE BOXES TO GRADE

D-122.01 GENERAL: Section includes adjusting elevation of valve boxes to new grades.

D-122.02 REFERENCE:

- A. ASTM C270 - Specification for Mortar for Unit Masonry.

PRODUCTS

D-122.03 CONCRETE MATERIALS:

- A. For cast in place concrete, conform to requirements to Section 504- Concrete and Section 406 - Concrete Structures.
- B. For mortar mix, conform to requirements of ASTM C270, Type S, using Portland Cement.

EXECUTION

D-122.04 EXAMINATION: Examine existing valve box for damage or defects that would affect adjustment to grade and report such damage or defects to the Utilities Engineer.

D-122.05 ESTABLISHING GRADE: Coordinate grade related items with existing grade and finished grade or paving.

D-122.06 ADJUSTING VALVE BOXES:

- A. Salvage and reuse valve box, if in good condition.
- B. Remove and replace 6-inch ductile iron or PVC riser pipe with suitable length for depth of cover required to establish the adjusted elevation to accommodate actual finish grade.
- C. Reinstall valve box and riser piping plumbed in vertical position. The nut of the valve shall be centered. The drop cover shall be lettered "WATER". A 24"x24"x6" thick minimum concrete collar around the valve box shall be provided

D-122.07 BACKFILL AND GRADING:

- A. Backfill the area of excavation surrounding each adjusted valve box and compact according to requirement of Section 102 - Excavation and Backfill for Utilities.
- B. Grade to ground surface to drain away from each valve box. Place earth fill around the valve box concrete slab, if the valve is outside of the pavement area.

D-122.08 MEASUREMENT AND PAYMENT: There will be no separate payment for Adjusting Valve Boxes to Grade; all materials, manipulation, labor, tools, equipment, and incidentals necessary to complete the work shall be included in the various bid items involved.

SECTION 128
DISPOSAL OF WASTE MATERIAL AND SALVAGEABLE MATERIAL

D-128.01 GENERAL: Section includes disposal of waste material and salvageable material.

D-128.02 SUBMITTALS:

- A.** Obtain and submit disposal permits for proposed disposal sites if required by local ordinances, TCEQ and/or EPA.
- B.** Submit a copy of written permission from a property owner, along with description of property prior to disposal of excess material adjacent to the Project. Submit a written and signed release from property owner upon completion of disposal work.

EXECUTION

D-128.03 SALVAGEABLE MATERIAL:

Excavated Material: when indicated on plans, load haul, and deposit excavated material at a location or locations shown on plans outside the limits of project.

Base, Surface, and Bedding Material: Local shell, gravel, bituminous, or other base and surfacing material designated for salvage.

Pipe Culvert: Load culverts designated for salvage into designated trucks.

Other Salvageable Materials: Conform to requirements of individual specification section.

Coordinate disposal of material with Environmental Services Director.

D-128.04 EXCESS MATERIAL:

- A.** Vegetation, rubble, broken concrete, debris, asphaltic concrete pavement, excess soil, and other materials not designated for salvage, shall become property of the Contractor and shall be removed from the job site and legally disposed of.
- B.** Excess soil may be deposited on private property adjacent to the project when written permission is obtained from property owner. See Paragraph 128.02B above.
- C.** Waste materials shall be removed from the site on a daily basis, such that the site is maintained in a neat and orderly condition.

D-128.05 MEASUREMENT AND PAYMENT: There will be no separate payment for waste material disposal; all materials, manipulation, labor, tools, equipment, and incidentals necessary to complete the work shall be included in the various bid items involved.

SECTION 132 PIPE JOINT RESTRAINT SYSTEMS

D 132.01 GENERAL

1. Description

This specification covers pipe joint restraint systems to be used on domestic water mains for PVC C-900 pipe sizes 4-inch through 12- inch diameter and PVC C-905 pipe sizes 16- inch through 24- inch diameter, and for Ductile Iron pipe sizes from 4- inch through 24-inch diameter. Joint restraint systems are classified as “mechanical joint” or non- metallic restrained joint “for the specific type of pipe joint to be restrained.

D 132.02 PRODUCTS

1. General Requirements

- A. Underwriter Laboratories (U.L) and Factory Mutual (FM) certifications are required on all restraint systems.
- B. Unless otherwise noted, restraint systems to be used on PVC C-900 and C-905 pipe shall meet or exceed A.S.T.M. Standard F1674-96, “Standard Test Methods for Joint Restraint Products for Use with PVC Pipe,” or the latest revision thereof and shall be made in USA only. Restraint systems used on ductile pipe shall meet or exceed U.L. Standard 194 and shall be made in USA only.
- C. Non-metallic restrained joint pipe and couplings shall be utilized specifically for C-900 PVC pipe and fittings in sizes 4”-12”, and for C-905 PVC pipe and fittings in size 16”.
- D. Each restraint system shall be packaged individually and include installation instructions.
- E. Each restraint system shall be wrapped with 8 mil. of polyethylene film with all edges and laps securely taped to provide continued wrap.

2. Specific Requirements:

A. Restrainer for PVC C-900/C-905 & Ductile Iron Push-on Type Connections:

1. Pipe restraints shall be utilized to prevent movement for push-on D.I. or PVC (C900&C905) (compression type) bell and spigot pipe connections or where a flexible coupling has been used to join two sections of plain-end pipe D.I. or PVC (C900&C905). The restrainer may be adapted to connect a plain end D.I. or PVC pipe to a ductile iron mechanical joint (MJ) bell fitting. The restrainer must not be directionally sensitive.

2. The pipe shall be restrained by a split retainer band. The band shall be cast ductile iron, meeting or exceeding ASTM A536-80, Grade 65-45-12. The inside face or contact surface of the band shall be of sufficient width to incorporate cast or machined non-directionally sensitive serration to grip the outside circumference of the pipe. The serration shall provide full (360 degrees) contact and maintain pipe roundness and avoid any localized points of stress. The split band casting shall be designed to “bottom-out” before clamping bolt forces (110ft-lb minimum torque) can over-stress the pipe, but will provide full non-directionally sensitive restraint at the rated pressures.
3. All T-head bolts, nuts and restraining rods shall be 316 Stainless Steel. Nuts coated to prevent galling.
4. The split ring type non-directionally sensitive restrainer system shall be capable of a test pressure twice the maximum sustained working pressure listed in section D and be for both D.I. and/or PVC C900.
5. Restraint systems sizes six through twelve inches shall be capable of use for both ductile iron and/or PVC C900.
6. The restraint system may consist of two types: the two split retainer rings and for new construction use only the one split and one solid cast backup ring.

B. Non-metallic restrained joint pipe and couplings for PVC C-900/C-905 Type Connections:

1. Gasketed restrained coupling connections shall join two sections of factory grooved PVC (C900/C-905) pipe, NSF 61. The restrainer coupling must not be directionally sensitive.
2. The coupling shall incorporate twin elastomeric sealing gaskets meeting the requirements of ASTM F-477 and shall be DR-14 Class 305 C-900 for 4” -12” pipe, meeting or exceeding the performance requirements of AWWA C-900, latest revision; and DR-18 C-905 for 16” pipe, meeting or exceeding the performance requirements of AWWA C-905, latest revision . The inside face or contact surface of the coupling connection shall be of sufficient width to incorporate a factory machined non-directionally sensitive groove in both pipe and coupling to grip the outside circumference of the pipe. The couplings shall provide full (360 degrees) contact and maintain pipe roundness and avoid and localized points of stress. The coupling shall be designed with an internal stop to align the precision-machined grooves in the coupling and pipe prior to installation of a non- metallic thermoplastic restraint spleen, and will provide full non-directionally sensitive restraint at the rated pressures.

3. High-strength flexible thermoplastic splines shall be inserted into mating precision –machined grooves in the pipe and coupling to provide full non-directional restraint with evenly distributed loading.
4. The non- metallic restrained joint pipe and couplings for PVC C-900/C-905 type non-directionally sensitive restrainer system shall be capable of a test pressure twice the maximum sustained working pressure and be for PVC: C-900 pipe sizes four (4) through twelve (12) inch, and C-905 pipe size sixteen (16) inch.
5. Non-metallic restrained joint pipe and couplings for PVC C-900 restrained systems sizes four (4) through twelve (12) inches shall be capable of use for both (DR 18) and four (4) through eight (8) inches for (DR 14) PVC C900 pipe. Non-metallic restrained joint pipe and couplings for PVC C-905 restrained systems size sixteen (16) inches shall be capable of use for (DR 18) PVC C905 pipe.
6. The non- metallic restrained joint pipe and couplings for PVC C-900 restraint system and for PVC C-905 restraint system shall consist of a pipe and couplings system produced by the same manufacturer meeting the performance qualifications of Factory Mutual (FM) and Underwriters Lab (UL).

D. Fitting Restraint for Ductile Iron Pipe (Only):

1. Radial bolt type restrainer systems shall be limited to ductile iron pipe in conjunction with Mechanical Joint (MJ) bell end pipe of fittings. The system shall utilize a standard MJ gasket with a ductile iron replacement gland conforming to ASTM A 536-80. The gland dimensions shall conform to Standard MJ bolt circle criteria.
2. Individual wedge restrainers shall be ductile iron heat treated to a minimum hardness of 370 BHN. The wedge screws shall be compressed to the outside wall of the pipe using a shoulder bolt and twist-off nuts to insure proper actuating of the restraining system.
3. All bolts, nuts and restraining rods shall be 316 Stainless Steel. Nuts coated to prevent galling.
4. Standard MJ gasket shall be virgin SBR meeting ASTM D-2000 3 BA 715 or 3 BA 515.

E. Maximum Sustained Working Pressure Requirements:

Nominal Diameter	PVC C-900 / C-905	Ductile Iron
4 & 6 inch	305 psi	350 psi
8 inch	305 psi	250 psi
10 & 12 inch	305 psi	200 psi

MANUFACTURER	MATERIAL	
	PVC C-900/C-905, DR-14/DR-18	Ductile Iron
EBBA Iron Sales, Inc.	2000 PV (Only C-900)	Megalug1100
Ford/Uni-Flange	UFR-1500-C 14"- 24"	Series 1400
Star Pipe Products (Domestic)	StarGrip Series 4000 (3"-12")	StarGrip Series 3000 (3"-12")

E. Restrained Flange Adapters:

MANUFACTURER	MATERIAL	
	PVC C-900	Ductile Iron
EBBA Iron Sales, Inc.	2100 Megaflange	2100 Megaflange
Ford/Uni-Flange	900	200, 400, 420

D 132.03 MEASUREMENT AND PAYMENT: There is no pay item for joint restraint systems. The cost of furnishing and installing joint restraints shall be included with and considered fully subsidiary to the unit bid price of the items that they restrain: pipe, valves, fittings, Etc.

**SECTION 134
FLOWABLE BACKFILL
(Controlled Low Strength Material)**

D-134.1 Description: Furnish and place flowable backfill for trench, hole, or other void without consolidation.

D-134.2 Materials.

A. Cement. Furnish cement conforming to **D-504.02**

B. Fine Aggregate. Provide fine aggregate that will stay in suspension in the mortar to the extent required for proper flow and that meets the gradation requirements of the aggregate gradation chart below.

Sieve Size	Percent Passing
3/4 in.	100
No. 200	0-30

Test fine aggregate gradation in accordance with Tex-401-A. Plasticity Index (PI) must not exceed 6 when tested in accordance with Tex-106-A.

C. Mixing Water. Use mixing water conforming to the requirements of TxDot Item 421, "Hydraulic Cement Concrete."

D-134.3. Construction. Submit a construction method and plan, including mix design and shrinkage characteristics of the mix, for approval. Provide a means of filling the entire void area, and be able to demonstrate that this has been accomplished. Prevent the movement of any inserted structure from its designated location. If voids are found in the fill or if any of the requirements are not met as shown on the plans, remove and replace or correct the problem without additional cost to the City of Laredo. Unless otherwise shown on the plans, furnish a mix meeting the requirements of Sections **134.3.A**, "Strength," and **134.3.B**, "Consistency."

A. Strength. The 28-day compressive strength range, when tested in accordance with Tex-418-A, must be between 80 psi and 150 psi unless otherwise directed. Two specimens are required for a strength test, and the compressive strength is defined as the average of the breaking strength of the 2 cylinders.

B. Consistency. Design the mix to be placed without consolidation and to fill all intended voids. Fill an open-ended, 3-in.-diameter-by-6-in.-high cylinder to the top to test the consistency. Immediately pull the cylinder straight up. The correct consistency of the mix must produce a minimum 8-in.-diameter circular spread with no segregation.

When necessary, use specialty type admixtures to enhance the flowability, reduce shrinkage, and reduce segregation by maintaining solids in suspension.

Mix the flowable fill using a central-mixed concrete plant, ready-mix concrete truck, pug mill, or other approved method. Cure test specimens in accordance with Tex-447-A. The laboratory will sample, make, and test all specimens.

D-134.4 Placement

The controlled low strength material shall be placed directly into the excavation. The CLSM shall be placed in a uniform manner that will prevent voids in or segregation of the material. Foreign material which falls into the trench prior to and during placing of the CLSM shall be immediately removed. The CLSM shall have consistency, workability, plasticity, flow characteristics and pumpability (when required) such that the material when placed is self-compacting.

Mechanical compaction or vibration may be used to consolidate around structures, pipes, multiple conduits, etc. when directed by the engineer, otherwise no mechanical compaction or vibration shall be required.

When CLSM is used for backfill around water or sanitary sewer pipes install zero PI sand or gravel 12" above the top of the pipe. When CLSM is used for backfill around conduits, the CLSM shall be placed equally on both sides of conduit to prevent lateral displacement. Also, the CLSM shall be placed in lifts. The height of each lift shall not exceed the depth that will cause floating of the pipe or conduit. When placing the CLSM in greater lift depths, sufficient anchorage shall be provided so the pipe or conduit will not float.

The minimum clear distance between the outside of the pipe or conduit and the side of the excavation (each side) shall be 12 inches

When CLSM is used behind retaining walls, the depth of each lift shall be limited so it will not induce hydraulic loads greater than the design loads.

For long trenches or installations which require a large amount of CLSM, bulkheads of wood, dirt, sand bags, etc. can be used to control the material's flowability. The bulkhead shall be removed prior to the continuation the backfilling.

A minimum of 24 hours shall elapse prior to backfilling the remaining portion of the trench with other backfill material in accordance with Section 102, "Excavation and Backfill for Utilities".

D-134.5 Measurement: This item will be measured by the cubic yard of material placed when indicated as a separate pay item. Measurement will not include additional volume caused by slips, slides, or cave-ins resulting from contractor's operations.

D-134.6 Payment: When indicated as a separate pay item, the materials furnished and work performed will be paid for at the unit price bid as measured. This price is full compensation for furnishing, hauling, placing the materials, equipment, tools, labor, and incidentals. When the Project Manual, plans or other specifications indicate the use of flowable backfill as incidental to another pay item, no direct payment for the material will be made.

SECTION 136 CEMENT-STABILIZED BACKFILL

D-136.1. Description: When shown on the plans, backfill the excavation to the bottom of pavement base with cement-stabilized sand or caliche.

D-136.2 Materials:

- A. Cement: Cement shall consist of Type I Portland Cement conforming to ASTM C150
- B. Sand: Zero P.I. sand as aggregate for cement-stabilized backfill. Use only approved aggregate up to the bottom of existing pavement section base.
- C. Caliche
- D. Water: Water shall be clean and clear, free of oils, acids, alkalis, organic matter or other deleterious substances and shall conform to the requirements of ASTM C94.

D-136.3 Execution:

Sand/caliche-cement Mixture Product. The mixture shall consist of a minimum of two (2) sacks of Portland cement per cubic yard based on the dry weight of the aggregate. The mixture shall contain sufficient water to hydrate the cement (not flowable).

The cement, sand/caliche and water shall be mixed in a pugmill type mixer, which meets the approval of the Engineer. It shall be mixed for a minimum period of two minutes per batch. No mixing will be allowed on street surface.

D-136.4 Placement:

Place cement-stabilized backfill equally along the sides of structures to prevent strain on or displacement of the structure. Fill voids when placing cement-stabilized backfill. Use hand operated tampers if necessary to fill voids.

The sand cement mixture shall be placed in maximum eight (8) inch thick lifts, loose measure, and thoroughly rodded and tamped around the pipe, boxes, structures, bridge approaches and paving sections. Placement and compaction shall be performed in a manner that will thoroughly fill all voids without placing undue strain on or displacement of the structure.

Cement stabilized sand backfill below the top of sewers, manholes, inlets or other structures shall be placed equally along all sides of the structure. Cement stabilized sand backfill/bedding shall be placed in a manner that will completely fill all voids in the trench. Should compaction be required to fill all voids in the areas described, hand operated tampers may be used.

Materials not placed and not compacted within four (4) hours after mixing shall be rejected.

Do not place or compact sand/caliche-cement mixtures in standing or free water.

D-136.5 Performance:

Random samples of the delivered product will be taken in the field at the direction of the Engineer and tested. A minimum of one (1) sample per week or job shall be taken at random to represent a production that is less than one hundred (100) tons per week. Two (2) samples per week shall be taken at random to represent a production greater than one hundred (100) tons per week. The Engineer shall have the option to obtain additional samples for testing.

D-136.6 Measurement: When specified or shown on the plans as a pay item will be measured by the cubic yard. Measurement will not include additional volume caused by slips, slides, or cave-ins resulting from contractor's operations

D-136.6 Payment: When indicated as a separate pay item, the materials furnished and work performed will be paid for at the unit price bid as measured. This price is full compensation for furnishing, hauling, placing the materials, equipment, tools, labor, and incidentals. When the Project Manual, plans or other specifications indicate the use of cement stabilized sand as incidental to another pay item, no direct payment for the material will be made.

SECTION 202 PVC SEWER PIPE

D-202.01. GENERAL

1. Submittals:

- A. Test Results: Include results of tests with shipment of materials. Furnish 2 additional copies of test results to Engineer.
- B. Submit in accordance with the Standard General Conditions and Supplementary Conditions.
- C. Contractor shall submit all final testing reports for deflection testing and for low pressure air testing of sewer pipe in accordance with Section B- Testing Sewer Systems.
- D. Any deviations from the standards shall be approved by the Director of Utilities in writing.

D-202.02. PRODUCTS

1. Polyvinyl Chloride (PVC) Sewer Pipe

- A. All 4"- 15" PVC Sewer Pipe and Fittings used in this contract shall be made of plastic, meeting the requirements of: ASTM D3034. All 4"- 15" PVC sewer pipe, service saddles and fittings shall be SDR- 26. All 18"- 27" PVC Sewer Pipe and Fittings used in this contract shall be made of plastic, meeting the requirements of: F679, PS-115.
- B. Fittings:
 - 1. Fittings such as saddles, elbows, tees, and wyes shall be of material and construction corresponding to and have joint design compatible with adjacent pipe.
 - 2. Provide submittals for approval of adapters for transitions to other types of pipe.
- C. Pipe Joints:
 - 1. Rubber Gasket: Bell and spigot joint, sealed by a rubber gasket so assembly will remain watertight under conditions of service including movements resulting from expansion, contraction, settlement, and deformation of pipe. Gaskets shall conform to ASTM C361.
- D. Pipe Markings: Mark at intervals of 5 feet or less with following.
 - 1. Manufacturer's name or trademark.
 - 2. Nominal pipe size.
 - 3. PVC cell classification, for example 12454-B.
 - 4. Legend, "Type PSM SDR-26 PVC Sewer Pipe".
 - 5. ASTM D3034
 - 6. Extrusion date, period of manufactured or lot number.

E. Fitting Markings

1. Manufacturer's name or trademark.
2. Nominal size.
3. Material designation "PVC".
4. PSM type.
5. ASTM D3034

F. Dimensions:

1. Dimensions of pipe shall be in accordance with Table 1, except wall thickness may be not less than 97% of specified minimum.
2. Average wall thickness shall meet minimum wall thickness requirements of Table 1.

TABLE 1						
PVC SEWER PIPE DIMENSIONS						
PIPE SIZE (IN)	AVERAGE O.D. (IN)	NOM. I.D. (IN)	MIN. T. (IN)	MIN. E (IN)	MIN. D (IN)	APPROX. WEIGHT (LBS/FT)
SDR 26 (PS 115) ASTM D3034						
4	4.215	3.891	0.162	3.50	4.863	1.40
6	6.275	5.793	0.241	4.25	7.239	3.11
8	8.400	7.754	0.323	4.75	9.692	5.63
10	10.500	9.692	0.404	6.00	12.116	8.84
12	12.500	11.538	0.481	6.25	14.424	12.56
15	15.300	14.124	0.588	7.25	17.652	18.90
PS 115, ASTM F679						
18	18.071	17.261	0.671	8.00	21.581	28.49
21	22.047	20.349	0.791	9.50	25.443	----
24	24.803	22.891	0.889	9.60	28.627	----
27	27.953	25.799	1.002	10.10	32.261	----
* 30 or greater, submit for approval						

2. Source Quality Control

A. Testing:

1. Tests conducted by approved testing agency shall be performed to determine the following.

- a. Pipe dimensions:
 - 1) Average outside diameter.
 - 2) Average inside diameter.
 - 3) Minimum and average wall thickness.
 - b. Pipe stiffness at 5% deflection.
 - c. Pipe flattening for PVC sewer pipe: Deflect pipe to 60% deflection. Remove load and examine specimen for evidence of splitting, cracking or breaking.
2. Conduct tests on random sampling basis covering representative extrusion dates making up Project of each individual pipe size.
 3. Tests reports shall show results of these tests and conformance to ASTM requirements.

D 202.03 EXECUTION

1. Installation

- A. Trench, backfill, and compaction shall be done in accordance with Section 102, "Excavation and Backfilling for Utilities".
- B. Rubber Gasket Joint:
 1. Immediately before making joint, lubricate outside of gasket and inside of bell of groove of last pipe with approved manufacturer lubricant.
 2. Assure gasket and ends of pipe are clean and free of sand and gravel.
 3. Introduce spigot or tongue of pipe being laid, with gasket in place, into bell or groove end of previously laid pipe.
 4. Carefully set pipe to line and grade, and join pipes per manufacturer recommendations.
 5. Use jack or "come-along" to ensure joints are tight.

2. Field Quality Control

- A. Pipe shall be subject to rejection for failure to conform to requirements of Specifications or following:
 1. Any fractures or cracks.
 2. Chips or imperfections.
 3. Defects indicating improper proportioning, mixing, and molding.
 4. Variations of more than 1/8 in./lin.ft. in alignment of pipe intended to be straight.
 5. Damaged ends, where such damage prevents making satisfactory joint.
 6. Complete discoloration of any side of pipe.
 7. Manufactured date exceeding one year.
- B. Specially fabricated fittings, stubs, or pipe sections, shall be submitted for approval by Engineer prior to manufacture.

3. Measurement

PVC sewer pipe will be measured for payment in linear feet for the various sizes and types

shown on the plans along the horizontal centerline of the pipe no deduction will be made for manholes or fittings.

4. Payment

Plastic sewer pipe will be paid for at the unit price per linear foot, complete in place, as provided in the proposal and contract. The contract price per linear foot shall be the total compensation for furnishing of all labor, materials, tools, equipment, and incidentals necessary to complete the work, including excavation, granular embedment material, backfill, and disposal of surplus materials, in accordance with plans and specifications.

SECTION 206 SERVICE CONNECTION

D-206.01 DESCRIPTION: This Specification shall govern for the furnishing, excavating, laying, or placing, and backfilling, shoring, and other operations necessary to the installing of all sanitary sewer services.

D-206.02 MATERIALS:

1. Polyvinyl Chloride (PVC)

PVC pipe and fittings 6 inch (6") through 12 inch (12") diameter shall be in accordance with Section 102.

2. Flexible tap saddles

Flexible 6" tap saddles shall be made of PVC meeting the requirements of ASTM D 5926 and shall be used on existing clay sewer pipe only.

D-206.03 EXECUTION: Sewer connections shall be provided for each dwelling and lot to be served and shall be a minimum of 6 inch (6") diameter. The location of each sewer connection shall be clearly in the construction drawings by indicating northing and easting. The as built plans shall include the location of each sewer connection by clearly indicating northing, easting and elevation.

All new sewer construction shall include pre-manufactured wyes for sewer connections according to Detail No. 206-1 thru 206-3. Saddles will only be allowed for connection to existing sewer lines. Saddles shall be installed by cutting the pipe with a tapping machine. Connection shall be either with a saddle tap or a slip-line taps according to Detail No. 206-4.

Service connection branches shall be plugged with a pipe stopper manufactured for such service. The stopper shall be capable of sustaining without failure or leakage.

The lowest floor elevation of any structure to be served by gravity shall be a minimum of four feet (4') above the invert elevation of its sewer connection at the sewer main.

For existing structures, connection to the public sewer with plumbing fixtures located on a floor of the structure that is not four feet (4') or more above the sewer main as specified above shall not be allowed unless a written waiver is obtained from the Utilities Department Director or a pumping operation is utilized.

Sewer connections shall not be tied directly into an interceptor sewer (18" or greater) unless specifically approved by the Utilities Director.

The minimum and maximum slope for a 6" sewer lateral shall be 0.50% and 12.35% respectively. The following are not permitted:

- 1) Attaching sewer service connections to the vertical portion of the cleanout constructed at the property line or easement line.
- 2) Drop connections on the portion of the lateral in the right of way or in a sanitary sewer easement.

For projects involving the construction of new sewer mains, the sewer lateral to the property line or easement line shall be constructed and tested with the sewer mains.

After acceptance by the City, the plumbing contractor shall construct the sewer lateral from the building to the tested sewer lateral, then construct a cleanout at the property or easement line and connect it to the tested portion of the lateral.

When specifically approved by the Director, a portion of the cleanout at the property line or easement line to within three feet (3') of the ground surface and a portion of the sewer lateral on the private property past any utility easements may be constructed and tested with the sewer mains, provided that a means of protecting the cleanout and/or extended sewer lateral is provided.

A sanitary sewer lateral table shall be included in the construction plans. The table will include stationing, the inverts of the lateral at the main and elbow, invert at the property or easement line, and depth at the property or easement line as well as Northing and Easting.

D-206.04 CLEANOUTS: A six-inch (6") cleanout shall be provided at one foot (1') from the property line within the R.O.W or easement line for each service connection.

Lateral backwater valves shall be installed on sewer laterals serving buildings with basements or floors located below the top of the wet well elevation of the nearest wastewater pumping station.

Connection of roof downspouts, exterior foundation drains, areaway drains, basement drains and other sources of surface runoff and groundwater directly or indirectly to a sanitary sewer is prohibited.

D-206.05 BACKFILL: All trenches and excavations in this section shall be in accordance with, Section 102.

D-206.06 CONCRETE CUSHION, CRADLE, OR PROTECTION: Concrete cradle, cushion, or protection where required, shall be constructed as shown on the plans. Where a condition arises which requires the installing of such concrete cushions or cradle or protection, not shown on the plans, such installation shall be made only on the written instructions of the Engineer; such instruction shall designate the location, shape, type, and manner of construction.

Where concrete cradle or cushion is constructed beneath the sewer pipe, the sub-grade shall be prepared to the dimensions and form as shown on the plans. Concrete cradle, cushion, or protection shall be placed in a dry trench unless, in the opinion of the Engineer, such a method is not practicable. Where the concrete is placed in a wet trench the work shall be done strictly as directed or approved by the Engineer.

D-206.07 MEASUREMENT: All sewer laterals, and stubs, shall be measured in accordance with the above specifications per each complete in place, of the size, type, depth constructed, and accepted by the Engineer. Concrete cradle or concrete encasement protection will be measured by the linear foot along the center of the pipe where it has been installed in accordance with the details shown on the plans.

D-206.08 PAYMENT: All sewer laterals, and stubs, shall be paid for at the unit price bid per each complete in place, of the size, type, and depth constructed, which price shall be full compensation for furnishing all labor, material, and equipment, for all hauling, excavation, shaping of trench bottom, bracing, sheeting, for all installation, backfilling, tamping of backfill, and for all clean-up and incidentals necessary to furnish sewer services complete in place.

SECTION 208 FIBERGLASS REINFORCED PLASTIC MANHOLES

D-208.01 MATERIALS

Fiberglass reinforced plastic manholes shall be in accordance with ASTM D3753 “Glass Fiber-Reinforced Polyester Manholes” and the requirements of this specification. The inside diameter of the manhole barrel shall be either 48” or as indicated in the plans. A concentric reducer over the barrel shall have an inside diameter of 30 inches. The minimum wall thickness for all manholes regardless of depth shall be ½” (.480”).

D-208.02 GOVERNING STANDARDS

- ① ASTM D3753 - Standard specifications for glass fiber reinforced polyester manholes.
- ② ASTM D2412 - Test method for external loading properties plastic pipe by parallel-plate loading.
- ③ ASTM C581 - Practice for determining chemical resistance of thermosetting resins.
- ④ ASTM D2584 - Test method for ignition loss of cured reinforced resins.
- ⑤ ASTM D695 - Test method for compressive properties of rigid plastics.
- ⑥ ASTM C790 - Test methods for flexural properties of unreinforced and reinforced plastics and electrical insulating materials.
- ⑦ ASTM D2583 - Test methods for indentation hardness of rigid plastics by means of barcol impressor.

The contractor shall furnish the manufacturer’s certificate that the material meets the standards set forth herein. All fiberglass manhole sections shall be identified with the manufacturer’s name, identification number, and manhole length.

Fiberglass – Reinforced Polyester Manholes shall include a 6’ X 6’ reinforced concrete collar in accordance to Detail 208-4.

D-208.03 MANHOLE RINGS AND COVERS

All manhole rings and covers for streets shall have a clear opening of no less than 30” labeled SANITARY SEWER and CITY OF LAREDO with emblem (EJIW 41430043A01 or approved equal) and shall have the seating surface of ring machined to secure a snug fit.

The castings for manhole rings and covers shall be as detailed on drawings. They shall be grey iron castings boldly filleted at angles and the rises shall be sharp and perfect. The casting shall be true to pattern, form, and dimensions, free from cracks, sponginess, blow holes, or other pouring faults affecting their strength and value for the service intended. Surfaces of the castings shall be free from burnt on sand and shall be reasonable smooth. Runners, risers, fins, and other cast-on places shall be removed from the surface.

D-208.04 EXCAVATION

The contractor shall be all necessary excavation for the various manholes. Such excavation shall be of sufficient size as to permit the proper installation of the base and wall forms, and allow room for striping of such forms. All such excavation shall conform to the size and dimensions as shown on the drawings, plus a maximum of four (4) feet to permit working room. Care shall be taken to insure that the excavation is not carried to a greater depth that required. If it becomes necessary to shore the walls and also permit the construction of the manhole itself without necessitating the removal of any

shoring until such time as the entire manhole is completed. No shoring shall be left or back filled around, unless authorized by the Engineer. Shoring shall remain in place for at least twenty-four (24) hours after the masonry or concrete work has been completed.

D-208.05 GENERAL CONSTRUCTION METHODS

All manhole work shall be completed and finished in a careful and workmanlike manner, special care being given to sealing the joints around all pipe that extend through the wall of the manhole. Joints for sewer pipe for line and drop connections in sizes 8"-15" shall be made by means of InsertaTee watertight compression connection or approved equal as shown in the plans and details. Install in accordance with the manufacturer's written instructions. Connections for pipe larger than 15" shall be made using a pre-approved connection. Install in accordance with the manufacturer's written instructions after finishing of wall has additional concrete to shape or form on the drawing.

Where old manholes are to be adjusted to meet new lines and grades, all old masonry or concrete shall be thoroughly cleaned and wetted before joining any new masonry or concrete to it. All work on manholes shall be done in a workmanlike manner and in conformity with the usual practice used for such work. All materials for adjusting old manholes shall conform to the requirements set out in these specifications for manhole work.

D-208.06 BACKFILLING

The backfilling around the outside of manholes shall commence as soon as the concrete or masonry has been allowed to cure the required time and the forms and shoring have been removed. Such backfill shall be placed in layers of not more than six inches and shall be thoroughly tamped before the next layer is installed. It is anticipated that the backfilling shall be either hand or mechanically tamped. Whichever method is used, care must be exercised to insure that the backfill is thoroughly compacted to the density shown on the drawings. When a density is not shown on the drawings, compaction shall be 90% standard proctor density (ASTM D-690). Unless shown otherwise on the drawings suitable material selected from the excavation shall be used for backfill. Material must be subject to approval by the Engineer.

D-208.07 DROP MANHOLES

Drop manholes shall consist of construction of a standard sanitary sewer manhole with one standard drop connection on one side only when 24 inches above the manhole invert, as shown in the detail drawings. All material used in the drop connection shall conform to the requirements of the pertinent specifications.

D-208.08 MEASUREMENT

This item will be measured by each individual structure completed. The depth will measure from the flow line to the top of the rim. The size shall be the nominal inside diameter. This item includes but, is not limited to the following:

- ① Structural Excavation;
- ② Loading, hauling, and disposing of all excess material;
- ③ Furnishing all labor and materials;
- ④ Placing and compacting all backfill;
- ⑤ Final Grading.

D-208.09 PAYMENT

This item will be paid for at the Contract unit price bid per each structure for the various sizes, types and various depths of manholes complete and in place as shown in the drawings and specified herein.

SECTION 210 CONCRETE MANHOLES

210.01 DESCRIPTION: This item shall govern construction of manholes complete in place and the materials used therein, including excavation, installation, backfilling and surface restoration. It shall also include furnishing and installing rings, covers, appurtenances and any pumping, and drainage necessary to complete work. Wastewater manholes shall be acceptance tested by the Contractor.

The Contractor shall submit descriptive information and evidence that the materials and equipment the Contractor proposes for incorporation into the Work is of the kind and quality that satisfies the specified functions and quality.

MATERIALS

210.02 MATERIALS and COMPONENTS:

- (1) Cast in place concrete shall be Class A, and precast concrete shall be Class I. All interior surfaces of wastewater manholes shall have a solvent-free 100% solids, ultra high build epoxy coating (Raven 405, Standard epoxy coating 4553, Reliner MSP, Carbolite plasite 4500S) or be otherwise acceptably protected from the acidic effects of municipal wastewater. Backfill or over excavated areas shall be in accordance with Section 102.
- (2) Mortar: Mortar shall be composed of one part Portland cement, one part masonry cement (or ¼ part hydrated lime), and sand equal to 2-1/2 to 3 times the sum of the volumes of the cement and lime used. The sand shall meet the requirements for “Fine Aggregate” as given in Section 406 “Concrete for Structures”.
- (3) Reinforcement: Reinforcing steel shall conform to the requirements of Section 410, “Reinforcing Steel”. Secondary, non-structural steel may be replaced by collated fibrillated polypropylene fibers acceptable to the Engineer in cast-in-place wastewater manholes.
- (4) Brick: Brick for ring adjustment courses or for wastewater manholes shall be prohibited.
- (5) Ring and Covers: Rings and covers shall conform to the requirements as described on the Std. Details.

Replacement Rings and Covers, 30” (clear opening) diameter Lids: This ring and cover shall be used for the replacement of broken rings and covers, Minor Manhole Adjustment, or as otherwise directed by the Engineer.

Rings and Covers, 30” (clear opening) diameter Lids: This ring and cover should be used for all new manhole construction, except as otherwise directed by the Engineer.

- (6) Pipe-to-Manhole: Precast bases shall have flexible, resilient and non-corrosive boot connector’s or ring water stops acceptable to the Engineer confirming to the requirements of ASTM C 923 on all wastewater pipe connections.

(7) Precast Grade Ring: Rings shall be reinforced Class A concrete

Precast Grade Rings, 30-1/2" Inside Diameter: This adjustment ring shall be used only for adjusting existing manholes with 30 inch lids and for Wastewater Access Device. Inside to outside diameter dimension of ring shall be 6" with a thickness of 3" to 6".

Precast Grade Rings 35" Inside Diameter: This adjustment ring shall be used for new manhole construction with 32" lids. Inside to outside dimensions of ring shall be 6" with a thickness of 4" to 6".

(8) New manhole Construction and Minor Manhole Adjustment:

New manhole construction and minor manhole adjustments shall be performed as indicated on plans and shall consist of adding precast reinforced concrete rings to adjust the manhole to final grade.

For new manhole construction, the maximum vertical allowable ring adjustment shall be limited to 12" (the maximum includes the depth of the ring casting). For existing manhole adjustments that fall within the limits of overlay and street reconstruction projects, the maximum vertical allowable shall be limited to two feet (the maximum includes the depth of the ring casting). All other existing manholes shall have a maximum allowable ring adjustment of one foot (the maximum includes the depth of the ring casting). Any adjustment that will exceed these requirements shall be accomplished as indicated on the standard detail, and as described below in (9) "Major Manhole Adjustment". All manholes located in flooded areas shall have bolted down covers and vents in accordance with TCEQ requirements.

(9) Major Manhole Adjustment:

Any adjustment that exceeds the requirements of 18" adjustments shall be accomplished as indicated on plans and shall consist of any combination of removing the concrete rings, and/or the manhole cone section, and/or the straight riser section of the manhole to bring the manhole to final grade. All manholes located in flooded areas shall have bolted down covers and vents in accordance with TCEQ requirements.

(10) Waterproofing Joint Materials: O-ring and wedge seals for the joints of all wastewater manholes, when indicated, shall conform to the requirements of ASTM C443. Cold applied preformed plastic gaskets for wastewater manholes shall be as specified by Engineer. Connections between reinforced concrete wastewater manhole structures and pipe shall meet the requirements of ASTM C923.

210.03 CONSTRUCTION: All manholes shall have a minimum inside diameter of 48 inches for pipe up to 15" diameter and minimum 60 inches for pipes up to 27" diameter. Manhole base section shall be appropriately increased to accommodate all converging pipe. A minimum horizontal clearance of 12 inches shall be maintained between adjacent pipes. Pipe ends within the base section shall not be relied upon to support overlying manhole dead and live load weights. All wastewater branch connections to new or existing main shall be made at manholes with the influent pipe crown installed at the elevation of the effluent pipe crown or above. Where lines enter the manhole up to 24 inches

above the flow line of the outlet, the invert shall be sloped upward to receive the flow, thus preventing splashing or solids deposition. Where the spring line of an influent pipe is 24 inches or more above the spring line of the effluent pipe, a drop manhole shall be used. Construction of extensions to existing system shall require placement of new manholes at locations indicated or directed by the Engineer. Unless otherwise indicated, wastewater manholes shall have concentric cones, except on manholes over large mains where an eccentric cone shall be situated to provide access to an invert ledge.

Manholes shall be founded to the established elevations on uniformly stable subgrade. Unstable subgrade shall be over excavated a minimum of 12 inches and replaced with a material acceptable to the Engineer. Precast base units shall be founded and leveled on 6" (inch) coarse aggregate bedding. The cast-in-place concrete cradle shall be poured against undisturbed trench walls up the pipe's spring line.

All adjustments shall be completed prior to the placement of the final surface.

Manhole components to be reused shall be carefully removed and the contact areas shall be cleaned of all mortar, concrete, grease and sealing compounds. Any items broken in the process of removal and cleaning shall be replaced in kind by the Contractor of this expense.

If the adjustment involves raising the elevation of the top of the manhole in accordance with these specifications, the top of the concrete ring shall be cleaned and built up vertically to the new elevation, using new or salvage concrete rings and the ring and cover installed with the top surface conforming to the proposed grade.

Cast-in-place foundations shall have a minimum depth of 12 inches at the invert flowing. The widths of all manhole inverts shall be specifically sized for the connecting pipes. Inverts shall be "U" shaped with a minimum depth of a minimum fall of 0.10 of a foot between the inlet and outlet. The lowermost riser section may be set in the concrete while still green, after which the foundation shall be, cured a minimum of 24 hours prior to proceeding with construction of the manhole up to 12 feet in depth. The foundation shall be cured an additional 24 hours prior to continuing construction above the 12 foot level. Manhole shall be measured from the invert flow line to the finish surface elevation.

Wastewater manhole having cast in place foundations may be constructed over existing wastewater pipes, except polyvinyl chloride (PVC), and the top half of the pipe removed to facilitate invert construction. The manhole shall rise from the spring line elevation of the pipe, approximately one inch of each 12 inches of run (8%). Wastewater manholes with lines larger than 15 inches shall require precast bases; manholes constructed over in-service mains however, may be built on cast-in-place foundations if the flow cannot be interrupted. Precast and cast-in-place wastewater junctions boxes shall be allowed only where indicated on the plans or acceptable to the Engineer. The floor of the manhole also, shall rise outwardly from the spring line on a slope at 1:12 (8%).

Wastewater lines, except reinforced concrete pipe, set in cast-in-place foundations, shall require a water stop seal or gasket acceptable to the Engineer around the outside perimeter of the pipe. It shall be approximately centered under the manhole section wall.

Cast-in-place manholes, junction boxes and flat-slab transitions shall be reinforced Class A concrete. All structural concrete work shall conform to Section 406, "Concrete Structures". Forms will be required for all cast-in-place walls above the foundation. Where the surrounding material can be

trimmed to a smooth vertical face, outside forms may be omitted.

Backfilling for manholes shall conform to the density requirements of Section 102. Manhole construction in roadways may be staged to facilitate base construction. Manholes constructed to interim elevations shall be covered with steel plates of sufficient thickness to support vehicular traffic. Steel plates on wastewater manholes shall be set in mortar to minimize inflow.

Manholes shall be completed to finish elevation prior to placement of the roadway's finish surface. The excavation for construction of manhole construction shall be backfilled with cement stabilized sand (2 sacks per cubic yard) up to the bottom of Portland Cement pavement slabs or to within two (2) inches of finish elevation of asphalted concrete pavements. The cement-stabilized sand shall be a minimum of 12 inches thick.

When rings and covers are set to grade, the inside and outside of the concrete rings shall be wiped with mortar so placed as to win a durable water-tight joint smooth and even with the manhole cones section. No grouting shall be performed when the atmospheric temperature is at or below 40 degree F, and when necessary, because of a sudden drop in temperature, joints shall be protected against freezing for at least 24 hours.

210.04 ACCEPTANCE TESTING OF WASTEWATER MANHOLES: Manholes shall be tested in accordance with Section 218.

- (1) Test by the Vacuum Methods: Shall not be acceptable unless recommended by Engineer and authorized by the Utilities Director.
- (2) Test by the Infiltration Method.

All manhole testing shall be performed by Exfiltration Method of testing described below. This method may only be used when ground water is not present. If ground water is present a Vacuum Test may be used only if directed by the Engineer. All backfilling and compaction shall be completed prior to the commencement of testing.

(a) Procedures:

1. Manhole section interiors shall be carefully inspected; units found to have through-wall lift holes, or any penetration of the interior surface by inserts provided to facilitate handling, will not be accepted. Coating shall be applied after the testing unless coating is applied before field assembly, or at the factory. All lift holes and exterior joints shall be plugged with an acceptable non-shrink grout. No grout shall be placed in horizontal joints.
2. After cleaning the interior surface of the manhole, the Contactor shall place and inflate pneumatic plugs in all of the connecting pipes to isolate the manhole; sealing pressure within the plugs shall be as recommended by the plug manufacturer.
3. Concrete manhole shall be filled with water or otherwise thoroughly water for a period of 24 hours prior to testing.
4. At the start of the test, the manhole shall be filled to the top with wetted. The test time shall be 1 hour (60 minutes). The Construction Inspector must be present for observation during the entire time of the test. Permissible loss of water in the 1 hour test time is 0.025 gallons per diameter foot, per foot of manhole depth. For a 4-foot diameter manhole, this

quantity converts to a maximum permissible drop in the water level (from the top of the manhole cone). Of 0.05 inches per foot of manhole depth (0.5 inches for a 10 foot deep manhole).

(3) Failure to Pass the Test (Records of Tests)

If the manhole fails to pass the initial test method as described in (2) Test by the Exfiltration Method and, if allowed, (1) Test by the Vacuum, or if visible groundwater leakage into the manhole is observed, the Contractor shall locate the leak, If necessary by disassembly of the manhole, checking gaskets and replacing if necessary, relubrication, and re-assembly, or Contractor may install an acceptable exterior joint sealing product (recommended by Engineer and approved by Utilities Director) on all joints and then retested. If any manhole fails the vacuum and/or exfiltration tested twice, the Contractor shall consider replacing that manhole. If the Contractor chooses to attempt to repair that manhole, the manhole must be retested until it passes. In no case shall cold applied preformed plastic gasket be used for repair. Records of all manhole testing shall be made available to the Engineer at the close of each working day, or as otherwise directed. Any damaged or visually defective products, or any products out of acceptable tolerance shall be removed from the site.

At a minimum, test Records shall include the following and shall be part of the Project records turned in with the acceptance package:

Name of the manhole manufacturer
 Date tested/date re-tested
 Passed/failed and state what was done to correct the problem
 Location/station of manhole
 Type of Coating
 Any repairs made to the joints.

(4) Inspection:

The Engineer shall make visual inspection of each manhole after it has passed the testing requirements and is considered to be its final condition. The inspection shall determine the completeness of the manhole; any defects shall be corrected to the Engineer's satisfaction. All

testing shall be performed at the presence of a Utilities Inspector.

210.05 MEASUREMENT: All manholes and the type indicated shall be measured as each unit, size and depth complete in place.

New manholes constructed to interim elevations to facilitate stage construction shall be measured as one unit regardless of the number of interim elevation constructed. All labor, materials and other expenses necessary for the stage construction shall be considered subsidiary to the completed unit.

210.06 PAYMENT: Payment for completed manholes of the type, size and depth indicated shall be made at the unit price bid for each including all labor, equipment, materials, time and incidentals necessary to complete the work.

SECTION 214 SANITARY SEWER CLEANOUTS

D-214.01 DESCRIPTION: This Specification shall govern for the furnishing, excavating, laying, or placing, and backfilling, shoring, and other operations necessary to the installing of all sanitary sewer cleanouts. Cleanout connections shall be provided at the end of the sanitary sewer main and shall be a minimum of 8 inch (8") diameter. The location shall be clearly indicated on the construction drawings.

D-214.02 MATERIALS :

Cast iron boot and cover shall be in accordance to ASTM A48 Class 30B.

PVC pipe and fittings 6 inch (6") through 12 inch (12") diameter shall conform to Section 202.

D-214.03 EXECUTION: An eight-inch (8") cleanout shall be provided outside of the pavement or as approved by the Utilities Director at one foot (1') from the property line within the R.O.W., easement line or as indicated on the plans. A cast iron cleanout cover shall be placed over every cleanout for the main line as per Detail No.

D-214.04 BACKFILL: All trenches and excavations in this section shall be in accordance with, Section 102.

D-214.05 CONCRETE CUSHION, CRADLE, OR COLLAR: Concrete cradle, cushion, or collar, shall be constructed as shown on the plans. Where concrete cradle or cushion is constructed beneath the sewer pipe, the sub-grade shall be prepared to the dimensions and form as shown on the plans. Concrete cradle, cushion, or collar shall be placed in a dry trench unless, in the opinion of the Engineer, such a method is not practicable. Where the concrete is placed in a wet trench, the work shall be done strictly as directed or approved by the Engineer.

D-214.06 MEASUREMENT: All sewer cleanouts shall be measured in accordance with the above specifications per each complete in place, of the size, type, depth constructed, and accepted by the Engineer.

D-214.07 PAYMENT: All sewer cleanouts, shall be paid for at the unit price bid per each complete in place, of the size, and type constructed, which price shall be full compensation for furnishing all labor, material, and equipment, for all hauling, excavation, shaping of trench bottom, bracing, sheeting, for all installation, backfilling, tamping of backfill, and for all clean-up and incidentals necessary to furnish sewer services complete in place.

SECTION 216 ADJUSTING MANHOLES, CLEANOUTS, AND INLETS

D-216.01 DESCRIPTION: This item shall govern for the furnishing of materials and for adjusting, abandoning, or capping existing sewer manholes, cleanouts, or inlets where required by the plans. Manholes, cleanouts, and inlets shall be adjusted to positions and/or elevations as shown on the plans or as ordered by the Engineer and in accordance with these specifications.

D-216.02 MATERIALS: Manholes, cleanouts, or inlet rings, plates, grates, covers in good condition removed from the manholes, cleanouts, and inlets in the process of abandonment, capping, or adjustment may be re-used upon approval from the engineer.

D-216.03 CONSTRUCTION: Manholes, cleanouts, or inlet rings, covers, plates, and grates shall be removed carefully and the contact areas shall be cleaned of all mortar and grease. Rings, covers, plates, or grates broken in the process of removal and cleaning shall be replaced in kind by the Contractor at his expense.

If the adjustment involves lowering the top of a manhole, cleanout, or inlet, a sufficient depth of concrete shall be removed to permit reconstruction on a batter not exceeding one (1) inch horizontal to two (2) inches vertical. The manhole or inlet ring, cover, plate, or grate shall then be installed with top conforming to the proposed new surface of street or grading as the case may be.

If the adjustment involves raising the elevation of the top of manhole, cleanout, or inlet, the top course shall be cleaned of mortar and built up vertically to the new elevation using new Class "A" Concrete as per section 504, and the ring, cover, plate, or grate installed with top conforming to the proposed new surface of street or grading as the case may be.

If abandonment of an inlet, cleanout, and manhole is required, it shall be removed completely to a depth one foot below the bottom of the trench. In each instance, the bottom of the trench shall be restored to grade by backfilling and compacting by the methods provided herein for backfill.

If capping of a manhole, cleanout, or inlet is required by the plans, capping shall be in accordance with the details shown on the plans.

D-216.04 MINOR ADJUSTMENTS: New concrete manhole and existing manhole adjustments shall be in accordance to Section 210.02 (7) and 210.02 (8). New fiberglass manhole and existing fiberglass manhole adjustments shall be done using a multi-purpose rubber composite adjustment riser (18" max) and fiberglass kit approved by the manufacturer.

D-216.05 MAJOR ADJUSTMENTS: Concrete and fiberglass manhole adjustments in accordance to Section 210.02 (9)

D-216.06 MEASUREMENT: Manholes, cleanouts, or inlets completely adjusted, abandoned, or capped as prescribed above, will be measured by the unit of each manhole, cleanout, or inlet adjusted. The excavation and backfill involved will not be measured for payment.

D-216.07 PAYMENT: Each manhole, cleanout, or inlet adjusted, measured as prescribed above, complete in accordance with these specifications, will be paid for at the unit price bid for "Adjusting Manholes", "Adjusting Cleanouts", and "Adjusting Inlets", which price shall be full compensation for furnishing all required materials, including backfill as required, excavation, tools, labor, equipment, and incidentals required to complete the work.

SECTION 218 TESTING SEWER SYSTEM

D-218.01 GENERAL

1. Summary

- A. Section Includes:
 - 1. Deflection testing of sanitary sewer lines.
 - 2. Leakage testing of sanitary sewer lines.
 - 3. Leakage testing of sanitary sewer manholes.
- B. Measurement and Payment:
 - 1. Include costs for testing in appropriate unit prices bid for sewer line construction.

2. Submittals

- A. Submit in accordance with Standard General Conditions and Supplementary Conditions.
- B. Copies of all test results shall be submitted to the Engineer prior to acceptance of sewer system.

D-218.02 PRODUCTS (N/A)

D-218.03 EXECUTION

1. GENERAL

- A. Commence test procedures when following condition are met.
 - 1. Pipe section to be tested is clean and free of dirt, sand, water or other foreign material. Pipe system shall be isolated from the existing waste water system.
 - 2. Pipe section to be tested has backfill placed and compacted
- B. Repair visible leaks in manholes and sewers regardless of results of leakage tests.
- C. Notify Engineer and City of Laredo Utilities Department in writing 48 hours before beginning tests.
- D. Contractor shall furnish and pay for all water required for testing.

2. Deflection Testing of Sanitary Sewer Lines

- A. Perform tests on sewer pipe in presence of Engineer and City of Laredo Utilities Inspector.
- B. Provide necessary test mandrel, cable, reeling equipment, and other materials and equipment required to perform tests. Provide cable at each end of test mandrel to allow withdrawal if mandrel becomes stuck.
- C. Deflection Tests shall be performed on all flexible pipes. For pipelines with inside diameters less than 27 inches, a rigid mandrel shall be used to measure deflection.

1. *Mandrel sizing.* The rigid mandrel shall have an outside diameter (OD) equal to 95% of the inside diameter (ID) of the pipe. The inside diameter of the pipe, for the purposes of determining the outside diameter of the mandrel, shall be the average outside diameter minus two minimum wall thicknesses for OD controlled pipe and the average inside diameter for ID controlled pipe, all dimensions shall be per appropriate standard. Statistical or other "tolerance packages" shall not be considered in mandrel sizing.
 2. *Mandrel design.* The rigid mandrel shall be constructed of a metal or a rigid plastic material that can withstand 200 psi without being deformed. The mandrel shall have nine or more "runners" or "legs" as long as the total number of legs is an odd number. The barrel section of the length at least 75% of the inside diameter of the pipe. A proving ring shall be provided and used for each size mandrel in use.
 3. *Method options.* Adjustable or flexible mandrels are prohibited. A television inspection is not a substitute of the deflection test. Mandrels with removable legs or runners may be accepted on a case-by-case basis.
- D. The test shall be performed without mechanical pulling devices. Sewer is considered to have passed deflection test if mandrel can be drawn through sewer system being tested without aid of mechanical assistance.
- E. If excessive force is required or mandrel fails to pass through, sewer shall have failed deflection test.
- F. The test shall be conducted after the final backfill has been in place at least 30 days. No pipe shall exceed a deflection of 5.0%. If a pipe should fail to pass deflection test, the problem shall be corrected and a second test shall be conducted after the final backfill has been in place and additional 30 days. Correct failed sewers by excavating sewer a point of failure and for distance of 10 ft on either side, allowing sewer to return to its original round cross-section and backfill according to Specifications. Remove and replace sewers failing to return to original round cross-section or failing second deflection test at not cost to Owner. Do not use devices to generate internal pressures or vibrations to correct failed sewers.

3. Leakage Testing of Sanitary Sewer Lines

- A. Tests:
1. Pressure test sanitary sewer pipe 24 inches or smaller in diameter using low pressure air test.
- B. General:
1. Conduct tests in presence of Engineer and City of Laredo Utilities Inspector.
 2. Provide piping connections between section of line being tested and air supply, test pressure equipment, weirs, meters, certified pressure gauge, and other equipment, materials, and facilities necessary to make specified test.
 3. Provide bulkheads, blocking, bracing or other temporary sectionalizing devices that may be required.
 4. Remove temporary sectionalizing devices after test complete.
- C. Low Pressure Air Test
1. General:

- a. Conduct required low pressure air test as specified herein.
 - b. Plug pipe outlets with test plugs. Brace each plug securely to prevent blowouts during air test.
 - c. Add air slowly.
 - d. Pressurizing equipment shall include regulator set to avoid over-pressuring and damaging line.
 - e. Safety pressure test in accordance with OSHA requirements.
2. Air Test Procedures:
- a. The procedure for the low pressure air test shall conform to the procedures described in ASTM C-828, ASTM C-924, ASTM F-1417, or other appropriate procedures, except for testing times.
 - b. The test times shall be as outlined in this section. For sections of pipe less than 36 inch average inside diameter, the pipe shall be pressurized to 3.5 psi greater than the pressure exerted by groundwater above the pipe. Once the pressure is stabilized, the minimum time allowable for the pressure to drop from 3.5 pounds per square inch gauge to 2.5 pounds per square inch gauge shall be computed from the following equation:

$$T = \frac{0.085 \times D \times K}{Q}$$

T= time for pressure to drop 1.0 pound per square inch gauge in seconds;
 K= 0.0049 x D x L, but not less than 1.0;
 D= average inside pipe diameter in inches;
 L= length of line of same pipe size being tested, in feet;
 Q= rate of loss, 0.0015 cubic feet per minute per square feet internal surface shall be used.

Since a K value of less than 1.0 shall not be used, there are minimum testing times for each pipe diameter as follows:

Pipe Diameter (inches)	Minimum Time (seconds)	Length for Minimum Time (feet)	Time for Longer Length (seconds)
6	340	398	0.855 (L)
8	454	298	1.520 (L)
10	567	239	2.374 (L)
12	680	199	3.419 (L)
15	850	159	5.342 (L)
18	1,020	133	7.693 (L)
21	1,190	114	10.471 (L)
24	1,360	100	13.676 (L)

27	1,530	88	17.309 (L)
30	1,700	80	21.369 (L)
33	1,870	72	25.856 (L)

The test may be stopped if no pressure loss has occurred during the first 25% of the calculated testing time. If any pressure loss or leakage has occurred during the first 25% of the test period, then the test shall continue for the entire test duration as outlined in this subparagraph or until failure.

- c. Provide calibrated and certified test gauge at remote test plug.
 1. Gauge air pressure within test section and attach to test plug by sufficient length of hose to place gauge at ground surface. In case of test frames for individual joint testing, gauge to be remote from air supply.
- d. Proceed with test after sewer and lateral installation, including backfilling, is complete and lines cleaned. Proceed as follows:
 1. Flush and clean prior to conducting low pressure air test.
 2. Isolate section of sewer line to be tested by means of inflatable stoppers of other suitable test plugs. One plug shall have inlet tap, or other provision, for connecting hose to portable air control source.
 3. If test section is below groundwater level, determine height of groundwater above spring line of pipe at each end of test section and compute average. For every foot of groundwater above pipe spring line, increase gauge test pressure by 0.43 lb/sq. in.
 4. Connect air hose to inlet tap and portable air control source. Air equipment shall consist of necessary valves and pressure gauges to control rate at which air flows into test section and to enable monitoring of air pressure within test section. Testing apparatus shall also be equipped with pressure relief device to prevent possibility of loading test section with full capacity of compressor.
 5. Add air slowly to test section until pressure inside pipe is raised to 4.0 psig greater than average back pressure that may be over pipe.
 6. After pressure of 4.0 psig obtained, regulate air supply so pressure is maintained between 3.5 and 4.0 psig (above average groundwater back pressure) for period of 2 min. This allows air temperature to stabilize in equilibrium with temperature of pipe walls. Pressure will normally drop slightly until temperature equilibrium is obtained. During this period, check plugs with soap solution to detect plug leakage.
 7. Determine rate of air loss by time pressure drop method. After 2-min air

stabilization period, air supply is disconnected and the test pressure is allowed to decrease to 3.5 psig. Time required for test pressure to drop from 3.5 to 2.5 psig is determined if rate of air loss is within allowable time limit. If time is equal to or greater than times indicated in tables, pipe line shall be deemed acceptable.

8. Upon completion of test, open bleeder valve and allow air to escape. Plugs shall not be removed until air pressure in test section is released. During this time, no one shall be allowed in trench or manhole while pipe is being decompressed.
- e. Repair sewers failing air test by removing and replacing defective pipe sections or by other approved methods at contractors cost.
 1. Retest until acceptable test results obtained to be paid by contractor.

D-218.04. LEAKAGE TESTING OF SANITARY SEWER MANHOLES

- A. After completion of manhole construction, all sealing or rehabilitation, all manholes shall be tested for water tightness and leakage separately and independently of wastewater lines by hydrostatic exfiltration testing.
- B. Plug influent and effluent lines, including services lines, with suitability-sized pneumatic or mechanical plugs. Ensure plugs are properly rated for pressures required for test. Follow manufacturer's safety and installation recommendations. Place plugs a minimum of 6 inches outside of manhole walls. Brace invert to prevent lines from being dislodged if lines entering manhole have not been backfilled.
- C. Hydrostatic Exfiltration Testing:
 1. Hydrostatic exfiltration testing shall be performed as follows: all wastewater lines coming into any manhole shall be sealed with an internal pipe plug, and then the manhole shall be filled with water and maintained full for at least one hour
 - a. The maximum leakage for hydrostatic testing shall be 0.025 gallons per foot diameter per foot of manhole depth per hour.
 2. If water loss exceeds amount tabulated above, locate leaks, complete repairs necessary to seal manhole and repeat test procedure until satisfactory results are obtained.
 3. For concrete manholes, a wetting period of 24 hours may be used prior to testing in order to allow saturation of the concrete.
- D. Repair sewers failing air test by removing and replacing defective pipe sections or by other approved methods at contractors cost.

h. For underground storm drain conduit installations, the maximum operation tolerance for a sag shall be one-hundredth foot (0.01') per inch of pipe diameter. No sag shall be longer than sixty feet (60'). When CCTV inspection is used to check for sag, a calibrated readable device acceptable to the Engineer shall be used to measure the depth of sag.

i. The Contractor shall not be entitled to any additional working days due to delays in securing the CCTV services of a private vendor.

D-226.03 EQUIPMENT:

1. CCTV inspection equipment shall consist of a monitoring unit and self-contained camera with pan, tilt and zoom capability. This equipment shall be specifically designed and constructed for such inspection purposes. The camera shall be mounted on a crawler or adjustable skids and have a height adjust to facilitate the inspection of different sizes of pipe and to allow for visual judgment of ovality by centering the camera within the pipe. The camera shall be self-operative in one hundred percent (100%) humidity conditions. Focal distance shall be adjustable through a range of from one inch (1") to infinity. The camera shall be waterproof and shall have a remote controlled self-contained lighting system capable of producing effective illumination for all sizes of pipe. The lighting system shall be capable of lighting the entire periphery of the pipe. The remote reading footage counter shall be accurate to within one-half percent (0.5%) over measured distance of the particular section being inspected and shall be displayed on the television monitor. The equipment shall be capable of providing a clear digital recording of the interior of the pipes. An inclinometer which gives a profile of the pipeline must be used for all new pipe inspections or on existing pipe at the discretion of the Engineer. The camera, television monitor and other components of the video system shall be capable of producing a minimum three hundred and fifty (350) line resolution color video picture. The equipment shall be capable of televising the entire length in one direction. When televising storm drains the camera shall be capable of scanning the joints for three hundred and sixty degrees (360°).
2. High velocity pipe cleaning equipment shall be constructed for ease and safety of operation. The equipment shall have a selection of nozzles capable of scouring the interior of the size range of pipe indicated on the plans.
3. Debris removal equipment shall consist of a vacuum tanker unit capable of removing typical sewage debris accumulated by the pipe cleaner at the manholes.
4. Solid debris cutting equipment shall be hydraulically driven by the sewer cleaner. The equipment must have circular saw-tooth blades in sizes consistent with the pipe being cleaned.

D-226.04 CCTV INSPECTION REPORTS:

1. Audio and written documentation shall accompany all DVD(s) submitted to the Engineer.

SECTION 226 PIPE CLEANING AND CCTV INSPECTION

D-226.01 DESCRIPTION: This Item shall govern the cleaning and Closed Circuit Television (CCTV) inspection of sanitary and storm sewer mains before assessment, rehabilitation and final acceptance of a system. The Contractor shall do the televising. The City reserves the right to re-televising any new sanitary sewer/storm drain work after the placement of pavement or permanent trench resurfacing, but before acceptance by the Engineer, to determine the existence and extent of any foreign material or obstructions such as, but not necessarily limited to, cement grout, wood, rocks, sand, concrete, or pieces of pipe, and any structural deficiencies or sags precipitated by the permanent resurfacing operations or other Contract Work.

The Contractor shall notify the Engineer and Utility Inspector five (5) working days in advance of the anticipated date of the televising. Five (5) working days shall be allowed for the Engineer to review each individual video recording of each and every storm drain documented on that particular recording. In the event that any deficiencies or sags are discovered by the Engineer, either by the Contractor's televising or the City's re-televising, Five (5) working days shall be allowed for the Engineer to determine whether the deficiencies or sags are repairable in place. If the Engineer determines that the deficiencies or sags are not repairable in place, the affected portion(s) shall be reconstructed in accordance with these Specifications.

The Contractor shall not be entitled to any additional working days due to delays resulting from the correction of any deficiencies or sags, repairable or non-repairable in place, as determined by televised inspections and the Engineer.

D-226.02 GENERAL: The CCTV inspection work must be completed by a certified National Association of Sewer Service Companies (NASSCO) Pipeline Assessment and Certification Program (PACP) trained operator(s) using established PACP coding and observations.

1. General Requirements:

- a. The video operator must have at least one (1) year of experience with a project of a similar nature.
- b. Video shall be submitted to the Municipality on DVDs with high quality color in a format reviewable by the Municipality.
- c. Video recordings that are out of focus shall be cause for rejection of the recordings and Contractor shall re-televising at no additional cost to the Owner.
- d. The Contractor shall notify the Engineer five (5) Municipal working days prior to televising.
- e. The Contractor shall turn over the original video recordings to the Engineer immediately after recording.
- f. Televising shall be done in one direction for the entire length between manholes; each section shall be isolated from the remainder of the pipe as required. Sufficient water shall be supplied to cause drainage within the isolated section prior to televising.
- g. Pipe must be clean and free of dirt, rock, gravel, debris, or any other material or obstruction that will hinder the CCTV inspection.

DVD(s) shall have printed labels with location information, date format information, and other descriptive information. The voice recording of the DVD(s) shall make brief but informative comments on data of significance, including, but not limited to, the locations of unusual conditions, type and size of connection, collapsed section, the presence of scale and corrosion, and other discernible features.

The DVD(s) shall include the following:

	Data View	Audio	Written
Report No. (including DVD number(s))	X		X
Date of CCTV inspection	X	X	X
Current weather conditions	X		X
MQA Storm Drain Grid page number	X		X
Upstream and downstream manhole structure numbers, storm drain access point or station numbers.	X	X	X
GPS coordinate locations for- upstream and downstream manholes and/or any other storm drain access points. GPS receivers shall provide sub-meter accuracy	X		X
Location, size, type, and length of pipe.	X	X	X
Direction of flow and measurement (“From” manhole/storm drain access point/station number “To” manhole/storm drain access point/station number			X
Tape Counter Footage (current distance along reach)	X		Beginning & End
Sketch showing the street and cross streets where the TV inspection was made			X
Description and location of each defect		X	X
Description and location of each connection		X	X

2. A digital video shall be provided accompanied by an inspection report. This report shall be in accordance with the NASSCO defect codes. A sample inspection report and corresponding digital data file shall be submitted for review prior to starting the project. The report shall be a record of the exact location of each leak or- fault discovered by the inspection - e.g. open joints, broken, cracked, deformed or collapsed pipe, and presence of grease, roots, debris, accumulation, obstruction, infiltration, water depth variations and other points of significance. The reference location for distance measurements shall be the centerline of the launch manhole (Station 0+000). If the inspection includes an intermediate manhole, station shall be reset to 0+000 in the center of the intermediate manhole.
3. All videos shall be in digital MPEG format that is compatible with the City of Laredo inspection software. Recorded picture quality and definition shall be to the satisfaction of the City.
4. The report shall include the location of all service connections together with a statement of opinion as to whether or not the service connections are subject to joint infiltration. Intrusions of service connections into the main line shall be noted with reference to the degree of intrusion.
5. Photographs of sewer defects and service connections shall be taken. The photographs shall be coordinated with the written report by reference numbers. A minimum of one photograph per line or manhole-to-manhole segment shall be taken to show a representative view of the workmanship.
5. Each manhole-to-manhole section of pipe shall be located on the report form in such a way as to be readily identifiable. Identify such items as name of subdivision, street names, manhole numbers, type of pipe, joint length, direction of flows, pipe diameter, manhole depth, inspection date, names of the inspection technician, persons viewing, and video identification numbers. Lot and block numbers for all services shall be provided.
6. Two copies of the final CCTV report with corresponding video shall be provided to the City within two weeks after the completion of the inspection. Media submitted shall become the property of the City.
7. All digital media shall be numbered and cross-indexed to the written report. Video footage shall indicate the size of the sewer, the manhole-to-manhole segment being inspected, plus the street address or location.
8. To insure photographic quality in reports, color printers shall be used.

D-226.05 EXECUTION:

1. Pipe Cleaning

- 1.1. Acceptance of pipe and manhole cleaning shall be made upon review of the corresponding video inspection.
- 1.2. Block debris at downstream manhole to prevent contamination of the downstream mains. Sludge, dirt, sand and other debris resulting from the cleaning operations shall be removed from the downstream manhole of the section being cleaned. Passing material from the section being cleaned to the downstream pipe section shall not be permitted.

- 1.3. The liquid portion of material removed at the manholes shall be decanted back into the pipe. The solid and semi-solid material removed at the manholes shall be disposed of at a designated site as approved by the City of Laredo.
2. Traffic Control
 - 2.1. Interference to the normal flow of traffic shall be kept to a minimum.
 - 2.2. Traffic control equipment shall conform to the TMUTCD Manual for Temporary Traffic Control.
3. Closed Circuit Television Inspection Procedures
 - 3.1. The CCTV inspection shall provide a fill record of the condition of the pipes, manholes and appurtenances along the designated section of sewer. This shall include all installation and material defects. The CCTV inspection shall use inclinometer testing that is compatible to the City's software.
 - 3.2. For new construction, completely wet the pipe with clean water to fill any sags prior to inspection
 - 3.3. The Contractor shall not attempt a CCTV inspection if water levels in the pipe obstruct the cameras view unless instructed by the City.
 - 3.4. Traveling speed of the camera in the pipeline to be as follows:
 - 3.4.1. 0.33 ft/s for pipelines less than 8" diameter
 - 3.4.2. 0.5 ft/s for 8" to 12" diameter
 - 3.4.3. 0.66 ft/s for over 12" diameter or
 - 3.4.4. Will not exceed a traverse rate of 30 ft/min.
 - 3.5. Position camera lens centrally in the pipeline with a positioning tolerance of plus or minus 10% off the vertical centerline axis of the pipeline.
 - 3.6. During the inspection, the camera operator shall pan the camera to focus on observable deficiencies in the pipe that may be located off-center to the direction of camera travel. This shall include but not be limited to all services, joints to the top, left or right, cracks and fractures or surface deterioration of the pipe walls. Pan and tilt into each service connection.
 - 3.7. Upon completion the Contractor shall provide inspection reports and digital media as detailed in Section 3.0 above.
 - 3.8. Manual winches, power winches, TV cable and powered rewinds or other devices that do not obstruct the camera view or interface with proper documentation of the pipe conditions shall be used to move the camera through the pipe. If, during the televising operations, the television camera will not pass through an entire manhole section or access point section, the Contractor shall reset the equipment in a manner so that the inspection can continue opposite the obstruction. If the television camera encounters an obstruction within a section not accessible to a manhole or access point, the Contractor shall remove the obstruction by excavation or other appropriate means, replace whatever pipe is necessary, and re-televis the entire section.
 - 3.9. Whenever non-remote powered and controlled winches are used to pull the television camera through the line, telephones, radios, or other suitable means of communication shall be set up between the two manholes or access points of the section being inspected to ensure that adequate communications exist between members of the crew.
 - 3.10. The importance of accurate distance measurements is emphasized. Measurement for

location of defects shall be above ground by means of a meter device Marking on the cable, or the like, which would require interpolation for depth of manhole or storm access points, is not acceptable. The accuracy of the measurement shall be checked daily by use of a walking meter, roll-a-tape, or other suitable device. Measurements shall be from center to center of each manhole or access point. Unless permission is given by the Engineer to do otherwise. Distance shall be shown on the video data view at all times.

- 3.11. The City, or a City approved contractor, can excavate a pipe in order to free lodged camera equipment at the expense of the Contractor

D-226.06 MEASUREMENT:

Measurement for all sizes of pipe shall be based on the horizontal distances and shall be from center to center of manholes, from the center of manholes to center of catch basins, from center of manholes to center of cleanout “wye”, and from center of manhole to end of pipe including flared end sections. Televising pipe is considered incidental to the pay item and no separate payment shall be made.

SECTION 302 STRUCTURAL EXCAVATION AND BACKFILL

D-302.01 DESCRIPTION: This item shall consist of doing the excavation for the placing of structures; for the disposal of all material obtained from such excavation; for the backfilling around completed structures to the finished grade as called for on the plans. Work to be done shall include all the necessary pumping or bailing, sheeting, drainage, and the construction and removal of any required cofferdams. Unless otherwise provided, the work included herein shall provide for the removal of old structures or portions thereof, trees, and other obstructions necessary to the proposed construction.

D-302.02 DEFINITIONS: "Common Structural Excavation" shall include the removal of all materials regardless of its nature.

D-302.03 USE OF EXPLOSIVES: When the use of explosives is necessary for the prosecution of the work, the Contractor shall use the utmost care not to endanger life or property. All explosives shall be stored in a secure manner, and all storage places shall be marked clearly "DANGEROUS EXPLOSIVES". The method of storing and handling explosives and highly flammable materials shall conform to Federal and State laws and regulations. Contractor shall provide permit from the appropriate agency. The Contractor shall not use explosives until he has taken the necessary legal precautions to save the Owner against any claims arising from such use of explosives.

CONSTRUCTION METHODS

D-302.04 EQUIPMENT: All equipment necessary and required for the proper construction of structures and appurtenances shall be on project site in first class working condition and shall be approved by the Engineer before construction is permitted to start.

The Contractor shall provide hand tamping devices and pneumatic tampers as may be necessary to obtain the proper compaction for the bed and backfill as specified.

D-302.05 COMMON EXCAVATION: Common excavation shall be done in accordance with the lines and depths indicated on the plans or as established by the Engineer. Unless written permission to the contrary is given by the Engineer, no excavation shall be made outside a vertical plan three feet from the footing lines and parallel thereto.

In order that the Engineer may judge the adequacy of a proposed foundation, the Contractor, if requested, shall make soundings to determine the character of the subgrade materials. The maximum depth of such soundings will not be required to exceed five (5) feet below the proposed footing grade; it is the intent of this provision that soundings shall be made at the time the excavation in each foundation is approximately complete.

The final elevation to which a foundation is to be constructed shall be as shown on the plans or as raised or lowered by written order of the Engineer when such alterations are judged proper to satisfactorily comply with the design requirements for the structure. Should it be found necessary in the judgment of the plans, the necessary alterations in the details of the structure shall be accomplished in a manner as directed by the Engineer.

When a structure is to rest on an excavated surface other than rock, special care shall be taken not to disturb the bottom of the excavation and the final removal of the foundation material to grade shall not be performed until just before the footing is placed.

D-302.06 ROCK EXCAVATION: All material encountered, regardless of its nature, shall be included as common structural excavation.

Unless written permission to the contrary is given by the Engineer, no excavation shall be made outside a vertical plane 3 (three) feet from the footing lines and parallel thereto.

Rock foundation material shall be freed from all loose material, cleaned and cut to a firm surface either level, stepped, or serrated as directed by the Engineer. All seams shall be cleaned out and filled out with concrete at the time the footing is placed.

D-302.07 EXCAVATED MATERIAL: Excavated material required to be used for backfill may be deposited by the Contractor in storage piles at points convenient for rehandling. The location of storage piles shall be subjected to the approval of the Engineer who may require that survey points or lines be kept free from any obstruction.

Excavated material not required for backfill shall be disposed of by the Contractor as directed by the Engineer or as specified herein. If, in the opinion of the Engineer, the bottom of the ditch consists of unstable soil, this soil shall be removed from the full width of the trench and replaced with a pit-run gravel. Pit-run gravel shall vary in size from 3/4" to 3 1/2". The material shall be free from large amounts of organic material such as grass, roots, etc. The Engineer shall determine the depth of removal or unstable soil and the amount of backfill necessary. The cost of removing this unstable soil and replacing it with approved material shall be covered by a supplemental agreement. The sides of the trench shall be vertical unless otherwise approved by the Engineer. The Contractor shall install such trench bracing and sheeting as is necessary to protect the excavation also as required for the safety and to conform with governing laws.

Unless otherwise provided, the bracing and sheeting shall be removed by the Contractor after the backfilling has been replaced to a point at least 12 (twelve) inches above the top of the structure. In no case shall any sheeting or bracing be removed until the backfilling conditions have been met. The cost of bracing and sheeting shall be included in the unit price per linear foot for the structures.

The Contractor shall take adequate precautions to prevent damage to all existing utilities. Any utility lines cut or damaged shall be repaired or restored to their former condition.

D-302.08 DEWATERING TRENCH: Removal of water may be accomplished by bailing, pumping, or by a well-point installation as conditions warrant. Pumping or bailing from any excavation shall be done through or alongside any concrete being placed. No pumping or bailing will be permitted during the placing of concrete or for a period of at least 24 hours thereafter, unless it is done from a suitable sump separated from the concrete work by a watertight wall.

1. Minor water seepage or pockets of saturated soil may be effectively controlled through bailing or pumping. This control shall be accomplished without removing any adjacent

- soil that could weaken or undermine any access pit, its supports, or other nearby structure.
2. Larger volumes of ground water shall be controlled with one or more well points or with staged deep wells. Well points and staged deep well pumping systems shall be installed and operated without damage to property or structures, and without interference with the rights of the public, owners of private property, pedestrians, vehicular traffic, or the work of other contractors. Any pumping methods used for de-watering and control of ground water and seepage shall have properly designated filters to ensure that the adjacent soil is not pumped along with the water. Well diameter, well spacing and the pump's pumping rate, shall provide adequate draw down of the water level. Wells shall be located to intercept ground water that otherwise would enter the access pit excavation and interfere with the work. Upon removal of a well, the hole shall be filled and grouted according to the specifications identified as flowable fill, and plug drill holes as directed by the Engineer.
 3. Existing storm sewers shall only be used to discharge water from the dewatering operation in accordance with a permit obtained from the appropriate storm sewer owner. Filters or sediment control devices shall be required to ensure that the existing system is not adversely affected by construction debris or sediment.
 4. If grouting is used to prevent ground water from entering the area of the access pit, the grouting shall be installed without damage to property or structures and without interference with the rights of the public, owners of private property, pedestrians, vehicular traffic, or the work of other contractors. The material properties of the grout shall conform to the specifications identified as flowable fill.

D-302.09 BEDDING: The structure shall be bedded as shown on plans on fine granular materials over an earth foundation accurately shaped to fit the lower part of the structure exterior for at least 15% of its overall height. Selected material from excavation or borrow shall then be placed along both sides of the structure equally in layers not more than six (6) inches thick and compacted by mechanical tamps or rammers for the remainder of the lower 30% of the overall height of the structure.

D-302.10 BACKFILLING: As soon as practicable, all portions of excavation not occupied by the permanent structure shall be backfilled. Backfill material shall be free from large or frozen lumps, wood or other extraneous material, placed in successive layers of not more than 6" in depth (loose measurement) for the full width of the cross section. The material and the layers shall have the proper moisture content before tamping or rolling. Wetting or drying of the material and manipulations to secure a uniform moisture content throughout the layer will be required. Should the material be too wet to permit proper compaction or rolling, all work on all positions of the fill thus affected shall be corrected. Unless otherwise provided by the plans or special provisions, hand tamping will not be accepted as an alternate for mechanical compaction.

As a general rule, material used in filling or backfilling the portions described in this paragraph shall be an earth free of any appreciable amount of gravel or stone particles more than 4 (four) inches in greatest dimension and of a gradation that permits thorough compaction. When, in the opinion of the Engineer, such material is not readily available, the use of rock or gravel mixed with earth will be permitted provided no particles larger than 12 (twelve) inches in the greatest and 6 (six) inches in the

least dimensions may be used. The percentage of fines shall be sufficient to fill all voids and insure a uniform and thoroughly compacted mass of proper density. **No backfill shall be placed adjacent to or over single and multiple boxes until the top slab has attained 500 psi flexural strength.**

All backfill as specified above shall be compacted to not less than 95% of the maximum density at optimum moisture content as determined by procedures set out under Tex-113-E or Tex-114-E. The compaction shall extend to the entire depth of each layer as specified or shown on the plans and the backfill, when completed, shall be a homogenous and uniformly compacted mass. **Water jetting in backfill operations will not be permitted.**

D-302.11 CLEANING AND RESTORATION OF SITE: After the backfill is completed, the Contractor shall notify the Environmental Services Department before the disposal of all surplus material, dirt, and rubbish from the site and shall restore all disturbed areas to their original condition. After all work is completed, the Contractor shall remove all tools and other equipment used by him, leaving the entire site free, clear, and in good condition.

D-302.12 MEASUREMENT AND PAYMENT No separate measurement or payment will be made under this item, but all such work done shall be deemed a subsidiary obligation of the Contractor, and as having been taken into account and included in the price bid for the complete job.

SECTION 308 HIGH DENSITY POLYETHYLENE STORM DRAIN PIPE

D-308.01 GENERAL: This Item shall govern for the furnishing and installing of all thermoplastic pipe for constructing thermoplastic pipe culverts or thermoplastic storm sewer mains, laterals, and stubs. The pipes shall be of the sizes, types, design and dimensions shown on the plans and shall include all connections and joints to new or existing pipes, sewer, manholes, inlets, headwalls and other appurtenances as may be required to complete the work.

A private system using HDPE pipe up to the property line, may enter the public right of way to connect with a public storm sewer at a structure. However, HDPE pipe is not allowed to be installed underneath public streets. Do not utilize HDPE pipe in closed storm sewers.

D-308.02 MATERIALS: Pipes within the R.O.W. shall be Type “S” with watertight joint and not to exceed 36” diam. Unless otherwise specified on the plans or herein, thermoplastic pipe and joint fittings shall conform to the following:

(a) High density polyethylene pipe and fittings shall meet the requirements as in AASHTO M 294.

(b) Raw Materials. The pipes and the fittings shall be manufactured from virgin PE compounds, which conform to the requirements of cell class 335400C as defined and described in ASTM D 3350, except that carbon black content shall not exceed 5%. PE compounds shall meet the Environmental Stress Crack Resistance according to the SP-NCTL test set forth in AASHTO M 294.

(c) Designation of Type. The HDPE pipes used for gravity flow drainage applications shall be of Type S (outer corrugated wall with smooth inner liner) or Type D (inner and outer smooth walls braced circumferentially or spirally with projections or ribs).

(d) Section Properties. Minimum wall thickness of the inner walls of Type S pipe and inner and outer walls of Type D pipe shall be as specified in Section 7.2.2 of AASHTO M 294. The pipe stiffness at 5% deflection, when determined in accordance with ASTM designation D 2412, shall be as specified in Section 7.4 of AASHTO M 294.

D-308.04 JOINTS: Joints shall be installed such that the connection of pipe sections will form a continuous line free from irregularities in the flow line. Joints shall conform to one of the following:

- Watertight Joints — Joints meeting the requirements of ASTM 3212.

D-308.05 END SECTIONS: Provide non flammable end sections of the minimum length shown in the table I for each exposed pipe end. Minimum length shown in the table refers to the portion of pipe completely embedded into the embankment or natural ground. All exposed and mitered pipe sections shall consist of the same non-flammable material.

Unless otherwise specified on the plans, non-flammable end sections shall be corrugated metal as described in Section 306, reinforced concrete as described in Section 304, or other non-flammable material deemed acceptable by the City.

Table I
Minimum length of Non-flammable End Section

Normal Pipe Diameter (in.)	Minimum length of End Section (ft.)
24	4
30	5
36	6

D-308.06 APRONS: Provide non-flammable aprons consisting of concrete rip-rap or other approved material at each exposed pipe end. Limits of apron shall be as Drawing No.

D-308.07 CONSTRUCTION METHODS: The location of private driveway and side road pipe shall be constructed at locations shown on the plans or as directed by the Engineer.

Only trench installation of thermoplastic pipe will be permitted. No portion of the pipe shall project above the existing ground level.

(1) Excavation. All excavation shall be in accordance with the requirements of ‘Excavation and Backfill for Structures’. The width of the trench for pipe installation shall be sufficient, but no greater than necessary, to ensure working room to properly and safely place and compact haunching and other embedment materials. The space between the pipe and trench wall must be wider than the compaction equipment used in the pipe zone.

When Type I backfill is used, the minimum trench width is the pipe outside diameter plus 12 inches.

When Type II or Type III backfill is used, the minimum trench width shall be as specified in Table II.

Table II
Minimum Trench Width

Normal Pipe Diameter Inches	Minimum Trench Width Inches
24	54
30	66
36	78

(2) Installation in Embankment. If any portion of the pipe projects above the existing ground level, an embankment shall be constructed as shown in the plans or as directed by the Engineer for a distance outside each side of the pipe location of not less than five times the diameter and to a minimum elevation of 2 feet above the top of the pipe. The trench shall then be excavated to a width as specified above.

(3) Shaping and Bedding. The pipe shall be bedded in a foundation of compacted cohesionless material, such as crushed stone, or pea gravel, with a maximum size not exceeding 3/8". This material shall extend a minimum of 6 inches below the outermost corrugations or ribs, and shall be carefully and accurately shaped to fit the lowest part of the pipe exterior for a least 10 percent of the overall height. When requested by the Engineer, the Contractor shall furnish a template for each size and shape of pipe to be placed for use in checking the shaping of the bedding. The template shall consist of a thin plate or board cut to match the lower half of the cross section of the pipe.

(4) Handling and Storage. Store pipe above ground on adequate blocking, keep pipe clean and fully drained at all times during storage. Handling and storage of thermoplastic pipe shall be in accordance with the pipe manufacturer's instructions. Proper facilities shall be provided for hoisting and lowering pipe into the trench without damaging the pipe or disturbing the bedding or the walls of the trench.

(5) Laying Pipe. Unless otherwise authorized by the Engineer, the laying of pipes on the bedding shall be started at the outlet end with the separate sections firmly joined together. Proper facilities shall be provided for hoisting and lowering the section of pipe into the trench without damaging the pipe or disturbing the bedding and the sides of the trench. Any pipe which is not in alignment or which shows any undue settlement after laying shall be removed and relaid at the Contractor's expense.

Multiple installation of thermoplastic pipe shall be laid with the center lines of individual barrels parallel. Unless otherwise indicated on the plans, the following clear distances between outer surfaces of adjacent pipes shall be maintained:

Table III

Nominal Pipe Diameter	Min. Clear Distance Between Pipes
24"	17"
30"	20"
36"	23"

(6) Reuse of Existing Appurtenance. When existing appurtenances are specified on the plans for reuse, the portion to be reused shall be severed from the existing culvert and moved to the new position previously prepared, by approved methods. Connections shall conform to the requirements for joining sections of pipes as indicated herein or as shown on the plans. Any headwalls and any

aprons or pipe attached to the headwall that are damaged during moving operations shall be restored to their original condition at the Contractor's expense. The Contractor, if he so desires, may remove and dispose of the existing headwalls and aprons and construct new headwalls at his own expense, in accordance with the pertinent specifications and design indicated on the plans or as furnished by the Engineer.

(7) Connections and Stub Ends. Connections of pipe sewer to existing sewers or sewer appurtenance shall be as shown on the plans or as directed by the Engineer. The bottom of the existing structure shall be mortared or concreted if necessary, to eliminate any drainage pockets created by the new connection. Where the sewer is connected into existing structures, which are to remain in service, any damage to the existing structure resulting from making the connection shall be restored by the Contractor to the satisfaction of the Engineer. Stub ends, for connections to future work not shown on the plans, shall be sealed by installing watertight plugs into the free end of the pipe.

D-308.08 BACKFILLING: Backfill from the pipe bedding up to 1 foot above the top of the pipe is critical for the successful performance of the pipe. Pipe backfill provides necessary structural support to the pipe and controls pipe deflection. Special emphasis is to be placed upon the need for obtaining uniform backfill material and uniform compacted density throughout the length of the pipe, so that unequal pressure will be avoided. Care should be taken to insure proper backfill under the pipe in the haunch zone.

1. Primary backfill material shall meet the following specifications:

- Type I - Backfill shall consist of flowable fill in accordance with Division D Section 134, "Flowable Backfill". The flowable backfill shall be placed across the entire width of the trench and shall maintain a minimum depth of 12 inches above the pipe. A minimum of 24 hours shall elapse prior to backfilling the remaining portion of the trench with other backfill material.
- Type II - Backfill shall consist of cement stabilized backfill in accordance with Division D Section 136. Cement stabilized backfill shall be placed and compacted to ensure that all voids are filled completely.
- Type III - Backfill shall consist of hard, durable, clean granular material that is free of organic matter, clay lumps, and other deleterious matter. Such backfill shall meet the gradation requirements shown in Table II. The backfill material shall be placed along both sides of the completed structure(s) to a depth of 12 inches above the pipe. The backfill shall be placed in uniform layers not exceeding 6 inches in depth (loose measurement), wetted if required, and thoroughly compacted between adjacent structures and between the structure and the sides of the trench. Until a minimum cover of 12 inches is obtained, only hand operated tamping equipment will be allowed within vertical planes 2 feet beyond the horizontal projection of the outside surfaces of the structure.

Table IV
Gradation Requirements for Type III Backfill Material

Sieve Number	Percent Retained (cumulative)
1 inch	0 - 5
7/8 inch	0 - 35
1/2 inch	0 - 75
3/8 inch	0 - 95
No.4	35 - 100
No. 10	50 - 100
No. 200	90 - 100

If Type III backfill is utilized, filter fabric shall be placed between the native soil and the backfill. Filter fabric shall conform to the requirements of DMS-6200, Type 1.

2. Secondary backfill shall be in accordance with Division D Section 304.13.3.3

D-308.09 PROTECTION OF PIPE: Unless otherwise shown on the plans or permitted in writing by the Engineer, no heavy earth moving equipment will be permitted over the structure until a minimum of 4 feet of compacted fill (permanent or temporary) has been placed over the top of the structure. Prior to adding each new layer of loose backfill material, until a minimum of 12 inches of cover is obtained, an inspection will be made of the inside periphery of the structure for local or unequal deformation caused by improper construction methods. Evidence of such will be reason for such corrective measures as may be directed by the Engineer.

Pipe damaged by the Contractor shall be removed and replaced by the Contractor at no additional cost.

Maximum deflection (reduction of the barrel base inside diameter) is 5%. Time of measurement shall be not less than 30 days following completion of installation and backfill. Contractor shall notify the engineer for testing.

D-308.10 REINSTALLATION: Deflections in excess of 5% may require the pipe to be removed and new pipe installed.

D-308.11 FIELD QUALITY CONTROL & TESTING:

- a) All storm sewer shall be inspected by City inspectors prior to backfilling the pipe.
- b) Mandrel testing (or other approved method) shall be required when visual inspection reveals excessive deflection as determined by the City. Testing shall be at the expense of the contractor.

D-306.12 TELEVISION PIPE : New storm drains up to 36" in diameter shall be inspected by closed circuit television (CCTV) after completion of trench backfill, all apertures, connections, and structures installed as well as finish grading, but prior to the placement of pavement or permanent

trench resurfacing, to determine the existence and extent of any obstructions, structural deficiencies, or sags as per Division D Section 226.

D-308.13 MEASUREMENT: This Item will be measured by the linear foot. Such measurements will be made between the ends of the barrel along its flow line, exclusive of safety end treatments. For multiple pipes, the measured length will be the sum of the lengths of the barrels, measured as prescribed above.

D-308.14 PAYMENT: The work performed and materials furnished in accordance with this Item and measured as provided under “Measurement” will be paid for at the unit price bid for “Thermoplastic Pipe” of the size, joint type and backfill type specified. This price shall be full compensation for furnishing, hauling, placing and joining of pipes; for all connections to new or existing structures; for moving and reusing headwalls where required; for removing and disposing of portions of existing structures as required; for cuffing of pipe ends on skew; and for all labor, tools, equipment and incidentals necessary to complete the work.

SECTION 312 MANHOLES AND INLETS

D-312.01 DESCRIPTION: This item shall consist of manholes and inlets, complete in place constructed of required materials in accordance with these specifications and at the locations and on conformity with the lines, grades, and dimensions shown on the plans or as required by the Engineer. Drainage junction boxes are classified as manholes.

MATERIALS

D-312.02 PRECAST RINGS, THROAT SECTIONS, AND THROAT RINGS: Precast manhole rings shall be a minimum of four feet in diameter and five inches thick and a maximum of six feet in diameter. Throat sections shall be five inches thick and 2.5 feet in length. Throat rings shall be two feet in diameter and five inches thick. Alternate designs other than precast are to be designed and sealed by a Texas licensed professional engineer.

D-312.03 MORTAR: The mortar for precast rings shall be composed of one part of Portland Cement and two parts mortar sand by volume. Portland cement shall conform to the requirements of ASTM Designation C-150, Type I. Sand shall conform to the requirements of AASHTO Specification M-45. The water shall be clean and free from injurious amounts of sewage, oil, acid, strong alkalis and other vegetable matter.

D-312.04 CONCRETE: Reinforced concrete used in manholes shall conform to the requirements of Class "A" Concrete, under the specification contained herein Division D Section 504 for "CONCRETE". Manholes may be either pre-cast or cast-in-place depending on the design, same requiring the approval of the City Engineer prior to installation.

D-312.05 CAST IRON FRAMES AND COVERS: All castings shall be true to form and dimensions and shall be free from inclusions of foreign matter, casting faults, injurious blow holes, cracks, sponginess, and other defects rendering them unsuitable.

Finished frames and covers shall have the bearing surfaces machined or ground so that there will be no variation that will permit rocking or rattling and the diameter of the cover will be such as to fit the frame without wedging. The machined sets of frames and covers shall be marked in such a way that they can be properly matched for assembly in the field.

Castings shall conform to AASHTO Designation M 306-89 (2000). Castings shall include labeling of manhole type on manhole covers, such as "STORM DRAIN". Manhole covers shall bear the "CITY OF LAREDO" name for all storm drain for proper identification. Casting covers and rings shall be as manufactured by East Jordan Iron Works or approved equal.

D-312.06 INLET UNITS: Inlet units shall be installed in conjunction with the construction or concrete curb and gutter. Prior to placing concrete for curb and gutter, the inlet units shall be set securely in position. Openings for the inlets and recesses in curb and gutter, as indicated on the plans, shall be formed in conjunction with the curb and gutter forms. Concrete for curb and gutter adjacent to the inlet shall be placed using care to secure thoroughly compacted concrete around the

inlet and formed openings and recesses without displacement of the inlet units in the forms.

CONSTRUCTION METHODS

D-312.07 GENERAL: Construct manholes and inlets as soon as is practicable after pipe lines into or through the manhole or inlet locations are completed. All concrete work shall be performed in accordance with the requirements of the item, "Concrete Structures", unless otherwise specified. Forms will be required for all concrete walls except where the nature of the surrounding material may be trimmed to a smooth, vertical face (the outside form for concrete bases supporting brick walls may be omitted with the approval of the Engineer).

Care shall be taken when connecting to the manhole several pipes with an angle less than 90 degrees between them. Minimum clear distance between two wall penetrations shall be 12 in. or half diameter of the smaller penetration, whichever is greater. See Detail No.

D-312.08 EXCAVATION:

(a) Excavation shall conform to Division D Section 302. The Contractor shall do all excavation for structures to the lines, grades, and elevations shown on the plans or staked by the Engineer. The excavation shall be sufficient size to permit the placing of a full width and length of the structure shown, plus such additional sizes to allow for forms.

(b) The Contractor shall do all bracing, sheeting, or shoring necessary to perform and protect the excavation in the structure or as required for safety to conform with governing laws. The cost of bracing, sheeting, and shoring shall be included in the unit price bid for this structure.

(c) Unless otherwise provided, bracing, sheeting, or shoring involved in the construction of this item shall be removed by the Contractor after completion of the structure. The removal shall be performed in such a manner as not to disturb or mar finish or masonry. The cost of removal shall be included in the unit price bid for the structure.

(d) After each excavation is completed, the Contractor shall notify the Engineer to that effect, and concrete and reinforcing steel shall be placed after the Engineer has approved the depth of excavation and the character of the foundation material.

D-312.9 CONCRETE STRUCTURES: Shall be in accordance with Division D Section 406

All invert channels shall be constructed and shaped accurately so as to be smooth, uniform, and cause minimum resistance to flow. The interior floor shall be sloped downward toward the outlet.

D-312.10 INLET AND OUTLET PIPES: Inlet and outlet pipes shall extend through the walls of the structures for sufficient distance beyond the outside of the surface to allow for connections, but shall be cut off flush with the wall on the inside surfaces unless otherwise directed. A concrete collar shall be placed around the pipe so as to prevent leakage and to form a neat connection. Detail No.

Care shall be taken when connecting a pipe in skew to an inlet box to avoid braking the corners and top & bottom beams of the box.

D-312.11 INVERTS: The inverts passing out or through the manhole or inlet shall be shaped and routed across the floor of the manhole or inlet as shown on the plans. This may be accomplished by adding and shaping mortar or concrete after the base is cast or by placing the required additional material with the base.

D-312.12 THE PLACEMENT AND TREATMENT OF CASTING, FRAMES, AND FITTINGS: All castings, frames, and fittings shall be placed in positions indicated on plans, or as directed by the Engineer and shall be set in true to line and elevation. If frames or fittings are to be set in concrete or cement mortar, all anchors or anchor bolts shall be in place and position before the concrete or mortar is placed. The unit shall not be disturbed until all the mortar or concrete is set.

When frames or fittings are to be placed upon previously constructed masonry, the bearing surfaces of the masonry shall be brought true to line and grade and present an even bearing surface in order that the entire face or back of the unit will come in contact with the masonry. The unit shall be set in mortar beds or anchored to the masonry as indicated on the plans or as directed and approved by the Engineer. All units shall be set firm and secure.

When concrete structures are so located as to be within the paved areas of the street, the finish top of these structures shall match existing grades.

D-312.13 BACKFILLING:

(a) After a structure has been completed, the area around it shall be filled with approved material in accordance with the Division D Section 302, "STRUCTURAL EXCAVATION AND BACKFILL". Fill shall be made to the elevations shown on the plans or as directed by the Engineer.

(b) No backfill material shall be placed against any structure until permission is given by the Engineer. In the case of the concrete, such permission preferably shall not be given until the concrete has been in place for 14 days and tested in a laboratory conforming to the requirements of ASTM Designation C-42. All water must be removed from excavation before backfilling is done unless otherwise directed by the Engineer.

(c) Fill in place shall be deposited on all sides of the structure at the same time and to approximately the same elevation. Special care shall be taken to prevent any wedging action against the structure and all slopes, bounding or within the area to be backfilled, will be stepped or serrated to prevent wedge action.

(d) All backfill shall be compacted as per Division D Section 302.

(e) Backfill shall not be measured for direct payment. Performance of this work is not payable directly but shall be considered a subsidiary obligation of the Contractor covered under the contract unit price for the structure involved.

D-312.14 CLEANING AND RESTORATION OF SITE: After the backfill is completed, the Contractor shall dispose of all surplus material, dirt, and rubbish from the site. Surplus dirt shall be disposed of as ordered by the Engineer. The Contractor shall restore all disturbed areas to their original condition.

After all work is completed, the Contractor shall remove all tools and other equipment used by him, leaving the entire area free, clear, and in good condition. The performance of the work described in this section is not payable directly, but shall be considered as a subsidiary obligation of the Contractor, covered under the contract unit price for each manhole and inlet.

D-312.15 MEASUREMENT: The number, types and nominal sizes of manholes and inlets shown on the plans shall be measured per each unit complete in place and accepted by the Engineer.

D-312.16 PAYMENT :The number of units of manholes and inlets determined as provided in above paragraph shall be paid at the contract unit price for each of the various types and nominal sizes of manholes and inlets as called for on the Bid Schedule, which price and payment shall constitute full compensation for furnishing all materials, for placing and finishing, for all excavation and hauling, for all backfill, for setting and anchoring any frame, cover, for all labor, equipment, tools, and incidentals necessary to complete the unit, as shown on the plans and as described in the specifications.

SECTION 316
CONCRETE ENCASEMENT, CRADLES, SADDLES, AND COLLARS

D-316.01 DESCRIPTION: This Item shall govern for placing concrete encasement, cradles, saddles, and collars, when called for the Project plans or as directed by the Engineer.

D-316.02 MATERIALS: Concrete: All concrete shall be class "A" and conform to the provisions of Division D Section 504 or shall be of the class noted on the plans.

D-316.03 CONSTRUCTION METHODS:

- 1. Concrete Encasement:** When concrete encasement is show on the plans or when directed by the Engineer, the trench shall be excavated and fine graded to a depth conforming with details and sections shown on the plans. The pipe shall be supported by precast concrete blocks of the same strength as the concrete for encasement and securely tied down to prevent floatation. Encasement shall then be placed to a depth and width conforming with details and sections shown on the plans.
- 2. Concrete Cradles:** When concrete cradles are shown on the plans or when called for by the Engineer, the trench shall be prepared and the pipe supported in the same manner as described in this specification and shall be constructed in accordance with details and sections shown on the plans.
- 3. Concrete Saddles:** When shown on the plans or when directed by the Engineer, pipe to receive concrete saddle shall be backfilled in accordance with Division D Section 302, "Structural Excavation, and Backfill" to the spring line and concrete placed for a depth and width conforming with details and sections shown on the plans.
- 4. Concrete Collars:** When shown on the plans or when directed by the Engineer, concrete collars shall be constructed in accordance with details and sections shown on the plans. See details No.

D-316.04 MEASUREMENT: "Concrete Encasement, Cradles, Saddles, and Collars", will be measured by the cubic yard of accepted work calculated based on the lines and dimensions shown on the plans, complete in place. Reinforcing, if required, shall not be measured for payment.

D-316.05 PAYMENT: "Concrete Encasement, Cradles, Saddles, and Collars", will be paid for at the unit price bid per cubic yard, which price shall be full compensation for furnishing and placing all materials, manipulation, labor, tools, equipment, and incidentals necessary to complete the work.

SECTION 318 CHANNEL EXCAVATION AND EMBANKMENT

D-318.01 DESCRIPTION Shall consist of required excavation for all channels proposed in the plans; the removal and proper utilization or disposal of all excavated materials; and constructing, shaping and finishing all earthwork involved in conformity with the required lines, grades and ~~typical~~ cross sections and in accordance with specifications requirements herein outlined.

D-318.02 METHODS All suitable materials removed from the excavation shall be used, insofar as practicable, in the formation of embankments as required by the Item, "Embankment", or shall be otherwise utilized or satisfactorily disposed of as indicated on plans, or as directed, and completed work shall conform to the established alignment, grades and cross sections. During construction, the channel shall be kept and drained, insofar as practicable, and the work shall be prosecuted in a neat workmanlike manner.

Unsuitable channel excavation in excess of that needed for construction shall be as known as "WASTE" and shall become property of the Contractor to be disposed of by him outside the limits of the right of way.

Payment will not be allowed for excavation of any material which is used for purposes other than those designated, except as provided in the governing specifications under the item "Scope of Work."

D-318.03 MEASUREMENT All channel excavation will be measured in its original or final, fully compacted position and the volume computed in cubic yards by the method of average in end areas.

D-318.04 PAYMENT All work performed as required herein and in the Item, "Embankment" and measured as provided under "Measurement" will be paid for at the unit price bid under the following method:

Ordinary Compaction (for channel embankment) each layer shall not exceed one (1) foot of loose depth, and shall be compacted as per specifications. Each layer shall be brought to the moisture content ordered by the Engineer, and shall be kept leveled with suitable equipment to insure uniform compaction over the entire layer.

The prices bid for channel excavation or embankment shall each be full compensation for furnishing all labor, materials, tools, equipment and incidentals necessary to complete the work. Payment for unauthorized work will not be made.

All work required for disposing of waste, including haul, will not be paid for directly, but shall be considered subsidiary work pertaining to the various contract items, and such cost shall be included in the unit prices for these items.

When specified on the plans, and hauling of materials will not be paid directly, but shall be considered as subsidiary work pertaining to the various contract items, and such cost shall be included in the unit prices bid.

SECTION 402 CLEARING AND GRUBBING

D-402.01 DESCRIPTION: "Clearing and Grubbing" shall consist of the removal and disposal of trees, stumps, brush roots, vegetation, logs, rubbish, and other objectionable matter. Full compliance with NPDES (National Pollution Discharge Elimination System) permitting & Drainage Standard shall be maintained.

D-402.02 CONSTRUCTION METHODS: The right-of-way shall be cleared of stumps, brush, logs, rubbish, trees, and shrubs, except such trees and shrubs and certain areas designated by the Engineer for preservation. Those trees, shrubs, and other landscape features specifically designed by the Engineer for preservation shall be carefully protected from abuse, marring, or damage during construction operations. Continual parking and/or servicing of equipment under the branches of trees designated for preservation will not be permitted. Trees and shrubs designated for preservation that must be pruned shall be trimmed as directed and all exposed cuts over two (2) inches in diameter shall be treated with an approved material.

Areas required for embankment construction, for roadway, channel and structural excavation, and for borrow sites and material sources shall be cleared and grubbed. On areas required for roadway, channel, or structural excavation, all stumps, roots, etc., (except for designated trees and brush) shall be removed to a depth of at least two (2) feet below the existing ground surface. All holes remaining after clearing and grubbing shall be backfilled and tamped as directed by the Engineer and the entire area bladed to prevent ponding of water and to provide drainage, except, in areas to be immediately excavated, the Engineer may direct that the holes not be backfilled. When permitted by the plans, trees and stumps may be cut off as close to natural ground as practicable on areas which are to be covered by at least three (3) feet of embankment. On areas required for borrow sites and material sources, stumps, roots, etc., (except for designated trees and brush) shall be removed to the complete extent necessary to prevent such objectionable matter becoming mixed with the material to be used in construction.

All cleared and grubbed material shall be disposed of in a manner satisfactory to the Engineer. Unless otherwise provided, all merchantable timber removed as required above shall become the property of the Contractor.

D-402.03 MEASUREMENT: Payment will be made for this item as clearing and grubbing and the Contractor shall investigate the conditions as they exist in the field.

D-402.04 PAYMENT: Price shall be full compensation for placing removing, loading and disposing all materials, manipulation, labor, tools, equipment, dumping fees and details necessary to complete the work.

SECTION 404 GENERAL CONSTRUCTION AND PREPARATION OF SITE

D-404.01 INTENT OF PLANS AND SPECIFICATIONS: The intent of the plans and specifications is to prescribe a complete work or improvement which the Contractor undertakes to do so, in full compliance with the plans, specifications, special provisions, proposal, and contract. The Contractor shall do all work as provided in the plans, specifications, special provisions, proposal, and contract, and shall do such additional work as may be considered necessary to complete the work in a satisfactory and acceptable manner. The Contractor shall furnish all labor, tools, materials, machinery, equipment, and incidentals necessary to the prosecution of the work.

D-404.02 DESCRIPTION OF SITE: This item shall consist of the preparation of site for construction operations by the removal and disposal of all obstructions which are not otherwise provided for in the plans and specifications.

Such obstructions shall be considered to include removal of sections of existing utility lines (water, sewer, & force main), existing fences/gates, and other such materials as shown on the plans including concrete slabs.

This item shall include the removal of obstructions in accordance with the item "Clearing and Grubbing", Section 402. It is the intent of this item to provide for the disposal of all objectionable materials not specifically provided for elsewhere in the plans/specifications. All materials to be salvaged by the Owner shall be properly disposed of by the contractor as directed.

D-404.03 FINAL CLEAN-UP: Upon the completion of the work and before acceptance and final payment will be made, the Contractor shall clean and remove from the site of the work, surplus and discarded materials, temporary structures, and debris of every kind. Contractor shall leave the site of the work in a neat and orderly condition. Surplus and waste materials removed from the site of the work shall be disposed of at locations satisfactory to the Engineer. Grounds around any structures shall be dressed to final grade as shown on plans.

D-404.04 COORDINATION OF PROJECT: The plans, these specifications, the proposal, special provisions, and all supplementary documents are intended to describe a complete work and are essential parts of the contract. A requirement occurring in any of them is binding. In case of discrepancies, figured dimensions shall govern over specifications; and plans and quantities shown on the plans shall govern over those shown in the proposal. The Contractor shall not take advantage of any apparent error or omission in the plans and specifications, and the Engineer shall be permitted to make such corrections or interpretations as may be deemed necessary for the fulfillment of the intent of the plans and specifications. In the event the Contractor discovers an apparent error or discrepancy, Contractor shall immediately call this to the attention of the Engineer.

D-404.05 COOPERATION OF CONTRACTOR: The Contractor shall give to the work the consistent attention necessary to facilitate the progress thereof, and he shall cooperate with the Engineer, his inspectors, and with other contractors in every way possible.

D-404.06 MATERIALS-GENERAL: The materials shall be the best procurable, as required by the plans, specifications, and special provisions. The Contractor shall not start delivery of materials until

the Engineer has approved the source of supply. Only materials conforming to these specifications shall be used in the work, and such materials shall be used only after approval has been given by the Engineer and only so long as the quality of said materials remains equal to the requirements of the specifications.

The Contractor shall furnish approved materials from other sources, if for any reason the product from any source at any time before commencement or during the prosecution of the work proves unacceptable. After approval, any material which has become mixed with or coated with dirt or any other foreign substances during its delivery and handling will not be permitted to be used in the work.

D-404.07 MATERIALS-STORAGE: Any and all materials, such as cement, lime, mill work, or other materials or equipment subject to deterioration by exposure to weather or other factors, shall be stored in such a manner to protect them from deterioration or damage preceding the time they become a permanent part of final structure.

D-404.08 MEASUREMENT AND PAYMENT: All work performed will NOT be paid directly but shall be included in the unit price bid for other items of construction. Price shall be full compensation for furnishing and placing all materials, manipulation, labor, tools, equipment, and incidentals necessary to complete the work.

SECTION 406 CONCRETE STRUCTURES

D-406.01 GENERAL: This item shall consist of reinforced concrete structures built in accordance with the design requirements and details shown on the plans and in conformity with the requirements herein.

MATERIALS

D-406.02 CONCRETE: Concrete shall conform to the requirements of Section D-504. Unless otherwise specified on the plans or in the proposal.

D-406.03 REINFORCING STEEL: Reinforcing steel shall conform to the requirements of Section D-410. Wire mesh reinforcement shall conform to the requirements of ASTM Designation A185.

D-406.04 STRUCTURAL STEEL: Structural steel shall conform to the requirements of ASTM Designation A-36.

D-406.05 EXPANSION JOINT MATERIAL:

(a) Pre-molded expansion joint material shall conform to the requirements of Division D, Section 414, titled, EXPANSION JOINT MATERIALS.

(b) Poured joint material shall conform to requirements of Federal Specifications SS-S-156, SS-S-159, or SS-S-164.

D-406.06 FORM MATERIAL:

(a) Form lumber for all exposed concrete surfaces shall be CM concrete form lumber, Southern Yellow Pine or approved equal, S4S, grade marked in accordance with the latest grading rules of the Southern Pine Association. Form lumber not otherwise specified shall be No. 2 Common Southern Yellow Pine, S4S.

(b) Plywood form shall be of Douglas Fir Plywood, 5 ply, and at least 3/4" thick, conforming to the grading rules as required under State Department of Highways and Public Transportation Specifications.

CONSTRUCTION METHODS

D-406.07 REINFORCEMENT:

(a) Reinforcing shall be detailed, fabricated, and erected in accordance with Manual of Standard Practice for Detailing Reinforced Concrete Structures (ACT 315-57). Shop drawings shall be submitted in triplicate for engineering approval prior to fabrication. All reinforcement shall be entirely free from rust, scale, grease, or other coating which might destroy or reduce its bond with concrete.

(b) **Spacing:** Unless otherwise indicated, the clear distance between parallel bars shall be not less

than one and one-half times the diameter of round bars. In no case shall the distance between bars be smaller than the maximum size of the aggregates.

(c) Protective Covering: Reinforcement shall be protected by the thickness of concrete indicated on the plans. Unless otherwise specified, the protective coverings over reinforcement shall not be less than the maximum size of aggregates.

(d) Splicing and Lapping: As per section D-410

(e) Supports: All reinforcement shall be secured in place true to the lines and grades, indicated by the use of metal supports, spacers, or ties approved by the Engineer. Such supports shall be of sufficient number and strength to maintain the reinforcement in place throughout the concreting operations. The use of pebbles, pieces of broken stones or brick, metal pipe and wooden blocks shall not be permitted.

D-406.08 FORMS:

(a) General: Forms shall conform to the shape, lines, and dimensions of the members of structures, as called for on the plans and shall be substantial and sufficiently tight to prevent leakage of mortar. All details of form construction shall be subject to the approval of the Engineer and permission to place concrete will not be given until all such work is complete to his satisfaction.

(b) Braces and Ties: Forms shall be properly braced and tied together so as to maintain position and shape. Metal form of an approved type shall be used to hold forms in place. Such ties shall be of a type especially designed for use in connection with concrete work and shall have provision to permit easy removal of the metal to a depth of at least one-half inch from the surface of the concrete. The use of wire from ties will not be permitted except for minor or special form areas where the use of rigid type metal ties would be impracticable. Where wire ties are used, all wires upon removal of the forms shall be cut back at least one-half inch from the face of the concrete.

(c) Curved Surface: In the case of exterior exposed curved surfaces, the Contractor shall use such forming as may be necessary to provide smooth forms of uniform curvature.

(d) Coating: Plywood forms and plywood form lining shall be mill-oiled according to standard practice recommended by the Douglas Fir Plywood Association. Form lumber for all other exposed surfaces shall be coated with approved non-staining mineral oil which shall be applied shortly before the concrete is deposited. In general, all forms shall be thoroughly wetted before the concrete is placed.

(e) Cleanouts: At the time of placing concrete, the forms shall be clean and entirely free from all chips, dirt, sawdust, and other extraneous matter. For narrow walls and other locations where access to the bottom of the forms is not readily obtainable otherwise, adequate cleanout openings shall be provided.

(f) Chamfers: Unless otherwise shown on the plans, fill forms at all sharp corners and edges with triangular chamfer strips measuring $\frac{3}{4}$ in. on the sides. Dress wood molding on all faces. Make

molding for chamfers strips of materials of a grade that will not split when nailed and that can be maintain to true line without warping.

D-406.09 PLACING CONCRETE-GENERAL:

(a) Supervision: The Contractor shall give the Engineer sufficient notice before starting to place concrete in any unit of the structure to permit the inspection of forms, reinforcing steel, and preparation for placing. Concrete shall not be placed in footings until the character of the foundation has been approved by the Engineer and permission has been given to proceed. When footings can be placed in dry foundation pits, forms may be omitted, if desired by the Contractor and approved by the Engineer, and the entire excavation filled with concrete to the top of the footing. Where this procedure is followed, no measurement for payment will be made for concrete placed outside of the footing dimensions shown on the plans.

(b) Placing: Place concrete according to TxDOT item 420. All concrete shall be placed before its initial set has occurred. The operation of depositing and compacting the concrete shall be conducted so as to form a compact, dense, impervious mass of uniform texture which shall show smooth faces on all surfaces. Each part of the forms shall be filled by depositing the concrete directly as near its final position as possible. The coarse aggregate shall be worked back from the face and the concrete forced under and around the reinforcement bars without displacing them. Depositing large quantities at one point in the forms and running or working it along the forms will not be permitted. Concrete in columns shall be placed monolithically unless otherwise provided. An interval of not less than 4 hours shall elapse between the placing of concrete above the tops of the columns or walls to allow shrinkage. Concrete in walls, columns, and deep foundations shall be placed in a manner that will avoid separation of the aggregates or displacement of the reinforcement. Suitable chutes or vertical pipes shall be provided.

(c) Vibrating: All concrete shall be placed with the aid of mechanical vibrating equipment unless otherwise directed. Vibration shall be transmitted directly to the concrete, and in no case shall it be transmitted through the forms of reinforcing steel. The duration of vibration shall at any location be held to the minimum necessary to produce thorough compaction. Vibration shall be supplemented by hand spading to insure the flushing of mortar to the surface of all forms.

(d) Construction Joints: Construction joints shall be formed as shown on the plans. In all cases where they are not shown on the plans, they shall be formed as directed by the Engineer. Where indicated or required dowel rods shall be used. Before placing is resumed, all water and laitance shall be removed and the concrete shall be cut away, if necessary, to insure a strong dense concrete at the joint. In order to secure adequate bond, the surface of all concrete already in place shall be cleaned and roughened and shall then be spread with a 1/2 inch layer of mortar of the same sand-cement ratio as is used in the concrete immediately before the new concrete is deposited.

D-406.10 FINISHING EXPOSED SURFACES: An ordinary surface finish shall be applied to all concrete surfaces either as a final finish or preparatory to a higher grade or class of finish. Higher grades and classes of finish shall be in accordance with TxDOT Item 427, "Surface Finishes for Concrete". Where neither a grade nor class of finish is specified, an ordinary surface finish shall be provided as follows:

After form removal, all porous or honeycombed areas and spalled areas shall be corrected by chipping away all loose or broken material to sound concrete. Holes and spalls caused by removal of metal ties, etc., as required by TxDOT Item 420, shall be cleaned and filled with adhesive grout or epoxy grout. Exposed parts of metal chairs on surfaces to be finished by rubbing shall be chipped out to depth of one-half inch and the surface repaired.

All fins, runs, drips, or mortar shall be removed from surfaces which remain exposed. Form marks and chamfer edges shall be smoothed by grinding and/or rubbing.

Grease, oil, curing compound, etc., shall be removed from surfaces requiring a higher grade of finish. Discolorations resulting from spillage or splashing of asphalt, paint, or other similar material shall be removed. Repairs shall be dense, well bonded, and properly cured, and when made on surfaces which remain exposed and do not require a higher finish, shall be finished to blend with the surrounding concrete. Unless otherwise specified on the plans, ordinary surface finish shall be the final finish for the following exposed surfaces: Inlets, manholes, and sewer appurtenances.

D-406.11 FINISHING VERTICAL SURFACES (General): After tie rods and bolts are removed, the holes shall be filled solid with cement mortar. Honeycomb and minor defects shall not be patched until approval has been given by the Engineer.

D-406.12 REMOVAL OF FORMS:

(a) Finished Concrete: Forms for surfaces required to be finished shall be removed when the concrete has aged not less than 1/2 nor more than 2 curing days after the concrete has been placed.

(b) Unfinished Concrete: Forms and false work may be removed when the concrete has attained a compressive strength of not less than 65 percent of the design strength except that forms for walls, columns, and sides of beams may be removed after 48 hours.

(c) Curing Day: The term "curing day" will be interpreted as any calendar day on which the temperature is above 50 F for at least 19 hours. In continued cold weather, the Engineer will determine when sufficient time has elapsed to permit the removal of forms and false work.

D-406.13 DEFECTIVE WORK: Any defective work discovered after the forms have been removed shall be repaired immediately. If the surface of the concrete is bulging, uneven, or shows excess honeycombing or form marks, which, in the opinion of the Engineer, cannot be repaired satisfactorily, the entire section shall be removed before the repair work is started. No extra compensation will be allowed for extra work or materials involved in repairing or replacing defective concrete.

D-406.14 CURING: Concrete shall be maintained in a moist condition for at least five (5) days after placement. Curing shall be commenced as soon as possible after the concrete has been finished. This shall be either by means of approved curing compound, sprinkling, or by damp curing by means of wet mats, sand, etc. Adequate protection shall be provided to prevent damage from extreme weather conditions shall they be either hot or cold temperatures, wind, or other conditions which

would cause evaporation of moisture from the fresh concrete. The ACI recommendations for hot or cold weather shall be followed.

D-406.15 ADDITIONAL CONCRETE FINISH FOR EXPOSED SURFACES: Concrete shall be finished pursuant to 2004 TxDOT Specification Item 427 or latest revision.

D-406.16 CONCRETE STRUCTURE REPAIRS: For all repairs, provide materials suitable for the appropriate horizontal, vertical or overhead application. Approval from the engineer for any proposed repair is required unless a repair material type is indicated in the plans. Remove unsound concrete, repair spalled or delaminated concrete, and replace concrete with repair materials. All concrete repairs shall be as per TxDOT Item 429, 2004 edition or latest revision.

D-406.17 MEASUREMENT AND PAYMENT: No separate measurement or payment will be made under this item, but all such work done shall be deemed a subsidiary obligation of the Contractor, having been taken into account and included in price bid for the complete job.

SECTION 408 RIPRAP

D-408.01 GENERAL: This item shall govern the furnishing and placing of riprap.

D-408.02 MATERIALS:

1. Concrete: Unless otherwise shown in the plans, concrete shall be Class "A". The riprap will consist of a minimum of 4 inch slab with a 6 x 6- W2.9 x W2.9 welded wire fabric or No. 3 or No. 4 reinforcing steel bars spaced at maximum 18-inch centers each way , and per requirements of specifications entitled, "CONCRETE", Division D, Section 504. Grout shall be in accordance with TxDot item 421
2. Stone shall be as large as can be conveniently placed in a layer of the required depth. The stones, excepting small stones and spalls used to chink interstices shall weigh not less than 10 pounds and at least 50 percent of the stone shall weigh not less than 100 pounds.
3. Sacks shall be made of burlap not lighter than 10 ounce and shall be approximately 19 1/2 inches by 36 inches measured inside the seams when the sack is laid flat. Sound reclaimed sacks may be used.

D-408.03 CONSTRUCTION METHODS: If the slopes and bottom of the trench for toe walls are dry and not consolidated properly, the Engineer may require the entire area to be sprinkled, or sprinkled and consolidated before the concrete is placed. All surfaces shall be moist when concrete is placed.

1. The concrete riprap shall have a toe ditch as specified on plans. Concrete slab shall be placed, finished, and cured in accordance with the item, "CONCRETE STRUCTURES" Division D, Section 406 of these specifications.
2. Stone: for plain and grouted riprap shall be sound and durable, free from seams and coatings, and of such characteristics that it will not disintegrate when subjected to the action of water. Stone shall be of shapes which will form a stable protection structure of the required depth. Rounded boulders or cobbles shall not be used on slopes steeper than 2 to 1 unless grouted. Angular shapes may be used on any slope. Flat or needle shapes will not be acceptable unless the thickness of the piece is more than 1/3 the length. Do not place grout when air temperature is below 35° F. Protect work for rapid drying for at least 3 days after placement. For non grouted rock riprap and when the voids are going to be filled only with spalls or small stones, use filter fabric with the length running up and down the slope with a minimum of 2 feet overlap. Non grouted rock riprap shall be constructed as per design and engineer's recommendations. Waste concrete may be used, if the pieces are sound free from coatings, steel and meet the size requirements specified for a stone.
3. Sacks: the capacity of each sack shall be 1.25 cubic feet. Each sack shall contain 1 cubic foot of

concrete loosely placed so as to leave room for folding the open end, the fold just enough to retain the concrete at the time. The filled sacks are placed immediately after filling. The sacks shall be placed and lightly trampled to cause them to conform with the ground surface and with adjacent sacks in place.

4. Riprap other than concrete shall have a perimeter toewall of reinforced concrete a minimum of 18 inches deep and 9 inches wide placed adjacent to the existing or proposed finish grade.

D-408.04 MEASUREMENT: Riprap of any type shall be measured by the square foot as measured in the plan view, there shall be no separate measurement for toewalls.

D-408.05 PAYMENT: Riprap shall be paid for on a unit price basis as measured. The price bid shall be considered to include furnishing, hauling, and placing all materials and for labor, tools, equipment, and incidentals necessary to complete the work. There shall be no separate payment for toewalls.

SECTION 410 REINFORCING STEEL

D-410.01 DESCRIPTION: This item shall provide for the furnishing and placing of bar reinforcing steel of the size and quantity designated for use in structures and other concrete items that require reinforcing steel as shown on the plans and in accordance with these specifications.

D-410.02 MATERIALS: Reinforcing steel shall conform to the requirement of Item 440, "Reinforcing Steel" of the TxDOT latest Provisions. Reinforcing steel bars produced outside of the United States are acceptable if such bar reinforcement conforms to the requirements of the ASTM Designations.

D-410.03 PLACING REINFORCEMENT: All steel reinforcing shall be accurately placed in the position shown on the plans and firmly held during the placing and setting of concrete. All reinforcement shall be inspected and approved before placement to be free from dust, rust, mill scale, paint, oil, or foreign material. When stored, it shall not be in direct contact with the ground. Bars shall be tied at all intersections. Distances from forms shall be maintained by means of stays, precast blocks, ties, hangers, metal chairs, or other approved supports. Blocks for holding reinforcement from contact with the form shall be precast concrete blocks of approved shape and dimensions or other equally suitable devices. The use of pebbles, pieces of broken stones or brick, metal pipe and wooden blocks shall not be permitted. Reinforcement in any sections shall be placed and then inspected and approved by the Inspector before the placing of concrete begins.

D-410.04 SPLACING AND LAPPING: Unless otherwise indicated, all spliced bars shall be staggered. Laps shall be in accordance with Table No. 1.

**Table 1
Minimum Lap Requirements for Bar Sizes through No. 11**

Bar size No. (in)	Bar size No. (mm)	Uncoated Lap Length	Coated Lap Length
3	10	1 ft 4 in	2 ft 0 in
4	13	1 ft 9 in	2 ft 8 in
5	16	2 ft 2 in	3 ft 3 in
6	19	2 ft 7 in	3 ft 11 in
7	22	3 ft 5 in	5 ft 2 in
8	25	4 ft 6 in	6 ft 9 in
9	29	5 ft 8 in	8 ft 6 in
10	32	7 ft 3 in	10 ft 11 in
11	36	8 ft 11 in	13 ft 5 in

Note: bar size numbers (in.) are based on the number of eighths of an inch included in the nominal diameter of the bar. Bar size numbers (mm) approximate the number of millimeters included in the nominal diameter of the bar.

D-410.05 MEASUREMENT AND PAYMENT: No separate measurement or payment will be made under this item, but all such work done shall be deemed a subsidiary obligation of the Contractor, having been taken into account and included by him in price bid for the complete job.

SECTION 412 WELDED WIRE FABRIC

D-412.01 DESCRIPTION: This item shall govern the furnishing and placing of the various sizes of welded wire fabric as indicated on the plans or as directed by the Engineer.

D-412.02 MATERIAL: All welded wire fabric used in construction shall conform to the requirements of ASTM Designation A-185. It shall be 6 x 6- W2.9 x W2.9 welded wire fabric, plain electric welded reinforcing fabric or as indicated on the plans.

D-412.03 CONSTRUCTION METHODS: All splices in the wire fabric shall overlap sufficiently to allow two (2) pairs or transverse wires to be tied together and no splices of less than six (6) inches will be permitted.

At the edge of the construction, the wire fabric shall not be less than one (1) inch nor more than three (3) inches from the edge of the concrete and shall have no wires projecting beyond the last member parallel to the edge of the concrete. The wire fabric shall be straightened to lie flat in place without bulges or excessive vertical displacement and shall be supported properly throughout to insure its proper position in the finished construction.

D-412.04 MEASUREMENT: No measurement of welded wire fabric will be made.

D-412.05 PAYMENT: No direct payment for furnishing and placing welded wire fabric will be made. All materials and labor required will be considered subsidiary to the item in which it is used and shall be included in the unit price bid for said item.

SECTION 418 MEMBRANE CURING

D-418.01 DESCRIPTION: This item shall consist of curing by the impervious membrane method of all curbs, sidewalks, drive approaches, concrete riprap, concrete structures, and other concrete as specified in the various items of these specifications or as indicated on the plans.

D-418.02 MATERIALS: The membrane curing compound shall comply with the requirements as set forth under "Membrane Curing, Type 2, White Pigmented" of the TxDOT latest provisions.

Type 1-D (Resin Base Only) is required for bridge slabs and top slabs of direct traffic culverts and all other surfaces that required a higher grade of surface finish.

D-418.03 CONSTRUCTION METHODS: The membrane curing compound shall be applied after the surface finishing has been completed, and immediately after the free surface moisture has disappeared. The surface shall be completely sealed with a uniform coating of the curing compound applied at the rate of coverage recommended by the manufacturer or as directed by the Inspector.

Do not apply membrane curing compound on projections of reinforcing steel or concrete that will later form a construction joint.

Do not apply membrane curing to dry surfaces. Dampen formed surfaces and surfaces that have been given a first rub so that they are moist at the time of application of membrane.

The liquid-membrane forming compound must not disintegrate, check, peel, or crack during the required curing period. It must not peel or pick up under traffic and must disappear from the surface of the cured concrete by gradual disintegration.

D-418.04 MEASUREMENT: "Membrane Curing" will not be measured for payment.

D-418.05 PAYMENT: The work and materials prescribed herein will not be paid for directly, but shall be included in the unit price bid for the items of construction in which these materials are used.

SECTION 420 CHAIN LINK FENCE

D-420.01 DESCRIPTION: Work includes: providing chain link fence system where shown on the drawings, as specified herein, and as needed for a complete and proper installation.

D-420.02 PRODUCT:

Dimensional Data:

General: Pipe size indicated are commercial pipe sizes.

Galvanizing: On steel framework and appurtenances, provide galvanized finish with not less than the following weight of zinc per square foot.

1. Pipe: 1.8 oz., complying with ASTM A120.
2. Hardware and Accessories: Comply with Table 1 of ASTM A153.
3. Fabric: 1.2 oz, complying with Class I of ASTM A392.

Fabric:

- A. Provide number 9 gauge or 0.148" wires in two (2) mesh with top and bottom knuckled finish.
- B. Place fabric in one piece width.

Posts, Rails, and Associated Items:

- A. End, corner, slope, and pull posts: provide at least the following minimum sizes and weights:

<u>Material and dimensions:</u>	<u>lbs./ft.</u>
Pipe: 2.875" outside dimension	5.79

- B. Line posts: provide minimum sizes and weights.

<u>Material and dimensions:</u>	<u>lbs./ft.</u>
Pipe: 1.900" outside dimension	2.75

- C. Gate posts: provide gate posts for supporting single gate leaf, or one leaf of a double gate installation, for nominal gate widths as follows:

<u>Material and dimensions:</u>	<u>lbs./ft.</u>
Pipe: 2.875" outside dimension	5.79

- D. Top rails:

<u>Material and dimensions:</u>	<u>lbs./ft.</u>
Pipe: 1.660" outside dimension	1.80

1. Provide in manufacturer's longest lengths, with expansion type couplings approximately 6" long for each joint.

2. Provide means for attaching top rail securely to each gate, corner, pull, slope, and end posts.

E. Post brace assemblies: Provide at end and gate posts, at both sides of corner, slope and pull posts, with the horizontal brace located at mid-height of the fabric.

<u>Material and dimensions:</u>	<u>lbs./ft.</u>
Pipe: 1.660" outside dimension	1.80

Use 3/8" diameter rod with turnbuckle for diagonal truss.

F. Tension wire: Provide number 9 gauge galvanized coiled spring wire at bottom of fabric.

G. Post tops:

1. Provide steel, wrought iron or malleable iron, designed as weathertight closure cap.
2. Provide one cap for each post.
3. Provide caps with openings to permit through passage of top rail.

H. Stretcher Bars:

1. Provide one-piece lengths equal to full height of fabric with a minimum cross section of 3/19" x 3/4".
2. Provide one stretcher bar for each gate and end post, and tow of each corner, slope and pull post, except where fabric is woven integrally into the post.

I. Stretcher Bar Bands:

1. Provide steel, wrought iron or malleable iron, spaced not over 15" on centers, to secure stretcher bars to end, corner, pull, slope, and gate posts.
2. Bands may be used also with special fittings for securing rails to end, corner, pull, slope, and gate posts.

D-420.03 GATES:

A. General:

1. Provide additional horizontal and vertical member to assure proper operation of the gate, and for attachment of fabric hardware and accessories.
2. Space frame members not more than 8 feet apart.

<u>Material and dimensions:</u>	<u>lbs./ft.</u>
Pipe: 1.660" outside dimension	2.27

B. Gate Hardware: Provide the following for each gate:

1. Hinges:

- a. Pressed or forged steel or malleable iron, to suit the gate size; non-lift-off type, offset to permit 180E opening.
- b. Provide 1-11/2 pr. of hinges for each leaf over 6 feet in nominal height.

2. Latches:
 - a. Provide forked type or plunger-bar type to permit operation from either side of the gate.
 - b. Provide padlock eye as integral part of latch.
3. Keeper: Provide keeper for vehicle gates, which automatically engages the gate leaf and holds it in the open position until manually released.
4. Double gates:
 - a. Provide gate stops for double gates consisting of mushroom or flush plate with anchors.
 - b. Set in concrete to engage the center drop rod or plunger bar.
 - c. Provide locking device and padlock eyes as an integral part of the latch, requiring both gate leaves.

D-420.04 MISCELLANEOUS MATERIALS AND ACCESSORIES:

A. Wire ties:

1. For tying fabric topline posts, use number 9 gauge wire ties spaced 12" on centers.
2. For tying fabric to rails and braces, use number 9 gauge wire ties spaced 24" on centers.
3. For tying fabric to tension wire, use number 11 gauge hog rings spaced 24" on centers.
4. Manufacturer's standard wire ties will be acceptable if of equal strength and durability.

B. Concrete: Comply with provisions for 2500 psi concrete.

D-420.05 EXECUTION:

Surface Conditions: Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the work. Do not proceed until unsatisfactory conditions are corrected.

Installation:

A. General:

1. Install posts at a maximum spacing of 10 feet on centers.
2. Install corner or slope posts where changes in line or grade exceed a 30° deflection.

B. Excavating:

1. Drill holes for post footings in firm, undisturbed or compacted soil, strictly adhering to the dimensions and spacing shown.
2. Post hole dimensions.
 - a. Provide 30" deep by 8" diameter foundations for line post for 5 foot fabric height and less.
 - b. Provide 36" deep by 8" diameter foundations for line posts for fabric heights exceeding 5 feet.
 - c. Provide 35" deep by 12" diameter foundations for all other posts.
3. Spread soil from excavations uniformly adjacent to the fence line, or on adjacent areas of the site if so directed.

C. Setting Posts:

1. Remove loose and foreign materials from sides and bottoms of holes, and moisten soil prior to placing concrete.
2. Center and align post in holes.
3. Place concrete around posts in a continuous pour, and vibrate and tamp for consolidation.
4. Check each post for vertical and top alignment and hold in position during placement and finishing operations.
5. Trowel tops of footings, and slope or dome to direct water away from posts.
6. Extend footing for gate posts to the underside of bottom hinge.
7. Set keeps, stops, sleeves, and other accessories into concrete as required.
8. Keep exposed concrete surfaces cured with membrane curing material.

D. Concrete Strength:

1. Allow concrete to attain at least 75% of its minimum 28-day strength before rails, tension wires, and/or fabric is installed.

E. Rails and Bracing:

1. Install fence with top rail and bottom tension wire.
2. Install tip rails continuously through post caps or extension arms bending to radius for curved runs.
3. Provide expansion couplings as recommended by the fencing manufacturer.
4. Provide bracing to the midpoint of the nearest line post or posts at all end corners, slope, pull, and gate posts.
5. Install tension wires parallel to the line of fabric by weaving through the fabric and tying to each post with not less than number 6 gauge galvanized wire, or by securing the wire to the fabric.

F. Installing Fabric:

1. Leave approximately 2" between finish grade and bottom salvage.
2. Excavate high points in the ground to clear the bottom of the fence.
3. Place and compact fill to within 1" of the bottom of the fabric in depressions.
4. Pull fabric taut and tie to post, rails, and tension wires.
5. Install fabric on outward side fencing side of fence and anchor to framework so that the fabric remains in tension after pulling force is removed.
6. Install stretcher bars by threading through or clamping to fabric on 4" centers and secure to posts with metal bands spaced 15" on centers.

G. Installing Gates:

1. Install gates plumb, level, and secure for full opening without interference.
2. Install ground-set items in concrete for anchorage in accordance with the fence manufacturer's recommendations.
3. Lubricate and adjust the hardware for smooth operation.

H. Miscellaneous:

1. Use U-shaped tie wires, conforming to diameter of pipe to which attached, clamping pipe and fabric firmly with ends twisted at least two full turns.

2. Bend ends of wire to minimize hazards to persons and clothing.
3. Fasteners.
 - a. Install nuts for tension bank and hardware bolts on side of fence opposite fabric side.
 - b. Peen the ends of bolts to prevent the removal of nuts.
4. Repair coatings damaged in the shop or field erection, using a hot-applied repair compound applied in accordance with its manufacturer's recommendations.

D-420.06 Measurement and Payment:

1. **Measurement:** Chain link fence of each height specified will be measured by the linear foot measured including gates. Gates will be measured as linear footage of fence complete in place.
2. **Payment:** The work performed and material furnished as prescribed by this Item, measured as provided under "Measurement" will be paid for at the unit price bid for "Chain Link Fence".

SECTION 422 CONDUITS

D-422.01 DESCRIPTION

This item shall govern for the furnishing and placing of conduit of the types and sizes indicated on the plans, including junction boxes, fittings, expansion joints, attachments, and incidentals.

D-422.02 MATERIALS

All conduit and fittings shall meet the requirements of the National Electrical Code and shall be listed by Underwriters Laboratories, and shall be marked in accordance with the applicable requirements of the NEC.

Junction boxes, expansion joints, and conduit fittings shall be fabricated from a material similar to the connection conduit unless indicated otherwise on the Plans and shall be listed by Underwriters Laboratories.

Rigid metal conduit shall be steel, hot dipped galvanized inside and outside. When tested in accordance with ASTM Designation: A 90, zinc coating shall be minimum of 1.5 ounces per square foot. Electronic metallic tubing and intermediate metal conduit shall be steel, hot dipped galvanized on the outside and protected on the inside with a suitable corrosion-resistant materials. Fittings shall be rain-tight. Set screw and pressure cast fittings will not be permitted.

Polyvinyl chloride and high-density polyethylene conduit shall meet the requirements of NEMA Standard TC-2 and UL 651, and the requirements of NEC for Rigid Nonmetallic Conduit. Unless otherwise noted on the Plans, PVC and HDP conduit shall be heavy wall (Schedule 40).

Flexible conduit shall liquid-tight metal meeting requirement of NEC and be UL-listed. Where conduit system metallic, all lengths of flexible metal conduit shall be fitted with bonding jumpers.

D-422.03 CONSTRUCTION METHODS

Conduit systems for new street crossings shall be installed prior to the subgrade compaction and the Curb & Gutter construction.

All conduit systems for street crossings shall be installed at least two (2') feet away from the existing or future sidewalk or extended to the Right of Way line.

The conduit, junction boxes, fitting, and incidentals shall be placed in accordance with the lines, grades, details, and dimensions shown on the Plans, or as directed by the Engineer. Installation of conduit shall be in accordance with the requirements of NEC. Conduit placed for concrete encasement shall be secured and supported in such a manner that the alignment will not be disturbed during placement of the concrete. No concrete shall be placed until all of the conduit ends have been capped and all box openings closed.

For electrical conduits a 12" of clearance in all directions shall be used when close to any water carrier pipe.

Where conduit is treated in the field, a standard conduit cutting die with a 3/4 inch taper per foot

shall be used. Conduit placed on structures shall be firmly fastened with three (3) feet of each outlet box, junction box or fitting and at other locations as required by the NEC.

When required by the Engineer, immediately prior to installation of conductors or final acceptance, a spherical template having a diameter of not less than 75 percent of the inside diameter of the conduit shall be drawn through the conduit to insure that the conduit is free from obstruction. Than all conduit ends shall be closed using permanent type caps.

D-422.04 SAMPLING AND TESTING

When tests are required, sampling and testing will be in accordance with the Department's Manual of Testing Procedures.

D-422.05 CURB MARKINGS

The location, size, and purpose of all conduits shall be clearly marked on street curbs.

D-422.6 MEASUREMENT

Conduit of the types and sizes specified on the plans will be measured by the linear foot along the main line of the conduit except that flexible metal conduit will not be paid for directly but will subsidiary to the various pay items. No measurement will be allowed under this item for conduit used in circuit protector assemblies, service poles, transformer stations, or roadway illumination assembly foundations.

D-422.07 PAYMENT

Conduit, measured as provided under "Measurement", will be paid for at the unit price bid in linear feet for "Conduit", of the types and sizes specified, which prices shall each be full compensation for furnishing and installing all conduit, jacking, boring, excavation, backfilling, replacing pavement , or surface treatment and marking location of conduit; for furnishing and installing all fittings, outlet boxes, bends, expansion devices, junction boxes, attachment devices and incidentals, and for all labor tools, equipment and incidentals as necessary to complete the work.

SECTION 424
RELOCATING WIRE FENCE

D-424.01 DESCRIPTION: This item shall consist of removing and relocating the wire fence(s) at the location(s) designated on the plans, and for furnishing and installing any additional materials required as specified by this item or as indicated on the plans.

D-424.02 MATERIALS: All materials furnished shall be equal to or better than the materials of the existing fence unless specifically designated otherwise on the plans.

D-424.03 CONSTRUCTION METHODS: Construction methods shall be equal to or better than existing type of wire fencing or conform to the Division D, Technical Provisions of Section 420 , "Chain Link Fence", for the relocating of existing chain link wire fence.

D-424.04 MEASUREMENT: Accepted work as performed and prescribed by this item will be measured by the linear foot of fence relocated.

D-424.05 PAYMENT: The work performed and the materials furnished as prescribed by this Item will be paid for at the contract unit bid price per linear foot for "Relocating Wire Fence", which price shall be full compensation for removing and reinstalling the existing fence, and for furnishing all additional materials, for all labor, tools, equipment, and incidentals necessary to complete the work.

SECTION 428 CONCRETE DRIVEWAYS

D-428.01 GENERAL: Applications for driveway permits shall be made in writing to the Building Development Services Department to construct, reconstruct, alter, remove, or replace any driveway section within the public R.O.W. (Right-of-way). The application shall include the location of the proposed improvements, together with a plot plan drawn to scale (or approved site plan) fully describing the nature of the proposed improvements and the locations as well as the traffic control plan. Construction of driveways within the R.O.W. shall be in compliance with ADA. Any existing obstructions as traffic signs, fire hydrants, street lights, etc. shall be relocated outside the proposed driveway at the owner's expense. Water meters, water valves and manholes shall be relocated or adjusted as shown on plans.

All driveways shall intersect the public street at essentially right angles except that one-way limited movement driveways may intersect at angles no less than 45 degrees as shown in Detail No.

No entrance nor exit driveway or curb cut for any property shall be allowed within twenty feet (20') from the intersecting property line at street intersection, measured along and parallel with the curb of such street Detail No.

Driveways within the ROW (right- of- way) shall not exceed a grade of 10%. Maximum "break over" angles, being the algebraic difference in successive grade changes, shall be 12% for summit conditions and 2% on sidewalk area, as shown in Detail No.

Minimum Thickness

Type of Driveway	Concrete thickness including sidewalk area
Residential	6 inch
Commercial	7 inch
Industrial	8 inch

D- 428.02 MATERIALS

- A.** Concrete: Conform to material and proportion requirements for concrete Section 504- Concrete and Section 406- Concrete Structures.
- B.** Reinforcing Steel: Conform to material requirements for welded wire fabric Section 410 - Reinforcing Steel.
- C.** Prefomed Expansion Joint Material: Conform to material requirements for prefomed

expansion joint material of Section 416- Expansion Joint Material.

- D. Expansion Joint Filler: Conform to material requirements for expansion joint material of Section 406- Concrete Structures.

D-428.03 PREPARATION:

- A. Identify and protect utilities which are to remain.
- B. Protect living trees, other plant growth, and features designated to remain.
- C. Conduct clearing and grubbing operation in accordance with Section 402 - Clearing and Grubbing.
- D. Excavate subgrade to the line, grade and cross-section shown on plans. Remove soft spots and pumping soils and replace with fill material having a Plasticity Index between 7 and 20.
- E. If there is an existing curb and gutter, saw cut the curb leaving the gutter radius or reconstruct as the existing.

D-428.04 PLACEMENT: Place and finish concrete in accordance with applicable portions of Section 406 - Concrete Structures. No exposed materials shall be allowed as finish surface within the R.O.W.

D-428.05 JOINTS: Install joints in concrete driveway in accordance with Section 406- Concrete Structures.

D-428.06 CONCRETE CURING: Cure concrete in accordance with Section 406- Concrete Structures.

D-428.07 PROTECTION: Conform to applicable requirements of Section 406- Concrete Structures.

D-428.08 MEASUREMENT AND PAYMENT: Payment for concrete driveways is on square foot basis. Refer to Division C, General Provisions, Section 9 Measurement and Payment for unit price procedures

SECTION 430 CONCRETE SIDEWALKS

D-430.01 GENERAL: Section includes reinforced concrete sidewalks and accessible ramps. Applications for sidewalk permits shall be made in writing to the Building Development Services Department to construct, reconstruct, alter, remove, or replace any sidewalk section within the R.O.W. (Right-of-Way). The application shall include the location of the proposed improvements, together with a plot plan drawn to scale (or approved site plan) fully describing the nature of the proposed improvements and the locations as well as the traffic control plan. Construction of sidewalks and accessible ramps shall be in compliance with ADA. Any existing obstructions as water meters, traffic signs, fire hydrants, water valves, street lights, etc. shall be relocated outside the proposed driveway at the owner's expense.

D- 430.02 REFERENCES:

- A.** ASTM C 31-Standard Practice for Making and Curing Concrete Test Specimens in the field.
- B.** ASTM C 39-Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens.
- C.** ASTM C 42- Test Method for Obtaining and Testing Drilled Cores and Sawed Beams of Concrete.
- D.** ASTM C 138 -Standard Test Method for Unit Weight, Yield, and Air Content (Gravimetric) of Concrete.
- E.** ASTM C 143 - Standard Method for Slump of Hydraulic Cement Concrete.
- F.** ASTM C 172 - Practice for Sampling Freshly Mixed Concrete.
- G.** ASTM C 698 - Standard Test Methods for Moisture - Density Relations of Soils and Soil Aggregate Mixtures Using 5.5 - Pound Rammer and 12-inch Drop.

D- 430.03 SUBMITTALS: Submit certified testing results and certificates of compliance.

D- 430.04 MATERIALS

- A.** Concrete: Conform to material and proportion requirements for concrete Section 406.
- B.** Reinforcing Steel: Conform to material requirements in section 410 & 412.
- C.** Reinforcing Fiberglass: Conform to material and proportion requirements as per Section 414. Approval from the City engineer is required.
- D.** Preformed Expansion Joint Material: Conform to material requirements for preformed expansion joint material of Section 416 - Expansion Joint Material.
- E.** Expansion Joint Filler: Conform to material requirements for expansion joint material of Section 406- Concrete Structures.
- F.** Forms: Use straight, unwrapped wood or metal forms with nominal depth equal to or greater

than the proposed sidewalk thickness. The use of 2" by 4" lumber as forms will be allowed.

EXECUTION

D-430.05 REPLACEMENT: Replace sidewalks and accessible ramps that are removed or damaged during construction as per this specification to the next joint. Provide replaced and new sidewalks with accessible ramps if sidewalk intersects curb at street or driveway as per the latest ADA standards.

D-430.06 PREPARATION:

- A. Identify and protect utilities which are to remain.
- B. Protect living trees, other plant growth, and features designated to remain.
- C. Conduct clearing and grubbing operation in accordance with Section 402 - Clearing and Grubbing.
- D. Excavate subgrade to the line, grade and cross-section shown on plans. Remove soft spots and pumping soils and replace with fill material having a Plasticity Index between 7 and 20.

D-430.07 PLACEMENT:

- A. *Setting Forms:* Securely stake forms to line and grade. Maintain position during concrete placement.
- B. *Reinforcement:* Install 6 x 6, W2.9 x W2.9 welded wire fabric or No. 3 reinforcing steel bars on 18-inch centers longitudinally and transversely. Lay longitudinal bars in walk continuously, except through expansion joints. Support reinforcement in manner to maintain reinforcement in center of slab vertically during placement.
- C. *Expansion Joints:* Install expansion joints at 40' to 80' in accordance with Section 416 - Expansion Joint Material.
- D. Place concrete in forms to specified depth and tamp thoroughly with "jitterbug" tamp, or other acceptable method. Bring mortar to surface. Where a sidewalk crosses a driveway, ensure that the sidewalk depth and reinforcement are not less than the driveway cross-sectional details shown on the plans.
- E. Strike off to smooth finish with wood strike board. Finish smoothly with wood hand float. Brush across sidewalk with fine-haired brush. Exposed material shall not be allowed as finish surface.
- F. Unless otherwise indicated on plans, mark off joints ¼ inch deep, at spacing equal to 5 feet and matching C&G joints. Use joint tool equal in width to edging tool.
- G. Finish edges with tool having ¼ inch radius.
- H. After concrete has set sufficiently, refill space along side of sidewalk to top of walk with

suitable material. Tamp until firm and solid. Dispose of excess material in accordance with Section 128 - Waste Material Disposal. Repair driveways and parking lots damaged by sidewalk excavation in accordance with Section 430.

D-430.08 CURING: Conform to requirements of Section 406 - Concrete Curing.

D-430.09 FIELD QUALITY CONTROL:

- A.** Testing will be performed under provision of Division C, General Provisions, Section 6 Control of Work and Materials.
- B.** Compressive Strength Test Specimens: Four test specimens for compressive strength test will be made in accordance with ASTM C 31 for each 30 cubic yards or less of sidewalk that is place in one day. Two specimens will be tested at 7 days. The remaining two specimens will be tested at 28 days. Specimens will be tested in accordance with ASTM C 39. Minimum compressive strength shall be 3000 pounds per square inch at 28 days.
- C.** Yield test for cement content per cubic yard of concrete will be made in accordance with ASTM C 138. If such cement content is found to be less than that specified per cubic yard, reduce batch weights until amount of cement per cubic yard of concrete conforms to requirements.
- D.** If the Contractor places concrete without notifying the laboratory, the City will have the concrete tested by means of a core test as specified in ASTM C 42. If the concrete does not meet the specification, the cost of the test will be deducted from payment due the Contractor.
- E.** Sampling of fresh concrete shall be in accordance with ASTM C 172.
- F.** Take slump tests when cylinders are made.
- G.** Concrete shall be acceptable if the average of the two 28 day compression tests is equal to or greater than the minimum 28-day strength specified.
- H.** If either of the two tests is less than the average of the two tests by more than 10 percent, that entire test shall be considered erratic and not indicative of the concrete strength. Core samples will be required of this concrete.
- I.** If any 28-day laboratory test indicates that concrete of low strength has been placed, the concrete in question shall be tested by taking cores as directed by the City Engineer may direct. At least three representative cores shall be taken and tested as specified in ASTM C 42. Cost for any additional testing required due to a failed test will be paid by the contractor.

D-430.10 NONCONFORMING: Remove and replace areas of sidewalk that fail compressive strength tests, with concrete of thickness shown on plans. Nonconforming sidewalk sections shall be replaced at no additional cost to the City.

D-430.11 PROTECTION: Maintain sidewalks in good condition until completion of work. Replace damaged sidewalks in accordance with Paragraph D-430.06 - Replacement.

D-430.12 MEASUREMENT: Sidewalks will be measured by the square foot or by the foot of different widths. Accessible ramps will be measured by each unit. The unit will consist of the curb ramp, landing, adjacent flares or side curb, and detectable warning surface as show on the plans.

D-430.13 PAYMENT: Will be paid by the unit price bid for concrete sidewalks for the depth specified and accessible ramps. This price is full compensation for surface preparation of base; materials; removal and disposal of excavated material; drilling and doweling into the existing concrete curb, sidewalk and pavement; repair of the adjacent street or pavement structure damaged by the operations; and equipment, labor, materials, tools and incidentals.

SECTION 502 EXCAVATION AND EMBANKMENT OF STREETS

D-502.01 DESCRIPTION: This item shall consist of doing all required excavation within the limits of the roadway (except for excavation otherwise classified such as excavation for drainage structures, etc.): the removal and proper utilization or disposal of all excavated materials; the erection of all embankments; and the constructing, shaping, compacting, and finishing of all earthwork on the entire roadway and approaches thereto in conformity with the lines, grades, and typical sections as shown on the plans and established by the Engineer.

D-502.02 GENERAL: Soil material for street subgrade or embankment with a PI > 20 shall be stabilized as shown on the plans. The method shall be approved by the City Engineer. All material encountered of whatever nature within the limits indicated shall be removed and disposed of as directed. The Contractor shall inform and satisfy himself as to the character, quantity, and distribution of all material to be excavated. No payment will be made for any excavated material which is used for purposes other than required in the plans or proposal or as directed by the Engineer.

The rough excavation shall be carried to such depth that sufficient material will be left above the designated grade to allow for compaction. Likewise on embankments, sufficient material shall be placed above the designated grade to allow for compaction and settlement. Should the Contractor excavate below the designated lines, Contractor shall replace such material excavated with approved material in an approved manner and condition at own expense.

The Engineer shall have complete control over the excavation, moving, placing, and disposition of all material, and he shall determine the suitability of material to be placed in embankments.

Stakes set by the Engineer as provided in the "General Provisions" shall include only one set of offset alignment and grade stakes. All slope stakes, bluetops, and additional alignment stakes shall be furnished and set by the Contractor.

EQUIPMENT

D-502.03 GRADING EQUIPMENT: The Contractor may use any type of earth-moving equipment the contractor wishes to use or has available, provided such equipment is in satisfactory condition and of such capacity that the grading schedule as planned by the Contractor and approved by the Engineer can be maintained.

D-502.04 COMPACTING EQUIPMENT:

(a) Tamping rollers shall consist of two metal rollers, drums, or shells or 40 " minimum diameter, each not less than 42 " in length and unit-mounted in a rigid frame in such manner that each roller may oscillate independently of the other; and each roller, drum, or shell shall be surmounted by metal studs with tamping feet projecting not less than seven (7) inches from the surface of the drum and spaced not less than six (6) inches nor more than ten (10) inches measured diagonally from center to center. The area of each tamping foot shall be not less than five (5) square inches nor more than eight (8) square inches. Each unit shall be provided with a suitable tamper foot cleaning device.

Where more than one rolling unit is used, the rolling units shall be pivoted on the main frame in a manner which will permit the rolling units to adapt themselves to uneven ground and to rotate individually. When empty, the weight of the roller shall be such that the unit pressure applied by the tamping foot in contact with the ground is not less than 120 pounds per square inch.

(b) Pneumatic rollers shall consist of not less than nine pneumatic tired wheels running on two axles in such manner that the rear group of tires will not follow in the tracks of the forward group and shall be mounted on a rigid frame provided with platform or body suitable for ballast loading. The front axle shall rotate around the kingpin so located that the roller may be turned within a minimum circle. The pneumatic tire roller under working conditions shall have an effective rolling width of approximately sixty (60) inches and shall give a minimum compression of three hundred and twenty-five (325) pounds per inch of width of tire trend

(c) Smooth self-propelled rollers shall weigh at least ten tons and may be tandem or three-wheel type. The wheels of the roller shall be equipped with adjustable scrapers.

CONSTRUCTION METHODS

D-502.05 EXCAVATION: The excavation material shall be handled in such a manner as to allow the selected material to be properly placed in embankment and in the capping of the pavement subgrades as determined by the Engineer. Any suitable surplus material shall be stock-piled in approved areas for later use as directed by the Engineer.

The contractor shall make the distribution as indicated on the plans, and the widening or narrowing of the section or raising or lowering of the grade to avoid haul will not be permitted. During the process of excavation, the grade shall be maintained in such condition that it will be well drained at all times. When directed, temporary drains and drainage ditches shall be installed to intercept and divert surface water.

In cut areas, the top of the subgrade shall be scarified and compacted to a minimum depth of six (6) inches to not less than 95% compaction as per TEX. 113-E or 114 -E, or ASTM 1557 or ASTM 698, as appropriate to the extent of at least 12" inches behind the back of the curb or edge of pavement. When the required density cannot be obtained, the material shall be undercut and replaced with suitable material as directed. The material placed to refill and undercut portion shall be handled and compacted as specified for embankments.

During compacting operations, water shall be added to the subgrade material. Such watering shall be done by approved methods and using approved equipment. This moisture shall not be more than 2% above or below the optimum. Approved subgrade shall be primed, cured and after primed will be covered with base within maximum seven (7) days.

D-502.06 BORROW: Borrow excavation shall consist of excavation made outside the normal grading limits to obtain material for the completion of embankments and for other purposes. It shall be the Contractor's responsibility to locate and obtain the supply, and the Contractor shall notify the Engineer sufficiently in advance to permit tests and measurements to be made.

All borrow pits shall be opened up immediately to expose the vertical face of various strata of acceptable material to obtain a uniform product. Borrow pits shall be excavated to regular lines to permit accurate measurements, and shall be drained and left in a neat and presentable condition with all slopes dress uniformly.

D-502.07 PREPARATION OF EMBANKMENT AREA: Immediately prior to the placing of material, the entire area upon which the embankment is to be placed shall be striped of all grass, weeds, brush and other organic materials, and shall be scarified and broken to a depth of six (6) inches. All roots, debris, large stones or objectionable material that would interfere with the compaction of fill will be moved and disposed of as directed. A thin layer (approximately three (3) inches) of fill material shall be spread over the scarified foundation, and the whole area compacted as required herein. When embankments are to be placed on natural slopes steeper than 3 to 1, horizontal benches shall be constructed as directed by the Engineer. Material excavated in the construction of such benches will be included in the total yardage of excavation.

D-502.08 CONSTRUCTION OF EMBANKMENTS: Embankments shall be formed of satisfactory materials placed in successive horizontal layers of not more than six inches in loose depth for the full width of the cross section. The material in the layers shall have the proper moisture content before rolling to obtain the required compaction. Wetting or drying of the material and manipulation to secure a uniform moisture throughout the layer shall be required. Should material be too wet to permit proper compaction, corrective work on all portions of the embankment thus affected shall be done with the proper equipment and methods approved by the Engineer.

Each layer placed as specified above shall be compacted to not less than the comparable density of the adjoining material. Compaction shall extend through the entire depth of each layer and the embankment, when complete, shall be homogeneous and uniformly compacted mass. The moisture shall not be more than 2% above or below the optimum.

Under all paved areas and for a depth of six inches below the surface of the subgrade, the embankment shall be compacted to not less than ninety-five percent of the maximum density as determined by procedures set out under TEX-113E or 114 -E to the extent of at least 12" inches behind the back of the curb or edge of pavement. Backfill behind back of curb shall be properly compacted. However, any areas inaccessible to a roller shall be consolidated and compacted with approved mechanical tampers. Stones or rock fragments larger than four inches in their greatest dimension will not be permitted in the top six inches of the embankment.

The Contractor shall be responsible for the stability of all embankments made under this contract and shall replace any portion which is the opinion of the Engineer has become displaced due to negligence on the part of the Contractor.

D-502.09 TRUENESS TESTS: In those areas upon which a sub-base or base course is to be placed, the surface of the subgrade shall be of such smoothness that when tested with a sixteen (16) foot straightedge, it shall show no deviation in excess of five-hundredths (0.05) of a foot from true grade as established by grade pins or hubs. In areas not under sub-base or base course, the surface shall not deviate more than one tenth (0.10) of a foot from true grade as established by grade pins or hubs.

D-502.10 COMPACTION TESTS: Subgrade materials shall be compacted to the required density and moisture content as shown below, unless otherwise shown on the plans:

The maximum dry density and optimum moisture content shall be determined in accordance with TxDOT Tex- 113-E or Tex- 114-E.

Test for in place density shall be made in accordance with TxDOT Test-115-E and within 24 hours after compacting operations are completed. If the material fails to meet the density specified, it shall be re-worked as necessary to obtain the density and moisture required.

Materials

PI	Max. Dry Density	Percentage of moisture
≤ 20	95%	- 2% of Optimum or grater
≥ 20	95%	≥ Optimum moisture

For materials with a PI > 20, just prior to placing any base materials or stabilization, the top 4 inches of compacted subgrade shall be tested for density and moisture content. If test show the density to be more than 2% below the specified minimum or the moisture content more than 3% above or below the specified minimum, the course shall be reworked as necessary to obtain the specified compaction and moisture content.

MEASUREMENT

D-502.10 ROADWAY EXCAVATION: The number of cubic yards of street excavation to be paid for shall be computed by the method of average end areas. The width of these areas shall be the distance measured from edge of asphalt to edge of asphalt or from back of curb to back of curb plus two (2.0) feet. The depth shall be that staked in the field by the Engineer.

D-502.11 BORROW EXCAVATION: The number of cubic yards of "Borrow Excavation" to be paid for shall be computed by the method of average and areas. The width of these areas shall be the distance measured from back of curb to back of curb plus two (2.0) feet. The depth shall be that staked "in the field by the Engineer."

D-502.12 EMBANKMENT: No separate measurement for embankment will be made.

D-502.13 HAUL: No separate measurement of haul will be made other than that specifically approved in the plans.

PAYMENT

D-502.14 STREET EXCAVATION: The cubic yards of street excavation measured as provided in these specifications will be paid for at the contract unit price per cubic yards (dense measurement) for "Street Excavation" which payment shall constitute full compensation for excavation, haul, embankment, watering and compaction; and for furnishing all materials, labor and equipment for

SECTION 504 CONCRETE

D-504.01 DESCRIPTION: These specifications shall govern for the materials used, for the storing, measuring, and handling of materials, and for the proportioning and mixing of Portland Cement Concrete.

MATERIALS

D-504.02 CEMENT: Portland Cement shall conform to the requirements of the latest revision of ASTM Designation C150, Type 1, or Type II. Only one brand or kind of cement shall be used in any one structure except as permitted in writing by the Engineer. All cement shall be delivered in bags plainly marked with the brand and name of the manufacturer.

D-504.03 COARSE AGGREGATE: The coarse aggregate shall conform to the requirements of the latest revision of ASTM Designation C-33 and ASTM Designation D-448. Coarse aggregate for the various classes of concrete shall conform to the requirements of the following table:

Table 1 COARSE AGGREGATE GRADATION CHART

Percent Retained on each sieve

Aggregate Grade No.	Nominal Size	2-1/2"	2"	1-1/2"	1"	3/4"	1/2"	3/8"	No. 4	No. 8
1	2 1/2	0	0-	15-50	-	60-80	-	-	95-100	-
2 (467)*	1 1/2		0	0-5	-	30-65	-	70-90	95-100	-
3	1		0	0-5	-	10-40	40-75	-	95-100	-
4(57)*	1			0	0-5	-	40-75	-	90-100	95-100
5(67)*	3/4				0	0-10	-	45-80	90-100	95-100
6(7)*	1/2					0	0-10	30-60	85-100	95-100
7	3/8						0	5-30	75-100	-
8	No.4						0	0-5	35-60	90-100

* Numbers in parenthesis indicate that these gradations conform to corresponding ASTM gradation form ASTM C-33.

The amount of deleterious substances in coarse aggregate shall not exceed the following percentages by weight:

Material removed by decantation	1.0%
Shale, slate and similar materials	1.0%
Clay lumps	0.25%
Soft fragments	3.0%
Other deleterious substances (Including friable, thin, elongated or laminated pieces)	5.0%

The sum of all deleterious materials exclusive of materials removed by decantation shall not exceed 5% by weight.

D-504.04 FINE AGGREGATE: The fine aggregate shall conform to the requirements of the latest revision of ASTM Designation C-33.

Percent Retained on Each Sieve								
AGGREGATE	3/8 in.	No.4	No.8	No.16	No. 30	No. 50	No.100	No.200
GRADE #1	0	0-5	0-20	15-50	35-75	65-90	90-100	97-100

The amount of deleterious substances in fine aggregate shall not exceed the following percentages by weight:

Materials removed by decantation	3.0%
Clay Lumps	0.5%
Other deleterious substances (Such as coal, shale, coated or soft flaky particles) Material finer than No. 200 sieve (a) In concrete subject to surface abrasion	2.5%
(b) All other concrete	3.0%

D-504.05 WATER: Water shall be clean and free from deleterious amounts of acids, alkalies, and organic materials.

EQUIPMENT

D-504.06 GENERAL: All equipment will be inspected by the Engineer and only equipment approved by him may be used. Any equipment disapproved shall be removed from the job site within 24 hours after it has been inspected.

D-504.07 CEMENT STORAGE FACILITIES: All cement shall be stored in well ventilated, weatherproof buildings which will protect the cement from dampness. The floor supporting the cement shall clear the ground a sufficient distance to prevent the absorption of moisture by the cement. Provision for storage shall be ample, and the shipment of cement shall be segregated in such manner as to provide easy access for identification of each shipment.

The Engineer may permit small quantities of cement to be stored in the open for periods not exceeding 48 hours, if a raised platform and adequate waterproof coverings are provided.

D-504.08 AGGREGATE STORAGE FACILITIES: If the aggregates are stored on the ground, the sites for the stockpiles shall be grubbed clear of all weeds and grass, and leveled off. The bottom layer of aggregate shall not be disturbed nor used without cleaning.

When the contract requires the use of two or more sizes of aggregate, the different sizes shall be stored in a manner as to prevent intermixing.

Materials in all stockpiles shall be handled and placed in such manner that segregation of materials within the stockpile will be avoided.

D-504.09 MEASURING EQUIPMENT: Equipment for measuring concrete materials shall be such that the proportions can be accurately controlled and easily checked at any time during the work, preferably measurement by weight rather than by volume.

D-504.10 MIXING EQUIPMENT: The mixing shall be done in a batch mixer of approved type and size which will insure the uniform distribution of the material throughout the mass so that the mixture will be uniform in color and smooth in appearance. Whenever a concrete mixer is not suitable or adequate for the work, it shall be removed from the site upon written order from the Engineer. Pick-up and throw-over blades in the mixer drum which are worn down more than ten percent (10%) in depth shall be repaired or replaced.

D-504.11 CLASSIFICATION AND MIX DESIGN: It shall be the responsibility of the Contractor to furnish the mix design, using a Coarse Aggregate Factor acceptable to the Engineer, for the class(es) of concrete specified to conform with the requirements contained herein and in accordance with TxDOT Standards. The contractor shall perform, at his own expense, the work required to substantiate the design, except the testing of strength specimens, which will be done by the Department. Complete concrete design data shall be submitted to the Engineer for approval and shall be less than 1 year old signed and sealed by a licensed professional engineer in the State of Texas.

It shall also be the responsibility of the Contractor to determine and measure the batch quantity of each ingredient including all water, not only for batch designs, but for all concrete produced for the project, so that the mix conforms to these specifications and other requirements shown on the plans.

In lieu of the above mix design responsibility, the Contractor may accept a design furnished by the Engineer, however, this will not relieve him of the responsibility of providing concrete meeting the requirements of these specifications.

Trial batches will be made and tested using all the proposed ingredients prior to placing of concrete, and when the aggregate, and/or type, brand or source of cement, or admixture is changed. When the brand and/or source of cement only is changed, the Engineer may waive trial batches only if a prior record of satisfactory performance of the cement has been established.

Trial batches shall be made in the mixer to be used on the job. When Transit Mix concrete is to be used, the trial designs will be made in a transit mixer representative of the mixers to be used. Batch size shall not be less than fifty percent (50%) of its rated mixing capacity.

Mix designs from previous or concurrent jobs may be used without trial batches if it is shown that no substantial change in any of the proposed ingredients has been made. Mix design shall be current or less than one (1) year old.

The coarse aggregate factor shall not be more than 0.82, but when the voids in the coarse aggregate exceed 48 percent of the total dry loose volume, the coarse aggregate factor shall not exceed 0.85.

The coarse aggregate factor shall not be less than 0.68 unless authorized by the Engineer in writing.

Water reducing or retarding agents may be used ~~will~~ with all classes of concrete at the option of the Contractor, and will be required for hot weather concreting for cased drilled shafts and for continuous slab placement.

When a retarding admixture is required for hot weather concreting, must meet the requirements of ASTM C 94. When used in continuous slab placement, the amount to be used will be established by several trial batches with varying retarder content and simulating the placing conditions to be encountered. When water reducing or retarding agents are used at the option of the Contractor, reduced dosage of the admixture will be permitted.

Entrained air materials shall comply with ASTM C 260 and will be required in accordance with Table 7 TxDOT item 421. Specimens will be tested in accordance with Tex-414-A or Tex-416-A

D-504.12 QUALITY OF CONCRETE: The concrete shall be uniform, workable, and of a consistency acceptable to the Engineer. The cement content, maximum allowable water/cement ratio, the desired and maximum slump, the proper amount of entrained air and the strength requirements for all classes of concrete shall conform to the requirements of these specifications. It shall be the responsibility of the Contractor to provide concrete meeting these specifications.

During the progress of the work, the Engineer will cast test cylinders or beams, perform slump and entrained air tests, and will make temperature checks, as required, to insure compliance with the specifications.

A strength test shall be defined as the average of the breaking strength of two cylinders or two beams as the case may be. Specimens will be tested in accordance with Test Methods TEX-418- A or Tex-448- A.

If the required strength or consistency of the class of concrete being produced cannot be secured with the minimum cement specified or without exceeding the maximum water/cement ratio, the Contractor will be required to furnish different aggregates, use a water-reducing agent, an air-entraining agent, or increase the cement content in order to provide concrete meeting these specifications.

All test specimens, beams or cylinders, representing tests for removal of forms and/or false work shall be cured using the same methods, and under the same conditions as concrete represented.

"Design Strength" beams and cylinders shall be cured in accordance with TxDOT Bulletin C-11 and Supplement thereto.

The Contractor shall provide and maintain curing facilities as described in TxDOT Bulletin C-11 and Supplement thereto, for the purpose of curing test specimens. Provision shall be made to maintain the water in the curing tank at temperatures between 70°F and 90°F.

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The Contractor shall provide and maintain curing facilities as described in TxDOT Bulletin C-11 and Supplement thereto, for the purpose of curing test specimens. Provision shall be made to maintain the water in the curing tank at temperatures between 70°F and 90°F.

When control of concrete quality is by twenty-eight day compressive tests, job control will be by seven day compressive tests which are shown to provide the required twenty-eight day strength based on results from trial batches. Thereafter, if the required seven day strength is not secured with the quantity of cement specified in Table 5, changes in the batch design will be made as specified in this article.

Table 5- Concrete Classes TxDOT Item 421

Class of Concrete	Design Strength, Mim. 28-day f'c (psi)	Maximum W/C Ratio¹	Coarse Aggregate Grades^{2,3}	General Usage⁴
A	3,000	0.60	1—4, 8	Inlets, manholes, curb, gutter, curb & gutter. conc. Retards, sidewalks, driveways, backup walls, anchors
B	2,000	0.60	2—7	Riprap, small roadside signs and anchors
C	3,600	0.45	1—6	Drilled shafts, bridge substructure , bridge railing, culverts except top slab of direct traffic culverts, headwalls, wing walls, approach slabs, concrete traffic barrier (cast-in-place)
D	1,500	0.60	2—7	Riprap
E	3,000	0.50	2—5	Seal concrete
F⁵	Note 6	0.45	2—5	Railroad structures; occasionally for bridge piers, columns, or bents
H⁵	Note 6	0.45	3—6	Prestressed concrete beams, boxes, piling, and concrete traffic barrier (precast)
S⁵	4,000	0.45	2—5	Bridge slabs, top slabs of direct traffic culverts
P	See Item 360	0.45	2—3	Concrete pavement
DC⁵	5,500	0.40	6	Dense conc. overlay
CO⁵	4,600	0.40	6	Conc. overlay

LMC ⁵	4,000	0.40	6—8	Latex-modified concrete overlay
SS ⁵	Note 7	0.45	4—6	Slurry displacement shafts, underwater drilled shafts
K ⁵	Note 6	0.45	Note 6	Note 6
HES	Note 6	0.45	Note 6	Note 6

- 1 . Maximuin water-cement or water-cementitious ratio by weight.
2. Unless otherwise permitted, do not use Grade 1 coarse aggregate except in massive foundations with 4-in. minimum clear spacing between reinforcing steel bars. Do not use Grade 1 aggregate in drilled shafts.
- 3 . Unless otherwise approved, use Grade 8 aggregate in extruded curbs.
4. For information only.
- 5 . Structural concrete classes.
6. As shown on the plans or specified.
7. Cementitious material content shall be minimum 658 lb/cy of concrete.

D-504.13 CONSISTENCY: The consistency of the concrete as placed should allow the completion of the finishing operation without the addition of water to the surface. When field conditions are such that additional moisture is needed for the final concrete surface finishing operation, the required water shall be applied to the surface by fog spray only and shall be held to a minimum. The concrete shall be workable, cohesive, possessing satisfactory finishing qualities, and of the stiffest consistency that can be placed and vibrated into a homogeneous mass. Excessive bleeding shall be avoided. Slump requirements will be as specified in TxDOT item 421 Table 8.

Table 8
Slump Rerquirements

CONCRETE DESIGNATION	RECOMMENDED DESIGN AND PLACEMENT SLUMP (in.)	MAXIMUM ACCEPTABLE PLACEMENT SLUMP (in.)
Drilled Shafts	See item 416	See item 416
Thin walled section (9 in. or less)	4	6-1/2
Approach slabs, concrete overlays, caps, columns, piers, wall sections (over 9 in.)	3	5
Bridge slabs	4	5-1/2
Prestressed Concrete Members ¹	4	6-1/2
Concrete Traffic Barrier, concrete bridge railing	4	6-1/2
Dense concrete overlay	3/4	2

CONCRETE DESIGNATION	RECOMMENDED DESIGN AND PLACEMENT SLUMP (in.)	MAXIMUM ACCEPTABLE PLACEMENT SLUMP (in.)
Latex-modified concrete for bridge deck overlays	3	7-1/2
Concrete Placed Under Water	6	8-1/2
Concrete pavement (slip-formed)	1-1/2	3
Concrete pavement (formed)	4	6-1/2
Riprap, Curb, Gutter, and other Miscellaneous Concrete	As approved	As approved

1. If a high-range water reducer (HRWR) is used, maximum acceptable slump will be 9 in.

NOTE: No concrete will be permitted with slump in excess of the maximums shown.

- (a) The mortar will cling to the coarse aggregate
- (b) The concrete is not sufficiently fluid to segregate when transported to the place of deposit
- (c) The concrete, when dropped directly from the discharge chute, will flatten out at the center of the pile but the edges of the pile will stand up and not flow
- (d) The mortar will show no free water when removed from the mixer
- (e) The concrete will settle into place when deposited in the forms, and when transported in metal chutes at an angle of 30 degrees horizontal, it will slide and not flow into place
- (f) The surface of the finished concrete will be free from "laitance", or a surface film of free water

Any concrete failing to meet the requirements although meeting the slump requirements will be considered unsatisfactory; and the mix shall be changed to correct such unsatisfactory conditions.

D-504.14 MIXING: The first batch of materials placed in the mixer for each placement shall contain an extra quantity of sand, cement, and water sufficient to coat the inside surface of the drum without diminishing the mortar content or the mix. Upon cessation of mixing for any considerable period of time, the mixer shall be thoroughly cleaned.

The entire contents of the drum shall be discharged before any materials are placed therein for the succeeding batch. The concrete shall be mixed in quantities required for immediate use, and any concrete which is not in place within one (1) hour after water is added to the batch will not be used. Re-tempering of concrete will not be permitted.

After all the ingredients are assembled in the drum the mixing shall continue for a minimum time of one and one-half minute for 14 cubic foot mixers and smaller, and for a minimum time of one minute for 21 cubic foot mixers and larger. During the mixing time the drum shall revolve at a speed of 14 to 20 revolutions per minute. The mixer shall be equipped with a speed regulator to hold the mixer to the required speed of revolution. The absolute volume of the concrete batch shall not exceed 120 percent of the NRMCA-rated capacity of the mixer.

D-504.15 READY MIX CONCRETE: Concrete forms from a central plant of mixed-in-transit mixer trucks may be used if it complies with these specifications. The Engineer shall have free access at all times to the batching and mixing plant for sampling of all materials and inspection of work performed at this project. Concrete shall be delivered in water-tight containers which will not permit segregation of the materials. When delivered, the concrete shall be uniform throughout the mass.

The delivery ticket shall include the date, time, strength, slump, and amount of batch delivered. If an extra charge of water is required at the job site because of too low a slump, the drum shall be turned a minimum of 30 revolutions after addition of such water. Mixer shall be completely emptied before recharging. Trucks shall not be loaded greater than NRMCA-rated capacity. The maximum time interval between the addition of the cement to the batch and the placing of the concrete in the forms shall conform to the requirements set up under TxDOT specifications, Item 421. Overwet mixers shall be rejected and shall not be corrected by the addition of either aggregate or cement to the particular batch in question.

D-504.16 ADVERSE WEATHER: In threatening weather which, in the opinion of the Engineer, may result in conditions which will adversely affect the quality of the concrete to be placed, the Engineer may order postponement of the work. Where work has been started and changes in weather conditions require protective measures to be used, the Contractor shall furnish adequate shelter to protect the concrete against damage from rainfall, wind, or damage due to freezing temperature. In case it is necessary to continue mixing operation during rainfall, the Contractor shall provide protective coverings for the material stockpiles as well as the concrete being placed. The covering for aggregate stockpiles will be required only to the extent as may be necessary to control the moisture conditions in the aggregate so that adequate control of the consistency of the concrete mix may be maintained.

No concrete shall be mixed without the approval of the Engineer when the air temperature is at or below 40 degrees Fahrenheit taken in the shade away from artificial heat and falling. If authorized by the Engineer, concrete may be mixed when the air temperature is 35 degrees Fahrenheit and rising. When permission is given for mixing when the temperature is below 40 degrees Fahrenheit, the Engineer will specify the special precautions which shall be taken.

In case the air temperature is at or above 85 degrees Fahrenheit, concrete may be mixed in accordance with the requirements set up in TxDOT, Specifications.

Hand mixing of concrete will be permitted only for small placements or in the case of an emergency and then only when authorized by the Engineer. The Engineer will also specify the proportioning and methods of mixing to be used.

D-504.17 TESTING AND INSPECTION OF MATERIALS:

- (a) Concrete testing of mix designs shall be made by a commercial testing laboratory approved by the Engineer. One copy of the test reports shall go to the Engineer and one copy of same shall go to the Contractor.
- (b) Selection of the testing laboratory by the Engineer shall be understood as in no way relieving the

Contractor's responsibility for the satisfactory performance of the work in full conformance with the requirements of the contract. Excluding written protest by the Contractor, in advance of processing or use of materials, services of the testing laboratory shall be understood as constituting full acceptance by an approval of the Contractor.

- (c) Tests of concrete and materials shall be made under the direction of the Engineer who shall have access to all places where materials are stored, proportioned, or mixed.
- (d) The Contractor shall submit to the Engineer the mixes he/she intends to use which have been proven by preliminary compression test prior to commencement of work. Proving tests shall consist of at least six 6" x 12" cylinders for each mix specified. Three cylinders shall be tested at 7 days and three at 28 days.
- (e) During the progress of the work one set of 3 (4) each 6" x 12" cylinders for compression tests shall be cast for each 50 c.y. or day's pour. Cylinders shall be tested for compression at seven 7 days, 14 days, and at 28 days, and one cylinder will be reserved as "stand-by" or as per engineer's recommendation.

Samples used for testing must be representative of the batch tested and should be taken from the middle third portion of the batch. Samples shall be mixed with a shovel to insure uniformity throughout the sample and immediately molded into test specimens.

If test cylinders fail to meet specified strength at 28 days by more than 5%, core tests of the structure may be ordered by the Engineer at the Contractor's expense. These tests shall be made by an approved laboratory.

- (f) Slump tests: Slump tests shall be made on each sample taken for compression tests and shall comply with Table 8 "Slump Requirements". Additional slump tests shall be as required by the Engineer.

D-504.18 TEST METHODS:

- (a) ASTM Designation C-17 "Standard Method of Sampling Fresh Concrete."
- (b) ASTM Designation C-143 "Standard Method of Slump Test for Consistency of Portland Cement Concrete".
- (c) ASTM Designation C-31 "Standard Method of Making and Curing Compression and Flexure Test Specimens in the Field".
- (d) ASTM Designation C-39 "Standard Method of Test for Compressive Strength of Molded Concrete Cylinders".
- (e) ASTM Designation C-42 "Standard Methods of Securing, Preparing, and Testing Specimens from Hardened Concrete for Compressive and Flexural Strengths".

All tests shall conform to the requirements of the latest revisions of the applicable ASTM Designations.

D-504.19 PLACING, CURING, AND FINISHING: The placing of concrete including construction of forms and falsework, curing and finishing, shall be in accordance with Division D, Section 406, CONCRETE STRUCTURES.

D-504.20 MEASUREMENT AND PAYMENT: No separate measurement or payment will be made under this item, but all such work done shall be deemed a subsidiary obligation of the Contractor, having been taken into account and included in price bid for the complete job.

SECTION 506 CONCRETE CURB AND GUTTER

D-506.01 DESCRIPTION: This item shall consist of curb and gutter composed of Portland Cement concrete, constructed as herein specified on an approved subgrade or base course, in conformity with the lines and grades established by the Engineer and the details and sections shown on the plans.

MATERIALS

D-506.02 CONCRETE: Concrete shall be Class "A" and shall conform to the requirements of Division D, Section 504, titled "CONCRETE" in the specifications.

D-506.03 EXPANSION JOINT MATERIAL: Filler for expansion joints shall be preformed bituminous fiber type and shall conform to the requirements of Division D, Section 416, titled "EXPANSION JOINT Materials".

D-506.04 FORMS: Forms shall be of metal and of a section satisfactory to the Engineer, straight, free from warp and of a depth equal to the depth of the finished work. Forms shall be securely staked to line and grade and maintained in true position during the placing of concrete.

D-506.05 REINFORCING STEEL: Reinforcing steel shall conform to the requirements of Division D, Section 410, titled REINFORCING STEEL.

CONSTRUCTION METHODS

D-506.06 SUBGRADE OR BASE COURSE: The subgrade and base course shall be excavated and shaped to line, grade and cross-section, compacted as specified. The subgrade and base course shall be moist at the time concrete is placed. The specified subgrade and base materials and specifications for the roadway shall extend 1 foot beyond the back of curb.

D-506.07 PLACING CONCRETE: Placement of concrete shall comply with TxDOT Item 420. Where reinforcing is required, it shall be placed and supported upon suitable chairs or concrete spacer blocks before concrete is poured.

D-506.08 FINISHING AND JOINTING: The surface of the concrete shall be struck off to the required line and grade with an appropriately shaped screed and shall be floated smooth while the concrete is still soft. The surface shall be floated with a wood float until a slight excess of sand appears. The outer edges and joints shall be rounded with approved tools to the radii shown on the plans. When the concrete has taken sufficient set, the inside form shall be carefully removed, and the surface thus exposed shall be pointed up where necessary, then wetted and rubbed with a wooden block to remove all form marks and other irregularities, producing a finish similar in appearance to the finished upper surfaces. Mortar finishing will not be permitted. Where the location of expansion joints is not indicated, joints shall be placed at spacing of not more than forty (40) feet. Expansion joint material shall be of the thickness shown on the plans and shall conform to the required section of the curb. Expansion joint material shall be placed between the curb and any abutting structures, and around all obstructions protruding through the curb and gutter as shown on the plans.

SECTION 508
MACHINE LAID CONCRETE CURB AND GUTTER

D-508.01 DESCRIPTION: This item shall consist of curb and gutter composed of Portland Cement concrete, constructed as herein specified on prepared subgrade, compacted as specified or shown, with reinforcing steel and in conformity with the lines and grades established by the Engineer and the details and sections shown on the plans.

D-508.02 MATERIALS: Shall conform to TxDOT Specifications 2004, Item 529 or latest revision, as stated for extruding curb.

D-508.03 CONSTRUCTION METHODS: Shall conform to TxDOT Specifications 2004 or latest revision, Item 529, as stated for extruding curb.

D-508.04 MEASUREMENT: The footage of concrete curb and gutter to be paid for shall be the number of linear feet, measured along the back of the curb in place, completed, and accepted. The various types and classes of curb and gutter shall be measured separately.

D-508.05 PAYMENT: The footage of concrete curb and gutter, the curing, the preparation of subgrade, and the placing of flexible base where shown under the curb to dimensions shown on the plans, measured as provided in Division D, Section 508, Paragraph D-508.04 shall be paid for at the contract unit price per linear foot for concrete curb and gutter.

SECTION 510 FLEXIBLE BASE COURSE

D-510.01 GENERAL: Flexible Base shall consist of a foundation course for surfacing, pavement, or other base courses; shall be composed of uncontaminated materials of uniform quality that meet the requirements of TxDOT Item 247, and shall be constructed as herein specified in conformity with the sections shown on the plans and to the lines and grades established by the Engineer.

MATERIALS

D-510.02 MATERIALS: The materials shall consist of argillaceous limestone, calcareous clay particles with or without stone, conglomerate, gravel, sand, or other granular materials. The materials shall be at least Type "B" Grade II, conforming to Item No. 247 of the Texas Department of Transportation Specifications 2004 or latest edition. The source of the material shall be approved by the Engineer prior to use. The plasticity index of caliche shall have a maximum of 12 and a minimum of 5. The Contractor shall stockpile the material to be used for this particular project. Sampling and testing shall conform to TxDOT or ASTM specifications. Triaxial test will be required only when specified by the engineer. Stones greater than 3" in any direction shall be removed from street during construction.

CONSTRUCTION METHODS

D-510.03 CONSTRUCTION METHODS: The flexible base materials shall be placed on the approved subgrade in courses not to exceed eight (8) inches compacted depth. It shall be the responsibility of the Contractor that the required amount of materials be delivered and uniformly spread and shaped. All materials shall be moved from the place where it is dumped by cutting in windrow. After the material has been cut into windrows, it shall be sprinkled, spread, shaped, and rolled in proper sequence to prevent segregation and as necessary for required compaction.

The surface upon completion shall be smooth and in conformity with typical sections and to the established lines and grades. Any deviation in excess of 1/4 inch in cross section and in length of 16 feet measured longitudinally shall be corrected. All irregularities, depressions, or weak spots which develop shall be corrected.

Flexible base shall be compacted to an apparent dry density of not less than 98 percent (98%) of the maximum dry density as determined in accordance with TxDOT Specifications Test Method TEX 113-E. Tests for density will be made within 24 hours after compaction operations are completed. If the material fails to meet the density specified, it shall be reworked as necessary to meet the density required. Just prior to the placing of any succeeding course of flexible base or surfacing on a previously completed course, the density and moisture of the top four (4) inches of the flexible base shall be checked and if tests show the density to be more than 2 percent (2%) below the specified minimum or the moisture content to be more than 3 percent (3%) above or below the optimum, the course shall be reworked as necessary to obtain the specified compaction and moisture content.

Should the base course due to any reason or cause lose the required stability, density, or finish before the surface is completed, it shall be recompacted, refinished, and retested at the sole expense of the Contractor.

The limits of placement for F.B.C. will extend 1 foot beyond the back of curb (whenever curb is specified) in order to provide proper support for concrete curb (Detail No.).

D-510.04 MEASUREMENT: Flexible Base: The number of square yards of flexible base course to be paid for shall be measured as the square yards in place after compaction. Thickness shall be checked by means of depth tests or cores, but no extra yardage for thickness in excess of that shown on the plans will be paid.

D-510.05 PAYMENT: The yardage of flexible base measured as provided for in Paragraph above will be paid for at the contract unit price for "Flexible Base". All payment made under this section shall constitute full compensation for excavation for furnishing, loading, hauling, and placing materials; for mixing, blending, sprinkling, shaping and compacting; for reconditioning the underlying course and shoulders, and for furnishing all labor, tools, and equipment as specified herein.

SECTION 512 ASPHALT STABILIZED BASE

D-512.1 DESCRIPTION: This item shall consist of base courses to be composed of a compacted mixture of mineral aggregates and asphaltic materials mixed hot in a mixing plant, and shall conform to Item 292 "Asphalt Treatment (Plant Mixed)" of the TxDOT's standard specifications for construction of highways, street and Bridges, 2004, or latest edition.

D-512.2 MATERIALS:

1. Asphaltic Materials

a. Mixture. Asphalt for the mixture shall meet the requirements for AC-10 or AC-20 asphalt. The grade of asphalt to be used will be approved by the Engineer after design tests have been made using the mineral aggregate approved for use in the construction of this item.

b. Tack Coat. The asphaltic material for the tack coat shall meet the requirements for emulsified asphalt MS-1 or cut back asphalt RC-2.

2. Mineral Aggregates.

a. Description. The material shall be crushed or uncrushed and screened as necessary to meet the requirements specified and shall consist of durable coarse aggregate particles mixed with approved binding materials.

b. Grades. Unless otherwise specified, the grading of the Master Job Mix Design shall conform to the limitations as shown below:

Table 1

SIEVE SIZE	PERCENT RETAINED
1 1/2"	0
1"	0-10
3/8"	30-55
No. 4	45-70
No.40	70-85

Unless otherwise specified, the mineral aggregate shall meet the following physical requirements:

Los Angeles Abrasion	50 % Max.
Liquid Limit	30 Max.
Plasticity Index	10 Max.
Crushed Faces	60% Min.

D-512.3 ASPHALT STABILIZED MIXTURE:

- 1. Paving Mixture.** The mixture shall consist of a uniform mixture of mineral aggregate and asphaltic material. The mineral aggregate will conform to the gradation limits shown above. The asphaltic material shall form from 3.0 to 7.0 percent of the mixture by weight unless otherwise shown on the plans. The exact percentage of asphaltic material shall be based on a mix design approved by the Engineer.
- 2.** Material used in construction methods and testing for asphalt stabilized base not included above shall meet the requirements as set forth in Item 292 "Asphalt Treatment (Plant Mixed)" of the TxDOT Standard Specifications.
- 3.** Prior to laying any asphalt, Contractor shall submit an Asphalt Stabilized base mix design for approval. He shall also submit written assurance that material stockpiles are sufficient to produce a mix consistent with the design for the duration of the project. If material source change occurs prior to completion, **contractor shall provide a revised mix design at no additional expense to the Owner.**
- 4.** The Contractor shall provide for quality control at the plant to ensure that paving material delivered to the site conforms to requirement of these specifications and the mix design. Mix design to be current and less than one year old signed and sealed by a professional engineer licensed in the State of Texas.
- 5.** Materials will be furnished pre-mixed by the Contractor at the job site. Material will be delivered in trucks by the asphalt plant operator. Material will be installed, in place, by the Contractor, according to specifications, including the required thickness.

D-512.4 EQUIPMENT:

1. Mixing Plants. All equipment for the handling of materials and the placement of the mixture shall be maintained in good repair and operating condition. Any equipment found to be defective and affecting the quality of the mixture will be replaced.

Mixing plants may be either the weight batching type, the continuous mixing type, or the drum type. All types of plants shall be equipped with satisfactory conveyors, power units, aggregate handling equipment, bins, and dust collectors.

2. Truck Scales. A set of standard platform truck scales, if needed for measurement, shall be placed at a location approved by the Engineer.

3. Asphaltic Material Heating Equipment. Asphaltic material heating equipment shall be

adequate to heat the asphaltic material to the required temperature in the quantities needed.

4. Surge Storage System. A surge storage system may be used providing the mixture from the surge storage unit is of equal quality to that coming from the mixer.

5. Spreading and Finishing Machine. The spreading and finishing machine shall be of a type approved by the Engineer, shall be capable of producing a surface that will meet the requirements of the typical cross-section, and shall have adequate power to propel the delivery vehicles in a satisfactory manner.

6. Motor Grader. The motor grader, if used, shall be a self-propelled motor grader and shall be in good operating condition.

7. Rollers. Rollers shall be power driven and of any type capable of obtaining the required compaction.

D-512.5 STORAGE, PROPORTIONING, AND MIXING:

1. Storage and Heating of Asphaltic Materials. The asphaltic material shall be ample to meet the requirements of the plant. Asphalt shall not be heated to a temperature in excess of that recommended by the producer. All equipment used in the handling and storage of asphaltic material shall be kept in a clean condition and be operated in such a manner that there will be no contamination with foreign matter.

2. Feeding and Drying of Aggregate. The feeding of various sizes of aggregate to the dryer shall be done in such a manner that a uniform and constant flow of materials in the required proportions will be maintained. In no case shall the aggregate be introduced into the mixing unit at a temperature of more than 400 F.

3. Proportioning. The proportioning of the various materials entering the asphaltic mixer shall be in accordance with these specifications.

4. Mixing.

a. Batch Type Mixer. In the charging of the weigh box and in the charging of the mixer from the weigh box, such methods or devices shall be used as are necessary to assure a uniform asphaltic mixture.

In introducing the batch to the mixer, all mineral aggregate shall be introduced first, the asphaltic material added, and the materials thoroughly mixed for at least 30 seconds. The mixing time may be increased, if, in the opinion of the Engineer, the mixture is not uniform.

b. Continuous Type Mixer. The amount of aggregate and asphaltic material entering the mixer and the rate of travel through the mixer shall be coordinated so that a uniform mixture of the specified grading and asphaltic content will be produced.

c. Dryer-Drum Mixer. The amount of aggregate and asphaltic material entering the mixer and the rate of travel through the mixer shall be coordinated so that a uniform mixture of the specified grading and asphaltic content will be produced.

d. Tolerances. When tested as determined by the Engineer, the asphalt content in the samples of the mixture shall not vary by more than 0.5 percentage points from the Job Mix Design. The gradation of the aggregates must be within the master grading limits except that a tolerance of 2 percentage points is allowed on the sieve size that shows 0% retained in table 1.

D-512.6 CONSTRUCTION METHODS:

1. Prime Coat. Before the asphalt stabilized base material is laid, the surface upon which the material will be placed shall be thoroughly cleaned and given a uniform prime coat using MC-30 cutback asphalt. The prime coat should be just sufficient to lightly coat the soil and should not exceed 0.1 gallons per square yard.

2. Transporting Asphalt Stabilized Base. The asphaltic mixture shall be hauled to the project site in vehicles which have been cleaned of all foreign material.

3. Placing. The asphalt stabilized base material shall be dumped and spread on the prepared surface with the specified spreading and finishing machine in such a manner that when properly compacted, the finished surface will be smooth, of uniform density, and will meet the requirements of the typical cross-sections. The limits of placement for A.S.B. will extend 1 foot beyond the back of curb (whenever curb is specified) in order to provide proper support for concrete curb.

4. Compacting. It is the intent of these specifications to require in-place density and that the materials be placed and compacted from 95 to 98 percent of the "Theoretical Specific Gravity" of the job sample with 96% being the optimum.

6. Surface Tests. The surface of the pavement, after compaction, shall be smooth and true to the established line, grade, and cross-section. In- place density testing of the compacted base and mix extraction and gradation tests shall be required by the Engineer.

7. The assigned Laboratory shall test a job site sample to compare with the approved Hot-Mix design. Reports of Core test, made by the assigned laboratory, to assure the required compacted lift thickness shall be provided prior to acceptance.

D-512.7 MEASUREMENT: Work and materials prescribed by the item shall be measured by the square yard of surface area, complete in place.

PAYMENT: The work performed and materials furnished with this item, will be paid for at the unit price bid per compacted squared yard for the various thickness, grade and binder type specified. This price is full compensation for furnishing and disposing of materials, loading, hauling, placing, compacting, replacing defective work, equipment, labor, tools, and incidentals.

**SECTION 514
GEOGRID REINFORCEMENT**

D-514.01 DESCRIPTION: This item consists of furnishing and installing geogrid reinforcement in accordance with the lines and grades a minimum of the full width of the street plus 12” behind the back of the curb or as shown on the plans (Detail No.)

D-514.02 MATERIALS: The geogrid shall be a single layer grid structure formed by a regular network of integrally connected polymeric tensile elements with apertures designed to interlock with the surrounding fill material. The structure shall be capable of maintaining dimensional stability during placement and under normal construction traffic. The geogrid shall be resistant to damage during construction, including ultraviolet degradation, and shall have long-term resistance to chemical and biological degradation caused by the material being reinforced. No multiple layered grids are acceptable.

The geogrid shall also conform at least to the properties specified below.

STRUCTURAL GEOGRID PROPERTIES
TABLE A

<i>Property</i>	<i>Test Method</i>	<i>Units</i>	<i>Type 1</i>	<i>Type 2</i>
Aperture Stability Modulus at 20 cm-kg	Kinney - 01	cm-kg/deg	3.2	6.5
Rib Shape	Observation	N/A	Rectangular or Square	Rectangular or Square
Rib Thickness	Calipered	in (mm)	0.03 (0.76)	0.05 (1.27)
Aperture Size	I.D. Calipered	in (mm)	0.9 to 1.5 (25 to 33)	0.9 to 1.5 (25 to 33)
Junction Efficiency	GRI-GG2-87	%	90	90
Flexural Rigidity	ASTM D1388- 96	mg-cm	250,000	750,000
Minimum True Initial Modulus in Use	ASTM D6637- 01			
- MD		lb/ft (kN/m)	15,170 (226)	32,980 (360)
- CMD		lb/ft (kN/m)	24,685 (481)	44,725 (652)

Approved products are TENSAR TriAx TX5-475 and TENSAR TriAx TX7-450 or approved equal.

Alternate geogrid material will be considered. Such materials must be pre-approved in writing by the Engineer prior to bid date. Alternate material packages must be submitted to the Engineer a minimum of 15 days prior to bid date. Submittal packages must include, as a minimum, the following:

1. Full-scale laboratory testing and in-ground testing of pavement structures reinforced with the specific geogrid which quantifies the structural contribution of the geogrid to the pavement structure. The increase in structural layer coefficient of the base course must meet or exceed that of the design geogrid.
2. Independent certified tests results stating that the alternate geogrid has a secant aperture stability modulus at 20 cm-kg, when tested in accordance with the "Grid Aperture Stability by In-Plane-Rotation" test of 3.2 or greater.
3. A list of 5 comparable projects, in terms of size and applications, in the United States, where the results of the specific alternate geogrids use can be verified after a minimum of 1 year of service.
4. A sample of the geogrid and certified specification sheets.

D-514.03 CONSTRUCTION METHODS: Subgrade shall be prepared as indicated on the plans or as directed by the Engineer. The geogrid shall be installed in accordance with the lines and grades shown on the plans. The geogrid shall be oriented such that the roll lengths run parallel to the road. Geogrid sections shall be overlapped a minimum of three feet for CBR (California Bearing Ratio) less or equal to 1.0 and one foot for CBR greater or equal to 4.0 as per manufacturer, unless otherwise indicated on the plans or as directed by the Engineer. Care shall be taken to ensure the geogrid sections do not separate during construction; adjacent rolls shall be tied together every 30 feet using suitable plastic ties. Placement of geogrid around corners may require cutting and diagonal lapping. The geogrid shall be pinned, or held in place by other suitable means, at the beginning of the backfill section but will be left free elsewhere to relieve wrinkles or folds in material during fill placement.

Fill material shall be placed in lift thicknesses and compacted as shown on the plans. Tracked construction equipment shall operate on the grid only with a minimum fill cover of four inches. Rubber-tired equipment may operate directly on the grid at speed less than five miles per hour if the underlying material is capable of supporting loads. Sections of geogrid which are damaged by construction activity shall be repaired or replaced at the Contractor's expense.

If an existing street constructed with geogrid needs to be cut and excavated, contractor shall make the repairs replacing the geogrid on the bottom of the trench and bottom of flexible base or as was originally installed overlapping with the existing geogrid at least three foot around the trench (Detail 514-1).

D-514.04 MEASUREMENT: This item will be measured by the square yard of surface area as shown on the plans. No measurement will be made for lapping material.

D-514.05 PAYMENT: The work performed and materials furnished, as prescribed by this item, measured as provided under “MEASUREMENT”, will be paid for the unit price bid for “Geogrid Reinforcement”, which price shall be full compensation for furnishing all labor, material, freight, tools, equipment and incidentals, and for doing all the work involved in placement of the geogrid, complete in place.

**SECTION 516
BITUMINOUS PRIME COAT**

GENERAL

D-516.01 DESCRIPTION: This item shall consist of an application of asphaltic material on the completed base course in accordance with these specifications and as directed by the Engineer.

MATERIAL

D-516.02 CUT-BACK ASPHALT: The bituminous material shall conform to the following:

GRADE MC-30

	Min	Max
Kinematic Vis. at 140 F, CST	30	60
Flash Point T.O.C. F	100	

When distilled ASTM Method D-402, the distillate-off volume shall be as follows:

	Min	Max
Off at 437 F%	--	25
Off at 500 F%	40	70
Off at 600 F%	75	93
Residue from 680 F Distillation		
Volume %	50	--

The residue when poured from the flash without cooling immediately upon reaching the maximum temperature specified, shall have the following characteristics:

	Min	Max
Penetration at 77 F, 100gms.,5 sec	120	250
Ductility at 77 F, 5 cm/min., cms.	100	---
Solubility in CCI 4%	99.5	---

The material shall be free from water.

MC-30 shall be applied uniformly at the rate of 0.25 gallons per square yard. At Contractor's option, appropriate emulsified asphalt, water mixture may be used in lieu of MC-30. Number of applications, mixture rate, and depth of penetration shall be approved by Engineer prior to use of emulsified asphalt. Furnishing and placement of prime coat shall be subsidiary to pavement and flexible base construction.

CONSTRUCTION METHODS

D-516.03 APPLICATION OF ASPHALT: Asphalt shall be applied when the air temperature is

60°F and above, and it may be applied when the air temperature is 50°F and rising; the air temperature to be taken in the shade and away from artificial heat. No asphalt shall be placed when general weather conditions in the opinion of the Engineer are not suitable.

All storage tanks, piping, retorts, booster tanks, and distributors used in storing or handling asphalt shall be kept clean and in good operating condition at all times, and they shall be operated in such a manner that there will be no contamination of the asphalt with foreign material. Asphalt shall not be heated above 400°F at any time, and when applied, shall be at a temperature of not less than 70°F, and not more than 150°F. The Engineer will select the temperature of application, and the Contractor shall apply the asphalt at a temperature within 15°F of the temperature selected. All asphalt heated above 400°F will be rejected.

Before the application of asphalt, the surface of the base shall be cleaned of dirt, dust, or other deleterious matter by sweeping or other approved methods and, if required by the Engineer, lightly sprinkled with water.

Asphalt shall be applied on the clean surface by an approved type of self-propelled pressure distributor so operated as to distribute the asphalt in the quantity specified evenly and smoothly under a pressure necessary for proper distribution. The Contractor shall provide all necessary facilities for determining the temperature of the asphalt in all the heating equipment and in the distributor for determining the rate at which it is applied and for insuring uniformity at the junction of two distributor loads. Asphalt shall be applied for the full width of the surface treatment in one application unless the width exceeds twenty-two (22) feet. No traffic or hauling will be permitted over the freshly applied asphalt for five days.

MEASUREMENT AND PAYMENT

D-516.04 QUANTITY-SQUARE YARDS: The quantity of bituminous prime coat to be paid shall be measured in square yards of the area primed, applied at a rate of 0.25 gallons per square yard.

D-516.05 GALLONS: The number of gallons of bituminous prime coat measured as provided in Division D, Section 514, Paragraph D-514.04 will be paid for at the contract unit price per square yard for bituminous prime coat applied.

D-516.06 GENERAL: All payment made under these sections shall constitute full compensation for furnishing (freight included) heating, hauling, and distributing all bituminous material; for cleaning the surface to which it is applied; and for furnishing all labor, tools, and equipment.

**SECTION 518
BITUMINOUS TACK COAT**

D-518.01 DESCRIPTION: This item shall consist of an application of asphaltic material on the completed and prime base course or existing pavement in accordance with these specifications and as directed by the Engineer. **Do not use prime oils as MC-30 or AEP as Tack Coat Material**

MATERIAL

D-518.02 CUT-BACK ASPHALT: The bituminous material shall conform to the following:

GRADE RC-250	Min	Max
Viscosity (Furol) at 140° F, cSt	250	400
Flash Point T.O.C. °F	80	--

The distillate, expressed as percent by volume of total distillate to 680° F, shall be as follows:

to 437 °F	40	75
to 500 °F, %	65	90
to 600 °F, %	85	--
Residue from Distillation, Volume %	70	--

The residue, when poured from the flash without cooling, immediately upon reaching the maximum temperature specified, shall have the following characteristics:

	Min	Max
Penetration at 77 F, 100 g., 5 sec.	80	120
Ductility at 77 F, 5 cm/min., cms.	100	---
Solubility in CCI 4%	99.0	---
Spot Test	Neg	

The material shall be free from water.

RC-2 cut-back asphalt used for tack coat may, upon written instructions from the Engineer, be further cut-back by the addition of an approved grade of gasoline not to exceed fifteen (15%) percent by volume.

CONSTRUCTION METHODS

D-518.03 APPLICATION OF ASPHALT: Asphalt shall not be applied when the air temperature is above 60°F, and may be applied when the air temperature is 50°F and rising; the air temperature to be taken in the shade and away from artificial heat. No asphalt shall be placed when general weather conditions in the opinion of the Engineer are not suitable.

All storage tanks, piping, retorts, booster tanks, and distributors used in handling asphalt shall be kept

clean and in good operating condition at all times, and they shall be operated in such a manner that there will be no contamination of the asphalt with foreign material. Asphalt shall not be heated above 400°F and at the time of application, it shall be at a temperature not less than 100°F, and not more than 175°F. The Engineer will select the temperature of application and the Contractor shall apply the asphalt at a temperature within 15 degrees of the temperature selected. All asphalt heated above 400°F will be rejected.

Before application of asphalt, the surface to receive the coat shall be cleaned of dirt, or other deleterious matter by sweeping or other approved methods. Asphalt shall be applied on the clean surface by an approved type of self-propelled pressure distributor so operated as to distribute the asphalt in the quantity specified evenly and smoothly under the pressure necessary for proper distribution. The Contractor shall provide all necessary facilities for determining the temperature of the asphalt in all the heating equipment and in the distributor for determining the rate at which it is applied, and for insuring uniformity at the junction of two distributor loads. Asphalt shall be applied for the full width of the surface treatment in one application unless the width exceeds twenty-two (22) feet. No traffic or hauling will be permitted on the freshly applied asphalt.

MEASUREMENT

D-518.04 QUANTITY-SQUARE YARDS: The quantity of bituminous tack coat to be paid for shall be measured in square yards of the area tacked, applied at a rate of 0.10 gallons per square yard.

PAYMENT

D-518.05 GALLONS: The number of gallons of bituminous tack coat measured as provided in Division D, Section 516, Paragraph D-516.04 will be paid for at the contract unit price per square yard for bituminous prime coat, applied.

D-518.06 GENERAL: All payment made under these sections shall constitute full compensation for furnishing (freight included), heating, hauling, and distributing all bituminous material; for cleaning the surface to which it is to be applied; and for furnishing all labor, tools, and equipment.

SECTION 520
HOT MIX ASPHALTIC CONCRETE PAVEMENT-TYPE D

D-520.01 DESCRIPTION: This item shall consist of a base course, a leveling up course, a surface course, or any combination of these courses as shown on the plans, each to be composed of a compacted mixture of mineral aggregate and asphaltic material. The mixture, when designed and tested in accordance with these specifications and methods outlined in Tex 204-F shall have the following:

IN PLACE DENSITY, PERCENT			STABILITY, PERCENT
MIN	MAX	OPTIMUM	
95	99	96	Not less than 35 nor more than 60 unless otherwise shown on plans.

The pavement shall be constructed on the previously completed and approved subgrade, base, existing pavement, bituminous surface, or, in the case of a bridge, on the prepared floor slab, as herein specified and in accordance with the details shown on the plans.

D-520.02 MATERIALS: Materials used in Hot-Mix Asphaltic Concrete Pavement shall meet the requirements as set forth in TxDOT Item 340 “Dense Graded Hot-Mix Asphalt” Specifications, 2004 or latest edition.

Prior to laying any asphalt, Contractor shall submit a Hot-Mix Asphaltic Concrete mix design (less than one year old) signed and sealed by a professional engineer licensed in Texas for approval. He/She shall also submit written assurance that material stockpiles are sufficient to produce a mix consistent with the design for the duration of the project. If material source change occurs prior to completion, Contractor shall provide a revised mix design at no additional expense to Owner.

The Contractor shall provide for quality control at the plant to ensure that paving material delivered to the site conforms to requirements of these specifications and the mix design unless otherwise specified by Engineer.

D-520.03 CONSTRUCTION METHODS: Construction methods used in Hot-Mix Asphaltic Concrete Pavement shall meet the requirements as set forth in TxDOT Item 340 “Dense Graded Hot-Mix Asphalt” Specifications, 2004 or latest revision, with the following addition:

1. Place the mixture when the roadway surface temperature is 60°F or higher unless otherwise approved. Place mixture only when weather conditions and moisture conditions of the roadway surface are suitable in the opinion of the engineer.
2. Delivery temperature no to exceed 350°F
3. Minimum placement temperature shall not be less than 260°F and depending on the Hot Mix Binder grade.
4. Ensure pavement is fully compacted before allowing rollers to stand on the pavement.
5. Use only water or an approved release agent on rollers, tamps, and other compaction equipment. Keep diesel, gasoline, oil, grease, and other foreign matter off of the mixture.

6. Allow the compacted pavement to cool to 160°F or lower before opening to traffic.

D-520.04 EQUIPMENT: Mixing plants that will not continuously produce a mixture meeting all of requirements of TxDOT Item 340.4 Specifications, 2004, shall not be allowed.

D-520.05 TESTING: The assigned Laboratory shall test a job site sample to compare with the approved Hot-Mix design and also test for in-place air void determination as per TxDOT Item 340. Reports of Core test, made by the assigned laboratory, to assure the required compacted lift thickness shall be provided prior to acceptance.

D-520.06 MEASUREMENT: The asphaltic mixture shall be measured by square yards of various types and thickness as actually used in the completed and accepted work in accordance with the plans and specifications for the project. No separate measurement will be made for fluxing oil.

D-520.07 PAYMENT: The number of square yards of asphaltic mixture placed will be paid for at the contract unit price per square yard of various types and thickness. The unit price will be full compensation for surface preparation, hot mix material, placement, equipment, labor, tools and incidentals.

SECTION 522 CUTTING AND REPLACING PAVEMENT

D-522.01 DESCRIPTION: This item shall govern for the cutting of pavements, the removal and bases and the replacement of bases and pavements, as herein specified and in conformity with the typical sections shown on the plans and to the lines established by the Engineer.

D-522.02 MATERIALS:

- 1. Prime Coat:** All prime coat shall conform to the provisions of Division D, Section 516, "Bituminous Prime Coat".
- 2. Tack Coat:** All tack coat shall conform to the provisions of Division D, Section 518, "Bituminous Tack Coat".
- 3. Flexible Base Course:** All flexible base shall conform to the provisions of Division D, Section 510, "Flexible Base Course".
- 4. Hot-Mix Asphaltic Concrete Pavement:** All hot-mix asphaltic concrete pavement shall conform to the provision of Division D, Section 520, "Hot Mix Asphaltic Concrete Pavement - Type D".
- 5. Excavation and Backfilling:** All excavation and backfilling shall conform to the provision of Division D, Section 102, "Excavation and Backfill for Utilities" Backfill under existing pavement.

D-522.03 CONSTRUCTION METHODS:

- 1. Cutting of Pavements:**
 - a. Concrete and asphaltic concrete pavements:** All concrete and asphaltic concrete pavements shall be cut with a concrete saw. The depth of the cut shall be such that upon removal of concrete and/or asphaltic concrete the sides of the cut shall be straight and square. Care shall be taken when cutting concrete pavement, not to cut transverse reinforcing steel.
 - b. Base Material:** Base material shall be removed by normal trenching operations.
- 2. Replacement of Bases:**
 - a. Base Material:** Base replacement shall be of the type shown on the plans and in the bid proposals.
- 3. Replacement of Pavements:** Pavements shall be replaced with hot-mix asphaltic concrete pavement or reinforced concrete pavement. Replacement will be of the type shown on the plans and in the bid proposals.
 - a. Hot-mix asphalt pavement:** Shall be furnished and placed in accordance with Division D, Section 520, "Hot-Mix Asphaltic Concrete Pavement. Flexible base shall be

primed in accordance with the provisions of Division D, Section 516, "Bituminous Prime Coat", prior to the placement of hot-mix asphaltic concrete.

- b.** All concrete bases shall be tack coated with RC- 250 in accordance with the provisions of Division D, Section 518, "Bituminous Tack Coat", prior to the placement of hot-mix asphaltic concrete.
- c.** Replacement of pavement, shall be with straight lines parallel and perpendicular to the flow of traffic. Do not replace pavement areas with angled sides or irregular shapes. All replacements shall be full lane width see details 534-1 to 534-5 for special conditions.

D-522.04 MEASUREMENT: This item will be measured by the square yard of finished pavement surface area repaired. No measurement will be made for areas outside the limits shown in the plans or other damaged because of Contractor negligence without written authorization by the engineer.

D-52205 PAYMENT: The work performed and the materials furnished in accordance with this specification shall be paid for the unit price bid per square yard of the various pavement types and depths when specified. The price shall be considered full compensation for saw cutting, removal, stockpiling, and/or disposal of existing pavement, base, and waste material and for all equipment, materials, labor, tools, and incidentals to reconstruct the pavement base, prime, tack and surface course shown in the plans. Curb replacement, where incidentally repaired will not be paid for directly but will be considered subsidiary to this item.

SECTION 536 PARKING LOTS

D - 536.01 DESCRIPTION: This item shall govern for the different type of materials and wearing surfaces used in the construction of parking lots for commercial, office, business, industrial, institutional, multi- family and other uses.

D - 536.02 GENERAL:

- (a) These standards differentiate the construction requirements between materials systems allowed in parking space areas and interior drives and loading areas. While all the following methods are permitted within the defined parking space area, some are restricted from use in the interior drive and loading areas. This is due to the higher load frequencies and vehicle turns within the interior drive areas.
- (b) The American Disabilities Act (ADA) must be considered when utilizing these standards. Certain surface materials (particularly aggregate, concrete grid and geotextile) can not be used in designated handicapped parking spaces or along accessible routes as defined by the ADA.
- (c) Aggregate, concrete grid and geotextile can not be use in designated fire lanes or emergency vehicle rout.

D - 536.03 MATERIALS: Materials shall be in accordance with:

Asphalt	Section 520
Flexible Base	Section 510
Concrete	Section 504
Concrete Pavers	ASTM C936 and the Interlocking Concrete Paver Institute (ICPI)
Geotextile or Geogrid	
Aggregate	
Chip Seal	

D - 536.04 CONSTRUCTION:

1. Hot Mix Asphalt:

- a. Sub-grade: In-situ material or fill material approved by the Engineering Department as necessary. Fine graded and compacted to a density not less than 95% of maximum dry density per Tex-113E or Tex-114E
- b. Base Course: Minimum 8” graded aggregate base per Standard Technical Specification Manual Division D Section 510 or as per plans.

- c. Surface: Hot Mix Asphalt Pavement per Standard Technical Specification Manual Division D Section 520. Consisting of a minimum of two inches (2”) of either type “C” or “D”.
- d. On Industrial parking lots a reinforced concrete running board three feet (3’) wide and twelve inches (12”) of thickness will be required to rest the landing legs of the trailers.
- e. Maintenance: The property owner is responsible for properly maintaining the pavement surface. The surface must be kept free of weeds and other vegetation. The surface grade shall be maintained as installed, ruts and potholes must be repaired immediately.

2. Portland Cement Concrete:

- a. Sub-grade: In-situ material or fill material. Fine graded and compacted to a density not less than 95% of maximum dry density per Tex 113E or Tex-114E
- b. Base Course: Not required, however a 4” graded aggregate base is recommended.
- c. Surface: 3600 psi Portland cement concrete pavement. Minimum between four (4”) and eight inches (8”) thick reinforced with minimum # 3 or # 4 rebar @ 24 o.c. as per Land Development Chapter 24.78 and Standard Technical Specification Manual Division D Section 504. Colored and/or imprinted concrete is acceptable.
- d. Maintenance: The property owner is responsible for properly maintaining the pavement surface. The surface must be kept free of weeds and other vegetation. The surface grade shall be maintained as installed. Ruts and potholes must be repaired immediately.

3. Concrete Unit Pavers – Standard:

- a. Sub-grade: In-situ material or fill material approved by the Engineering Department. Fine graded and compacted to a density not less than 95% of maximum dry density per Tex 113E. or Tex-114E
- b. Base Course: Minimum eight inch (8”) graded aggregate base as per Standard Technical Specification Manual Division D Section 510.
- c. Surface: Interlocking Concrete Unit Pavers (ASTM C936). Minimum thickness 2-3/8” over a 1” thick sand bed. Install per Interlocking Concrete Paver Institute (ICPI) standards. Edge entire perimeter with edge restraint system approved by ICPI.
- d. Maintenance: The property owner is responsible for properly maintaining the pavement surface and edge restraints per the paver’s manufacturer’s recommendations. The surface must be kept free of weeds and other vegetation. The surface grade shall be maintained as installed. Ruts and potholes must be repaired immediately.

4. Concrete Unit Pavers – Permeable:

- a. Sub-grade: In-situ material or fill material approved by the Engineering Department. Sub-grade soil must have a minimum infiltration rate of one half inch (1/2") per hour as determined by a standard percolation test with a plasticity index of zero. Fine graded and moderately compacted such that the permeability of the soil is not negatively impacted but soil is able to support the expected vehicular load surcharge. Lack of well draining soil may prevent the use of this method.
- b. Base Course:
 - i. Option 1: With piped under drain system: 4" thick graded aggregate base course per Standard Technical Specification Manual Division D Section 510.
 - ii. Option 2: Open graded base: 6" thick (8" preferred) # 57 stone per Standard Technical Specification Manual Division D Section 504. Install a layer of filter fabric between the base course and the bedding material.
 - iii. Where permeable pavers adjoin an asphalt surface, the pavers shall be bordered by a flush concrete curb. It is recommended that the base course beneath the asphalt surface within 4' of the curb be graded stabilized aggregate base to a depth of not less than 6" in order to avoid future settlement of the asphalt pavement adjacent to the border Curb.
- c. Surface: Interlocking Concrete Unit Paver system (ASTM C936) with void area per square foot of between twelve and twenty percent (12%-20%). Minimum paver thickness of 2-3/8" over a minimum 1" # 8 aggregate bedding layer per Standard Technical Specification Manual Division D Section 504. Fill void material with poorly graded aggregate as recommended by the paver's manufacturer. Install per Interlocking Concrete Paver Institute (ICPI) standards. Edge entire perimeter with edge restraint system approved by ICPI.
- d. Maintenance: The property owner is responsible for properly maintaining the pavement surface and edge restraints per the paver's manufacturer's recommendations. The surface must be kept free of weeds and other vegetation. The surface grade shall be maintained as installed. Ruts and potholes must be repaired immediately. All stone must be contained within the parking/driveway area.

5. Concrete Grid Pavers – *Parking Areas Only*:

- a. Subgrade: In-situ material or fill material approved by the engineer. Sub-grade soil must have a minimum infiltration rate of one half inch (1/2") per hour as determined by a standard percolation test with a plasticity index of zero. Fine graded and moderately compacted such that the permeability of the soil is not negatively impacted but soil is able to support the expected vehicular load surcharge.

- b. Base Course:
 - i. Option 1: With piped under drain system: 4" thick graded aggregate base course per Standard Technical Specification Manual Division D Section 510.
 - ii. Option 2: Open graded base: 6" thick (8" preferred) # 57 stone per Standard Technical Specification Manual Division D Section 504. Install a layer of filter fabric between the base course and the bedding material.
 - iii. Where permeable pavers adjoin an asphalt surface, the pavers shall be bordered by a flush concrete curb. It is recommended that the base course beneath the asphalt surface within 4' of the curb be graded stabilized aggregate base to a depth of not less than 6" in order to avoid future settlement of the asphalt pavement adjacent to the border curb.
- c. Surface Course: Concrete Grid Pavers per National Concrete Masonry Association (NCMA) A-I 5-82. Void area per square foot between twenty and fifty percent (20%-50%). One inch (1") thick #8 aggregate bed per Standard Technical Specification Manual Division D Section 504 (voids filled with stone) or a 1" sand bed (voids filled with topsoil and vegetation). Install per grid manufacturer's recommendations.
- d. Maintenance: The property owner is responsible for properly maintaining the pavement surface and edge restraints per the paver's manufacturer's recommendations. The surface grade shall be maintained as installed. Ruts and potholes must be repaired immediately. All stone must be contained within the parking/driveway area and immediately removed from the sidewalk or public street areas. All vegetation must be properly maintained and cut to a height not exceeding nine inches.

6. Geotextile Grid System –*Parking Areas Only*:

- a. Subgrade: In-situ material or fill material approved by the Engineering Department. Subgrade soil must have a minimum infiltration rate of one half inch (1/2") per hour as determined by a standard percolation test with a plasticity index of zero. Fine graded and moderately compacted such that the permeability of the soil is not negatively impacted but soil is able to support the expected vehicular load surcharge.
- b. Base Course: 4" thick graded aggregate base course as per Standard Technical Specification Manual Division D Section 510.
- c. Surface Course: Geotextile or plastic grid type system with voids filled with either stone or vegetation. Minimum load rating of 40,000 pounds gross vehicle weight. Submit system specifications, manufacturer literature and sample to City Engineer for approval. Install per manufacturers recommendations.
- d. Maintenance: The property owner is responsible for properly maintaining the pavement surface per the geotextile manufacturer recommendations. All stone must be contained

within the parking driveway area and immediately removed from the sidewalk or public Street areas. The surface grade shall be maintained as installed. Ruts and potholes must be repaired immediately. All vegetation must be properly maintained and cut to a height not exceeding six inches.

7. Aggregate Surface – *On Temporary spill-over Parking Areas Only:*

- a. Subgrade: In-situ material or fill material. Sub-grade soil must have a minimum infiltration rate of one half inch (1/2”) per hour as determined by a standard percolation test with a plasticity index of zero. Fine graded and moderately compacted such that the permeability of the soil is not negatively impacted but soil is able to support the expected vehicular load surcharge.
- b. Base Course: 4” graded aggregate base as per Standard Technical Specification Manual Division D Section 510.
- c. Surface: Minimum 4” thickness aggregate material with 0% fines (no material passing a # 200 sieve). All material to be contained with perimeter edging consisting of either concrete curbing, treated landscape timbers, or masonry. Submit aggregate sample and sieve analysis to City Engineer for approval.
- d. Maintenance: The property owner is responsible for properly maintaining the stone surface and edge restraint. All stone must be contained within the parking area and immediately removed from the sidewalk, public street, or travel/back-up areas. The surface must be kept free of weeds and other vegetation. The surface grade shall be maintained as installed. Ruts and potholes must be repaired immediately. Add stone as necessary to maintain grading and drainage. The surface shall be kept moist as necessary to prevent dust and debris from becoming airborne.

8. Chip Seal Pavement – *On Temporary Parking Areas Only:*

- a. Sub-grade: In-situ material or fill material (approved by the engineer as necessary. Fine graded and compacted to a density not less than 95 % of maximum dry density per Tex-113E or Tex-114E.
- b. Base Course: Not required, however a 4” graded aggregate base is recommended.
- c. Surface: Chip seal surface treatment per TxDot Item 316. Consisting of a single prime coat and two seal coats.
- d. Maintenance: The property owner is responsible for properly maintaining the pavement surface. The surface must be kept free of weeds and other vegetation. The surface grade shall be maintained as installed Ruts and potholes must be repaired immediately.

9. Pavement Overlays:

- a. Existing impermeable pavements may be overlaid from time to time for maintenance purposes. Pavement overlays shall not increase the authorized impervious area of any parking lot.
 - i. Existing pavements constructed per above standard section 2.02, 2.03 or 2.04: Minimum of 1” thickness of Type “D” or minimum of 1-1/2” thickness of Type “C”. Construct overlays in accordance with Standard Technical Specification Manual Division D Section 520.
 - ii. Existing impermeable pavements constructed with a minimum of 2” hot-mix asphalt or 4” concrete: Minimum of 1” thickness of Type “D” or minimum of 1-1/2” thickness of Type “C” Construct overlays in accordance with Standard Technical Specification Manual Division D Section 520.
 - iii. Existing pavements not constructed per these standards nor with a minimum 2” hot-mix asphalt or 4” concrete pavement thickness and not required to be permeable for stormwater management purposes: Minimum of 1-1/2” thickness of Type “D” .Construct overlays in accordance with Standard Technical Specification Manual Division D Section 520.
- b. Permeable pavement areas shall not be overlaid. Repairs and maintenance to pervious pavement materials shall be per the pavement manufacturer’s recommendations and shall not decrease the design porosity or functionality of the pavement system.

10. Drainage: All parking lots shall be design with the appropriate drainage system. Evidence of poor drainage, which includes ponding (bird baths) or standing water that does not drain from surface of parking lot, is an unacceptable consequence of poor parking construction. The City will require that the contractor rectify any ponding susceptible areas at their cost and at the schedule and method acceptable to the city engineer.

D - 536.05 MEASUREMENT AND PAYMENT: Regardless of the type of materials used for the construction of the parking lot, this item will be measure and pay by the square yard. The unit bid price shall include all work and materials for subgrade, base, base protection, wearing surface course as shown in the plans and bid, labor, equipment and incidentals.

SECTION 538 PEDESTRIAN RAILING

D - 538.01 DESCRIPTION: This Item shall govern for the construction of steel pipe pedestrian railing, on bridges, culverts, walls, or incidental structures as shown on the plans.

D - 538.02 GENERAL: In general, railing shall include that portion of the structure erected on and above the roadway or along the edges of walks, walls, curbs and/or slabs for the protection of pedestrians and shall include any tie-in anchorage to approach railing or guard fence. Railing, including the necessary anchorage, shall be in accordance with these specifications and the details shown on drawings 543-1 to 543-6 as well as with ADA.

D - 538.03 MATERIALS: All materials shall conform to the requirements of the TxDot items “Concrete Structures”, “Reinforcing Steel”, “Metal for Structures”, “Steel Structures” and “Concrete”.

D – 538.04 QUALITY ASSURANCE: Bridge railings shall meet the requirements of the Texas Department of Transportation’s, “Standard Specifications for Construction of Highways Streets and Bridges” 2004 edition and as hereinafter amended.

D - 538.05 SUBMITTALS: Contractor shall submit fabrication drawings for metal railing, showing construction and materials.

D - 538.06 FABRICATION: Fabrication and erection of railing shall conform to the pertinent provisions of the Item “Steel Structures” and to the requirements of these specifications.

Splicing of members will be permitted only as provided by the plans. All splice locations and details shall be shown on the shop or erection drawings. For metal railings, shop or erection drawings shall be prepared and forwarded for approval in accordance with the requirements of the Item “Steel Structures”.

Shop welding shall be in accordance with the Item “Steel Structures” while field welding, when required, shall be in accordance with the Item “Structural Welding”.

Pipe rail and posts, shop fabricated into panels shall be mounted in a jig clamped in their true relative position, accurately spaced with respect to each other and while assembled shall be completely welded or bolted, as the case may be. When required by the plans, as each rail section is completely assembled and connection, the adjacent section shall be set in its proper relative position with the ends engaged and remain in this position until completely connected. Each pair of sections shall be matchmarked so they may be erected in the same order in which they were fabricated.

The fabricated elements for deep beam railing shall conform to the dimensions and cross-section shown on the plans. The rail shall be straight and free from warp. The maximum deviation for straightness of either edge of a full length section shall be one-half of an inch. Rail elements shall be jointed and connected to the rail posts as shown on the plans. Lapped elements shall have the

lap in the direction of traffic in the adjacent lane.

D - 538.07 PROTECTIVE COATING: Unless otherwise noted on the plans, all portions of steel railing shall be galvanized.

Galvanized railing shall be hot dipped galvanized after fabrication, in accordance with ASTM Designation A123 and A153.

After erection, any damaged galvanizing on steel posts and rail elements shall be thoroughly cleaned and painted with two coats of zinc dust-zinc oxide paint conforming to the requirements of Federal Specification TTP- 641b or repaired by the application of repair compounds meeting Federal Specification O-G-93.

When fabrication is done after galvanizing and when specifically required by the plans, the cut edges and bolt holes shall be cleaned by brushing and the cleaned area shall be treated as specified above.

D - 538.08 MEASUREMENT: Measurement Railing, of the type designated, shall be measured by the linear foot, in accordance with the dimensions and details shown on the plans. Measurement will be made upon the face of the rail in place.

D - 538.09 PAYMENT: Payment will be made at the contract unit price bid per linear foot for railing of the type indicated on the plans, complete in place, measured as provided herein, which price shall be full compensation for furnishing, preparing and placing of all concrete, expansion joint material, reinforcing steel, structural steel, pipe, anchor bolts, anchorage devices and all other materials required in the finished railing and for all labor, tools, hardware, equipment, galvanizing and all other incidentals necessary to complete the work in the manner and in accordance with the plans and these specifications.

SECTION 540 VALLEY GUTTER

D-540.01 DESCRIPTION: This work shall consist of the construction of conventionally formed Portland Cement concrete valley gutter in accordance with these specifications and in reasonably close conformity with the pavement design report for the concrete thickness but not less than the minimum standards shown in Detail No. and the lines and grades shown on the plans or established by the Engineer.

D-540.02 GENERAL:

1. Valley gutters crossing local street intersection with collectors shall be minimum five (5) foot wide.
2. Valley gutters will not be allowed to cross Arterials and collectors.
3. Mid-Block valley gutters shall only be permitted at local streets when drainage conditions require this structure, and shall be minimum ten (10) foot wide.
4. Asphalt valley gutters will not be allowed on any street.

D-540.03 MATERIALS:

Concrete: Conform to material and proportion requirements for concrete Section 406.

Reinforcing Steel: Conform to material requirements in section 410 & 412.

Curing: Conform to requirements of Section 406 - Concrete Curing.

D-540.04 CONSTRUCTION:

1. All valley gutters shall be constructed monolithic with curb & gutter at radii of return. No concrete shall be poured until forms, steel and grades are inspected and approved.
2. Contractor shall "blue-top" along flow line and the connection with gutter tangent elevation and valley gutter.
3. Place concrete in forms to specified depth. Bring mortar to surface. Curb depressions and adjacent flares for accessible ramps shall be constructed.

4. Strike off to smooth finish with wood strike board. Finish smoothly with wood hand float. Brush across with fine-haired brush.
5. A water flow test shall be required to detect depressions during finishing of concrete.
6. Concrete testing will be performed under provision of Division C, General Provisions, Section 6 Control of Work and Materials. Compressive Strength Test Specimens will be tested in accordance with ASTM C 39. Minimum compressive strength shall be 3000 pounds per square inch at 28 days or as shown on the plans.

D-540.05 MEASUREMENT: Valley gutter will be measured by the unit for the length (tangent to tangent) and different widths specified.

D-540.05 PAYMENT: Will be paid by the unit price bid for concrete valley gutter for the width specified. This price is full compensation for surface preparation of base; materials; removal and disposal of excavated material; drilling and doweling into the existing concrete curb, the curb ramp depression, adjacent flares and pavement; repair of the adjacent street or pavement structure damaged by the operations; and equipment, labor, materials, tools and incidentals.

SECTION 702
PERMANENT TRAFFIC BARRICADES

D-702.01 GENERAL DESCRIPTION: This item shall govern for the furnishing, assembling, and installation of permanent traffic barricades

D-702.02 MATERIALS: All barricade materials, erection, and usage shall be in strict accordance with the Texas Manual on Uniform Traffic Control Devices for Streets and Highways and the latest revision of the Texas Department of Transportation Standard Plans WZ (DERD)-03 WORK ZONE DEAD END ROADWAY DETAILS. The barricade supports shall use the Wedge Anchor Steel System.

D-702.03 FOUNDATIONS: The concrete footing shall use the Wedge Anchor Steel System in conformance with the latest revision of the Texas Department of Transportation Standard Plans SMD (TWT) – 08 SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS WEDGE & UNIVERSAL ANCHOR WITH THIN WALL TUBING POST and the Compliant Work Zone Traffic Control Devices TxDOT Manual on D.2.f. Posts (Fixed-Type-III Barricade)

D-702.04 MEASUREMENT: Permanent traffic barricades shall be measured by each assembly complete in place.

D-702.05 PAYMENT: Permanent barricades signs shall be paid by each assembly complete in place. The price bid shall be considered to include materials, labor, equipment and incidentals necessary to complete the work. Payment will be made when installed barricade is approved and accepted by the Owner .

SECTION 704 STREET SIGNS

D-704.01 GENERAL DESCRIPTION This item shall govern for the furnishing, assembling, and installation of street signs. Street Name Signs see Figure 704 - 1 thru Figure 704 - 4.

D-704.02 MATERIALS The sign supports shall use the Wedge Anchor Steel System and shall be tall enough to provide a minimum of 7 feet ground clearance (7.5 feet maximum) from bottom edge of the sign assembly. Length of the support will vary depending on the type and size of the signs installed on the pole as an assembly.

All traffic signs must comply with the latest edition of the Texas Manual of Uniform Traffic Control Devices. Unless otherwise specified by the Engineer, all signs shall be fabricated from 0.080 gauge aluminum. Sign face materials shall conform to ASTM D 4956-04, reflective beaded sheeting, TYPE II or better except for stop signs and school zone signs. All stop signs shall conform to ASTM D 4956-04, reflective prismatic sheeting, TYPE III or better. All school zone signs shall conform to ASTM D 4956-04, reflective prismatic sheeting, TYPE VII or better.

Street name signs shall have white lettering with a green background. Aluminum sign blades for street signs shall be 9 inch in height with a minimum length of 30 inches and maximum length of 48 inches. Lettering on post-mounted Street Name signs shall use a six (6) inch upper and lower case Clearview Highway font character set (6CV-2W). Street name lettering used for abbreviations, designations and block numbers shall use a three (3) inch upper and lower case Clearview Highway font character set (3CV-2W) Follow Figure – 704-4 for Mast Arm Street Name Sign Specification.

D-704.03 PROVISIONS: Sidewalk clearance and sign standards shall comply with the latest revision of the TEXAS ACCESSIBILITY STANDARDS

D-704.04 FOUNDATIONS: The concrete footing shall use the Wedge Anchor Steel System in conformance with the latest revision of the Texas Department of Transportation Standard Plans SMD (TWT) – 08 SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS WEDGE & UNIVERSAL ANCHOR WITH THIN WALL TUBING POST. Signs shall be installed no less than 2 feet from the back of curb and the edge of sign. Maximum sidewalk clearance shall be maintained in identifying location of sign, but it shall not be installed more than 5 feet from back of curb to the edge of the sign. The location of the sign may be modified in special situations where the ROW is limited or obstructions are present based on engineering judgement. See Examples 1 thru 4 When the above requirement cannot be met due to location or width of sidewalk, a minimum of 30 inches sidewalk clearance shall be provided.

D-704.05 MEASUREMENT: Street signs shall be measured by each assembly complete in place.

D-704.06 PAYMENT: Street signs shall be paid by each assembly complete in place. The price bid shall be considered to include materials, labor, equipment and incidentals necessary to complete the work.

SECTION D-706 REFLECTORIZED PAVEMENT MARKINGS

D-706.1. DESCRIPTION

This item shall govern for furnishing and placing Reflectorized pavement markings and raised reflectorized pavement markers of the types, colors, shapes, sizes, widths and thickness shown on the plans. Unless otherwise approved by the Engineer, Type II pavement markings shall be used on all roadways within the City of Laredo that are under the City's jurisdiction. Reflectorized pavement markings supplemented by raised Reflectorized pavement markings (traffic buttons) shall be required on all streets with a classification of collector or greater. The installation of these must abide by the latest edition of the Texas Manual of Uniform Control Devices and must comply with the latest TxDOT Traffic Engineer Standard Detail Sheets.

D-706.2. MATERIALS

Type I: Marking Materials. Type I markings are thermoplastic type materials that require heating to elevated temperatures for application. Type I marking materials shall conform to TxDOT Departmental Materials Specifications DMS-8220. Each container of Type I marking material shall be clearly marked to indicate the color, weight, type of material, manufacturer's name and the lot/batch number.

Type II: Marking Materials. Type II markings are paint-type materials that are applied at ambient or slightly elevated temperatures. Type II marking materials shall conform to TxDOT Departmental Materials Specifications DMS-8200, YPT-12 and/or WPT-12, and DMS-8200.

Blue Reflectors for Fire Hydrants: Blue raised reflective markers shall be used on all streets to identify location for all fire hydrants. One marker (Type II-B-B) shall be installed in the center of roadway immediately in front of the location of fire hydrant. The pavement marker shall have two (2) Reflectorized faces 180° of each other. The body, other than the reflective faces, shall be blue. Reflectorized raised pavement markers shall abide by latest TxDOT Traffic Engineer Standard Plan Sheets.

D-706.3. EQUIPMENT REQUIREMENTS

Equipment used to place pavement markings shall:

1. Be maintained in satisfactory operating condition.
2. Be considered in satisfactory operating condition if it has an average placement rate of 5,000 linear feet per hour of acceptable four-inch solid or broken lines over any five (5) consecutive working days. Must comply with the latest edition of the Texas Manual of Uniform Traffic Control Revisions.
3. Meet or exceed the material handling at elevated temperatures requirements of the National Fire Underwriters and the Texas Railroad Commission.

4. Be capable of placing a minimum of 40,000 linear feet of four-inch solid or broken markings per working day.
5. Have production capabilities similar to four-inch marking equipment and shall be capable of placing linear markings up to eight (8) inches in width in a single pass when used for placing markings in widths other than four (4) inches.
6. Have production capabilities considered satisfactory by the Engineer when used to place markings other than solid or broken lines.
7. Be capable of placing centerline and no-passing barrier-like configuration consisting of one (1) broken line with two (2) solid lines at the same time to the alignment and spacing shown on the plans.
8. Be capable of placing broken and/or continuous white line from both sides.
9. Be capable of placing lines with clean edges and of uniform cross-section. All lines shall have a tolerance of plus or minus 1/8 inch per four (4) inch width.
10. Have an automatic cut-off device with manual operating capabilities to provide clean, reasonable square marking ends to the satisfaction of the Engineer, and to provide a method of applying broken line in an approximate stripe-to-gap ration of 10 to 30. The length of any stripe-gap cycle shall not be less than 39.5 feet or more than 40.5 feet.
11. Provide continuous mixing and agitation of the pavement marking material. The use of pans, aprons or similar appliances which the die overruns will not be permitted for longitudinal striping applications.
12. Apply glass beads by an automatic bead dispenser attached to the pavement marking equipment in such a manner that the beads are dispensed uniformly and almost instantly upon the marking as the marking is being applied to the road surface. The bead dispenser shall have an automatic cut-off control, synchronized with the cut-off of the pavement marking equipment.

When Type I markings are to be placed, the contractor shall have a hand-held thermometer on the project. The thermometer shall be capable of measuring the temperature of the pavement marking material to be placed.

D-706.04 CONSTRUCTION METHODS

General: When required by the Engineer, the Contractor and the Engineer shall review the sequence of work to be followed and the estimated progress schedule.

Markings may be placed on roadways either free of traffic or open to traffic. On roadways already open to traffic, the markings shall be placed under traffic conditions that exist with a minimum of interference to the operation of the facility. Traffic control shall be as shown on the plans or as approved by the Engineer in writing. All markings placed under open-traffic

conditions shall be protected from traffic damage and disfigurement. On roadways open to traffic, with three (3) lanes of travel in one direction, all markings shall be placed from the outside lanes only, unless otherwise approved in writing by the Engineer.

Guides to mark the lateral location of pavement markings shall be established as shown on the plans or as directed by the Engineer. The Contractor shall establish the pavement marking guides and the Engineer will verify the location of the guides.

Markings shall be placed in proper alignment with the guides. The deviation rate in alignment shall not exceed one (1) inch per 200 feet of roadway. The maximum deviation shall not exceed two (2) inches nor shall any deviation be abrupt.

Markings shall essentially have a uniform cross section. The density and quality of markings shall be uniform throughout their thickness. The applied markings shall have no more than five (5) percent, by area, of holes or voids and shall be free of blisters.

Markings, in place on the roadway, shall be reflectorized both internally and externally. Glass beads shall be applied to the materials at a uniform rate sufficient to achieve uniform and distinctive retroreflective characteristics when observed in accordance with Test Method Tex-828-B Determining Functional Characteristics of Pavement Markings.

The Contractor's personnel shall be sufficiently skilled in the work of installing pavement markings.

Markings placed that are not in alignment or sequence, as shown on the plans or as stated in this specifications, shall be removed by the Contractor at the Contractor's expense. Removal shall be in accordance with Item 667, "Eliminating Existing Pavement Markings and Markers," Except for measurement and payment. Guides placed on the roadway for alignment purposes shall not establish a permanent marking on the roadway.

Unless otherwise shown on the plans, pavement markings may be applied by any method that will yield markings meeting the requirements of these specifications.

Surface Preparation: New portland-cement-concrete surfaces shall be cleaned in accordance with Item 678, "Pavement Surface Preparation for Markings" to remove curing membrane, dirt, grease, loose and/or flaking existing construction markings and other forms of contamination.

Older Portland-cement-concrete surfaces and asphaltic surfaces that exhibit loose and/or flaking existing markings shall be cleaned in accordance with Item 678, "Pavement Surface Preparation for Markings" to remove all loose and flaking markings.

Pavement to which material is to be applied shall be completely dry. Pavement shall be considered dry if, on a sunny day after observation for 15 minutes, no condensation occurs on the underside of a one (1) foot square piece of clear plastic that has been placed on the pavement and weighted on the edges.

Application of Type I Markings: New portland-cement-concrete surfaces shall be further prepared for Type I markings, after cleaning, by placing a Type II markings as a sealer in accordance with this Item. When placing Type I markings in new locations on asphaltic surfaces three (3) years old or older or any portland-cement-concrete surfaces, a Type II marking shall be used as a sealer. Unless otherwise shown on the plans, existing portland-cement-concrete and asphaltic surfaces to be re-striped will not require Type II markings as a sealer; existing markings may be used as a sealer in lieu of Type II markings. Type II markings shall be placed a minimum of two (2) and a maximum of 30 calendar days in advance of placing Type I markings. Type II markings that become dirty due to inclement weather or road conditions shall be cleaned by washing, brushing, compressed air or other means approved by the Engineer, prior to application of Type I markings. If washing is used, the surface of Type II markings shall become thoroughly dry before placing Type I markings. Color, location and configuration of Type II markings shall be the same as that of Type I markings.

Type I pavement marking material shall be applied within temperature limits recommended by the material manufacturer. Application of Type I pavement markings shall be done only on clean, dry pavement having a surface temperature above 50°F. Pavement temperature shall be measured in accordance with Test Method Tex-829-B Measuring Pavement Temperature.

When Type I pavement marking application is by spray, and operations cease for five (5) minutes or more, the spray head shall be flushed by spraying pavement marking material into a pan or similar container until the pavement marking material being sprayed is at the proper temperature for application.

Unless otherwise directed by the Engineer in writing, Type I pavement marking materials shall not be placed on roadways between during cold inclement weather subject to temperature and moisture limitations specified herein.

Unless otherwise shown on the plans, Type I marking minimum thickness shall be 0.060 inches (60 mil) for edge line markings and 0.090 inches (90 mil) for stop-bars, symbols, gore and center-line/no-passing barrier line markings. The maximum thickness of all Type I markings shall be 0.180 inches (180 mil).

The thickness of Type I markings at the time of placement will be measured above the plane formed by the pavement surface. The Engineer will supply a device to measure the thickness of the applied markings. The markings shall be of uniform thickness of the applied markings. The markings shall be of uniform thickness throughout their lengths and widths.

Application of Type II Markings: The application of Type II marking materials shall be done only on surfaces with a minimum surface temperature of 50°F.

The application rate for Type II marking material shall be: between 15 to 20 gallons per mile of solid four (4) inch line and between 30 to 40 gallons per mile for solid eight (8) inch line except that, for new surface treatment projects the application rate shall be between 25 to 30 gallons per mile of solid four (4) inch line and between 40 and 50 gallons per mile for solid

eight (8) inch line. Pavement markings for new surface treatment projects shall be applied in two (2) applications each approximately one-half the application rate. The first application shall not contain glass beads. The interval between the first and second applications shall be a minimum of one (1) hour.

When, in the case of impending inclement weather, and the Engineer directs the Contractor to apply water-base traffic paint, the markings are damaged by subsequent rain, sleet, hail, etc., the Contractor will be paid for the initial placement and the replacement markings. However, if the Contractor places the markings at his option, the Contractor is responsible for all costs associated with the replacement markings.

Reflective raised pavement markers will be required to supplement pavement markings and shall abide by Traffic Engineering Standards Plan Sheets (TxDOT). Temporary flexible reflective roadway marker tabs may be used to mark or delineate roadway prior to applying pavement markings and shall conform to Department Materials Specifications DMS8242 (TxDOT).

D-706.5. PERFORMANCE PERIOD FOR TYPE I MARKINGS

Type I pavement markings shall meet all requirements of this specification for a minimum of 5 calendar days after installation. Pavement markings that fail to meet all requirements of this specification shall be removed and replaced by the Contractor at the Contractor's expense. The Contractor shall replace all pavement markings failing the requirements of this specification within 30 calendar days following notification by the Engineer of such failing. All replacement markings shall also meet all requirements of this specification for a minimum of 15 calendar days after installation.

D-706.6. MEASUREMENT

This item will be measured by the linear foot, by each of the various words, symbols or shapes, or by any other unit as shown on the plans.

Where double stripes are placed, each stripe will be measured separately.

This is a plans quantity measurement Item and the quantity to be paid for will be that quantity shown in the proposal and on the "Estimate and Quantity" sheet of the contract plans except as may be modified by approval of Engineer. If no adjustment of quantities is required, additional measurement or calculations will not be required.

Type II pavement markings requiring two (2) applications on new surface treatments will be measured as one (1) marking.

Type II pavement marking materials, when used as a sealer for Type I markings will be measured as Type II markings.

D-706.7. PAYMENT

The work performed and materials furnished in accordance with this Item and measured as provided under "Measurement" will be paid for at the unit price bid for "Reflectorized Pavement Markings" of the various types, colors, shapes, sizes, widths and thickness (Type I

markings only) specified. This price shall be full compensation for furnishing all materials; for application of pavement and raised pavement markings and for all other labor, tools, equipment and incidentals necessary to complete the work, except as shown below.

Surface Preparation, when shown on the plans, will be paid for under Item 678 "Pavement Surface Preparation for Marking."

Final work zone pavement markings (paint and beads), which will be, used as a sealer for Type I pavement markings will be paid for under this Item.

When replacement Type II markings are required due to damage to the original markings from rain, sleet, hail, etc., and the original markings were placed at the direction of the Engineer, the plan quantity requirements under "Measurement" do not apply to the original and replacement markings. The Contractor will be paid for the actual quantity of original and replacement markings at the unit price bid for that item.

SECTION 712 TRAFFIC CONTROL AND REGULATION

D-712.01 GENERAL DESCRIPTION: Section includes requirements for signs, signals, control devices, flares, lights, and traffic signals, as well as construction parking control, designated haul routes and bridging of trenches and excavation. Temporary Traffic Control plans shall be in strict accordance with the latest revision of TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES.

D-712.02 INSPECTIONS:

- a) Yard Inspection: Before the Traffic control Plan (TCP) is implemented and devices or hardware are installed in the field the devices must be inspected to insure that they are accepted devices in acceptable condition. There must also be sufficient devices to meet the needs of the approved traffic control plan.
- b) Drive-Through Inspection: To decrease hazards to motorists and workers, traffic control shall be inspected and evaluated immediately after the traffic control plan is implemented. This kind of inspection shall be done in all lanes, in both directions or crossroads, during the day and the night, and from all entry or exist points within the zone. Any other routes such as detours that have work zone traffic on them shall be inspected also. Unacceptable devices or situations that are found on the jobsite shall be replaced or the situation corrected. Imminent danger situation require immediate correction.

D-712.03 MATERIALS :All materials shall comply with the latest version of the Texas State Manual on Uniform Traffic Control Devices

D-712.04 PUBLIC ROADS:

- (a) Abide by laws and regulations of governing authorities when using public roads. If the Contractor's work requires that public roads be temporarily impeded or closed, approvals shall be obtained from governing authorities and permits paid for before starting any work.
- (b) Contractor shall maintain at all times a 10-foot-wide all-weather lane adjacent to work areas which shall be kept free of construction equipment and debris and shall be for the use of emergency vehicles, or as otherwise provided in traffic control plan.
- (c) Contractor shall not obstruct the normal flow of traffic from 7:00 a.m. to 9:00 a.m. and 4:00 p.m. to 6:00 p.m. on designated major arterials or as directed by the City Engineer.
- (d) Contractor shall maintain local driveway access to residential and commercial properties adjacent to work areas at all times.
- (e) Surrounding streets used for entering or leaving the job area must be keep free of excavated

material, debris, and any foreign material resulting from construction operations.

D-712.05 CONSTRUCTION PARKING CONTROL:

(a) Control vehicular parking to prevent interference with public traffic and parking, access by emergency vehicles and City's Operations.

(b) Monitor parking of construction personnel's vehicles in existing facilities. Maintain vehicular access to and through parking areas.

(c) Prevent parking on or adjacent to access roads or in non-designated areas.

D-712.06 FLARES AND LIGHTS:

(a) Provide flares and lights during hours of low visibility to delineate traffic lanes and to guide traffic.

D-712.07 HAUL ROUTES:

(a) Utilize haul routes designed by authorities or shown on the drawings for construction traffic.

(b) Confine construction traffic to designated haul routes.

(c) Provide traffic control at critical areas of haul routes to regulate traffic minimize interference with public traffic.

D-712.08 TRAFFIC SIGNS AND SIGNALS:

(a) Install traffic control devices at approaches to the site and on site, at cross roads, detours, parking areas, and elsewhere as needed to direct construction and affected public traffic.

(b) Install and operate traffic control signals to direct and maintain orderly flow of traffic in areas under Contractor's control and areas affected by Contractor's operations.

1. Relocate traffic signs and signals as work progresses to maintain effective traffic control.

D-712.09 BRIDGING TRENCHES AND EXCAVATIONS

(a) Whenever necessary, bridge trenches and excavation to permit an unobstructed flow of traffic.

(b) Secure bridging against displacement by using adjustable cleats, angles, bolts or other devices whenever bridge is installed:

1. On an existing bus route;
2. When more than five percent of daily traffic is comprised of commercial or truck traffic;

3. When more than two separate plates are used for the bridge; or
4. When bridge is to be used for more than five consecutive days.

(c) Install bridging to operate with minimum noise.

(d) Adequately shore the trench or excavation to support bridge and traffic.

(e) Extend steel plates used for bridging a minimum one foot beyond edges of trench or excavation. Use temporary paving materials (premix) to feather edges of plates to minimize wheel impact on secured bridging.

(f) Use steel plates (refer to SECTION 808) of sufficient thickness to support H-20 loading, truck or lane that produces maximum stress.

D-712.10 REMOVAL

(a) Remove equipment and devices when no longer required.

(b) Repair damage caused by installation

(c) Remove post settings to a depth of 2 feet.

D-712.11 MEASUREMENT: Measurement is a lump sum basis for traffic control and regulation, including submittal of a traffic control plan if different from the plan shown on the Drawings, provision of traffic control devices and provision of equipment and personnel as necessary to protect the work and the public.

D-712.12 PAYMENT: The amount invoiced shall be paid by percent completed or as approved by the Engineer based on the schedule of values submitted for traffic control and regulation. Refer to Division C, General Provisions, Section 9 - Measurement and Payment for unit prices procedures.

SECTION 804
WORK PERFORMED ON NON-WORKING DAYS

D-804.01 WORKING DAY: A working day is Monday thru Friday, 8:00 a.m. to 5:00 p.m. excluding holidays.

D-804.02 WORK PERFORMED ON A NON-WORKING DAY: Any work which is to be performed on a non-working day must be inspected. The Engineer will decide which work will be requiring the presence of an inspector.

D-804.03 COST OF INSPECTION: The cost for having an inspector present shall be incurred by the Contractor performing the work. Such arrangements will be made in writing and submitted to the Engineer for his approval. Any testing requested by the contractor out of service hours or any overtime charged by the testing laboratory for delaying, shall be paid by the contractor.

D-804.04 STOP WORK: Any work stoppage by the contractor must be reported in writing to the engineer and owner 24 hours prior to work stoppage.

SECTION 033000CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section specifies cast-in place concrete, including formwork, reinforcing, mix design, placement procedures, and finishes.
- B. Cast-in-place concrete includes the following:
 - 1. Foundations and footings.
 - 2. Slabs-on-grade.
 - 3. Equipment pads and bases.
- C. Related Sections: The following Sections contain requirements that relate to this Section:
 - 1. Division 2 for concrete paving and walks.

1.3 SUBMITTALS

- A. General: Submit the following according to Conditions of the Contract and Division 1 Specification Sections.
- B. Product data for proprietary materials and items, including reinforcement and forming accessories, admixtures, patching compounds, waterstops, joint systems, curing compounds, dry-shake finish materials, and others if requested by Engineer.
- C. Shop drawings for reinforcement detailing fabricating, bending, and placing concrete reinforcement. Comply with ACI SP-66 (88), ACI Detailing manual," showing bar schedules, stirrup spacing, bent bar diagrams, and arrangement of concrete reinforcement. Include special reinforcing required for openings through concrete structures.
- D. Shop drawings for formwork indicating fabrication and erection of forms for specific finished concrete surfaces. Show form construction including jointing, special form joints or reveals, location and pattern of form tie placement, and other items that affect exposed concrete visually.
 - 1. Architect's review is for general architectural applications and features only. Designing formwork for structural stability and efficiency is Contractor's responsibility.
- E. Samples of materials as requested by Engineer, including names, sources, and descriptions, follows:
 - 1. Color finishes.
 - 2. Normal weight aggregates.

3. Reglets.
 4. Waterstops.
 5. Vapor retarder/barrier.
- F. Laboratory test reports for concrete materials and mix design test.
- G. Material certificates in lieu of material laboratory test reports when permitted by Architect. Material certificates shall be signed by manufacturer and Contractor, certifying that each material item complies with or exceeds specified requirements. Provide certification from admixture manufacturers that chloride content complies with specification requirements.
- H. Minutes of preinstallation conference.

1.4 QUALITY ASSURANCE

- A. Codes and Standards: Comply with provisions of the following codes, specifications, and standards, except where more stringent requirements are shown or specified:
1. American Concrete Institute (ACI) 301, "Specifications for Structural Concrete for Buildings."
 2. ACI 318, "Building Code Requirements for Reinforced Concrete."
 3. Concrete Reinforcing Steel Institute (CRSI) "Manual of Standard Practice."
- B. Concrete Testing Service: Owner to engage an independent testing laboratory acceptable to Engineer to perform material evaluation tests and to design concrete mixes by contractor.
- C. Materials and installed work may require testing and retesting at any time during progress of Work. Tests, including retesting of rejected materials for installed Work, shall be done at Contractor's expense.
- D. Mockup: Cast mockup of size indicated or as required to demonstrate typical joints, form tie spacing, and proposed surface finish, texture, and color. Maintain sample panel exposed to view for duration of Project, after Architect's acceptance of visual qualities.
1. Demolish mockup and remove from site when directed by Architect.
- E. Preinstallation Conference: Conduct conference at Project site to comply with requirements of Division 1 Section "Project Meetings" and the following:
1. At least 35 days prior to submitting design mixes, conduct a meeting to review detailed requirements for preparing concrete design mixes and to determine procedures for satisfactory concrete operations. Review requirements for submittals, status of coordinating work, and availability of materials. Establish preliminary work progress schedule and procedures for materials inspection, testing, and certifications. Require representatives of each entity directly concerned with cast-in-place concrete to attend conference, including, but not limited to, the following:
 - a. Contractor's superintendent.
 - b. Agency responsible for concrete design mixes.
 - c. Agency responsible for field quality control.
 - d. Ready-mix concrete producer.

- e. Concrete subcontractor.
- f. Primary admixture manufacturers.

PART 2 - PRODUCTS

2.1 FORM MATERIALS

- A. Forms for Exposed Finish Concrete: Plywood, metal, metal-framed plywood faced, or other acceptable panel-type materials to provide continuous, straight, smooth, exposed surfaces. Furnish in largest practicable sizes to minimize number of joints and to conform to joint system shown on drawings.
 - 1. Use overlaid plywood complying with U.S. Product Standard PS-1 "A-C or B-B High Density Overlaid Concrete Form," Class I.
 - 2. Use plywood complying with U.S. Product Standard PS-1 "B-B (Concrete Form) Plywood," Class I, Exterior Grade or better, mill-oiled and edge-sealed, with each piece bearing legible inspection trademark.
- B. Forms for Unexposed Finish Concrete: Plywood, lumber, metal, or another acceptable material. Provide lumber dressed on at least two edges and one side for tight fit.
- C. Form Release Agent: Provide commercial formulation form release agent with a maximum of 350 mg/l volatile organic compounds (VOCs) that will not bond with, stain, or adversely affect concrete surfaces and will not impair subsequent treatments of concrete surfaces.
- D. Form Ties: Factory-fabricated, adjustable-length, removable or snap-off metal form ties designed to prevent form deflection and to prevent spalling of concrete upon removal. Provide units that will leave no metal closer than 1-1/2 inches to the plane of the exposed concrete surface.
 - 1. Provide ties that, when removed, will leave holes not larger than 1 inch in diameter in the concrete surface.

2.2 REINFORCING MATERIALS

- A. Reinforcing Bars: ASTM A 615, Grade 40 for No. 3 bars, Grade 60 for No. 4 bars and larger, deformed.
- B. Steel Wire: ASTM A 82, plain, cold-drawn steel.
- C. Welded Wire Fabric: ASTM A 185, welded steel wire fabric.
- D. Deformed-Steel Welded Wire Fabric: ASTM A 497.
- E. Supports for Reinforcement: Bolsters, chairs, ACI approved precast concrete block

supports, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded wire fabric in place. Use wire bar-type supports complying with CRSI specifications.

1. For slabs-on-grade, use supports with sand plates or horizontal runners where base material will not support chair legs.
2. For exposed-to-view concrete surfaces where legs of supports are in contact with forms, provide supports with legs that are protected by plastic (CRSI, Class 1) or stainless steel (CRSI, Class 2).

2.3 CONCRETE MATERIALS

A. Portland Cement: ASTM C 150, Type I.

1. Use one brand of cement throughout Project unless otherwise acceptable to Engineer of Record.

B. Normal-Weight Aggregates: ASTM C 33 and as specified. Provide aggregates from a single source for exposed concrete.

1. For exposed exterior surfaces, do not use fine or coarse aggregates that contain substances that cause spalling.
2. Local aggregates not complying with ASTM C 33 that have been shown to produce concrete of adequate strength and durability by special tests or actual service may be used when acceptable to Engineer.

C. Lightweight Aggregates: ASTM C 330.

1. Nominal maximum aggregate size: 1-1/2 inch.

D. Water: Potable.

E. Admixtures, General: Provide concrete admixtures that contain not more than 0.1 percent chloride ions.

F. Air-Entraining Admixture: ASTM C 260, certified by manufacturer to be compatible with other required admixtures.

1. Available Products: Subject to compliance with requirements, products that may be incorporated in the Work include, but are not limited to, the following:
2. Products: Subject to compliance with requirements, provide one of the following:
 - a. Air-Tite, Cormix Construction Chemicals.
 - b. Air-Mix or Perma-Air, Euclid Chemical Co.
 - c. Darex AEA or Daravair, W.R. Grace & Co.
 - d. MB-VR or Micro-Air, Master Builders, Inc.
 - e. Sealtight AEA, W.R. Meadows, Inc.
 - f. Sika AER, Sika Corp.

- G. Water-Reducing Admixture: ASTM C 494, Type A.
1. Available Products: Subject to compliance with requirements, products that may be incorporated in the Work include, but are not limited to, the following:
 2. Products: Subject to compliance with requirements, provide one of the following:
 - a. Chemtard, ChemMasters Corp.
 - b. PSI N, Cormix Construction Chemicals.
 - c. Eucon WR-75, Euclid Chemical Co.
 - d. WRDA, W.R. Grace & Co.
 - e. Pozzolith Normal or Polyheed, Master Builders, Inc.
 - f. Metco W.R., Metalcrete Industries.
 - g. Prokrete-N, Prokrete Industries.
 - h. Plastocrete 161, Sika Corp.
- H. High-Range Water-Reducing Admixture: ASTM C 494, Type F or Type G.
1. Available Products: Subject to compliance with requirements, products that may be incorporated in the Work include, but are not limited to, the following:
 2. Products: Subject to compliance with requirements, provide one of the following:
 - a. Super P, Anti-Hydro Co., Inc.
 - b. Cormix 200, Cormix Construction Chemicals.
 - c. Eucon 37, Euclid Chemical Co.
 - d. WRDA 19 or Daracem, W.R. Grace & Co.
 - e. Rheobuild or Polyheed, Master Builders, Inc.
 - f. Superslump, Metalcrete Industries.
 - g. PSPL, Prokrete Industries.
 - h. Sikament 300, Sika Corp.
- I. Water-Reducing, Accelerating Admixture: ASTM C 494, Type E.
1. Available Products: Subject to compliance with requirements, products that may be incorporated in the Work include, but are not limited to, the following:
 2. Products: Subject to compliance with requirements, provide one of the following:
 - a. Q-Set, Conspec Marketing & Manufacturing Co.
 - b. Lubricon NCA, Cormix Construction Chemicals.
 - c. Accelguard 80, Euclid Chemical Co.
 - d. Daraset, W.R. Grace & Co.
 - e. Pozzutec 20, Master Builders, Inc.
 - f. Accel-Set, Metalcrete Industries.
- J. Water-Reducing, Retarding Admixture: ASTM C 494, Type D.
1. Available Products: Subject to compliance with requirements, products that may be incorporated in the Work include, but are not limited to, the following:
 2. Products: Subject to compliance with requirements, provide one of the following:
 - a. PSI-R Plus, Cormix Construction Chemicals.
 - b. Eucon Retarder 75, Euclid Chemical Co.
 - c. Daratard-17, W.R. Grace & Co.
 - d. Pozzolith R, Master Builders, Inc.

- e. Protard, Prokrete Industries.
- f. Plastiment, Sika Corporation.

2.4 RELATED MATERIALS

- A. Reglets: Where sheet flashing or bituminous membranes are terminated in reglets, provide reglets of not less than 0.0217-inch-thick (26-gage) galvanized sheet steel. Fill reglet or cover face opening to prevent intrusion of concrete or debris.
- B. Dovetail Anchor Slots: Hot-dip galvanized sheet steel, not less than 0.0336 inch thick (22 gage) with bent tab anchors. Fill slot with temporary filler or cover face opening to prevent intrusion of concrete or debris.
- C. Waterstops: Provide flat, dumbbell-type or centerbulb-type waterstops at construction joints and other joints as indicated. Size to suit joints.
- D. Rubber Waterstops: Corps of Engineers CRD-C 513.
 - 1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated in the Work include, but are not limited to, the following:
 - 2. Manufacturers: Subject to compliance with requirements, provide products of one of the following:
 - a. The Burke Co.
 - b. Progress Unlimited.
 - c. Williams Products, Inc.
- E. Polyvinyl Chloride Waterstops: Corps of Engineers CRD-C 572.
 - 1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated in the Work include, but are not limited to, the following:
 - 2. Manufacturers: Subject to compliance with requirements, provide products of one of the following:
 - a. The Burke Co.
 - b. Greenstreak Plastic Products Co.
 - c. W.R. Meadows, Inc.
 - d. Progress Unlimited.
 - e. Schlegel Corp.
 - f. Vinylex Corp.
- F. Sand Cushion: Clean, manufactured or natural sand.
- G. Vapor Retarder: Provide vapor retarder that is resistant to deterioration when tested according to ASTM E 154, as follows:
 - 1. Polyethylene sheet not less than 10 mils thick.

abrasive aggregate for a nonslip finish, with emery aggregate containing not less than 50 percent aluminum oxide and not less than 25 percent ferric oxide. Use material that is factory-graded, packaged, rustproof, nonglazing, and unaffected by freezing, moisture, and cleaning materials.

- I. Absorptive Cover: Burlap cloth made from jute or kenaf, weighing approximately 9 oz. per sq. yd., complying with AASHTO M 182, Class 2.
- J. Moisture-Retaining Cover: One of the following, complying with ASTM C 171.
 - 1. Waterproof paper.
 - 2. Polyethylene film.
 - 3. Polyethylene-coated burlap.
- K. Liquid Membrane-Forming Curing Compound: Liquid-type membrane-forming curing compound complying with ASTM C 309, Type I, Class A. Moisture loss not more than 0.55 kg/sq. meter when applied at 200 sq. ft./gal.
 - 1. Provide material that has a maximum volatile organic compound (VOC) rating of 350 mg per liter.
 - 2. Available Products: Subject to compliance with requirements, products that may be incorporated in the Work include, but are not limited to, the following:
 - 3. Products: Subject to compliance with requirements, provide one of the following:
 - a. A-H 3 Way Sealer, Anti-Hydro Co., Inc.
 - b. Spartan-Cote, The Burke Co.
 - c. Conspec #1, Conspec Marketing & Mfg. Co.
 - d. Sealco 309, Cormix Construction Chemicals.
 - e. Day-Chem Cure and Seal, Dayton Superior Corp.
 - f. Eucocure, Euclid Chemical Co.
 - g. Horn Clear Seal, A.C. Horn, Inc.
 - h. L&M Cure R, L&M Construction Chemicals, Inc.
 - i. Masterkure, Master Builders, Inc.
 - j. CS-309, W.R. Meadows, Inc.
 - k. Seal N Kure, Metalcrete Industries.
 - l. Kure-N-Seal, Sonneborn-Chemrex.
 - m. Stontop CS2, Stonhard, Inc.
- L. Water-Based Acrylic Membrane Curing Compound: ASTM C 309, Type I, Class B.
 - 1. Available Products: Subject to compliance with requirements, products that may be incorporated in the Work include, but are not limited to, the following:
 - 2. Products: Subject to compliance with requirements, provide one of the following:
 - a. Highseal, Conspec Marketing and Mfg. Co.
 - b. Sealco - VOC, Cormix Construction Chemicals.
 - c. Safe Cure and Seal, Dayton Superior Corp.
 - d. Aqua-Cure, Euclid Chemical Co.
 - e. Dress & Seal WB, L&M Construction Chemicals, Inc.
 - f. Masterkure 100W, Master Builders, Inc.
 - g. Vocomp-20, W.R. Meadows, Inc.
 - h. Metcure, Metalcrete Industries.
 - i. Stontop CS1, Stonhard, Inc.

- M. Evaporation Control: Monomolecular film-forming compound applied to exposed concrete slab surfaces for temporary protection from rapid moisture loss.
1. Available Products: Subject to compliance with requirements, products that may be incorporated in the Work include, but are not limited to, the following:
 2. Products: Subject to compliance with requirements, provide one of the following:
 - j. Aquafilm, Conspec Marketing and Mfg. Co.
 - k. Eucobar, Euclid Chemical Co.
 - l. E-Con, L&M Construction Chemicals, Inc.
 - m. Confilm, Master Builders, Inc.
 - n. Waterhold, Metalcrete Industries.
- N. Bonding Agent: Polyvinyl acetate or acrylic base.
1. Available Products: Subject to compliance with requirements, products that may be incorporated in the Work include, but are not limited to, the following:
 2. Products: Subject to compliance with requirements, provide one of the following:
 - o. Polyvinyl Acetate (Interior Only):
 - 1 Superior Concrete Bonder, Dayton Superior Corp.
 - 2 Euco Weld, Euclid Chemical Co.
 - 3 Weld-Crete, Larsen Products Corp.
 - 4 Everweld, L&M Construction Chemicals, Inc.
 - 5 Herculox, Metalcrete Industries.
 - 6 Ready Bond, Symons Corp.
 - p. Acrylic or Styrene Butadiene:
 - 1 Acrylic Bondcrete, The Burke Co.
 - 2 Strongbond, Conspec Marketing and Mfg. Co.
 - 3 Day-Chem Ad Bond, Dayton Superior Corp.
 - 4 BR Latex, Euclid Chemical Co.
 - 5 Daraweld C, W.R. Grace & Co.
 - 6 Hornweld, A.C. Horn, Inc.
 - 7 Everbond, L&M Construction Chemicals, Inc.
 - 8 Acryl-Set, Master Builders Inc.
 - 9 Intralok, W.R. Meadows, Inc.
 - 10 Acrylpave, Metalcrete Industries.
 - 11 Sonocrete, Sonneborn-Chemrex.
 - 12 Stonlock LB2, Stonhard, Inc.
 - 13 Strong Bond, Symons Corp.
- O. Epoxy Adhesive: ASTM C 881, two-component material suitable for use on dry or damp surfaces. Provide material type, grade, and class to suit Project requirements.
1. Available Products: Subject to compliance with requirements, products that may be incorporated in the Work include, but are not limited to, the following:
 2. Products: Subject to compliance with requirements, provide one of the following:

- a. Burke Epoxy M.V., The Burke Co.
- b. Spec-Bond 100, Conspec Marketing and Mfg. Co.
- c. Resi-Bond (J-58), Dayton Superior.
- d. Euco Epoxy System #452 or #620, Euclid Chemical Co.
- e. Epoxite Binder 2390, A.C. Horn, Inc.
- f. Epabond, L&M Construction Chemicals, Inc.
- g. Concrevis Standard Liquid, Master Builders, Inc.
- h. Rezi-Weld 1000, W.R. Meadows, Inc.
- i. Metco Hi-Mod Epoxy, Metalcrete Industries.
- j. Sikadur 32 Hi-Mod, Sika Corp.
- k. Stonset LV5, Stonhard, Inc.
- l. R-600 Series, Symons Corp.

2.5 PROPORTIONING AND DESIGNING MIXES

- A. Prepare design mixes for each type and strength of concrete by either laboratory trial batch or field experience methods as specified in ACI 301. For the trial batch method, use an independent testing agency acceptable to Engineer for preparing and reporting proposed mix designs.
 1. **Do not use the same testing agency for field quality control testing.**
 2. Use of fly ash or calcium chloride will not be permitted in concrete, unless noted otherwise.
- B. Submit written reports to Architect of each proposed mix for each class of concrete at least 15 days prior to start of Work. Do not begin concrete production until proposed mix designs have been reviewed and approved by Engineer.
- C. Design mixes to provide normal weight concrete with the following properties as indicated on drawings and schedules:
 1. 3000-psi, 28-day compressive strength; water-cement ratio, 0.58 maximum (non-air-entrained), 0.46 maximum (air-entrained). For slabs on grade, grade beam, loading docks & ramps.
 2. 2500-psi, 28-day compressive strength; water-cement ratio, 0.67 maximum (non-air-entrained), 0.54 maximum (air-entrained). For miscellaneous sidewalks and curbs not otherwise called out to have a higher strength.
- D. Water-Cement Ratio: Provide concrete for following conditions with maximum water-cement (W/C) ratios as follows:
 1. Subjected to freezing and thawing: W/C 0.45.
- E. Slump Limits: Proportion and design mixes to result in concrete slump at point of placement as follows:
 1. Ramps, slabs, and sloping surfaces: Not more than 3 inches.
 2. Reinforced foundation systems: Not less than 1 inch and not more than 5 inches.
 3. Concrete containing high-range water-reducing admixture (superplasticizer): Not more than 8 inches after adding admixture to site-verified 2-to-3-inch slump concrete.
 4. Other concrete: Not more than 4 inches.

- F. Adjustment to Concrete Mixes: Mix design adjustments may be requested by Contractor when characteristics of materials, job conditions, weather, test results, or other circumstances warrant, as accepted by Engineer. Laboratory test data for revised mix design and strength results must be submitted to and accepted by Architect before using in Work.

2.6 ADMIXTURES

- A. Use water-reducing admixture or high-range water-reducing admixture (superplasticizer) in concrete, as required, for placement and workability.
- B. Use accelerating admixture in concrete slabs placed at ambient temperatures below 50 deg F (10 deg C).
- C. Use high-range water-reducing admixture in pumped concrete, concrete for heavy-use industrial slabs, architectural concrete, parking structure slabs, concrete required to be watertight, and concrete with water-cement ratios below 0.50.
- D. Use admixtures for water reduction and set accelerating or retarding in strict compliance with manufacturer's directions.

2.7 CONCRETE MIXING

- A. Job-Site Mixing: Mix concrete materials in appropriate drum-type batch machine mixer. For mixers of 1 cu. yd. or smaller capacity, continue mixing at least 1-1/2 minutes, but not more than 5 minutes after ingredients are in mixer, before any part of batch is released. For mixers of capacity larger than 1 cu. yd., increase minimum 1-1/2 minutes of mixing time by 15 seconds for each additional cu. yd.
 - 1. Provide batch ticket for each batch discharged and used in the Work, indicating Project identification name and number, date, mix type, mix time, quantity, and amount of water introduced.
- B. Ready-Mixed Concrete: Comply with requirements of ASTM C 94, and as specified.
 - 1. When air temperature is between 85 deg F (30 deg C) and 90 deg F (32 deg C), reduce mixing and delivery time from 1-1/2 hours to 75 minutes, and when air temperature is above 90 deg F (32 deg C), reduce mixing and delivery time to 60 minutes.

PART 3 - EXECUTION

3.1 GENERAL

- A. Coordinate the installation of joint materials, vapor retarder/barrier, and other related materials with placement of forms and reinforcing steel.

3.2 FORMS

- A. General: Design, erect, support, brace, and maintain formwork to support vertical, lateral, static, and dynamic loads that might be applied until concrete structure can support such loads. Construct formwork so concrete members and structures are of correct size, shape, alignment, elevation, and position. Maintain formwork construction tolerances and surface irregularities complying with the following ACI 347 limits:
1. Provide Class A tolerances for concrete surfaces exposed to view.
 2. Provide Class C tolerances for other concrete surfaces.
- B. Construct forms to sizes, shapes, lines, and dimensions shown and to obtain accurate alignment, location, grades, level, and plumb work in finished structures. Provide for openings, offsets, sinkages, keyways, recesses, moldings, rustications, reglets, chamfers, blocking, screeds, bulkheads, anchorages and inserts, and other features required in the Work. Use selected materials to obtain required finishes. Solidly butt joints and provide backup at joints to prevent cement paste from leaking.
- C. Fabricate forms for easy removal without hammering or prying against concrete surfaces. Provide crush plates or wrecking plates where stripping may damage cast concrete surfaces. Provide top forms for inclined surfaces where slope is too steep to place concrete with bottom forms only. Kerf wood inserts for forming keyways, reglets, recesses, and the like for easy removal.
- D. Provide temporary openings for clean-outs and inspections where interior area of formwork is inaccessible before and during concrete placement. Securely brace temporary openings and set tightly to forms to prevent losing concrete mortar. Locate temporary openings in forms at inconspicuous locations.
- E. Chamfer exposed corners and edges as indicated, using wood, metal, PVC, or rubber chamfer strips fabricated to produce uniform smooth lines and tight edge joints.
- F. Provisions for Other Trades: Provide openings in concrete formwork to accommodate work of other trades. Determine size and location of openings, recesses, and chases from trades providing such items. Accurately place and securely support items built into forms.
- G. Cleaning and Tightening: Thoroughly clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, or other debris just before placing concrete. Retighten forms and bracing before placing concrete, as required, to prevent mortar leaks and maintain proper alignment.

3.3 VAPOR RETARDER/BARRIER INSTALLATION

- A. General: Place vapor retarder/barrier sheeting in position with longest dimension parallel with direction of pour.
- B. Lap joints 6 inches and seal with manufacturer's recommended mastic or pressure-sensitive tape.

3.4 PLACING REINFORCEMENT

- A. General: Comply with Concrete Reinforcing Steel Institute's recommended practice for "Placing
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Reinforcing Bars," for details and methods of reinforcement placement and supports and as specified.

1. Avoiding cutting or puncturing vapor retarder/barrier during reinforcement placement and concreting operations. Repair damages before placing concrete.
- B. Clean reinforcement of loose rust and mill scale, earth, ice, and other materials that reduce or destroy bond with concrete.
- C. Accurately position, support, and secure reinforcement against displacement. Locate and support reinforcing by metal chairs, runners, bolsters, spacers, and hangers, as approved by Engineer.
- D. Place reinforcement to maintain minimum coverages as indicated for concrete protection. Arrange, space, and securely tie bars and bar supports to hold reinforcement in position during concrete placement operations. Set wire ties so ends are directed into concrete, not toward exposed concrete surfaces.
- E. Install welded wire fabric in lengths as long as practicable. Lap adjoining pieces at least one full mesh and lace splices with wire. Offset laps of adjoining widths to prevent continuous laps in either direction.

3.5 JOINTS

- A. Construction Joints: Locate and install construction joints so they do not impair strength or appearance of the structure, as acceptable to Architect.
- B. Provide keyways at least 1-1/2 inches deep in construction joints in walls and slabs and between walls and footings. Bulkheads designed and accepted for this purpose may be used for slabs.
- C. Place construction joints perpendicular to main reinforcement. Continue reinforcement across construction joints except as indicated otherwise. Do not continue reinforcement through sides of strip placements.
- D. Use bonding agent on existing concrete surfaces that will be joined with fresh concrete.
- E. Waterstops: Provide waterstops in construction joints as indicated. Install waterstops to form continuous diaphragm in each joint. Support and protect exposed waterstops during progress of Work. Field-fabricate joints in waterstops according to manufacturer's printed instructions.
- F. Isolation Joints in Slabs-on-Grade: Construct isolation joints in slabs-on-grade at points of beams, and other locations, as indicated.
 1. Joint fillers and sealants are specified in Division 7 Section "Caulking Sealants."
- G. Contraction (Control) Joints in Slabs-on-Grade: Construct contraction joints in slabs-on-grade to form panels of patterns as shown. Use saw cuts 1/8 inch wide by one-fourth of slab depth or inserts 1/4 inch wide by one-fourth of slab depth, unless otherwise indicated.
 1. Form contraction joints by inserting premolded plastic, hardboard, or fiberboard strip into fresh concrete until top surface of strip is flush with slab surface. Tool slab edges round on each side of insert. After concrete has cured, remove inserts and clean groove of loose

debris.

2. Contraction joints in unexposed floor slabs may be formed by saw cuts as soon as possible after slab finishing as may be safely done without dislodging aggregate.
3. If joint pattern is not shown, provide joints not exceeding 15 feet in either direction and located to conform to bay spacing wherever possible (at column centerlines, half bays, third bays).
4. Joint fillers and sealants are specified in Division 7 Section "Caulking Sealants."

3.6 INSTALLING EMBEDDED ITEMS

- A. General: Set and build into formwork anchorage devices and other embedded items diagrams, instructions, and directions provided by suppliers of items to be attached.
- B. Install reglets to receive top edge of foundation sheet waterproofing and to receive through-wall flashings in outer face of concrete frame at exterior walls, where flashing is shown at lintels, relieving angles, and other conditions.
- C. Install dovetail anchor slots in concrete structures as indicated on drawings.
- D. Forms for Slabs: Set edge forms, bulkheads, and intermediate screed strips for slabs to achieve required elevations and contours in finished surfaces. Provide and secure units to support screed strips using strike-off templates or compacting-type screeds.

3.7 PREPARING FORM SURFACES

- A. General: Coat contact surfaces of forms with an approved, nonresidual, low-VOC, form-coating compound before placing reinforcement.
- B. Do not allow excess form-coating material to accumulate in forms or come into contact with in-place concrete surfaces against which fresh concrete will be placed. Apply according to manufacturer's instructions.
 1. Coat steel forms with a nonstaining, rust-preventative material. Rust-stained steel formwork is not acceptable.

3.8 CONCRETE PLACEMENT

- A. Inspection: Before placing concrete, inspect and complete formwork installation, reinforcing steel, and items to be embedded or cast in. Notify other trades to permit installation of their work.
- B. General: Comply with ACI 304, "Guide for Measuring, Mixing, Transporting, and Placing Concrete," and as specified.
- C. Deposit concrete continuously or in layers of such thickness that no new concrete will be placed on concrete that has hardened sufficiently to cause seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as specified. Deposit concrete to avoid segregation at its final location.

- D. **Placing Concrete in Forms:** Deposit concrete in forms in horizontal layers no deeper than 24 inches and in a manner to avoid inclined construction joints. Where placement consists of several layers, place each layer while preceding layer is still plastic to avoid cold joints.
1. Consolidate placed concrete by mechanical vibrating equipment supplemented by hand-spading, rodding, or tamping. Use equipment and procedures for consolidation of concrete complying with ACI 309.
 2. Do not use vibrators to transport concrete inside forms. Insert and withdraw vibrators vertically at uniformly spaced locations no farther than the visible effectiveness of the machine. Place vibrators to rapidly penetrate placed layer and at least 6 inches into preceding layer. Do not insert vibrators into lower layers of concrete that have begun to set. At each insertion, limit duration of vibration to time necessary to consolidate concrete and complete embedment of reinforcement and other embedded items without causing mix to segregate.
- E. **Placing Concrete Slabs:** Deposit and consolidate concrete slabs in a continuous operation, within limits of construction joints, until completing placement of a panel or section.
1. Consolidate concrete during placement operations so that concrete is thoroughly worked around reinforcement, other embedded items and into corners.
 2. Bring slab surfaces to correct level with a straightedge and strike off. Use bull floats or darbies to smooth surface free of humps or hollows. Do not disturb slab surfaces prior to beginning finishing operations.
 3. Maintain reinforcing in proper position on chairs during concrete placement.
- F. **Cold-Weather Placement:** Comply with provisions of ACI 306 and as follows. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.
- G. When air temperature has fallen to or is expected to fall below 40 deg F (4 deg C), uniformly heat water and aggregates before mixing to obtain a concrete mixture temperature of not less than 50 deg F (10 deg C) and not more than 80 deg F (27 deg C) at point of placement.
1. Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials.
 2. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise accepted in mix designs.
- H. **Hot-Weather Placement:** When hot weather conditions exist that would impair quality and strength of concrete, place concrete complying with ACI 305 and as specified.
1. Cool ingredients before mixing to maintain concrete temperature at time of placement to below 90 deg F (32 deg C). Mixing water may be chilled or chopped ice may be used to control temperature, provided water equivalent of ice is calculated to total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.
 2. Cover reinforcing steel with water-soaked burlap if it becomes too hot, so that steel temperature will not exceed the ambient air temperature immediately before embedding in concrete.
 3. Fog spray forms, reinforcing steel, and subgrade just before placing concrete. Keep subgrade moisture uniform without puddles or dry areas.
 4. Use water-reducing retarding admixture when required by high temperatures, low humidity, or other adverse placing conditions, as acceptable to Architect.

3.9 FINISHING FORMED SURFACES

- A. **Rough-Formed Finish:** Provide a rough-formed finish on formed concrete surfaces not exposed to view in the finished Work or concealed by other construction. This is the concrete surface having texture imparted by form-facing material used, with tie holes and defective areas repaired and patched, and fins and other projections exceeding 3/4 inch in height rubbed down or chipped off.
- B. **Smooth-Formed Finish:** Provide a smooth-formed finish on formed concrete surfaces exposed to view or to be covered with a coating material applied directly to concrete, or a covering material applied directly to concrete, such as waterproofing, dampproofing, veneer plaster, painting, or another similar system. This is an as-cast concrete surface obtained with selected form-facing material, arranged in an orderly and symmetrical manner with a minimum of seams. Repair and patch defective areas with fins and other projections completely removed and smoothed.
- C. **Smooth-Rubbed Finish:** Provide smooth-rubbed finish on scheduled concrete surfaces that have received smooth-formed finish treatment not later than 1 day after form removal.
 - 1. Moisten concrete surfaces and rub with carborundum brick or another abrasive until producing a uniform color and texture. Do not apply cement grout other than that created by the rubbing process.
- D. **Grout-Cleaned Finish:** Provide grout-cleaned finish on scheduled concrete surfaces that have received smooth-formed finish treatment.
 - 1. Combine one part portland cement to one and one-half parts fine sand by volume, and a 50:50 mixture of acrylic or styrene butadiene-based bonding admixture and water to form the consistency of thick paint. Blend standard portland cement and white portland cement in amounts determined by trial patches so that final color of dry grout will match adjacent surfaces.
 - 2. Thoroughly wet concrete surfaces, apply grout to coat surfaces, and fill small holes. Remove excess grout by scraping and rubbing with clean burlap. Keep damp by fog spray for at least 36 hours after rubbing.
- E. **Related Unformed Surfaces:** At tops of walls, horizontal offsets, and similar unformed surfaces adjacent to formed surfaces, strike-off smooth and finish with a texture matching adjacent formed surfaces. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces unless otherwise indicated.

3.10 MONOLITHIC SLAB FINISHES

- A. **Scratch Finish:** Apply scratch finish to monolithic slab surfaces to receive concrete floor topping or mortar setting beds for tile, portland cement terrazzo, and other bonded applied cementitious finish flooring material, and where indicated.
 - 1. After placing slabs, finish surface to tolerances of F(F) 15 (floor flatness) and F(L) 13 (floor levelness) measured according to ASTM E 1155. Slope surfaces uniformly to drains where required. After leveling, roughen surface before final set with stiff brushes, brooms, or rakes.

- B. **Float Finish:** Apply float finish to monolithic slab surfaces to receive trowel finish and other finishes as specified; slab surfaces to be covered with membrane or elastic waterproofing, membrane or elastic roofing, or sand-bed terrazzo; and where indicated.
1. After screeding, consolidating, and leveling concrete slabs, do not work surface until ready for floating. Begin floating, using float blades or float shoes only, when surface water has disappeared, or when concrete has stiffened sufficiently to permit operation of power-driven floats, or both. Consolidate surface with power-driven floats or by hand-floating if area is small or inaccessible to power units. Finish surfaces to tolerances of F(F) 18 (floor flatness) and F(L) 15 (floor levelness) measured according to ASTM E 1155. Cut down high spots and fill low spots. Uniformly slope surfaces to drains. Immediately after leveling, refloat surface to a uniform, smooth, granular texture.
- C. **Trowel Finish:** Apply a trowel finish to monolithic slab surfaces exposed to view and slab surfaces to be covered with resilient flooring, carpet, ceramic or quarry tile, paint, or another thin film-finish coating system.
1. After floating, begin first trowel-finish operation using a power-driven trowel. Begin final troweling when surface produces a ringing sound as trowel is moved over surface. Consolidate concrete surface by final hand-troweling operation, free of trowel marks, uniform in texture and appearance, and finish surfaces to tolerances of F(F) 20 (floor flatness) and F(L) 17 (floor levelness) measured according to ASTM E 1155. Grind smooth any surface defects that would telegraph through applied floor covering system.
- D. **Trowel and Fine Broom Finish:** Where ceramic or quarry tile is to be installed with thin-set mortar, apply a trowel finish as specified, then immediately follow by slightly scarifying the surface with a fine broom.
- E. **Nonslip Broom Finish:** Apply a nonslip broom finish to exterior concrete platforms, steps, and ramps, and elsewhere as indicated.
1. Immediately after float finishing, slightly roughen concrete surface by brooming with fiber-bristle broom perpendicular to main traffic route. Coordinate required final finish with Architect before application.
- F. **Nonslip Aggregate Finish:** Apply nonslip aggregate finish to concrete stair treads, platforms, ramps, sloped walks, and where indicated.
1. After completing float finishing and before starting trowel finish, uniformly spread 25 lb of dampened nonslip aggregate per 100 sq. ft. of surface. Tamp aggregate flush with surface using a steel trowel, but do not force below surface. After broadcasting and tamping, apply trowel finishing as specified.
 2. After curing, lightly work surface with a steel wire brush or an abrasive stone, and water to expose nonslip aggregate.

3.11 MISCELLANEOUS CONCRETE ITEMS

- A. **Filling In:** Fill in holes and openings left in concrete structures for passage of work by other trades, unless otherwise shown or directed, after work of other trades is in place. Mix, place, and cure concrete as specified to blend with in-place construction. Provide other miscellaneous

concrete filling shown or required to complete Work.

- B. Curbs: Provide monolithic finish to interior curbs by stripping forms while concrete is still green and by steel-troweling surfaces to a hard, dense finish with corners, intersections, and terminations slightly rounded.
- C. Equipment Bases and Foundations: Provide machine and equipment bases and foundations as shown on drawings. Set anchor bolts for machines and equipment to template at correct elevations, complying with diagrams or templates of manufacturer furnishing machines and equipment.

3.12 CONCRETE CURING AND PROTECTION

- A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. In hot, dry, and windy weather protect concrete from rapid moisture loss before and during finishing operations with an evaporation-control material. Apply according to manufacturer's instructions after screeding and bull floating, but before power floating and troweling.
- B. Start initial curing as soon as free water has disappeared from concrete surface after placing and finishing. Weather permitting, keep continuously moist for not less than 7 days.
- C. Curing Methods: Cure concrete by curing compound, by moist curing, by moisture-retaining cover curing, or by combining these methods, as specified.
- D. Provide moisture curing by the following methods:
 - 1. Keep concrete surface continuously wet by covering with water.
 - 2. Use continuous water-fog spray.
 - 3. Cover concrete surface with specified absorptive cover, thoroughly saturate cover with water, and keep continuously wet. Place absorptive cover to provide coverage of concrete surfaces and edges, with a 4-inch lap over adjacent absorptive covers.
- E. Provide moisture-retaining cover curing as follows:
 - 1. Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width with sides and ends lapped at least 3 inches and sealed by waterproof tape or adhesive. Immediately repair any holes or tears during curing period using cover material and waterproof tape.
- F. Apply curing compound on exposed interior slabs and on exterior slabs, walks, and curbs as follows:
 - 1. Apply curing compound to concrete slabs as soon as final finishing operations are complete (within 2 hours and after surface water sheen has disappeared). Apply uniformly in continuous operation by power spray or roller according to manufacturer's directions. Recoat areas subjected to heavy rainfall within 3 hours after initial application. Maintain continuity of coating and repair damage during curing period.
 - 2. Use membrane curing compounds that will not affect surfaces to be covered with finish materials applied directly to concrete.

G. Curing Formed Surfaces: Cure formed concrete surfaces, including underside of beams,
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supported slabs, and other similar surfaces, by moist curing with forms in place for the full curing period or until forms are removed. If forms are removed, continue curing by methods specified above, as applicable.

- H. Curing Unformed Surfaces: Cure unformed surfaces, including slabs, floor topping, and other flat surfaces, by applying the appropriate curing method.
 - 1. Final cure concrete surfaces to receive finish flooring with a moisture-retaining cover, unless otherwise directed.

3.13 REMOVING FORMS

- A. General: Formwork not supporting weight of concrete, such as sides of beams, walls, columns, and similar parts of the work, may be removed after cumulatively curing at not less than 50 deg F (10 deg C) for 24 hours after placing concrete, provided concrete is sufficiently hard to not be damaged by form-removal operations, and provided curing and protection operations are maintained.
- B. Formwork supporting weight of concrete, such as beam soffits, joists, slabs, and other structural elements, may not be removed in less than 14 days or until concrete has attained at least 75 percent of design minimum compressive strength at 28 days. Determine potential compressive strength of in-place concrete by testing field-cured specimens representative of concrete location or members with cost borne by contractor.
- B. Form-facing material may be removed 4 days after placement only if shores and other vertical supports have been arranged to permit removal of form-facing material without loosening or disturbing shores and supports.

3.14 REUSING FORMS

- A. Clean and repair surfaces of forms to be reused in the Work. Split, frayed, delaminated, or otherwise damaged form-facing material will not be acceptable for exposed surfaces. Apply new form-coating compound as specified for new formwork.
- B. When forms are extended for successive concrete placement, thoroughly clean surfaces, remove fins and laitance, and tighten forms to close joints. Align and secure joint to avoid offsets. Do not use patched forms for exposed concrete surfaces except as acceptable to Architect.

3.15 CONCRETE SURFACE REPAIRS

- A. Patching Defective Areas: Repair and patch defective areas with cement mortar immediately after removing forms, when acceptable to Architect.
- B. Mix dry-pack mortar, consisting of one part portland cement to 2-1/2 parts fine aggregate passing a No. 16 mesh sieve, using only enough water as required for handling and placing.

1. Cut out honeycombs, rock pockets, voids over 3/4 inch in any dimension, and holes left by tie rods and bolts down to solid concrete but in no case to a depth less than 1 inch. Make edges of cuts perpendicular to the concrete surface. Thoroughly clean, dampen with water, and brush-coat the area to be patched with bonding agent. Place patching mortar before bonding agent has dried.
 2. For surfaces exposed to view, blend white portland cement and standard portland cement so that, when dry, patching mortar will match surrounding color. Provide test areas at inconspicuous locations to verify mixture and color match before proceeding with patching. Compact mortar in place and strike-off slightly higher than surrounding surface.
- B. Repairing Formed Surfaces: Remove and replace concrete having defective surfaces if irregularities, cracks, spalls, air bubbles, honeycomb, rock pockets, fins and other projections on the surface, and stains and other discolorations that cannot be removed by cleaning. Flush out form tie holes and fill with dry-pack mortar or precast cement cone plugs secured in place with bonding agent.
1. Repair concealed formed surfaces, where possible, containing defects that affect the concrete's durability. If defects cannot be repaired, remove and replace the concrete.
- C. Repairing Unformed Surfaces: Test unformed surfaces, such as monolithic slabs, for smoothness and verify surface tolerances specified for each surface and finish. Correct low and high areas as specified. Test unformed surfaces sloped to drain for trueness of slope and smoothness by using a template having the required slope.
1. Repair finished unformed surfaces containing defects that affect the concrete's durability. Surface defects include crazing and cracks in excess of 0.01 inch wide or that penetrate to the reinforcement or completely through nonreinforced sections regardless of width, spalling, popouts, honeycombs, rock pockets, and other objectionable conditions.
 2. Correct high areas in unformed surfaces by grinding after concrete has cured at least 14 days.
 3. Correct low areas in unformed surfaces during or immediately after completing surface finishing operations by cutting out low areas and replacing with patching mortar. Finish repaired areas to blend into adjacent concrete. Proprietary underlayment compounds may be used when acceptable to Architect.
 4. Inspector shall inspect and approve the removal of defective concrete before patching is done. Repair defective areas, except random cracks and single holes not exceeding 1 inch in diameter, by cutting out and replacing with fresh concrete. Remove defective areas with clean, square cuts and expose reinforcing steel with at least 3/4-inch clearance all around. Dampen concrete surfaces in contact with patching concrete and apply bonding agent. Mix patching concrete of same materials to provide concrete of same type or class as original concrete. Place, compact, and finish to blend with adjacent finished concrete. Cure in same manner as adjacent concrete.
- D. Repair isolated random cracks and single holes 1 inch or less in diameter by dry-pack method. Groove top of cracks and cut out holes to sound concrete and clean of dust, dirt, and loose particles. Dampen cleaned concrete surfaces and apply bonding compound. Place dry-pack before bonding agent has dried. Compact dry-pack mixture in place and finish to match adjacent concrete. Keep patched area continuously moist for at least 72 hours.
- E. Perform structural repairs with prior approval of Engineer for method and procedure, using specified epoxy adhesive and mortar.

F. Repair methods not specified above may be used, subject to acceptance of Engineer.

3.16 QUALITY CONTROL TESTING DURING CONSTRUCTION

- A. General: The Owner will employ a testing agency to perform tests and to submit test reports.
- B. Sampling and testing for quality control during concrete placement may include the following, as directed by Engineer.
1. Sampling Fresh Concrete: ASTM C 172, except modified for slump to comply with ASTM C 94.
 - a. Slump: ASTM C 143; one test at point of discharge for each day's pour of each type of concrete; additional tests when concrete consistency seems to have changed.
 - b. Air Content: ASTM C 173, volumetric method for lightweight or normal weight concrete; ASTM C 231, pressure method for normal weight concrete; one for each day's pour of each type of air-entrained concrete.
 - c. Concrete Temperature: ASTM C 1064; one test hourly when air temperature is 40 deg F (4 deg C) and below, when 80 deg F (27 deg C) and above, and one test for each set of compressive-strength specimens.
 - d. Compression Test Specimen: ASTM C 31; one set of four standard cylinders for each compressive-strength test, unless otherwise directed. Mold and store cylinders for laboratory-cured test specimens except when field-cured test specimens are required.
 - e. Compressive-Strength Tests: ASTM C 39; one set for each day's pour exceeding 5 cu. yd. plus additional sets for each 50 cu. yd. more than the first 25 cu. yd. of each concrete class placed in any one day; one specimen tested at 7 days, two specimens tested at 28 days, and one specimen retained in reserve for later testing if required.
 - f. For drilled piers, u.n.o., there shall be (1) set of compressive strength test for each 10 cu. Yds.
 2. When frequency of testing will provide fewer than five strength tests for a given class of concrete, conduct testing from at least five randomly selected batches or from each batch if fewer than five are used.
 3. When total quantity of a given class of concrete is less than 50 cu. yd., Engineer may waive strength testing if adequate evidence of satisfactory strength is provided.
 4. When strength of field-cured cylinders is less than 85 percent of companion laboratory-cured cylinders, evaluate current operations and provide corrective procedures for protecting and curing the in-place concrete.
 5. Strength level of concrete will be considered satisfactory if averages of sets of two consecutive strength test results equal or exceed specified compressive strength and no individual strength test result falls below specified compressive strength by more than 500 psi.
- C. Test results will be reported in writing to Architect, Structural Engineer, ready-mix producer, and Contractor within 24 hours after tests. Reports of compressive strength tests shall contain the Project identification name and number, date of concrete placement, name of concrete testing service, concrete type and class, location of concrete batch in structure, design compressive strength at 28 days, concrete mix proportions and materials, compressive breaking strength, and type of break for both 7-day tests and 28-day tests.

- D. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted but shall not be used as the sole basis for acceptance or rejection.
- E. Additional Tests: The testing agency will make additional tests of in-place concrete when test results indicate specified concrete strengths and other characteristics have not been attained in the structure, as directed by Architect. Testing agency may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C 42, or by other methods as directed.

END OF SECTION 033000

SECTION 042000UNIT MASONRY

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Concrete masonry units (CMU's).
2. Face brick.

B. Related Sections:

1. Section 055000 "Metal Fabrications" for furnishing steel lintels and shelf angles for unit masonry.
2. Section 076210 "Thru wall flashing and trim" for furnishing manufactured reglets installed in masonry joints.

1.2 PRECONSTRUCTION TESTING

A. Preconstruction Testing Service: Owner will engage a qualified independent testing agency to perform preconstruction testing indicated below. Retesting of materials that fail to comply with specified requirements shall be done at Contractor's expense.

1. Concrete Masonry Unit Test: For each type of unit required, according to ASTM C 140 for compressive strength.
2. Mortar Test (Property Specification): For each mix required, according to ASTM C 109/C 109M for compressive strength.
3. Mortar Test (Property Specification): For each mix required, according to ASTM C 780 for compressive strength.
4. Grout Test (Compressive Strength): For each mix required, according to ASTM C 1019.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product indicated.

B. Samples for Verification: For each type and color of exposed masonry unit and colored mortar.

1.4 INFORMATIONAL SUBMITTALS

A. Material Certificates: For each type and size of product indicated. For masonry units include data on material properties and material test reports substantiating compliance with requirements.

B. Mix Designs: For each type of mortar and grout. Include description of type and proportions of ingredients.

1. Include test reports for mortar mixes required to comply with property specification. Test according to ASTM C 109/C 109M for compressive strength, ASTM C 1506 for water retention, and ASTM C 91 for air content.

2. Include test reports, according to ASTM C 1019, for grout mixes required to comply with compressive strength requirement.

1.5 QUALITY ASSURANCE

- A. Masonry Standard: Comply with ACI 530.1/ASCE 6/TMS 602 unless modified by requirements in the Contract Documents.
- B. Sample Panels: Build sample panels to verify selections made under sample submittals and to demonstrate aesthetic effects. Comply with requirements in Division 1 for mockups.
 1. Build sample panels for typical exterior wall in sizes approximately 60 inches (1500 mm) long by 48 inches (1200 mm) high by full thickness.

1.6 PROJECT CONDITIONS

- A. Cold-Weather Requirements: Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen substrates. Remove and replace unit masonry damaged by frost or by freezing conditions. Comply with cold-weather construction requirements contained in ACI 530.1/ASCE 6/TMS 602.
- B. Hot-Weather Requirements: Comply with hot-weather construction requirements contained in ACI 530.1/ASCE 6/TMS 602.

PART 2 - PRODUCTS

2.1 MASONRY UNITS, GENERAL

- A. Defective Units: Referenced masonry unit standards may allow a certain percentage of units to contain chips, cracks, or other defects exceeding limits stated in the standard. Do not use units where such defects will be exposed in the completed Work.
- B. Fire-Resistance Ratings: Where indicated, provide units that comply with requirements for fire-resistance ratings indicated as determined by testing according to ASTM E 119, by equivalent masonry thickness, or by other means, as acceptable to authorities having jurisdiction.

2.2 CONCRETE MASONRY UNITS

- A. Shapes: Provide shapes indicated and for lintels, corners, jambs, sashes, movement joints, headers, bonding, and other special conditions.
- B. Integral Water Repellent: Provide units made with liquid polymeric, integral water repellent admixture that does not reduce flexural bond strength for exposed units between the new construction and existing buildings.
 1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
 - a. ACM Chemistries; RainBloc.
 - b. Grace Construction Products, W. R. Grace & Co. - Conn.; Dry-Block.

C. CMUs: ASTM C 90.

1. Unit Compressive Strength: Provide units with minimum average net-area compressive strength as described in the structural drawings.
2. Density Classification: Normal weight unless otherwise indicated.

2.3 MASONRY LINTELS

- A. Masonry Lintels: Prefabricated or built-in-place masonry lintels made from bond beam CMUs with reinforcing bars placed as indicated and filled with coarse grout.

2.4 BRICK

- A. General: Provide shapes indicated and as follows:

1. For ends of sills and caps and for similar applications that would otherwise expose unfinished brick surfaces, provide units without cores or frogs and with exposed surfaces finished.
2. Provide special shapes for applications where shapes produced by sawing would result in sawed surfaces being exposed to view.

- B. Face Brick: Facing brick complying with ASTM C 216.

1. Products: Subject to compliance with requirements, provide the following:
 - a. Endicott Clay Products, Fairbury, NE – Color to selected by Architect from standard colors.
2. Grade: SW.
3. Type: FBX or FBS.
4. Initial Rate of Absorption: Less than 30 g/30 sq. in. (30 g/194 sq. cm) per minute when tested per ASTM C 67.
5. Efflorescence: Provide brick that has been tested according to ASTM C 67 and is rated "not effloresced."
6. Surface Coating: Brick with colors or textures produced by application of coatings shall withstand 50 cycles of freezing and thawing per ASTM C 67 with no observable difference in the applied finish when viewed from 10 feet (3 m).
7. Size (Actual Dimensions): 3-5/8 inches (92 mm) wide by 2-1/4 inches (57 mm) high by 11-5/8 inches (194 mm) long.

2.5 MORTAR AND GROUT MATERIALS

- A. Portland Cement: ASTM C 150, Type I or II, except Type III may be used for cold-weather construction. Provide natural color or white cement as required to produce mortar color indicated.
- B. Hydrated Lime: ASTM C 207, Type S.
- C. Portland Cement-Lime Mix: Packaged blend of portland cement and hydrated lime containing no other ingredients.
- D. Masonry Cement: ASTM C 91.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Capital Materials Corporation; Flamingo Color Masonry Cement.
 - b. Lehigh Cement Company; Lehigh Masonry Cement.
 - c. National Cement Company, Inc.; Coosa Masonry Cement.
- E. Mortar Pigments: Natural and synthetic iron oxides and chromium oxides, compounded for use in mortar mixes and complying with ASTM C 979. Use only pigments with a record of satisfactory performance in masonry mortar.
 1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Davis Colors; True Tone Mortar Colors.
 - b. Lanxess Corporation; Bayferrox Iron Oxide Pigments.
 - c. Solomon Colors, Inc.; SGS Mortar Colors.
- F. Colored Cement Product: Packaged blend made from portland cement and hydrated lime Aggregate for Mortar: ASTM C 144.
 1. For joints less than 1/4 inch (6 mm) thick, use aggregate graded with 100 percent passing the No. 16 (1.18-mm) sieve.
 2. White-Mortar Aggregates: Natural white sand or crushed white stone.
 3. Colored-Mortar Aggregates: Natural sand or crushed stone of color necessary to produce required mortar color.
- G. Aggregate for Grout: ASTM C 404.

2.6 REINFORCEMENT

- A. Uncoated Steel Reinforcing Bars: ASTM A 615/A 615M or ASTM A 996/A 996M, Grade 60 (Grade 420).
- B. Masonry Joint Reinforcement, General: ASTM A 951/A 951M.
- C. Masonry Joint Reinforcement for Single-Wythe Masonry: Either ladder or truss type with single pair of side rods.

2.7 TIES AND ANCHORS

- A. Materials: Provide ties and anchors specified in this article that are made from materials that comply with the following unless otherwise indicated.
 1. Hot-Dip Galvanized, Carbon-Steel Wire: ASTM A 82/A 82M; with ASTM A 153/A 153M, Class B-2 coating.
 2. Steel Sheet, Galvanized after Fabrication: ASTM A 1008/A 1008M, Commercial Steel, with ASTM A 153/A 153M, Class B coating.
 3. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.
- B. Adjustable Anchors for Connecting to Structural Steel Framing: Provide anchors that allow vertical or horizontal adjustment but resist tension and compression forces perpendicular to plane of wall.

1. Anchor Section for Welding to Steel Frame: Crimped 1/4-inch- (6.35-mm-) diameter, hot-dip galvanized steel wire.
2. Tie Section: Triangular-shaped wire tie, sized to extend within 1 inch (25 mm) of masonry face, made from 0.25-inch- (6.35-mm-) diameter, hot-dip galvanized steel wire.

C. Adjustable Masonry-Veneer Anchors:

1. General: Provide anchors that allow vertical adjustment but resist tension and compression forces perpendicular to plane of wall, for attachment over sheathing to wood or metal studs, and as follows:
 - a. Structural Performance Characteristics: Capable of withstanding a 100-lbf (445-N) load in both tension and compression without deforming or developing play in excess of 0.05 inch (1.3 mm).
2. Contractor's Option: Unless otherwise indicated, provide any of the following types of anchors:
3. Screw-Attached, Masonry-Veneer Anchors: Units consisting of a wire tie and a metal anchor section.
 - a. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
 - 1) Dayton Superior Corporation, Dur-O-Wal Division; Heckmann Building Products Inc.
 - 2) Hohmann & Barnard, Inc.
 - b. Anchor Section: Rib-stiffened, sheet metal plate with screw holes top and bottom, having slotted holes for inserting wire tie.

- D. Anchor Bolts: Headed or L-shaped steel bolts complying with ASTM A 307, Grade A (ASTM F 568M, Property Class 4.6); with ASTM A 563 (ASTM A 563M) hex nuts and, where indicated, flat washers; hot-dip galvanized to comply with ASTM A 153/A 153M, Class C; of dimensions indicated.

2.8 EMBEDDED FLASHING MATERIALS

- A. Thru-Wall Flashing: Provide metal flashing complying with Section 076210 "Thru-Wall Flashing and Trim"

2.9 MISCELLANEOUS MASONRY ACCESSORIES

- A. Compressible Filler: Premolded filler strips complying with ASTM D 1056, Grade 2A1; compressible up to 35 percent; formulated from neoprene.
- B. Preformed Control-Joint Gaskets: Made from styrene-butadiene-rubber compound, complying with ASTM D 2000, Designation M2AA-805 and designed to fit standard sash block and to maintain lateral stability in masonry wall; size and configuration as indicated.
- C. Bond-Breaker Strips: Asphalt-saturated, organic roofing felt complying with ASTM D 226, Type I (No. 15 asphalt felt).
- D. Weep/Vent Products: Use the following unless otherwise indicated:

1. Mesh Weep/Vent: Free-draining mesh; made from polyethylene strands, full height and width of head joint and depth 1/8 inch (3 mm) less than depth of outer wythe; in color selected from manufacturer's standard.

- a. Products: Subject to compliance with requirements, provide the following:

- 1) Mortar Net USA, Ltd.; Mortar Net Weep Vents.

- E. Cavity Drainage Material: Free-draining mesh, made from polymer strands that will not degrade within the wall cavity.

1. Products: Subject to compliance with requirements, provide the following:

- a. Mortar Net USA, Ltd.; Mortar Net.

2. Provide one of the following configurations:

- a. Strips, full-depth of cavity and 10 inches (250 mm) high, with dovetail shaped notches 7 inches (175 mm) deep.
- b. Strips, not less than 3/4 inch (19 mm) thick and 10 inches (250 mm) high, with dimpled surface designed to catch mortar droppings and prevent weep holes from clogging with mortar.
- c. Sheets or strips full depth of cavity and installed to full height of cavity.

2.10 MORTAR AND GROUT MIXES

- A. General: Do not use admixtures, including pigments, air-entraining agents, accelerators, retarders, water-repellent agents, antifreeze compounds, or other admixtures, unless otherwise indicated.

1. Do not use calcium chloride in mortar or grout.
2. Use portland cement-lime mortar unless otherwise indicated.
3. For exterior masonry, use portland cement-lime mortar.
4. For reinforced masonry, use portland cement-lime mortar.

- B. Preblended, Dry Mortar Mix: Furnish dry mortar ingredients in form of a preblended mix. Measure quantities by weight to ensure accurate proportions, and thoroughly blend ingredients before delivering to Project site.

- C. Mortar for Unit Masonry: Comply with ASTM C 270. Provide the following types of mortar for applications stated unless another type is indicated.

1. For masonry below grade or in contact with earth, use Type S.
2. For reinforced masonry, use Type S.
3. For mortar parge coats, use Type S.
4. For exterior, above-grade, load-bearing and non-load-bearing walls and parapet walls; for interior load-bearing walls; for interior non-load-bearing partitions; and for other applications where another type is not indicated, use Type N.
5. For interior non-load-bearing partitions, Type O may be used instead of Type N.

- D. Pigmented Mortar: Use colored cement product or select and proportion pigments with other ingredients to produce color required. Do not add pigments to colored cement products.

1. Pigments shall not exceed 10 percent of portland cement by weight.
2. Pigments shall not exceed 5 percent of masonry cement by weight.

3. Application: Use pigmented mortar for exposed mortar joints with the following units:
 - a. Face brick.
- E. Colored-Aggregate Mortar: Produce required mortar color by using colored aggregates and natural color or white cement as necessary to produce required mortar color.
 1. Mix to match Architect's sample.
 2. Application: Use colored aggregate mortar for exposed mortar joints with the following units:
 - a. Face brick.
- F. Grout for Unit Masonry: Comply with ASTM C 476.
 1. Use grout of type indicated or, if not otherwise indicated, of type (fine or coarse) that will comply with Table 1.15.1 in ACI 530.1/ASCE 6/TMS 602 for dimensions of grout spaces and pour height.
 2. Proportion grout in accordance with ASTM C 476, Table 1 or paragraph 4.2.2 for specified 28-day compressive strength indicated, but not less than 2000 psi (14 MPa).

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Use full-size units without cutting if possible. If cutting is required to provide a continuous pattern or to fit adjoining construction, cut units with motor-driven saws; provide clean, sharp, unchipped edges. Allow units to dry before laying unless wetting of units is specified. Install cut units with cut surfaces and, where possible, cut edges concealed.
- B. Select and arrange units for exposed unit masonry to produce a uniform blend of colors and textures.
- C. Wetting of Brick: Wet brick before laying if initial rate of absorption exceeds 30 g/30 sq. in. (30 g/194 sq. cm) per minute when tested per ASTM C 67. Allow units to absorb water so they are damp but not wet at time of laying.

3.2 TOLERANCES

- A. Dimensions and Locations of Elements:
 1. For dimensions in cross section or elevation do not vary by more than plus 1/2 inch (12 mm) or minus 1/4 inch (6 mm).
 2. For location of elements in plan do not vary from that indicated by more than plus or minus 1/2 inch (12 mm).
 3. For location of elements in elevation do not vary from that indicated by more than plus or minus 1/4 inch (6 mm) in a story height or 1/2 inch (12 mm) total.
- B. Lines and Levels:
 1. For bed joints and top surfaces of bearing walls do not vary from level by more than 1/4 inch in 10 feet (6 mm in 3 m), or 1/2 inch (12 mm) maximum.
 2. For conspicuous horizontal lines, such as lintels, sills, parapets, and reveals, do not vary from level by more than 1/8 inch in 10 feet (3 mm in 3 m), 1/4 inch in 20 feet (6 mm in 6 m), or 1/2 inch (12 mm) maximum.

3. For vertical lines and surfaces do not vary from plumb by more than 1/4 inch in 10 feet (6 mm in 3 m), 3/8 inch in 20 feet (9 mm in 6 m), or 1/2 inch (12 mm) maximum.
4. For conspicuous vertical lines, such as external corners, door jambs, reveals, and expansion and control joints, do not vary from plumb by more than 1/8 inch in 10 feet (3 mm in 3 m), 1/4 inch in 20 feet (6 mm in 6 m), or 1/2 inch (12 mm) maximum.
5. For lines and surfaces do not vary from straight by more than 1/4 inch in 10 feet (6 mm in 3 m), 3/8 inch in 20 feet (9 mm in 6 m), or 1/2 inch (12 mm) maximum.

C. Joints:

1. For bed joints, do not vary from thickness indicated by more than plus or minus 1/8 inch (3 mm), with a maximum thickness limited to 1/2 inch (12 mm).
2. For head and collar joints, do not vary from thickness indicated by more than plus 3/8 inch (9 mm) or minus 1/4 inch (6 mm).
3. For exposed head joints, do not vary from thickness indicated by more than plus or minus 1/8 inch (3 mm).

3.3 LAYING MASONRY WALLS

- A. Lay out walls in advance for accurate spacing of surface bond patterns with uniform joint thicknesses and for accurate location of openings, movement-type joints, returns, and offsets. Avoid using less-than-half-size units, particularly at corners, jambs, and, where possible, at other locations.
- B. Bond Pattern for Exposed Masonry: Unless otherwise indicated, lay exposed masonry in running bond; do not use units with less than nominal 4-inch (100-mm) horizontal face dimensions at corners or jambs.
- C. Built-in Work: As construction progresses, build in items specified in this and other Sections. Fill in solidly with masonry around built-in items.
- D. Fill space between steel frames and masonry solidly with mortar unless otherwise indicated.
- E. Fill cores in hollow CMUs with grout 24 inches (600 mm) under bearing plates, beams, lintels, posts, and similar items unless otherwise indicated.

3.4 MORTAR BEDDING AND JOINTING

- A. Lay face brick and CMUs as follows:
 1. With face shells fully bedded in mortar and with head joints of depth equal to bed joints.
 2. With webs fully bedded in mortar in all courses of piers, columns, and pilasters.
 3. With webs fully bedded in mortar in grouted masonry, including starting course on footings.
 4. With entire units, including areas under cells, fully bedded in mortar at starting course on footings where cells are not grouted.
- B. Tool exposed joints slightly concave when thumbprint hard, using a jointer larger than joint thickness unless otherwise indicated.
- C. Cut joints flush for masonry walls to receive plaster or other direct-applied finishes (other than paint) unless otherwise indicated.

3.5 MASONRY JOINT REINFORCEMENT

- A. General: Install entire length of longitudinal side rods in mortar with a minimum cover of 5/8 inch (16 mm) on exterior side of walls, 1/2 inch (13 mm) elsewhere. Lap reinforcement a minimum of 6 inches (150 mm).
1. Space reinforcement not more than 16 inches (406 mm) o.c.
 2. Space reinforcement not more than 8 inches (203 mm) o.c. in foundation walls and parapet walls.
 3. Provide reinforcement not more than 8 inches (203 mm) above and below wall openings and extending 12 inches (305 mm) beyond openings in addition to continuous reinforcement.
- B. Interrupt joint reinforcement at control and expansion joints unless otherwise indicated.
- C. Provide continuity at wall intersections by using prefabricated T-shaped units.
- D. Provide continuity at corners by using prefabricated L-shaped units.

3.6 ANCHORING MASONRY VENEERS

- A. Anchor masonry veneers to wall framing and concrete and masonry backup with masonry-veneer anchors to comply with the following requirements:
1. Fasten screw-attached anchors through sheathing to wall framing and to concrete and masonry backup with metal fasteners of type indicated. Use two fasteners unless anchor design only uses one fastener.
 2. Embed masonry anchor sections in masonry joints. Provide not less than 2 inches (50 mm) of air space between back of masonry veneer and face of sheathing.
 3. Locate anchor sections to allow maximum vertical differential movement of ties up and down.
 4. Space anchors as indicated, but not more than 16 inches (406 mm) o.c. vertically and 32 inches (813 mm) o.c. horizontally with not less than 1 anchor for each 3.5 sq. ft. (0.33 sq. m) of wall area. Install additional anchors within 12 inches (305 mm) of openings and at intervals, not exceeding 36 inches (914 mm), around perimeter.

3.7 FLASHING, WEEP HOLES, CAVITY DRAINAGE, AND VENTS

- A. General: Install embedded flashing and weep holes in masonry at shelf angles, lintels, ledges, other obstructions to downward flow of water in wall, and where indicated.
- B. Install flashing as follows unless otherwise indicated:
1. Prepare masonry surfaces so they are smooth and free from projections that could puncture flashing. Where flashing is within mortar joint, place through-wall flashing on sloping bed of mortar and cover with mortar. Before covering with mortar, seal penetrations in flashing with adhesive, sealant, or tape as recommended by flashing manufacturer.
 2. At lintels and shelf angles, extend flashing a minimum of 6 inches (150 mm) into masonry at each end. At heads and sills, extend flashing 6 inches (150 mm) at ends and turn up not less than 2 inches (50 mm) to form end dams.
 3. Install metal drip edges beneath flexible flashing at exterior face of wall. Stop flexible flashing 1/2 inch (13 mm) back from outside face of wall and adhere flexible flashing to top of metal drip edge.
 4. Install metal flashing termination beneath flexible flashing at exterior face of wall. Stop flexible flashing 1/2 inch (13 mm) back from outside face of wall and adhere flexible flashing to top of metal flashing termination.

- C. Install weep holes in head joints in exterior wythes of first course of masonry immediately above embedded flashing and as follows:
 - 1. Use specified weep/vent products to form weep holes.
 - 2. Space weep holes 24 inches (600 mm) o.c. unless otherwise indicated.
 - 3. Cover cavity side of weep holes with plastic insect screening at cavities insulated with loose-fill insulation.
- D. Place cavity drainage material in cavities to comply with configuration requirements for cavity drainage material in "Miscellaneous Masonry Accessories" Article.
- E. Install vents in head joints in exterior wythes at spacing indicated. Use specified weep/vent products to form vents.
 - 1. Close cavities off vertically and horizontally with blocking in manner indicated. Install through-wall flashing and weep holes above horizontal blocking.

3.8 REINFORCED UNIT MASONRY INSTALLATION

- A. Temporary Formwork and Shores: Construct formwork and shores as needed to support reinforced masonry elements during construction.
 - 1. Construct formwork to provide shape, line, and dimensions of completed masonry as indicated. Make forms sufficiently tight to prevent leakage of mortar and grout. Brace, tie, and support forms to maintain position and shape during construction and curing of reinforced masonry.
 - 2. Do not remove forms and shores until reinforced masonry members have hardened sufficiently to carry their own weight and other loads that may be placed on them during construction.
- B. Placing Reinforcement: Comply with requirements in ACI 530.1/ASCE 6/TMS 602.
- C. Grouting: Do not place grout until entire height of masonry to be grouted has attained enough strength to resist grout pressure.
 - 1. Comply with requirements in ACI 530.1/ASCE 6/TMS 602 for cleanouts and for grout placement, including minimum grout space and maximum pour height.

3.9 FIELD QUALITY CONTROL

- A. Testing and Inspecting: Owner will engage special inspectors to perform tests and inspections and prepare reports. Allow inspectors access to scaffolding and work areas, as needed to perform tests and inspections. Retesting of materials that fail to comply with specified requirements shall be done at Contractor's expense.
- B. Testing Prior to Construction: One set of tests.
- C. Testing Frequency: One set of tests for each 5000 sq. ft. (464 sq. m) of wall area or portion thereof.
- D. Concrete Masonry Unit Test: For each type of unit provided, according to ASTM C 140 for compressive strength.
- E. Mortar Aggregate Ratio Test (Proportion Specification): For each mix provided, according to ASTM C 780.

- F. Grout Test (Compressive Strength): For each mix provided, according to ASTM C 1019.

3.10 REPAIRING, POINTING, AND CLEANING

- A. In-Progress Cleaning: Clean unit masonry as work progresses by dry brushing to remove mortar fins and smears before tooling joints.
- B. Final Cleaning: After mortar is thoroughly set and cured, clean exposed masonry as follows:
 - 1. Test cleaning methods on sample wall panel; leave one-half of panel uncleaned for comparison purposes.
 - 2. Protect surfaces from contact with cleaner.
 - 3. Wet wall surfaces with water before applying cleaners; remove cleaners promptly by rinsing surfaces thoroughly with clear water.
 - 4. Clean brick by bucket-and-brush hand-cleaning method described in BIA Technical Notes 20.
 - 5. Clean masonry with a proprietary acidic cleaner applied according to manufacturer's written instructions.
 - 6. Clean concrete masonry by cleaning method indicated in NCMA TEK 8-2A applicable to type of stain on exposed surfaces.

3.11 MASONRY WASTE DISPOSAL

- A. Waste Disposal as Fill Material: Dispose of clean masonry waste, including excess or soil-contaminated sand, waste mortar, and broken masonry units, by crushing and mixing with fill material as fill is placed.
 - 1. Do not dispose of masonry waste as fill within 18 inches (450 mm) of finished grade.
- B. Excess Masonry Waste: Remove excess clean masonry waste that cannot be used as fill, as described above, and other masonry waste, and legally dispose of off Owner's property.

END OF SECTION 042000

SECTION 042300
MASONRYREINFORCED UNIT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.
- B. Requirements of Section "Unit Masonry" apply to work of this section.

1.2 DESCRIPTION OF WORK

- A. Extent of each type of reinforced unit masonry work is indicated on drawings and in schedules.

1.3 SUBMITTALS

- A. Shop Drawings: Submit shop drawings for fabrication, bending, and placement of reinforcement bars. Comply with ACI 315 "Manual of Standard Practice for Detailing Reinforced Concrete Structures". Show bar schedules, diagrams of bent bars, stirrup spacing, lateral ties and other arrangements and assemblies as required for fabrication and placement of reinforcement for unit masonry work.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. General: Refer to Section "Unit Masonry" for masonry materials and accessories not included in this section.
- B. Reinforcement Bars: Provide deformed bars of following grades complying with ASTM A 615, except as otherwise indicated.
 - 1. Provide Grade 60 for bars No. 3 to No. 18, except as otherwise indicated.
- C. Shop-fabricate reinforcement bars which are shown to be bent or hooked.

PART 3 - EXECUTION

3.1 PLACING REINFORCEMENT

- A. General: Clean reinforcement of loose rust, mill scale, earth, ice or other materials which will reduce bond to mortar or grout. Do not use reinforcement bars with kinks or bends not shown on drawings or final shop drawings, or bars with reduced cross-section due to excessive rusting or other causes.
- B. Position reinforcement accurately at the spacing indicated.
 - 1. Support and secure vertical bars against displacement. Horizontal reinforcement may be placed as the masonry work progresses. Where vertical bars are shown in proximity, provide a clear distance between bars of not less than the nominal bar diameter or 1", whichever is greater.
 - 2. For columns, piers and pilasters, provide a clear distance between vertical bars as indicated, but not less than 1-1/2 times the nominal bar diameter or 1-1/2", whichever is greater. Provide lateral ties as indicated.

3. Splice reinforcement bars where shown; do not splice at other points unless acceptable to the Architect. Provide lapped splices, unless otherwise indicated. In splicing vertical bars or attaching to dowels, lap ends, place in contact and wire tie.
 4. Provide not less than minimum lap indicated, or if not indicated, as required by governing code.
 5. Embed metal ties in mortar joints as work progresses, with a minimum mortar cover of 5/8" on exterior face of walls and 1/2" at other locations.
 6. Embed prefabricated horizontal joint reinforcement as the work progresses, with a minimum cover of 5/8" on exterior face of walls and 1/2" at other locations. Lap units not less than 6" at ends. Use prefabricated "L" and "T" units to provide continuity at corners and intersections. Cut and bend units as recommended by manufacturer for continuity at returns, offsets, column fire-proofing, pipe enclosures and other special conditions.
- C. Anchoring: Anchor reinforced masonry work to supporting structure as indicated.
1. Anchor reinforced masonry walls to non-reinforced masonry where they intersect.

3.2 INSTALLATION, GENERAL

- A. Refer to Section "Unit Masonry" for general installation requirements of unit masonry.
- B. Temporary Formwork: Provide formwork and shores as required for temporary support of reinforced masonry elements.
- C. Construct formwork to conform to shape, line and dimensions shown. Make sufficiently tight to prevent leakage of mortar, grout, or concrete (if any). Brace, tie and support as required to maintain position and shape during construction and curing of reinforced masonry.
- D. Do not remove forms and shores until reinforced masonry members have hardened sufficiently to carry their own weight and all other reasonable temporary loads that may be placed on them during construction.
- E. Allow not less than the following minimum time to elapse after completion of members before removing shores or forms, provided suitable curing conditions have been obtained during the curing period:
1. 10 days for girders and beams.
 2. 7 days for slabs.
 3. 7 days for reinforced masonry soffits.

3.3 INSTALLATION OF REINFORCED CONCRETE UNIT MASONRY

A. GENERAL

1. Do not wet concrete masonry units (CMU).
2. Lay CMU units with full-face shell mortar beds. Fill vertical head joints (end joints between units) solidly with mortar from face of unit to a distance behind face equal to not less than the thickness of longitudinal face shells. Solidly bed cross-webs of starting courses in mortar. Maintain head and bed joint widths shown, or if not shown, provide 3/8" joints.

B. WALLS

1. Pattern Bond: Lay CMU wall units in 1/2-running bond with vertical joints in each course

centered on units in courses above and below, unless otherwise indicated. Bond and interlock each course at corners and intersections. Use special-shaped units where shown, and as required for corners, jambs, sash, control joints, lintels, bond beams and other special conditions.

2. Maintain vertical continuity of core or cell cavities, which are to be reinforced and grouted, to provide minimum clear dimension indicated and to provide minimum clearance and grout coverage for vertical reinforcement bars. Keep cavities free of mortar. Solidly bed webs in mortar where adjacent to reinforced cores or cells.
3. Where horizontal reinforced beams (bond beams) are shown, use special units or modify regular units to allow for placement of continuous horizontal reinforcement bars. Place small mesh expanded metal lath or wire screening in mortar joints under bond beam courses over cores or cells of non-reinforced vertical cells, or provide units with solid bottoms.
3. Grouting Technique: At the Contractor's option, use either low-lift or high-lift grouting techniques subject to requirements which follow.

C. LOW-LIFT GROUTING

1. Provide minimum clear dimension of 2" and clear area of 8 sq. in. in vertical cores to be grouted.
2. Place vertical reinforcement prior to laying of CMU. Extend above elevation of maximum pour height as required for splicing. Support in position at vertical intervals not exceeding 192 bar diameters nor 10 ft.
3. Lay CMU to maximum pour height. Do not exceed 4' height, or if bond beam occurs below 4' height stop pour at course below bond beam.
4. Pour grout using chute or container with spout. Rod or vibrate grout during placing. Place grout continuously; do not interrupt pouring of grout for more than one hour. Terminate grout pours 1-1/2" below top course of pour.
5. Bond Beams: Stop grout in vertical cells 1-1/2" below bond beam course. Place horizontal reinforcement in bond beams; lap at corners and intersections as shown. Place grout in bond beam course before filling vertical cores above bond beam.

D. HIGH-LIFT GROUTING

1. Do not use high-lift grouting technique for grouting of CMU unless minimum cavity dimension and area is 3" and 10 sq. in., respectively.
2. Provide cleanout holes in first course at all vertical cells which are to be filled with grout.
3. Use units with one face shell removed and provide temporary supports for units above, or use header units with concrete brick supports, or cut openings in one face shell.
4. Construct masonry to full height of maximum height grout pour specified, prior to placing grout.
5. Limit grout lifts to a maximum height of 4' and grout pour to a full height of wall, unless otherwise indicated.
6. Place vertical reinforcement before grouting. Place before or after laying masonry units, as required by job conditions. Tie vertical reinforcement to dowels at base of masonry where shown and thread CMU over or around reinforcement. Support vertical reinforcement at intervals not exceeding 192 bar diameters nor 10'.

7. Where individual bars are placed after laying masonry, place wire loops extending into cells as masonry is laid and loosen before mortar sets. After insertion of reinforcement bar, pull loops and bar to proper position and tie free ends.
8. Place horizontal beam reinforcement as the masonry units are laid.

E. PREPARATION OF GROUT SPACES

1. Prior to grouting, inspect and clean grout spaces. Remove dust, dirt, mortar droppings, loose pieces of masonry and other foreign materials from grout spaces. Clean reinforcement and adjust to proper position. Clean top surface of structural members supporting masonry to ensure bond. After final cleaning and inspection, close cleanout holes and brace closures to resist grout pressures.
2. Do not place grout until entire height of masonry to be grouted has attained sufficient strength to resist displacement of masonry units and breaking of mortar bond. Install shores and bracing, if required, before starting grouting operations.
3. Place grout by pumping into grout spaces unless alternate methods are acceptable to the Architect.
4. Limit grout pours to sections which can be completed in one working day with not more than one hour interruption of pouring operation. Place grout in lifts which do not exceed 4ft. Allow not less than 30 minutes, nor more than one hour between lifts of a given pour. Rod or vibrate each grout lift during pouring operation.
5. Place grout in lintels or beams over openings in one continuous pour.
6. Where bond beam occurs more than one course below top of pour, fill bond beam course to within 1" of vertically reinforced cavities, during construction of masonry.
7. When more than one pour is required to complete a given section of masonry, extend reinforcement beyond masonry as required for splicing. Pour grout to within 1-1/2" of top course of first pour. After grouted masonry is cured, lay masonry units and place reinforcement for second pour section before grouting. Repeat sequence if more pours are required.

END OF SECTION 042300

SECTION 051200

STRUCTURAL STEEL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes fabrication and erection of structural steel work, as shown on drawings including schedules, notes, and details showing size and location of members, typical connections, and types of steel required.
 - 1. Structural steel is that work defined in American Institute of Steel Construction (AISC) "Code of Standard Practice" and as otherwise shown on drawings.
 - 2. Miscellaneous Metal Fabrications are specified elsewhere in Division 5.
 - 3. Refer to Division 3 for anchor bolt installation in concrete, Division 4 for anchor bolt installation in masonry.

1.3 SUBMITTALS

- A. General: Submit the following in accordance with Conditions of Contract and Division 1 Specification Sections.
- B. Product data or manufacturer's specifications and installation instructions for following products. Include laboratory test reports and other data to show compliance with specifications (including specified standards).
 - 1. Structural steel (each type), including certified copies of mill reports covering chemical and physical properties.
 - 2. High-strength bolts (each type), including nuts and washers.
 - a. Include Direct Tension Indicators if used.
 - 3. Structural steel primer paint.
 - 4. Shrinkage-resistant grout.
- C. Shop drawings prepared under supervision of a licensed Structural Engineer, including complete details and schedules for fabrication and assembly of structural steel members, procedures, and diagrams.
 - 1. Include details of cuts, connections, camber, holes, and other pertinent data. Indicate welds by standard AWS symbols and show size, length, and type of each weld.
 - 2. Provide setting drawings, templates, and directions for installation of anchor bolts and other anchorages to be installed as work of other sections.
- D. Test reports conducted on shop- and field-bolted and welded connections. Include data on type(s) of tests conducted and test results.

- E. Certified copies of each survey conducted by a licensed Land Surveyor, showing elevations and locations of base plates and anchor bolts to receive structural steel and final elevations and locations for major members. Indicate discrepancies between actual installation and contract documents.

1.4 QUALITY ASSURANCE

- A. Codes and Standards: Comply with provisions of following, except as otherwise indicated:
1. American Institute of Steel Construction (AISC) "Code of Standard Practice for Steel Buildings and Bridges."
 - a. Paragraph 4.2.1 of the above code is hereby modified by deletion of the following sentence:
 - 1) "This approval constitutes the owner's acceptance of all responsibility for the design adequacy of any detail configuration of connections developed by the fabricator as a part of his preparation of these shop drawings."
 2. AISC "Specifications for Structural Steel Buildings," including "Commentary."
 3. "Specifications for Structural Joints using ASTM A 325 or A 490 Bolts" approved by the Research Council on Structural Connections.
 4. American Welding Society (AWS) D1.1 "Structural Welding Code - Steel."
 5. ASTM A 6 "General Requirements for Delivery of Rolled Steel Plates, Shapes, Sheet Piling and Bars for Structural Use."
- B. Qualifications for Welding Work: Qualify welding procedures and welding operators in accordance with AWS "Qualification" requirements.
1. Provide certification that welders to be employed in work have satisfactorily passed AWS qualification tests.
 2. If recertification of welders is required, retesting will be Contractor's responsibility.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials to site at such intervals to ensure uninterrupted progress of work.
- B. Deliver anchor bolts and anchorage devices, which are to be embedded in cast-in-place concrete or masonry, in ample time to not to delay work.
- C. Store materials to permit easy access for inspection and identification. Keep steel members off ground by using pallets, platforms, or other supports. Protect steel members and packaged materials from erosion and deterioration. If bolts and nuts become dry or rusty, clean and relubricate before use.
1. Do not store materials on structure in a manner that might cause distortion or damage to members or supporting structures. Repair or replace damaged materials or structures as directed.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Metal Surfaces, General: For fabrication of work that will be exposed to view, use only materials that are smooth and free of surface blemishes including pitting, rust and scale seam marks, roller marks, rolled trade names, and roughness. Remove such blemishes by grinding, or by welding and grinding, prior to cleaning,

treating, and applying surface finishes.

- B. Structural Steel Shapes, Plates, and Bars: ASTM A 36.
- C. Cold-Formed Steel Tubing: ASTM A 500, Grade B.
- D. Hot-Formed Steel Tubing: ASTM A 501.
- E. Steel Pipe: ASTM A 53, Type E or S, Grade B; or ASTM A 501.
 - 1. Finish: Black, except where indicated to be galvanized.
- F. Steel Castings: ASTM A 27, Grade 65-35, medium-strength carbon steel.
- G. Headed Stud-Type Shear Connectors: ASTM A 108, Grade 1015 or 1020, cold-finished carbon steel with dimensions complying with AISC Specifications.
- H. Anchor Bolts: ASTM A 307, nonheaded type unless otherwise indicated.
- I. Unfinished Threaded Fasteners: ASTM A 307, Grade A, regular low-carbon steel bolts and nuts.
 - 1. Provide hexagonal heads and nuts for all connections.
 - 2. Provide either hexagonal or square heads and nuts, except use only hexagonal units for exposed connections.
- J. High-Strength Threaded Fasteners: Heavy hexagon structural bolts, heavy hexagon nuts, and hardened washers, as follows:
 - 1. Quenched and tempered medium-carbon steel bolts, nuts, and washers, complying with ASTM A 325.
 - a. Where indicated as galvanized, provide units that are zinc coated, either mechanically deposited complying with ASTM B 695, Class 50, or hot-dip galvanized complying with ASTM A 153.
 - 2. Quenched and tempered alloy steel bolts, nuts, and washers, complying with ASTM A 490.
- K. Direct Tension Indicators: ASTM F 959, type as required.
 - 1. Use at Contractor's option.
- L. Electrodes for Welding: Comply with AWS Code.
- M. Structural Steel Primer Paint: GPA-313
- N. Cement Grout: Portland cement (ASTM C 150, Type I or Type III) and clean, uniformly graded, natural sand (ASTM C 404, Size No. 2). Mix at a ratio of 1.0 part cement to 3.0 parts sand, by volume, with minimum water required for placement and hydration.
- O. Metallic Shrinkage-Resistant Grout: Premixed factory-packaged ferrous aggregate grouting compound.
 - 1. Available Products: Subject to compliance with requirements, products that may be incorporated in the work include, but are not limited to, the following:
 - 2. Products: Subject to compliance with requirements, provide one of the following:

- a. 100 Non-Shrink Grout (Metallic); Conspec, Inc.
 - b. Firmix; Euclid Chemical Co.
 - c. Vibra-Foil; W. R. Grace.
 - d. Ferrogrout; L & M Construction Chemicals, Inc.
 - e. Embeco 885; Master Builders.
 - f. Protalico; Protex Industries, Inc.
 - g. Kemox G; Sika Corporation.
 - h. Ferrolith G; Sonneborn/Rexnord.
- P. Nonmetallic Shrinkage-Resistant Grout: Premixed, nonmetallic, noncorrosive, nonstaining product containing selected silica sands, Portland cement, shrinkage compensating agents, plasticizing and water-reducing agents, complying with CE-CRD-C621.
1. Available Products: Subject to compliance with requirements, products that may be incorporated in the work include, but are not limited to, the following:
 2. Products: Subject to compliance with requirements, provide one of the following:
 - a. 100 Non-Shrink Grout (Non-Metallic); Conspec, Inc.
 - b. Supreme Grout; Cormix, Inc.
 - c. Sure Grip Grout; Dayton Superior.
 - d. Euco N.S.; Euclid Chemical Co.
 - e. Crystex; L & M Construction Chemicals, Inc.
 - f. Masterflow 713; Master Builders.
 - g. Sealtight 588 Grout; W. R. Meadows.
 - h. Propak; Protex Industries, Inc.
 - i. Set Non-Shrink; Set Products, Inc.
 - j. Five Star Grout; U.S. Grout Corp.

2.2 FABRICATION

- A. Shop Fabrication and Assembly: Fabricate and assemble structural assemblies in shop to greatest extent possible. Fabricate items of structural steel in accordance with AISC Specifications and as indicated on final shop drawings. Provide camber in structural members where indicated.
1. Properly mark and match-mark materials for field assembly. Fabricate for delivery sequence that will expedite erection and minimize field handling of materials.
 2. Where finishing is required, complete assembly, including welding of units, before start of finishing operations. Provide finish surfaces of members exposed in final structure free of markings, burrs, and other defects.
- B. Connections: Weld or bolt shop connections, as indicated.
- C. Bolt field connections, except where welded connections or other connections are indicated.
1. Provide high-strength threaded fasteners for principal bolted connections, except where unfinished bolts are indicated.
 2. Provide unfinished threaded fasteners for only bolted connections of secondary framing members to primary members (including purlins, girts, and other framing members taking only nominal stresses) and for temporary bracing to facilitate erection.
- D. High-Strength Bolted Construction: Install high-strength threaded fasteners in accordance with AISC "Specifications for Structural Joints using ASTM A 325 or A 490 Bolts."
- E. Welded Construction: Comply with AWS Code for procedures, appearance and quality of welds, and "Webb County Youth Rehabilitation Center" Laredo, Texas

methods used in correcting welding work.

- F. Assemble and weld built-up sections by methods that will produce true alignment of axes without warp.
- G. Shear Connectors: Prepare steel surfaces as recommended by manufacturer of shear connectors. Weld shear connectors in field, spaced as shown, to beams and girders in composite construction. Use automatic end welding of headed stud shear connectors in accordance with manufacturer's printed instructions.
- H. Steel Wall Framing: Select members that are true and straight for fabrication of steel wall framing. Straighten as required to provide uniform, square, and true members in completed wall framing.
- I. Build up welded door frames attached to structural steel framing. Weld exposed joints continuously and grind smooth. Plug-weld steel bar stops to frames, except where shown removable. Secure removable stops to frames with countersunk, cross-recessed head machine screws, uniformly spaced not more than 10 inches o.c., unless otherwise indicated.
- J. Holes for Other Work: Provide holes required for securing other work to structural steel framing and for passage of other work through steel framing members, as shown on final shop drawings.
- K. Provide threaded nuts welded to framing and other specialty items as indicated to receive other work.
- L. Cut, drill, or punch holes perpendicular to metal surfaces. Do not flame-cut holes or enlarge holes by burning. Drill holes in bearing plates.
- M. Expansion Joints: Provide expansion joints in steel shelf angles when part of structural steel frame; locate at vertical brick expansion joints as indicated on drawings.

2.3 SHOP PAINTING

- A. General: Shop-paint structural steel, except those members or portions of members to be embedded in concrete or mortar. Paint embedded steel that is partially exposed on exposed portions and initial 2 inches of embedded areas only.
 - 1. Do not paint surfaces to be welded or high-strength bolted with friction-type connections.
 - 2. Do not paint surfaces scheduled to receive sprayed-on fireproofing.
 - 3. Apply 2 coats of paint to surfaces that are inaccessible after assembly or erection. Change color of second coat to distinguish it from first.
- B. Surface Preparation: After inspection and before shipping, clean steelwork to be painted. Remove loose rust, loose mill scale, and spatter, slag, or flux deposits. Clean steel in accordance with Steel Structures Painting Council (SSPC) as follows:
 - 1. SP-1 "Solvent Cleaning."
- C. Painting: Immediately after surface preparation, apply structural steel primer paint in accordance with manufacturer's instructions and at a rate to provide dry film thickness of not less than 1.5 mils. Use painting methods that result in full coverage of joints, corners, edges, and exposed surfaces.
- D. Painting: Provide a one-coat, shop-applied paint system complying with Steel Structures Painting Council (SSPC) Paint System Guide No. 7.00.

2.4 SOURCE QUALITY CONTROL

- A. General: Materials and fabrication procedures are subject to inspection and tests in mill, shop, and field, conducted by a qualified inspection agency. Such inspections and tests will not relieve Contractor of responsibility for providing materials and fabrication procedures in compliance with specified requirements.
 - 1. Promptly remove and replace materials or fabricated components that do not comply.
- B. Design of Members and Connections: Details shown are typical; similar details apply to similar conditions, unless otherwise indicated. Verify dimensions at site whenever possible without causing delay in the work.
 - 1. Promptly notify Engineer whenever design of members and connections for any portion of structure are not clearly indicated.

PART 3 - EXECUTION

3.1 ERECTION

- A. Surveys: Employ a licensed land surveyor for accurate erection of structural steel. Check elevations of concrete and masonry bearing surfaces, and locations of anchor bolts and similar devices, before erection work proceeds, and report discrepancies to Architect. Do not proceed with erection until corrections have been made or until compensating adjustments to structural steel work have been agreed upon with Engineer.
 - B. Temporary Shoring and Bracing: Provide temporary shoring and bracing members with connections of sufficient strength to bear imposed loads. Remove temporary members and connections when permanent members are in place and final connections are made. Provide temporary guy lines to achieve proper alignment of structures as erection proceeds.
 - C. Temporary Planking: Provide temporary planking and working platforms as necessary to effectively complete work.
 - D. Setting Bases and Bearing Plates: Clean concrete and masonry bearing surfaces of bond-reducing materials and roughen to improve bond to surfaces. Clean bottom surface of base and bearing plates.
 - 1. Set loose and attached base plates and bearing plates for structural members on wedges or other adjusting devices.
 - 2. Tighten anchor bolts after supported members have been positioned and plumbed. Do not remove wedges or shims, but if protruding, cut off flush with edge of base or bearing plate prior to packing with grout.
 - 3. Pack grout solidly between bearing surfaces and bases or plates to ensure that no voids remain. Finish exposed surfaces, protect installed materials, and allow to cure.
 - 4. For proprietary grout materials, comply with manufacturer's instructions.
 - E. Field Assembly: Set structural frames accurately to lines and elevations indicated. Align and adjust various members forming part of complete frame or structure before permanently fastening. Clean bearing surfaces and other surfaces that will be in permanent contact before assembly. Perform necessary adjustments to compensate for discrepancies in elevations and alignment.
 - F. Level and plumb individual members of structure within specified AISC tolerances.
 - G. Establish required leveling and plumbing measurements on mean operating temperature of structure. Make allowances for difference between temperature at time of erection and mean temperature at which structure will be when completed and in service.
 - H. Splice members only where indicated and accepted on shop drawings.
 - I. Erection Bolts: On exposed welded construction, remove erection bolts, fill holes with plug welds, and
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grind smooth at exposed surfaces.

1. Comply with AISC Specifications for bearing, adequacy of temporary connections, alignment, and removal of paint on surfaces adjacent to field welds.
 2. Do not enlarge unfair holes in members by burning or by using drift pins, except in secondary bracing members. Ream holes that must be enlarged to admit bolts.
- J. Gas Cutting: Do not use gas cutting torches in field for correcting fabrication errors in primary structural framing. Cutting will be permitted only on secondary members that are not under stress, as acceptable to Architect. Finish gas-cut sections equal to a sheared appearance when permitted.
- K. Touch-Up Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas of shop paint. Apply paint to exposed areas using same material as used for shop painting.
1. Apply by brush or spray to provide minimum dry film thickness of 1.5 mils.
- L. Touch-Up Painting: Cleaning and touch-up painting of field welds, bolted connections, and abraded areas of shop paint on structural steel is included in Division 9 under painting work.

3.2 QUALITY CONTROL

- A. Owner will engage an independent testing and inspection agency to inspect high-strength bolted connections and welded connections and to perform tests and prepare test reports.
- B. Testing agency shall conduct and interpret tests, state in each report whether test specimens comply with requirements, and specifically state any deviations therefrom.
- C. Provide access for testing agency to places where structural steel work is being fabricated or produced so that required inspection and testing can be accomplished.
- D. Testing agency may inspect structural steel at plant before shipment.
- E. Correct deficiencies in structural steel work that inspections and laboratory test reports have indicated to be not in compliance with requirements. Perform additional tests, at Contractor's expense, as necessary to reconfirm any noncompliance of original work and to show compliance of corrected work.
- F. Shop-Bolted Connections: Inspect or test in accordance with AISC specifications.
1. Verify that gaps of installed Direct Tension Indicators are less than gaps specified in ASTM F 959, Table 2.
- G. Shop Welding: Inspect and test during fabrication of structural steel assemblies, as follows:
1. Certify welders and conduct inspections and tests as required. Record types and locations of defects found in work. Record work required and performed to correct deficiencies.
 2. Perform visual inspection of all welds.
 3. Perform tests of welds as follows. Inspection procedures listed are to be used at Contractor's option.
 - a. Liquid Penetrant Inspection: ASTM E 165.
 - b. Magnetic Particle Inspection: ASTM E 709; performed on root pass and on finished weld. Cracks or zones of incomplete fusion or penetration not acceptable.
 - c. Radiographic Inspection: ASTM E 94 and ASTM E 142; minimum quality level "2-2T."
 - d. Ultrasonic Inspection: ASTM E 164.
- H. Field-Bolted Connections: Inspect in accordance with AISC specifications.

- 1 For Direct Tension Indicators, comply with requirements of ASTM F 959. Verify that gaps are less than gaps specified in Table 2.
- I. Field Welding: Inspect and test during erection of structural steel as follows:
- 2 Certify welders and conduct inspections and tests as required. Record types and locations of defects found in work. Record work required and performed to correct deficiencies.
 - 3 Perform visual inspection of all welds.
 - 4 Perform tests of welds as follows:
 - a. Liquid Penetrant Inspection: ASTM E 165.
 - b. Magnetic Particle Inspection: ASTM E 709; performed on root pass and on finished weld. Cracks or zones of incomplete fusion or penetration not acceptable.
 - c. Radiographic Inspection: ASTM E 94 and ASTM E 142; minimum quality level "2-2T."
 - d. Ultrasonic Inspection: ASTM E 164.

END OF SECTION 051200

SECTION 052200STEEL JOISTS AND JOIST GIRDERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes steel joists and joist girders for floor and roof framing. Types of joists required include the following:
 - 1. K-Series Open Web Steel Joists.
 - 2. LH-Series Longspan Steel Joists.
 - 3. DLH-Series Deep Longspan Steel Joists.
 - 4. Joist Girders.
- B. Refer to Division 3 Sections for installation of anchors set in concrete.
- C. Refer to Division 4 Sections for installation of anchors set in masonry.

1.3 SUBMITTALS

- A. General: Submit the following in accordance with Conditions of Contract and Division 1 Specification Sections.
- B. Product data and installation instructions for each type of joist and accessories.
 - 1. Include manufacturer's certification that joists comply with SJI "Specifications."
- C. Shop drawings showing layout of joist members, special connections, joining and accessories. Include mark, number, type, location and spacing of joists and bridging.
 - 1. Provide templates or location drawings for installation of anchor bolts and metal bearing plates.

1.4 QUALITY ASSURANCE

- A. General: Provide joists fabricated in compliance with Steel Joist Institute (SJI) "Standard Specifications, Load Tables and Weight Tables for Steel Joists and Joist Girders."
- B. Qualification of Field Welding: Qualify welding processes and welding operators in accordance with American Welding Society (AWS) "Structural Welding Code - Steel," AWS D1.1.
- C. Inspection: Inspect joists and girders in accordance with SJI "Specifications."

1.5 DELIVERY, STORAGE AND HANDLING

- A. Deliver, store and handle steel joists as recommended in SJI "Specifications." Handle and store joists in a manner to avoid deforming members and to avoid excessive stresses.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Steel: Comply with SJI "Specifications" for chord and web sections.
- B. Steel Bearing Plates: ASTM A 36.
- C. Unfinished Threaded Fasteners: ASTM A 307, Grade A, regular hexagon type, low carbon steel.
- D. Steel Prime Paint: Comply with SJI "Specifications."
- E. Steel Prime Paint: Manufacturer's standard.

2.2 FABRICATION

- A. General: Fabricate steel joists in accordance with SJI "Specification."
- B. Holes in Chord Members: Provide holes in chord members where shown for securing other work to steel joists; however, deduct area of holes from the area of chord when calculating strength of member.
- C. Extended End: Provide extended ends on joists where indicated, complying with SJI "Specifications" and load tables.
- D. Ceiling Extension: Provide ceiling extensions in areas having ceilings attached directly to joist bottom chord. Provide either an extended bottom chord element or a separate unit, to suit manufacturer's standards, of sufficient strength to support ceiling construction. Extend ends to within 1/2 inch of finished wall surface, unless otherwise indicated.
- E. Top Chord Extension: Provide top chord extensions ("S" type) on joists where indicated, complying with SJI "Specifications" and load tables.
- F. Bridging: Provide horizontal or diagonal type bridging for joists and joist girders, complying with SJI "Specifications."
 - 1. Provide bridging anchors for ends of bridging lines terminating at walls or beams.
- G. End Anchorage: Provide end anchorages, including steel bearing plates, to secure joists to adjacent construction, complying with SJI "Specifications."
- H. Header Units: Provide header units to support tail joists at openings in floor or roof system not framed with steel shapes.
- I. Shop Painting: Remove loose scale, heavy rust, and other foreign materials from fabricated joists and accessories before application of shop paint.
 - 1. Apply one shop coat of steel prime paint to joists and accessories, by spraying, dipping, or other method to provide a continuous dry paint film thickness of not less than 0.50 mil.

PART 3 - EXECUTION

3.1 ERECTION

- A. Place and secure steel joists in accordance with SJI "Specifications," final shop drawings, and as herein specified.
- B. Anchors: Furnish anchor bolts, steel bearing plates, and other devices to be built into concrete and masonry construction.
 - 1. Provide unfinished threaded fasteners for anchor bolts, unless high strength bolts indicated.
- C. Placing Joists: Do not start placement of steel joists until supporting work is in place and secured. Place joists on supporting work, adjust and align in accurate locations and spacing before permanently fastening.
- D. Provide temporary bridging, connections, and anchors to ensure lateral stability during construction.
 - 1. Where "open-web" joist lengths are 40 feet and longer, install a center row of bolted bridging to provide lateral stability before slackening of hoisting lines.
- E. Bridging: Install bridging simultaneously with joist erection, before construction loads are applied. Anchor ends of bridging lines at top and bottom chords where terminating at walls or beams.
- F. Fastening Joists: Comply with the following:
 - 1. Field weld joists to supporting steel framework and steel bearing plates where indicated in accordance with SJI "Specifications" for type of joists used. Coordinate welding sequence and procedure with placing of joists.
 - 2. Bolt joists to supporting steel framework in accordance with SJI "Specifications" for type of joists used.
 - a. Use unfinished threaded fasteners for bolted connections, unless otherwise indicated.
- G. Touch-Up Painting: After joist installation, wire brush welded areas, abraded or rusty surfaces, and clean with solvent. Paint field-applied bolt heads and nuts and prepared surfaces on joists and steel supporting members. Use same type of paint as used for shop painting.
- H. Touch-Up Painting: Cleaning and touch-up painting of field welds, abraded areas, and rust spots of shop painting is included under Division 9 painting work.

END OF SECTION 052200

SECTION 053100

STEEL DECK

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this section.

1.2 SUMMARY

- A. This Section includes steel deck units for floor and roof applications.
- B. Header Duct used in conjunction with cellular metal floor deck is specified in Division 16; it is not work of this section.

1.3 SUBMITTALS

- A. General: Submit the following in accordance with Conditions of Contract and Division 1 Specification Sections.
 - 1. Product data including manufacturer's specifications and installation instructions for each type of decking and accessories.
 - a. Provide test data for mechanical fasteners used in lieu of welding for fastening deck to supporting structures.
 - 2. Shop drawings showing layout and types of deck units, anchorage details, and conditions requiring closure strips, supplementary framing, sump pans, cant strips, cut openings, special jointing, and other accessories.

1.4 QUALITY ASSURANCE

- A. Codes and Standards: Comply with provisions of the following codes and standards, except as otherwise indicated:
 - 1. American Iron and Steel Institute (AISI), "Specification for the Design of Cold-Formed Steel Structural Members."
 - 2. American Welding Society (AWS), D1.3 "Structural Welding Code - Sheet Steel."
 - 3. Steel Deck Institute (SDI), "Design Manual for Composite Decks, Form Decks and Roof Decks."
- B. Qualification of Field Welding: Use qualified welding processes and welding operators in accordance with "Welder Qualification" procedures of AWS.
 - 1. Welded decking in place is subject to inspection and testing. Owner will bear expense of removing and replacing portions of decking for testing purposes if welds are found to be satisfactory. Remove work found to be defective and replace with new acceptable work.
- C. Underwriters' Label: Provide metal floor deck units listed in Underwriters' Laboratories "Fire Resistance "Webb County Youth Village Rehabilitation Center" Laredo, Texas

Directory", with each deck unit bearing the UL label and marking for specific system detailed.

1. Provide cellular floor deck units listed in UL "Electrical Construction Materials Directory" with each cellular metal floor deck unit bearing UL labels and marking. Provide units that will permit use of standard header ducts and outlets for electrical distribution systems.
- D. FM Listing: Provide steel roof deck units that have been evaluated by Factory Mutual System and are listed in "Factory Mutual Approval Guide" for "Class I" fire-rated construction.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated in the work include but are not limited to the following:
- B. Manufacturers: Subject to compliance with requirements, provide products of one of the following:
1. Bowman Metal Deck Div., Cyclops Corp.
 2. Consolidated Systems, Inc.
 3. Epic Metals Corp.
 4. Marlyn Steel Products, Inc.
 5. H. H. Robertson Co.
 6. Roll Form Products, Inc.
 7. Roof Deck, Inc.
 8. United Steel Deck, Inc.
 9. Vulcraft Div., Nucor Corp.
 10. Wheeling Corrugating Co.

2.2 MATERIALS

- A. Steel for Painted Metal Deck Units: ASTM A 611, grade as required to comply with SDI specifications.
- B. Steel for Galvanized Metal Deck Units: ASTM A 446, grade as required to comply with SDI specifications.
- C. Miscellaneous Steel Shapes: ASTM A 36.
- D. Shear Connectors: Headed stud type, ASTM A 108, Grade 1015 or 1020, cold-finished carbon steel, with dimensions complying with AISC specifications.
- E. Shear Connectors: Strap type, ASTM A 570, Grade D, hot-rolled carbon steel.
- F. Sheet Metal Accessories: ASTM A 526, commercial quality, galvanized.
- G. Galvanizing: ASTM A 525, G60.
- H. Galvanizing Repair: Where galvanized surfaces are damaged, prepare surfaces and repair in accordance with procedures specified in ASTM A 780.
- I. Paint: Manufacturer's baked-on, rust-inhibitive paint, for application to metal surfaces that have been chemically cleaned and phosphate chemical treated.

- J. Flexible Closure Strips: Manufacturer's standard vulcanized, closed-cell, synthetic rubber.
- K. Acoustic Sound Barrier Closures: Manufacturer's standard mineral fiber closures.

2.3 FABRICATION

- A. General: Form deck units in lengths to span three or more supports, with flush, telescoped, or nested 2-inch laps at ends and interlocking or nested side laps, of metal thickness, depth, and width as indicated.
- B. Roof Deck Units: Provide deck configurations that comply with SDI "Specifications and Commentary for Steel Roof Deck."
- C. Acoustical Roof Deck Units:
 - 1. Single-pan units: Single-pan fluted units with vertical webs perforated with approximate 5/32-inch-diameter holes staggered 3/8-inch o.c. Provide mineral fiber acoustical insulation strips of profile to fit void space between vertical ribs.
 - 2. Multiple-pan cellular units: Composite units consisting of upper fluted section combined with lower flat plate section having interlocking side laps and approximate 5/32-inch perforations staggered on 3/8-inch centers under cells formed by upper unit. Provide mineral fiber acoustical insulation strips of profile to fit void space of each cell.
- D. Non-Composite Steel Form Deck: Provide fluted sections of metal deck as permanent forms for reinforced concrete slabs.
- E. Cellular Metal Floor Deck Units:
 - 1. Fabricate flat-bottom units with top fluted section cells combined on a lower flat plate, of metal thickness, depth, and width of unit, number of cells per unit, and width of cells as indicated.
 - 2. Fabricate double-cell units with top fluted section cells combined with matching fluted bottom section, of metal thickness, depth, and width of units, number of cells per unit, and width of cells as indicated.
 - 3. Provide sufficient welds, forming sheets into cellular floor deck units to develop full horizontal shear strength at plane where steel sheets are joined.
- F. Composite Steel Floor Deck: Fabricate deck units with integral embossing or raised pattern to furnish mechanical bond with concrete slabs. Fabricate open-beam deck units with fluted section having interlocking side laps.
- G. Metal Cover Plates: Fabricate metal cover plates for end-abutting floor deck units of not less than same thickness as decking. Form to match contour of deck units and approximately 6 inches wide.
- H. Metal Closure Strips: Fabricate metal closure strips, for cell raceways and openings between decking and other construction, of not less than 0.045-inch min. (18 gage) sheet steel. Form to provide tight-fitting closures at open ends of cells or flutes and sides of decking.
- I. Roof Sump Pans: Fabricate from single piece of 0.071-inch min. (14 gage) galvanized sheet steel with level bottoms and sloping sides to direct water flow to drain. Provide sump pans of adequate size to receive roof drains and with bearing flanges not less than 3 inches wide. Recess pans not less than 1-1/2 inches below roof deck surface unless otherwise shown or required by deck configuration. Holes for drains will be cut in the field by others.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. General: Install deck units and accessories in accordance with manufacturer's recommendations, shop drawings, and as specified herein.
- B. Place deck units on supporting steel framework and adjust to final position with ends accurately aligned and bearing on supporting members before being permanently fastened. Do not stretch or contract side lap interlocks.
- C. Align deck units for entire length of run of cells and with close alignment between cells at ends of abutting units.
- D. Place deck units flat and square, secured to adjacent framing without warp or deflection.
- E. Do not place deck units on concrete supporting structure until concrete has cured and is dry.
- F. Coordinate and cooperate with structural steel erector in locating decking bundles to prevent overloading of structural members.
- G. Do not use floor deck units for storage or working platforms until permanently secured.
- H. Fastening Deck Units (U.N.O. on plans):
 - 1. Fasten floor deck units to steel supporting members by nominal 5/8- inch puddle welds or elongated welds of equal strength, spaced not more than 12 inches o.c. with a minimum of two welds per unit at each support.
 - 2. Tack weld or use self-tapping No. 8 or larger machine screws at 4 feet o.c. for fastening end closures.
 - 3. Fasten roof deck units to steel supporting members by not less than 1/2-inch-diameter puddle welds or elongated welds of equal strength, spaced not more than 12 inches at every support, and at closer spacing where indicated. In addition, secure deck to each supporting member in ribs where side laps occur.
 - 4. Comply with AWS requirements and procedures for manual shielded metal arc welding, appearance and quality of welds, and methods used in correcting welding work.
 - a. Use welding washers where recommended by deck manufacturer.
 - 5. Mechanical fasteners, either powder-actuated or pneumatically driven, may be used in lieu of welding. Locate mechanical fasteners and install in accordance with deck manufacturer's instructions.
 - 6. Mechanically fasten side laps of adjacent deck units between supports, at intervals not exceeding 36 inches o.c., using self-tapping No. 8 or larger machine screws.
 - 7. Uplift Loading: Install and anchor roof deck units to resist gross uplift loading of 45 lbs. psf at eave overhang and 30 lbs. psf for other roof areas U.N.O. on plans.
 - a. Keep the interiors of cells that will be used as raceways free of welds having sharp points or edges.
- I. Cutting and Fitting: Cut and neatly fit deck units and accessories around other work projecting through or adjacent to the decking, as shown.

- J. Reinforcement at Openings: Provide additional metal reinforcement and closure pieces as required for strength, continuity of decking, and support of other work shown.
- K. Hanger Slots or Clips: Provide UL-approved punched hanger slots between cells or flutes of lower element where floor deck units are to receive hangers for support of ceiling construction, air ducts, diffusers, or lighting fixtures.
1. Hanger clips designed to clip over male side lap joints of floor deck units may be used instead of hanger slots.
 2. Locate slots or clips at not more than 14 inches o.c. in both directions, not over 9 inches from walls at ends, and not more than 12 inches from walls at sides, unless otherwise indicated.
 3. Provide manufacturer's standard hanger attachment devices.
- L. Joint Covers: Provide metal joint covers at abutting ends and changes in direction of floor deck units, except where taped joints are required.
- M. Roof Sump Pans: Place over openings provided in roof decking and weld to top decking surface. Space welds not more than 12 inches o.c. with at least one weld at each corner.
- N. Shear Connectors: Weld shear connectors to supports through decking units in accordance with manufacturer's instructions. Do not weld shear connectors through two layers (lapped ends) of decking units. Weld only on clean, dry deck surfaces.
- O. Closure Strips: Provide metal closure strips at open uncovered ends and edges of roof decking and in voids between decking and other construction. Weld into position to provide a complete decking installation.
1. Provide flexible closure strips instead of metal closures, at Contractor's option, wherever their use will ensure complete closure. Install with adhesive in accordance with manufacturer's instructions.
- P. Touch-Up Painting: After decking installation, wire brush, clean, and paint scarred areas, welds, and rust spots on top and bottom surfaces of decking units and supporting steel members.
1. Touch-up galvanized surfaces with galvanizing repair paint applied in accordance with manufacturer's instructions.
 2. Touch-up painted surfaces with same type of shop paint used on adjacent surfaces.
- Q. In areas where shop-painted surfaces are to be exposed, apply touch-up paint to blend into adjacent surfaces.
- R. Touch-Up Painting: Cleaning and touch-up painting of field welds, abraded areas, and rust spots, as required after erection and before proceeding with field painting, is included in Division 9 under "Painting."

END OF SECTION 053100

SECTION 054000

COLD-FORMED METAL FRAMING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this section.

1.2 SUMMARY

- A. Types of cold-formed metal framing units include the following:
 - 1. Load-bearing punched channel studs.
 - 2. C-shaped load-bearing steel studs.

1.3 SUBMITTALS

- A. General: Submit the following in accordance with Conditions of Contract and Division 1 Specification Sections.
 - 1. Product data and installation instructions for each item of cold-formed metal framing and accessories.

1.4 QUALITY ASSURANCE

- A. Component Design: Calculate structural properties of studs and joists in accordance with American Iron and Steel Institute (AISI) "Specification for Design of Cold-Formed Steel Structural Members."
- B. Welding: Use qualified welders and comply with American Welding Society (AWS) D1.3, "Structural Welding Code - Sheet Steel."
- C. Fire-Rated Assemblies: Where framing units are components of assemblies indicated for a fire-resistance rating, including those required for compliance with governing regulations, provide units that have been approved by governing authorities that have jurisdiction.
- D. Pre-Installation Conference: Prior to start of installation of metal framing systems, meet at project site with installers of other work including door and window frames and mechanical and electrical work. Review areas of potential interference and conflicts, and coordinate layout and support provisions for interfacing work.
 - 1. Coordinate with provisions of Division 1 Section "Project Meetings."

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that "Webb County Youth Village Rehabilitation Center" Laredo, Texas

may be incorporated in the work include but are not limited to the following:

- B. Manufacturers: Subject to compliance with requirements, provide products of one of the following:
 - 1. Alabama Metal Industries Corp.
 - 2. Dale Industries, Inc.
 - 3. Dietrich Industries, Inc.
 - 4. Marino Industries, Inc.
 - 5. Superior Steel Studs, Inc.
 - 6. USG Industries
 - 7. United States Steel
 - 8. Wheeling Corrugating Co.

2.2 METAL FRAMING

- A. System Components: Manufacturers' standard load-bearing steel studs and joists of type, size, shape, and gage as indicated. With each type of metal framing required, provide manufacturer's standard, steel runners (tracks), blocking, lintels, clip angles, shoes, reinforcements, fasteners, and accessories for applications indicated, as needed to provide a complete metal framing system.
- B. Materials and Finishes:
 - 1. For 18-gage and lighter units, fabricate metal framing components of commercial quality steel sheet with a minimum yield point of 33,000 psi; ASTM A 446, A 570, or A 611.
 - 2. Provide galvanized finish to metal framing components complying with ASTM A 525 for minimum G 60 coating.
 - a. Finish of installation accessories to match that of main framing components, unless otherwise indicated.
 - 3. Fasteners: Provide nuts, bolts, washers, screws, and other fasteners with corrosion-resistant plated finish.
 - 4. Electrodes for Welding: Comply with AWS Code and as recommended by stud manufacturer.
 - 5. Galvanizing Repair: Where galvanized surfaces are damaged, prepare surfaces and repair in accordance with procedures specified in ASTM A 780.

2.3 FABRICATION

- A. General: Framing components may be prefabricated into assemblies before erection. Fabricate panels plumb, square, true to line, and braced against racking with joints welded. Perform lifting of prefabricated units to prevent damage or distortion.
- B. Fabricate units in jig templates to hold members in proper alignment and position and to assure consistent component placement.
- C. Fastenings: Attach similar components by welding. Attach dissimilar components by welding, bolting, or screw fasteners, as standard with manufacturer.
- D. Wire tying of framing components is not permitted.
- E. Fabrication Tolerances: Fabricate units to a maximum allowable tolerance variation from plumb, level, and true to line of 1/8 inch in 10 feet.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. General: Install metal framing systems in accordance with manufacturer's printed or written instructions and recommendations.
- B. Runner Tracks: Install continuous tracks sized to match studs. Align tracks accurately to layout at base and tops of studs. Secure tracks as recommended by stud manufacturer for type of construction involved, except do not exceed 24 inches o.c. spacing for nail or power-driven fasteners or 16 inches o.c. for other types of attachment. Provide fasteners at corners and ends of tracks.
- C. Installation of Wall Studs: Secure studs to top and bottom runner tracks by either welding or screw fastening at both inside and outside flanges.
- D. Set studs plumb, except as needed for diagonal bracing or required for nonplumb walls or warped surfaces and similar requirements.
- E. Where stud system abuts structural columns or walls, including masonry walls, anchor ends of stiffeners to supporting structure.
- F. Install supplementary framing, blocking, and bracing in metal framing system wherever walls or partitions are indicated to support fixtures, equipment, services, casework, heavy trim and furnishings, and similar work requiring attachment to the wall or partition. Where type of supplementary support is not otherwise indicated, comply with stud manufacturer's recommendations and industry standards in each case, considering weight or loading resulting from item supported.
- G. Frame wall openings larger than 2 feet square with double stud at each jamb of frame except where more than two are either shown or indicated in manufacturer's instructions. Install runner tracks and jack studs above and below wall openings. Anchor tracks to jamb studs with stud shoes or by welding, and space jack studs same as full-height studs of wall. Secure stud system wall opening frame in manner indicated.
- H. Frame both sides of expansion and control joints with separate studs; do not bridge the joint with components of stud system.
- I. Install horizontal stiffeners in stud system, spaced (vertical distance) at not more than 54 inches o.c. Weld at each intersection.
- J. Erection Tolerances: Bolt or weld wall panels (at both horizontal and vertical junctures) to produce flush, even, true-to-line joints.
 - 1. Maximum variation in plane and true position between prefabricated assemblies should not exceed 1/16 inch.

END OF SECTION 054000

SECTION 054100

COLD-FORMED METAL FRAMING – NON-LOAD BEARING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Exterior non-load-bearing wall framing.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of cold-formed steel framing product and accessory.

1.3 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For testing agency.
- B. Welding certificates.
- C. Product test reports.
- D. Research reports.

1.4 QUALITY ASSURANCE

- A. Product Tests: Mill certificates or data from a qualified independent testing agency.
- B. Welding Qualifications: Qualify procedures and personnel according to AWS D1.3/D1.3M, "Structural Welding Code - Sheet Steel."

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
1. AllSteel & Gypsum Products, Inc.
 2. ClarkWestern Building Systems, Inc.
 3. Craco Mfg., Inc.
 4. Dietrich Metal Framing; a Worthington Industries company.
 5. MarinoWARE.
 6. Nuconsteel; a Nucor Company.
 7. SCAFCO Corporation.
 8. Southeastern Stud & Components, Inc.
 9. State Building Products, Inc.

10. Steel Construction Systems.
11. Steel Structural Systems.
12. United Metal Products, Inc.
13. United Steel Manufacturing.

2.2 PERFORMANCE REQUIREMENTS

- A. AISI Specifications and Standards: Unless more stringent requirements are indicated, comply with AISI S100 and AISI S200.
- B. Fire-Resistance Ratings: Comply with ASTM E 119; testing by a qualified testing agency.
 1. Indicate design designations from UL's "Fire Resistance Directory" or from the listings of another qualified testing agency.

2.3 COLD-FORMED STEEL FRAMING, GENERAL

- A. Recycled Content of Steel Products: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 25 percent.
- B. Steel Sheet: ASTM A 1003/A 1003M, Structural Grade, Type H, metallic coated, of grade and coating weight as follows:
 1. Grade: As required by structural performance.
 2. Coating: Complying with ASTM A 525 minimum G 60 coating.
- C. Steel Sheet for Clips: ASTM A 653/A 653M, structural steel, zinc coated, of grade and coating as follows:
 1. Grade: As required by structural performance.
 2. Coating: G60 (Z180).

2.4 FRAMING ACCESSORIES

- A. Fabricate steel-framing accessories from steel sheet, ASTM A 1003/A 1003M, Structural Grade, Type H, metallic coated, of same grade and coating weight used for framing members.
- B. Provide accessories of manufacturer's standard thickness and configuration.

2.5 ANCHORS, CLIPS, AND FASTENERS

- A. Steel Shapes and Clips: ASTM A 36/A 36M, zinc coated by hot-dip process according to ASTM A 123/A 123M.
- B. Anchor Bolts: ASTM F 1554, Grade 55, threaded carbon-steel hex-headed bolts and carbon-steel nuts; and flat, hardened-steel washers; zinc coated by hot-dip process according to ASTM A 153/A 153M, Class C.
- C. Expansion Anchors: Fabricated from corrosion-resistant materials, with allowable load or strength design capacities calculated according to ICC-ES AC193 and ACI 318 greater than or equal to the design load, as determined by testing per ASTM E 488 conducted by a qualified testing agency.

- D. Power-Actuated Anchors: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with allowable load capacities calculated according to ICC-ES AC70, greater than or equal to the design load, as determined by testing per ASTM E 1190 conducted by a qualified testing agency.
- E. Mechanical Fasteners: ASTM C 1513, corrosion-resistant-coated, self-drilling, self-tapping, steel drill screws.
 - 1. Head Type: Low-profile head beneath sheathing, manufacturer's standard elsewhere.

2.6 MISCELLANEOUS MATERIALS

- A. Galvanizing Repair Paint: ASTM A 780.
- B. Shims: Load bearing, high-density multimonomer plastic, and nonleaching; or of cold-formed steel of same grade and coating as framing members supported by shims.
- C. Sealer Gaskets: Closed-cell neoprene foam, 1/4 inch (6.4 mm) thick, selected from manufacturer's standard widths to match width of bottom track or rim track members.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Cold-formed steel framing may be shop or field fabricated for installation, or it may be field assembled.
- B. Install cold-formed steel framing according to AISI S200 and to manufacturer's written instructions unless more stringent requirements are indicated.
- C. Install cold-formed steel framing and accessories plumb, square, and true to line, and with connections securely fastened.
- D. Install framing members in one-piece lengths.
- E. Install temporary bracing and supports to secure framing and support loads comparable in intensity to those for which structure was designed. Maintain braces and supports in place, undisturbed, until entire integrated supporting structure has been completed and permanent connections to framing are secured.
- F. Frame wall openings larger than 2 feet square with double stud at each jamb of frame except where more than two are either shown or indicated in manufacturer's instructions. Install runner tracks and jack studs above and below wall openings. Anchor tracks to jamb studs with stud shoes or by welding, and space jack studs same as full-height studs of wall. Secure stud system wall opening frame in manner indicated.
- G. Do not bridge building expansion joints with cold-formed steel framing. Independently frame both sides of joints.
- H. Install horizontal stiffeners in stud system, spaced (vertical distance) at not more than 54 inches o.c. Weld at each intersection.
- I. Install insulation, specified in Section 072100 "Thermal Insulation," in built-up exterior framing members, such as headers, sills, boxed joists, and multiple studs at openings, that are inaccessible on completion of framing work.

- J. Fasten hole reinforcing plate over web penetrations that exceed size of manufacturer's approved or standard punched openings.
- K. Erection Tolerances: Install cold-formed steel framing level, plumb, and true to line to a maximum allowable tolerance variation of 1/16 inch.

3.2 EXTERIOR NON-LOAD-BEARING WALL INSTALLATION

- A. Install continuous tracks sized to match studs. Align tracks accurately and securely anchor to supporting structure as indicated.
- B. Fasten both flanges of studs to top and bottom track unless otherwise indicated. Space studs as follows:
 - 1. Stud Spacing: 24 inches (610 mm) o.c. for nail or power-driven fasteners or 16 inches (406 mm) o.c. for other types of attachment.
- C. Set studs plumb, except as needed for diagonal bracing or required for nonplumb walls or warped surfaces and similar requirements.
- D. Isolate non-load-bearing steel framing from building structure to prevent transfer of vertical loads while providing lateral support.
 - 1. Install single deep-leg deflection tracks and anchor to building structure.
 - 2. Install double deep-leg deflection tracks and anchor outer track to building structure.
 - 3. Connect vertical deflection clips to bypassing and infill studs and anchor to building structure.
 - 4. Connect drift clips to cold-formed metal framing and anchor to building structure.
- E. Install horizontal bridging in wall studs, spaced vertically in rows indicated on Shop Drawings but not more than 48 inches (1220 mm) apart. Fasten at each stud intersection.
 - 1. Top Bridging for Single Deflection Track: Install row of horizontal bridging within 12 inches (305 mm) of single deflection track. Install a combination of bridging and stud or stud-track solid blocking of width and thickness matching studs, secured to stud webs or flanges.
 - 2. Bridging: Cold-rolled steel channel, welded or mechanically fastened to webs of punched studs.
 - 3. Bridging: Combination of flat, taut, steel sheet straps of width and thickness indicated and stud-track solid blocking of width and thickness to match studs. Fasten flat straps to stud flanges and secure solid blocking to stud webs or flanges.
 - 4. Bridging: Proprietary bridging bars installed according to manufacturer's written instructions.
- F. Install miscellaneous framing and connections, including stud kickers, web stiffeners, clip angles, continuous angles, anchors, and fasteners, to provide a complete and stable wall-framing system.

3.3 FIELD QUALITY CONTROL

- A. Testing: Owner will engage a qualified independent testing and inspecting agency to perform field tests and inspections and prepare test reports.
- B. Field and shop welds will be subject to testing and inspecting.
- C. Testing agency will report test results promptly and in writing to Contractor and Architect.
- D. Remove and replace work where test results indicate that it does not comply with specified requirements.

- E. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

3.4 REPAIRS AND PROTECTION

- A. Galvanizing Repairs: Prepare and repair damaged galvanized coatings on fabricated and installed cold-formed steel framing with galvanized repair paint according to ASTM A 780 and manufacturer's written instructions.
- B. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and Installer, that ensure that cold-formed steel framing is without damage or deterioration at time of Substantial Completion.

END OF SECTION 054000

SECTION 055000METAL FABRICATIONS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to work of this Section.

1.2 SUMMARY

- A. This section includes the following metal fabrications:
1. Rough hardware.
 2. Loose steel lintels.
 3. Miscellaneous framing and supports for the following:
 - a. Suspended toilet partitions.
 - b. Applications where framing and supports are not specified in other sections.
 4. Pipe bollards.
- B. Related Sections: The following sections contain requirements that relate to this section:
1. Division 5 Section "Structural Steel" for structural steel framing system components.
 2. Division 5 Section "Handrails and Railings" for the following:
 - a. Ornamental metal handrails and railing systems.

1.3 DEFINITIONS

- A. Definitions in ASTM E 985 for railing-related terms apply to this section.

1.4 SYSTEM PERFORMANCE REQUIREMENTS

- A. Structural Performance of Handrails and Railing Systems: Design, engineer, fabricate, and install handrails and railing systems to comply with requirements of ASTM E 985 for structural performance based on testing performed in accordance with ASTM E 894 and E 935.
- B. Structural Performance: Design, engineer, fabricate, and install the following metal fabrications to withstand the following structural loads without exceeding the allowable design working stress of the materials involved, including anchors and connections. Apply each load to produce the maximum stress in each respective component of each metal fabrication.
1. Top Rail of Guardrail Systems: Capable of withstanding the following loads applied as indicated:
 - a. Concentrated load of 300 lbf applied at any point nonconcurrently, vertically downward, or horizontally.
 - b. Uniform load of 100 lbf per linear ft. applied nonconcurrently, vertically downward or horizontally.
 - c. Concentrated and uniform loads above need not be assumed to act concurrently.
 2. Handrails Not Serving as Top Rails: Capable of withstanding the following loads applied as indicated:

- a. Concentrated load of 200 lbf applied at any point nonconcurrently, vertically downward or horizontally.
 - b. Uniform load of 50 lbf per linear foot applied nonconcurrently, vertically downward or horizontally.
 - c. Concentrated and uniform loads above need not be assumed to act concurrently.
3. Infill Area of Guardrail Systems: Capable of withstanding a horizontal concentrated load of 200 lbf applied to one sq. ft. at any point in the system including panels, intermediate rails balusters, or other elements composing the infill area.
- a. Above load need not be assumed to act concurrently with uniform horizontal loads on top rails of railing systems in determining stress on guard.

1.5 SUBMITTALS

- A. General: Submit the following in accordance with Conditions of Contract and Division 1 Specification Sections.
- B. Product data for products used in miscellaneous metal fabrications, including paint products and grout.
- C. Shop drawings detailing fabrication and erection of each metal fabrication indicated. Include plans, elevations, sections, and details of metal fabrications and their connections. Show anchorage and accessory items. Provide templates for anchors and bolts specified for installation under other sections.
 1. Where installed metal fabrications are indicated to comply with certain design loadings, include structural computations, material properties, and other information needed for structural analysis that has been signed and sealed by the qualified professional engineer who was responsible for their preparation.
- D. Samples representative of materials and finished products as may be requested by Architect.
- E. Welder certificates signed by Contractor certifying that welders comply with requirements specified under "Quality Assurance" article.
- F. Qualification data for firms and persons specified in "Quality Assurance" article to demonstrate their capabilities and experience. Include list of completed projects with project name, addresses, names of Architects and Owners, and other information specified.

1.6 QUALITY ASSURANCE

- A. Fabricator Qualifications: Firm experienced in successfully producing metal fabrications similar to that indicated for this Project, with sufficient production capacity to produce required units without causing delay in the Work.
- B. Installer Qualifications: Arrange for installation of metal fabrications specified in this section by same firm that fabricated them.
- C. Qualify welding processes and welding operators in accordance with AWS D1.1 "Structural Welding Code - Steel," D1.3 "Structural Welding Code - Sheet Steel", and D1.2 "Structural Welding Code - Aluminum."
 1. Certify that each welder has satisfactorily passed AWS qualification tests for welding processes involved and, if pertinent, has undergone recertification.

- D. Engineer Qualifications: Professional engineer licensed to practice in jurisdiction where project is located and experienced in providing engineering services of the kind indicated that have resulted in the successful installation of metal fabrications similar in material, design, and extent to that indicated for this Project.

1.7 PROJECT CONDITIONS

- A. Field Measurements: Check actual locations of walls and other construction to which metal fabrications must fit, by accurate field measurements before fabrication; show recorded measurements on final shop drawings. Coordinate fabrication schedule with construction progress to avoid delay of Work.
1. Where field measurements cannot be made without delaying the Work, guarantee dimensions and proceed with fabrication of products without field measurements. Coordinate construction to ensure that actual opening dimensions correspond to guaranteed dimensions. Allow for trimming and fitting.

1.8 SEQUENCING AND SCHEDULING

- A. Sequence and coordinate installation of wall handrails as follows:
1. Mount handrails only on completed walls. Do not support handrails temporarily by any means not satisfying structural performance requirements.
 2. Mount handrails only on gypsum board assemblies reinforced to receive anchors, and where the location of concealed anchor plates has been clearly marked for benefit of Installer.

PART 2 - PRODUCTS

2.1 FERROUS METALS

- A. Metal Surfaces, General: For metal fabrications exposed to view upon completion of the Work, provide materials selected for their surface flatness, smoothness, and freedom from surface blemishes. Do not use materials whose exposed surfaces exhibit pitting, seam marks, roller marks, rolled trade names, roughness, and, for steel sheet, variations in flatness exceeding those permitted by reference standards for stretcher-leveled sheet.
- B. Steel Plates, Shapes, and Bars: ASTM A 36.
- C. Rolled Steel Floor Plates: ASTM A 786.
- D. Steel Bars for Gratings: ASTM A 569 or ASTM A 36.
- E. Wire Rod for Grating Cross Bars: ASTM A 510.
- F. Steel Tubing: Product type (manufacturing method) and as follows:
1. Cold-Formed Steel Tubing: ASTM A 500, grade as indicated below:
 - a. Grade A, unless otherwise indicated or required for design loading.
 - b. Grade B, unless otherwise indicated or required for design loading.
 2. Hot-Formed Steel Tubing: ASTM A 501.
 - a. For exterior installations and where indicated, provide tubing with hot-dip galvanized coating

per ASTM A 53.

- G. Uncoated Structural Steel Sheet: Product type (manufacturing method), quality, and grade, as follows:
1. Cold-Rolled Structural Steel Sheet: ASTM A 611, grade as follows:
 - a. Grade A, unless otherwise indicated or required by design loading.
 2. Hot-Rolled Structural Steel Sheet: ASTM A 570, grade as follows:
 - a. Grade 30, unless otherwise indicated or required by design loading.
- H. Uncoated Steel Sheet: Commercial quality, product type (method of manufacture) as follows:
1. Cold-Rolled Steel Sheet: ASTM A 366.
- I. Galvanized Steel Sheet: Quality as follows:
1. Structural Quality: ASTM A 446; Grade A, unless another grade required for design loading, and G90 coating designation unless otherwise indicated.
- J. Steel Pipe: ASTM A 53; finish, type, and weight class as follows:
1. Black finish, unless otherwise indicated.
 2. Galvanized finish for exterior installations and where indicated.
 3. Type F, standard weight (schedule 40), unless otherwise indicated, or another weight, type, and grade required by structural loads.
- K. Gray Iron Castings: ASTM A 48, Class 30.
- L. Malleable Iron Castings: ASTM A 47, grade 32510.
- M. Brackets, Flanges and Anchors: Cast or formed metal of the same type material and finish as supported rails, unless otherwise indicated.
- N. Concrete Inserts: Threaded or wedge type; galvanized ferrous castings, either malleable iron, ASTM A 47, or cast steel, ASTM A 27. Provide bolts, washers, and shims as required, hot-dip galvanized per ASTM A 153.
- O. Welding Rods and Bare Electrodes: Select in accordance with AWS specifications for the metal alloy to be welded.

2.2 STAINLESS STEEL

- A. Bar Stock: ASTM A 276, Type 302 or 304.
- B. Plate: ASTM A 167, Type 302 or 304.

2.3 ALUMINUM

- A. Extruded Bars and Shapes: ASTM B 221, alloys as follows:

1. 6061-T6 or 6063-T6 for bearing bars of gratings and shapes.
 2. 6061-T1 for grating cross bars.
- B. Aluminum-Alloy Rolled Tread Plate: ASTM B 632, alloys as follows:
1. 6061-T6 for platforms.
 2. 6061-T4 for treads.
- C. Aluminum Rivets: ASTM B 316, alloy 6053-T4 or 6061-T6.
- D. Aluminum Sheet for Expanded Aluminum Grating: ASTM B 209, alloy 5052-H32.
- E. Fasteners for Aluminum Gratings: Use fasteners made of same basic metal as fastened metal except use galvanized fasteners complying with ASTM A 153 for exterior aluminum units, unless otherwise indicated. Do not use metals that are corrosive or incompatible with metals joined.

2.4 GROUT AND ANCHORING CEMENT

- A. Nonshrink Metallic Grout: Premixed, factory-packaged, ferrous aggregate grout complying with CE CRD-C 621, specifically recommended by manufacturer for heavy duty loading applications of type specified in this section.
- B. Nonshrink Nonmetallic Grout: Premixed, factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with CE CRD- C 621. Provide grout specifically recommended by manufacturer for interior and exterior applications of type specified in this section.
- C. Interior Anchoring Cement: Factory-prepackaged, nonshrink, nonstaining, hydraulic controlled expansion cement formulation for mixing with water at Project site to create pourable anchoring, patching, and grouting compound. Use for interior applications only.
- D. Erosion-Resistant Anchoring Cement: Factory-prepackaged, nonshrink, nonstaining, hydraulic controlled expansion cement formulation for mixing with water at Project site to create pourable anchoring, patching, and grouting compound. Provide formulation that is resistant to erosion from water exposure without need for protection by a sealer or waterproof coating and is recommended for exterior use by manufacturer.
- E. Available Products: Subject to compliance with requirements, products that may be incorporated in the Work include but are not limited to the following:
- F. Products: Subject to compliance with requirements, provide one of the following:
1. Nonshrink Metallic Grouts:
 - a. "Metox RM"; Chem-Masters Corp.
 - b. "Hi Mod Grout"; Euclid Chemical Co.
 - c. "Embeco 885 and 636"; Master Builders.
 - d. "Ferrolith G Redi-Mix and G-NC"; Sonneborn Building Products Div., Rexnord Chemical Products, Inc.
 - e. "Stoncrete MG1"; Stonhard, Inc.
 2. Nonshrink Nonmetallic Grouts:
 - a. "Bonsal Construction Grout"; W. R. Bonsal Co.
 - b. "Diamond-Crete Grout"; Concrete Service Materials Co.
 - c. "Euco N-S Grout"; Euclid Chemical Co.

- d. "Kemset"; Chem-Masters Corp.
 - e. "Crystex"; L & M Construction Chemicals, Inc.
 - f. "Masterflow 713"; Master Builders.
 - g. "Sealtight 588 Grout"; W. R. Meadows, Inc.
 - h. "Sonogrout"; Sonneborn Building Products Div., Rexnord Chemical Products, Inc.
 - i. "Stoncrete NM1"; Stonhard, Inc.
 - j. "Five Star Grout"; U. S. Grout Corp.
 - k. "Vibropruf #11"; Lambert Corp.
3. Interior Anchoring Cement:
- a. "Bonsal Anchor Cement"; W. R. Bonsal Co.
 - b. "Por-Rok"; Minwax Construction Products Division.
4. Erosion-Resistant Anchoring Cement:
- a. "Super Por-Rok"; Minwax Construction Products Division.

2.5 FASTENERS

- A. General: Provide zinc-coated fasteners for exterior use or where built into exterior walls. Select fasteners for the type, grade, and class required.
- B. Bolts and Nuts: Regular hexagon head type, ASTM A 307, Grade A.
- C. Lag Bolts: Square head type, FS FF-B-561.
- D. Machine Screws: Cadmium plated steel, FS FF-S-92.
- E. Wood Screws: Flat head carbon steel, FS FF-S-111.
- F. Plain Washers: Round, carbon steel, FS FF-W-92.
- G. Drilled-In Expansion Anchors: Expansion anchors complying with FS FF-S-325, Group VIII (anchors, expansion, [nondrilling]), Type I (internally threaded tubular expansion anchor); and machine bolts complying with FS FF-B-575, Grade 5.
- H. Toggle Bolts: Tumble-wing type, FS FF-B-588, type, class, and style as required.
- I. Lock Washers: Helical spring type carbon steel, FS FF-W-84.

2.6 PAINT

- A. Shop Primer for Ferrous Metal: Manufacturer's or fabricator's standard, fast-curing, lead-free, universal modified alkyd primer selected for good resistance to normal atmospheric corrosion, for compatibility with finish paint systems indicated, and for capability to provide a sound foundation for field-applied topcoats despite prolonged exposure complying with performance requirements of FS TT-P-645.
 - B. Galvanizing Repair Paint: High zinc dust content paint for regalvanizing welds in galvanized steel, with dry film containing not less than 94 percent zinc dust by weight, and complying with DOD-P-21035 or SSPC-Paint-20.
 - C. Bituminous Paint: Cold-applied asphalt mastic complying with SSPC-Paint 12 except containing no asbestos
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fibers.

- D. Zinc Chromate Primer: FS TT-P-645.

2.7 CONCRETE FILL AND REINFORCING MATERIALS

- A. Concrete Materials and Properties: Comply with requirements of Division 3 section "Concrete Work" for normal weight, ready-mix concrete with minimum 28-day compressive strength of 2,500 psi, 440 lb cement per cu. ft. minimum, and W/C ratio of 0.65 maximum, unless higher strengths indicated.
- B. Nonslip Aggregate Finish: Factory-graded, packaged material containing fused aluminum oxide grits or crushed emery as abrasive aggregate; rust-proof and nonglazing; unaffected by freezing, moisture, or cleaning materials.
- C. Reinforcing Bars: ASTM A 615, Grade 60, unless otherwise indicated.

2.8 FABRICATION, GENERAL

- A. Form metal fabrications from materials of size, thickness, and shapes indicated but not less than that needed to comply with performance requirements indicated. Work to dimensions indicated or accepted on shop drawings, using proven details of fabrication and support. Use type of materials indicated or specified for various components of each metal fabrication.
- B. Form exposed work true to line and level with accurate angles and surfaces and straight sharp edges.
- C. Allow for thermal movement resulting from the following maximum change (range) in ambient temperature in the design, fabrication, and installation of installed metal assemblies to prevent buckling, opening up of joints, and overstressing of welds and fasteners. Base design calculations on actual surface temperatures of metals due to both solar heat gain and nighttime sky heat loss.
1. Temperature Change (Range): 100 deg F (55.5 deg C).
- D. Shear and punch metals cleanly and accurately. Remove burrs.
- E. Ease exposed edges to a radius of approximately 1/32 inch, unless otherwise indicated. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work.
- F. Remove sharp or rough areas on exposed traffic surfaces.
- G. Weld corners and seams continuously to comply with AWS recommendations and the following:
1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
 2. Obtain fusion without undercut or overlap.
 3. Remove welding flux immediately.
 4. At exposed connections, finish exposed welds and surfaces smooth and blended so that no roughness shows after finishing and contour of welded surface matches those adjacent.
- H. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners wherever possible. Use exposed fasteners of type indicated or, if not indicated, Phillips flat-head (countersunk) screws or bolts. Locate joints where least conspicuous.
- I. Provide for anchorage of type indicated; coordinate with supporting structure. Fabricate and space

anchoring devices to provide adequate support for intended use.

- J. Shop Assembly: Preassemble items in shop to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Use connections that maintain structural value of joined pieces. Clearly mark units for reassembly and coordinated installation.
- K. Cut, reinforce, drill and tap miscellaneous metal work as indicated to receive finish hardware, screws, and similar items.
- L. Fabricate joints that will be exposed to weather in a manner to exclude water, or provide weep holes where water may accumulate.

2.9 ROUGH HARDWARE

- A. Furnish bent or otherwise custom fabricated bolts, plates, anchors, hangers, dowels, and other miscellaneous steel and iron shapes as required for framing and supporting woodwork, and for anchoring or securing woodwork to concrete or other structures. Straight bolts and other stock rough hardware items are specified in Division 6 sections.
- B. Fabricate items to sizes, shapes, and dimensions required. Furnish malleable-iron washers for heads and nuts which bear on wood structural connections; elsewhere, furnish steel washers.

2.10 STEEL LADDERS

- A. General: Fabricate ladders for the locations shown, with dimensions, spacings, details and anchorages as indicated. Comply with requirements of ANSI A14.3.
- B. Siderails: Continuous steel flat bars, 1/2 inch x 2-1/2 inches, with eased edges, spaced 18 inches apart.
- C. Bar Rungs: Round steel bars, 3/4 inch diameter, spaced 12 inches o.c.
- D. Bar Rungs: Square steel bars, 3/4 inch, spaced 12 inches o.c.
- E. Fit rungs in centerline of side rails, plug weld and grind smooth on outer rail faces.
- F. Support each ladder at top and bottom and at intermediate points spaced not more than 5'-0" o.c. by means of welded or bolted steel brackets.
 - 1. Size brackets to support design dead and live loads indicated and to hold centerline of ladder rungs clear of the wall surface by not less than 7 inches.
 - 2. Extend side rails 42 inches above top rung, and return rails to wall or structure unless other secure handholds are provided. If the adjacent structure does not extend above the top rung, goose-neck the extended rails back to the structure to provide secure ladder access.
- G. Provide non-slip surface on top of each rung, either by coating the rung with aluminum oxide granules set in epoxy resin adhesive, or by using a type of manufactured rung which is filled with aluminum oxide grout.

2.11 SHIP'S LADDERS

- A. Provide ship's ladders where indicated. Fabricate of open type construction with structural steel channel or steel plate stringers, pipe handrails, and open steel grating treads, unless otherwise indicated. Provide all necessary brackets and fittings for installation.

- B. Galvanize ladders, including, brackets and fasteners; in the following locations:
 - 1. Exterior locations.
 - 2. Interior locations where indicated.

2.12 LADDER SAFETY CAGES

- A. General: Fabricate ladder safety cages to comply with ANSI A14.3; assemble by welding or riveting.
- B. Primary Hoops: Steel bars, 5/16 inch x 4 inches, for top, bottom, and for cages longer than 20 feet, intermediate hoops spaced not more than 20'-0" o.c.
- C. Secondary Intermediate Hoops: Steel bars, 5/16 inch x 2 inches hoops spaced not more than 4'-0" o.c. between primary hoops.
- D. Vertical Bars: Steel bars, 5/16 inch x 2 inches, secured to each hoop, spaced approximately 9 inches o.c.
- E. Fasten assembled safety cage to ladder rails and adjacent construction as indicated.
- F. Galvanize ladder safety cages, including fasteners, in the following locations:
 - 1. Exterior locations.
 - 2. Interior locations, where indicated.

2.13 NOSINGS

- A. Fabricate curb nosings from structural steel shapes as indicated, of all welded construction with mitered corners and continuously welded joints. Provide anchors welded to nosings for embedding in concrete or masonry construction, spaced not more than 6 inches from each curb end, 6 inches from corners and 24 inches o.c., unless otherwise indicated.
- B. Galvanize nosings in the following locations:
 - 1. Exterior locations.
 - 2. Interior locations where indicated.

2.14 LOOSE BEARING AND LEVELING PLATES

- A. Provide loose bearing and leveling plates for steel items bearing on masonry or concrete construction, made flat, free from warps or twists, and of required thickness and bearing area. Drill plates to receive anchor bolts and for grouting as required. Galvanize after fabrication.

2.15 LOOSE STEEL LINTELS

- A. Fabricate loose structural steel lintels from steel angles and shapes of size indicated for openings and recesses in masonry walls and partitions at locations indicated.
 - B. Weld adjoining members together to form a single unit where indicated.
 - C. Size loose lintels for equal bearing of one inch per foot of clear span but not less than 8 inches bearing at
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each side of openings, unless otherwise indicated.

- D. Galvanize loose steel lintels located in exterior walls.

2.16 MISCELLANEOUS FRAMING AND SUPPORTS

- A. General: Provide steel framing and supports for applications indicated or which are not a part of structural steel framework, as required to complete work.
- B. Fabricate units to sizes, shapes, and profiles indicated and required to receive adjacent other construction retained by framing and supports. Fabricate from structural steel shapes, plates, and steel bars of welded construction using mitered joints for field connection. Cut, drill, and tap units to receive hardware, hangers, and similar items.
 - 1. Equip units with integrally welded anchors for casting into concrete or building into masonry. Furnish inserts if units must be installed after concrete is placed.
 - b. Except as otherwise indicated, space anchors 24 inches o.c. and provide minimum anchor units in the form of steel straps 1-1/4 inches wide x 1/4 inch x 8 inches long.
- C. Fabricate support for suspended toilet partitions as follows:
 - 1. Beams: Continuous steel shapes of size required to limit deflection to L/360 between hangers, but use not less than C 8 x 11.5 channels or another shape with equivalent structural properties.
 - 2. Hangers: Steel rods, 1/2 inch in diameter, spaced not more than 36 inches o.c. Thread rods to receive anchor and stop nuts. Fit hangers with wedge shape washers for full bearing on sloping flanges of support beam.
 - 3. Braces and Angles: Steel angles of size required for rigid support of beam and for secure anchorage.
- D. Galvanize miscellaneous framing and supports in the following locations:
 - 1. Exterior locations.
 - 2. Interior locations where indicated.

2.17 MISCELLANEOUS STEEL TRIM

- A. Provide shapes and sizes indicated for profiles shown. Unless otherwise indicated, fabricate units from structural steel shapes, plates, and steel bars, with continuously welded joints and smooth exposed edges. Use concealed field splices wherever possible. Provide cutouts, fittings, and anchorages as required for coordination of assembly and installation with other work.
- B. Galvanize miscellaneous framing and supports in the following locations:
 - 1. Exterior locations.
 - 2. Interior locations where indicated.

2.18 SHELF AND RELIEVING ANGLES

- A. Fabricate shelf and relieving angles from steel angles of sizes indicated and for attachment to concrete framing. Provide slotted holes to receive 3/4 inch bolts, spaced not more than 6 inches from ends and not more than 24 inches o.c., unless otherwise indicated.

- B. For cavity walls, provide vertical channel brackets to support shelf/relieving angles from back-up masonry and concrete. Align expansion joints in angles with indicated expansion joints in cavity wall exterior wythe.
- C. Galvanize shelf angles to be installed on exterior concrete framing.
- D. Furnish wedge-type concrete inserts, complete with fasteners, for attachment of shelf angles to cast-in-place concrete.

2.19 STEEL PIPE RAILINGS AND HANDRAILS

- A. General: Fabricate pipe railings and handrails to comply with requirements indicated for design, dimensions, details, finish, and member sizes, including wall thickness of pipe, post spacings, and anchorage, but not less than that required to support structural loads.
- B. Interconnect railing and handrail members by butt-welding or welding with internal connectors, at fabricator's option, unless otherwise indicated.
 - 1. At tee and cross intersections, notch ends of intersecting members to fit contour of pipe to which end is joined and weld all around.
- C. Form changes in direction of railing members as follows:
 - 1. By insertion of prefabricated elbow fittings.
 - 2. By radius bends of radius indicated.
 - 3. By mitering at elbow bends.
 - 4. By bending.
 - 5. By any method indicated above, applicable to change of direction involved.
- D. Form simple and compound curves by bending pipe in jigs to produce uniform curvature for each repetitive configuration required; maintain cylindrical cross-section of pipe throughout entire bend without buckling, twisting, cracking, or otherwise deforming exposed surfaces of pipe.
- E. Provide wall returns at ends of wall-mounted handrails, unless otherwise indicated.
- F. Close exposed ends of pipe by welding 3/16 inch thick steel plate in place or by use of prefabricated fittings, except where clearance of end of pipe and adjoining wall surface is 1/4 inch or less.
- G. Toe Boards: Where indicated, provide toe boards at railings around openings and at the edge of open-sided floors and platforms. Fabricate to dimensions and details indicated, or if not indicated, use 4 inches high x 1/8 inch steel plate welded to, and centered between, each railing post.
- H. Brackets, Flanges, Fittings, and Anchors: Provide wall brackets, end closures, flanges, miscellaneous fittings, and anchors for interconnections of pipe and attachment of railings and handrails to other work. Furnish inserts and other anchorage devices for connecting railings and handrails to concrete or masonry work.
 - 1. For railing posts set in concrete fabricate sleeves from steel pipe not less than 6 inches long and with an inside diameter not less than 1/2 inch greater than the outside diameter of post, with steel plate closure welded to bottom of sleeve.
 - c. Provide friction fit, removable covers designed to keep sleeves clean and hold top edge of sleeve 1/2 inch below finished surface of concrete.

for a close fit with posts and to limit deflection of post without lateral load, measured at top, to not more than 1/12 of post height. Provide socket covers designed and fabricated to resist accidental dislodgement.

- I. Fillers: Provide steel sheet or plate fillers of thickness and size indicated or required to support structural loads of handrails where needed to transfer wall bracket loads through wall finishes to structural supports. Size fillers to suit wall finish thicknesses. Size fillers to produce adequate bearing to prevent bracket rotation and overstressing of substrate.
- J. For exterior steel railings and handrails formed from steel pipe with galvanized finish, galvanize fittings, brackets, fasteners, sleeves, and other ferrous components.
- K. For interior steel railings and handrails formed from steel pipe with galvanized finish, galvanize fittings, brackets, fasteners, sleeves, and other ferrous components.
- L. For interior steel railings formed from steel pipe with black finish, provide nongalvanized ferrous metal fittings, brackets, fasteners, and sleeves, except galvanize anchors embedded in exterior masonry and concrete construction.

2.20 CAST TREADS AND THRESHOLDS

- A. Fabricate units of material, sizes, and configurations indicated. If not indicated, provide cast-iron units with integral abrasive finish. Furnish in lengths as required to accurately fit each opening or conditions.
 - 1. Cast units with an integral abrasive grit consisting of aluminum oxide, silicone carbide, or a combination of both.
- B. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated in the Work include, but are not limited to, the following:
- C. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. American Abrasive Metals Co.
 - 2. American Mason Safety Tread Co.
 - 3. American Safety Tread Co., Inc.
 - 4. Armstrong Products, Inc.
 - 5. Safe-T-Metal Co., Inc.
 - 6. Wooster Products Inc.
- D. Provide anchors for embedding units in concrete, either integral or applied to units, as standard with the manufacturer.
- E. Drill for mechanical anchors with countersunk holes located not more than 4 inches from ends and not more than 12 inches o.c., evenly spaced between ends, unless otherwise indicated. Provide closer spacing if recommended by the manufacturer.
 - 1. Provide 2 rows of holes for units over 5 inches wide, with 2 holes aligned at ends and staggered intermediate holes.
- F. Apply black asphaltic coating to concealed bottoms, sides, and edges of cast-iron units set into concrete.
- G. Provide a plain surface texture, except where fluted or cross-hatched surfaces are indicated.

2.21 STEEL FRAMED STAIRS

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- A. General: Construct stairs to conform to sizes and arrangements indicated. Join pieces together by welding, unless otherwise indicated. Provide complete stair assemblies, including metal framing, hangers, columns, railings, newels, balusters, struts, clips, brackets, bearing plates, and other components necessary for the support of stairs and platforms, and as required to anchor and contain the stairs on the supporting structure.
1. NAAMM Stair Standard: Comply with "Recommended Voluntary Minimum Standards for Fixed Metal Stairs" in NAAMM "Metal Stair Manual" for class of stair designated, except where more stringent requirements are indicated:
 - d. Commercial class, unless otherwise indicated.
 - e. Architectural class where indicated.
 2. Fabricate treads and platforms of exterior stairs to accommodate slopes to drain in finished traffic surfaces.
- B. Stair Framing: Fabricate stringers of structural steel channels, or plates, or a combination thereof, as indicated. Provide closures for exposed ends of stringers. Construct platforms of structural steel channel headers and miscellaneous framing members as indicated. Bolt or weld headers to strings, newels, and framing members to strings and headers; fabricate and join so that bolts, if used, do not appear on finish surfaces.
1. Where masonry walls support steel stairs, provide temporary supporting struts designed for erection of steel stair components before installation of masonry.
- C. Metal Pan Risers, Subtreads, and Subplatforms: Shape metal pans for risers and subtreads to conform to configuration shown. Provide thicknesses of structural steel sheet for metal pans indicated, but not less than that required, to support total design loading.
1. Form metal pans of galvanized steel sheet, where indicated.
 2. Directly weld risers and subtreads to stringers; locate welds on side of metal pans to be concealed by concrete fill.
 3. Attach risers and subtreads to stringers by means of brackets made of steel angles or bars. Weld brackets to stringers and attach metal pans to brackets by welding, riveting or bolting.
 - a. At Contractor's option, provide prefabricated stair assemblies with prefilled treads consisting of prepoured reinforced concrete fill, with non-slip aggregate finish, in welded sheet metal pan, attached to installed stringers using manufacturer's standard connection detail.
 - 1) Product: Subject to compliance with requirements, provide Speedstair by American Stair Corp., Inc.
 - 4.. Provide subplatforms of configuration and construction indicated; if not indicated, of same metal as risers and subtreads, in thicknesses required to support design loading. Attach subplatform to platform framing members with welds.
 - a. Smooth Soffit Construction: Construct subplatforms with smooth soffits.
- D. Steel Floor Plate Treads and Platforms: Provide raised pattern steel floor plate in pattern indicated or, if not indicated, as selected from manufacturer's standard patterns.
1. Form treads of 1/4 inch thick raised pattern steel floor plate with integral nosing and back edge stiffener. Weld steel supporting brackets to stringers and treads to brackets.
 2. Fabricate platforms of raised pattern steel floor plate of thickness indicated. Provide nosing matching that on treads at all landings. Secure to platform framing members with welds.

- E. Floor Grating Treads and Platforms: Provide patterns, spacing, and bar sizes indicated; fabricate to comply with NAAMM "Metal Bar Grating Manual."
 - 1. Finish: Shop prime paint.
- F. Fabricate grating treads with steel plate nosing on one edge and with steel angle or steel plate carrier at each end for stringer connections. Secure treads to stringers with bolts.
- G. Fabricate grating platforms, with nosing matching that on grating treads, at all landings. Provide toe plates at open-sided edges of grating platform. Secure grating to platform frame with welds.
- H. Stair Railings and Handrails: Comply with applicable requirements specified elsewhere in this section for steel pipe railings and handrails, and as follows:
 - 1. Fabricate newels of steel tubing and provide newel caps of gray-iron castings, as shown.
 - 2. Railings may be bent at corners, rail returns, and wall returns, instead of using prefabricated fittings.
 - 3. Connect railing posts to stair framing by direct welding, unless otherwise indicated.

2.22 WHEEL GUARDS

- A. Provide wheel guards of 3/4 inch thick, hollow core, gray-iron castings, of size and shape indicated. Provide holes for countersunk anchor bolts and grouting.

2.23 PIPE BOLLARDS

- A. Fabricate pipe bollards from Schedule 80 steel pipe. Cap bollards with 1/4 inch minimum thickness steel base plate.
- B. Fabricate sleeves for bollard anchorage from steel pipe with 1/4 inch thick steel plate welded to bottom of sleeve.

2.24 FINISHES, GENERAL

- A. Comply with NAAMM "Metal Finishes Manual" for recommendations relative to application and designations of finishes.
- B. Finish metal fabrications after assembly.

2.25 STEEL AND IRON FINISHES

- A. Galvanizing: For those items indicated for galvanizing, apply zinc-coating by the hot-dip process compliance with the following requirements:
 - 1. ASTM A 153 for galvanizing iron and steel hardware.
 - 2. ASTM A 123 for galvanizing both fabricated and unfabricated iron and steel products made of uncoated rolled, pressed, and forged shapes, plates, bars, and strip 0.0299 inch thick and heavier.

- B. Preparation for Shop Priming: Prepare uncoated ferrous metal surfaces to comply with minimum requirements indicated below for SSPC surface preparation specifications and environmental exposure conditions of installed metal fabrications:
 - 1. Exteriors (SSPC Zone 1B): SSPC-SP6 "Commercial Blast Cleaning."
 - 2. Interiors (SSPC Zone 1A): SSPC-SP3 "Power Tool Cleaning:"
- C. Apply shop primer to uncoated surfaces of metal fabrications, except those with galvanized finish or to be embedded in concrete, sprayed-on fireproofing, or masonry, unless otherwise indicated. Comply with requirements of SSPC-PA1 "Paint Application Specification No. 1" for shop painting.
 - 1. Stripe paint all edges, corners, crevices, bolts, welds, and sharp edges.

2.26 ALUMINUM FINISHES

- A. Finish designations prefixed by "AA" conform to the system established by the Aluminum Association for designating aluminum finishes.
- B. As Fabricated Finish: AA-M10 (Mechanical Finish: as fabricated, unspecified).
- C. Class I Clear Anodized Finish: AA-M12C22A41 (Mechanical Finish: as fabricated, nonspecular; Chemical Finish: etched, medium matte; Anodic Coating: Class I Architectural: clear film thicker than 0.7 mil) complying with AAMA 607.1.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Coordinate and furnish anchorages, setting drawings, diagrams, templates, instructions, and directions for installation of anchorages, including concrete inserts, sleeves, anchor bolts, and miscellaneous items having integral anchors that are to be embedded in concrete or masonry construction. Coordinate delivery of such items to project site.
- B. Center nosings on tread widths with noses flush with riser faces and tread surfaces.
- C. Set sleeves in concrete with tops flush with finish surface elevations; protect sleeves from water and concrete entry.

3.2 INSTALLATION, GENERAL

- A. Fastening to In-Place Construction: Provide anchorage devices and fasteners where necessary for securing miscellaneous metal fabrications to in-place construction; include threaded fasteners for concrete and masonry inserts, toggle bolts, through-bolts, lag bolts, wood screws, and other connectors as required.
- B. Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required for installation of miscellaneous metal fabrications. Set metal fabrication accurately in location, alignment, and elevation; with edges and surfaces level, plumb, true, and free of rack; and measured from established lines and levels.
- C. Provide temporary bracing or anchors in formwork for items that are to be built into concrete masonry or similar construction.

- D. Fit exposed connections accurately together to form hairline joints. Weld connections that are not to be left as exposed joints, but cannot be shop welded because of shipping size limitations. Do not weld, cut, or abrade the surfaces of exterior units which have been hot-dip galvanized after fabrication, and are intended for bolted or screwed field connections.
- E. Field Welding: Comply with AWS Code for procedures of manual shielded metal-arc welding, appearance and quality of welds made, methods used in correcting welding work, and the following:
 - 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
 - 2. Obtain fusion without undercut or overlap.
 - 3. Remove welding flux immediately.
 - 4. At exposed connections, finish exposed welds and surfaces smooth and blended so that no roughness shows after finishing and contour of welded surface matches those adjacent.
- F. Corrosion Protection: Coat concealed surfaces of aluminum that will come into contact with grout, concrete, masonry, wood, or dissimilar metals with a heavy coat of bituminous paint or zinc chromate primer.

3.3 SETTING LOOSE PLATES

- A. Clean concrete and masonry bearing surfaces of any bond-reducing materials, and roughen to improve bond to surfaces. Clean bottom surface of bearing plates.
- B. Set loose leveling and bearing plates on wedges, or other adjustable devices. After the bearing members have been positioned and plumbed, tighten the anchor bolts. Do not remove wedges or shims, but if protruding, cut off flush with the edge of the bearing plate before packing with grout.
 - 1. Use metallic nonshrink grout in concealed locations where not exposed to moisture; use nonmetallic nonshrink grout in exposed locations, unless otherwise indicated.
 - 2. Pack grout solidly between bearing surfaces and plates to ensure that no voids remain.

3.4 INSTALLATION OF SUPPORTS FOR TOILET PARTITIONS

- A. Anchor supports securely to, and rigidly brace from, overhead building structure.

3.5 INSTALLATION OF STEEL PIPE RAILINGS AND HANDRAILS

- A. Adjust railings prior to anchoring to ensure matching alignment at abutting joints. Space posts at spacing indicated, or if not indicated, as required by design loadings. Plumb posts in each direction. Secure posts and railing ends to building construction as follows:
 - 1. Anchor posts in concrete by means of pipe sleeves preset and anchored into concrete. After posts have been inserted into sleeves, fill annular space between post and sleeve solid with the following anchoring material, mixed and placed to comply with anchoring material manufacturer's directions.
 - 2. Anchor posts in concrete by core drilling holes not less than 5 inches deep and 3/4 inch greater than outside diameter of post. Clean holes of all loose material, insert posts and fill annular space between post and concrete with the following anchoring material, mixed and placed to comply with anchoring material manufacturer's directions.
 - a. Nonshrink, nonmetallic grout or anchoring cement.
 - b. Cover anchorage joint with a round steel flange attached to post as follows:

- 1) Welded to post after placement of anchoring material.
 - 2) By set screws.
- c. Leave anchorage joint exposed, wipe off surplus anchoring material, and leave 1/8 inch build-up, sloped away from post. For installations exposed on exterior, or to flow of water, seal anchoring material to comply with grout manufacturer's directions.
3. Anchor posts to steel with steel oval flanges, angle type or floor type as required by conditions, welded to posts and bolted to steel supporting members.
 4. Anchor rail ends into concrete and masonry with steel round flanges welded to rail ends and anchored into wall construction with lead expansion shields and bolts.
 5. Anchor rail ends to steel with steel oval or round flanges welded to rail ends and bolted to structural steel members, unless otherwise indicated.
 6. Install removable railing sections where indicated in slip-fit metal sockets cast into concrete. Accurately locate sockets to match post spacing.
- B. Secure handrails to wall with wall brackets and end fittings. Provide bracket with not less than 1-1/2 inch clearance from inside face of handrail and finished wall surface. Locate brackets as indicated, or if not indicated, at spacing required to support structural loads. Secure wall brackets and wall return fittings to building construction as follows:
1. Use type of bracket with flange tapped for concealed anchorage to threaded hanger bolt.
 2. Use type of bracket with pre-drilled hole for exposed bolt anchorage.
 3. For concrete and solid masonry anchorage, use drilled-in expansion shield and either concealed hanger bolt or exposed lag bolt, as applicable.
 4. For hollow masonry anchorage, use toggle bolts having square heads.
 5. For wood stud partitions, use lag bolts set into wood backing between studs. Coordinate with stud installations for accurate location of backing members.
 6. For steel framed gypsum board assemblies, fasten brackets directly to steel framing or concealed anchors using self-tapping screws of size and type required to support structural loads.
- C. Expansion Joints: Provide expansion joints at locations indicated, or if not indicated, at intervals not to exceed 40 feet. Provide slip joint with internal sleeve extending 2 inches beyond joint on either side; fasten internal sleeve securely to one side; locate joint within 6 inches of posts.

3.6 INSTALLATION OF CAST TREADS AND THRESHOLDS

- A. Install cast treads and thresholds with anchorage system indicated to comply with manufacturer's recommendations.
- B. Seal thresholds exposed to exterior with elastomeric sealant complying with Division 7 Section "Joint Sealers" to provide a watertight installation.

3.7 INSTALLATION OF WHEEL GUARDS

- A. Anchor wheel guards to concrete or masonry construction to comply with manufacturer's instructions. Fill cores solidly with air-entrained concrete having a 28-day minimum compressive strength at 3,000 psi.

3.8 INSTALLATION OF BOLLARDS

- A. Anchor bollards in concrete by means of pipe sleeves preset and anchored into concrete. After bollards have been inserted into sleeves, fill annular space between bollard and sleeve solid with nonshrink, nonmetallic grout, mixed and placed to comply with grout manufacturer's directions.

3.9 ADJUSTING AND CLEANING

- A. Touch-Up Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with same material as used for shop painting to comply with SSPC-PA 1 requirements for touch-up of field painted surfaces.
 - 1. Apply by brush or spray to provide a minimum dry film thickness of 2.0 mils.
- B. Touch-Up Painting: Cleaning and touch-up painting of field welds, bolted connections, and abraded areas of the shop paint on miscellaneous metal is specified in Division 9 Section "Painting" of these specifications.
- C. For galvanized surfaces clean welds, bolted connections and abraded areas and apply galvanizing repair paint to comply with ASTM A 780.

END OF SECTION 055000

SECTION 061000

ROUGH CARPENTRY

1. SCOPE

Furnish, erect, and perform all carpentry at site and appurtenant work as shown and specified. Install doors, finish carpentry and finish hardware, etc.

2. GENERAL REQUIREMENTS

- A. Guarantee: Contractor shall guarantee the operation of all moving parts for one year after completion and occupancy. Contractor shall adjust and properly fit all doors, locks, and other movable parts for the year-long period at no cost to the owner.
- B. Workmanship: All material shall be installed in a workmanlike manner, free from hammer marks, blemishes, stains and other disfigurements which will not permit a satisfactory finish. Nails for finish woodwork shall be finishing nails and carefully set. Workmanship shall be of best quality, accurate cuts, square bearing, close fitting, plumb and level, to lines and levels indicated, secured rigidly in place.
- C. Standards: Materials, construction, fastening devices, etc. American Plywood Association, Gypsum Association, and Southern Standard Building Code. Grades of all lumber shall be as defined by the Association of Lumber Manufacturers producing the material and shall bear the inspection bureau's grade marking.

3. MATERIALS

- A. Lumber: Shall be sound, thoroughly seasoned, well manufactured S4S, and free from warp that cannot be corrected by bridging or nailing.
- 1) Non-Stressed Graded Lumber:
 - a. Douglas Fir #2, S4S, kiln-dried.
 - b. Southern Pine #2, S4S, kiln-dried.
 - 2) Stress Graded Lumber: Southern Pine, 1100f or as indicated on the drawings, S4S, kiln-dried.
 - 3) Wolmanized Lumber: Exterior lumber and all nailing strips, blocking, toe plates, and all other framing lumber coming into contact with moisture, steel, concrete or masonry: #2 and better yellow pine or Douglas fir, wolmanized. (0.35 lbs. of Wolman preservative per foot of each foot bearing brand label denoting conformance to standards of the Koppers Co., or equal); Wolmanizing process may not include salts that will affect and deteriorate metal attached to it.
- C. Plywood, General Use: American Plywood Association grading rules, 4' x 8' or largest practical size; thickness as indicated.
- 1) Interior use, Grade A-D, Int-DFPA.
 - 2) Exterior use, Grade A-D, Ext-DFPA as needed at specific location.
 - 3) Exterior Fire-Retardant Treated Plywood, Exterior Fire-X plywood by Hoover Treated Wood Products.
- D. Sheathing: Gypsum/Fiberglass fire resistant water-repellent sheathing in compliance with ASTM C1177, 5/8" thick Type X Firecode Dens Sheathing. Dens-Glass Gold by G-P Gypsum, scoring 10 (most resistant to mold-mildew and fungus) on ASTM D3273-94. Product consists of inorganic glass mats embedded with water-resistant gypsum core and a gold colored bond enhancing primer coating.

Install at all exterior wall conditions where wall finishes are backed up by metal wall framing. Install in accordance with manufacturers written recommendations. Do not leave sheathing exposed to weather beyond manufacturers recommendations.

4. INSTALLATION

- A. Grounds, Blocking, and Furring: Provide wood blocking for the anchorage of items furnished under other sections. Provide all incidental furring not specifically shown or specified to carry out the intent of the project design.
- 1) Set all grounds and concealed blocking throughout building, substantially attached to studs or masonry partitions, for nailing and anchoring interior wood trim, millwork, cabinets and other items furnished by other trades.
 - 2) Grounds shall be continuous, straight, and plumb or level in true alignment. Wood blocking to receive other connections and equipment shall be provided. Unless otherwise indicated, all nailers, grounds, stripping, etc., shall be spaced not over 16" o.c. Provide countersunk holes for mechanical fasteners.
- B. Rough Hardware: Furnish and install all rough hardware such as bolts, nuts and washers, screws, expansion bolts, toggle bolts, lag bolts, etc., not otherwise shown or specified but necessary to make a complete job. See specification section 05200.
- C. Cabinet and Casework: Shall be set level and shall be well-secured and scribed to fit job site conditions.
- D. Miscellaneous Specialty Items: Shall be set level and shall be well-secured and scribed to fit job site conditions.
- E. Soffits, Awnings, and Parapets: Fire retardant treated plywood to be used in these areas. Material shall be applied according to the plywood strength tables provided by the manufacturer.
- F. Door Installation: Protect doors during shipment, handling, storage, and installation. Doors with gouges, warpage, scratches, and other damage will not be accepted (doors supplied under Section 08210).
- 1) The hardware shall be accurately applied only by mechanics experienced in such class of work. Door knobs, push and pull plates, etc., shall be kept covered and protected until the building is ready for final acceptance. Doorknobs and anti-panic hardware shall be set 38" centered above the floor. Door pulls and push plates shall be height directed by architect.
 - 2) Doors throughout shall be carefully fitted into openings with uniform clearance on all frame edges. Coordinate door sill clearance with finish and thresholds.
- G. Sheathing: Install 8 ft. dimension horizontal with tightly butted, staggered joints. After installation of sheathing, dampproof all surfaces of sheathing, screw and nail holes, penetrations, gaps, cracks, and voids of any sort as follows.
- 1) Apply a 3/8" bead of sealant to all joints, voids, penetrations, etc. and trowel in firmly until flat. Apply enough of the same material to each fastener to cover completely when troweled flat. Application rate as recommended by manufacturer. Use backer rod for openings over 1/8" in width. Sealant material shall be equal to Dow Corning 795 or Pecora 895 Building Sealant.
 - 2) Apply fiberglass joint tape to joints, dampproof coating to entire surface of sheathing and install membrane flashing around perimeter of system. Mop in membrane flashing to face with dampproofing. Membrane flashing is required at penetrations, at perimeter, where

sheathing transitions to other materials above doors and windows, above openings, at base of exterior wall, etc. and at uneven planes for a complete watertight exterior vapor barrier.

- 3) System shall provide a complete waterproof vapor barrier to stop moisture at face of sheathing and deliver water to cavity drainage systems.
- 4) Seal all edges of sheathing exposed to moisture.

H. Workmanship: Workmanship shall be of best quality, accurate cuts, square bearing, close fitting, plumb and level, to lines and level indicated, secured rigidly in place. All material shall be installed in a workmanlike manner, free from hammer marks, blemishes, stains, and other disfigurements. Nails for finish woodwork shall be finishing nails carefully set.

END OF SECTION 061000

SECTION 06200

INTERIOR ARCHITECTURAL WOODWORK

1. SCOPE

Furnish and deliver all millwork, wood trim, and finished woodwork as shown and specified.

2. GENERAL REQUIREMENTS

- A. Woodwork Details: Shall be done in accordance with details shown on drawings. For details not shown, architect will furnish scale details on request or standard details or Architectural Woodwork Institute "Custom Grade" shall govern.
- B. Moisture Content: All millwork shall be kiln dried to average not more than 7% to 10%.
- C. Workmanship: Shall be of the best customarily done on work of this type. The intent is that joints be neatly and carefully made, surfaces straight and clean, work sanded with the grain, all machine marks removed by sanding except on exterior material which shall be cleanly machined. All cross surfaces shall be eliminated. Shop assembled surfaces shall be glued where possible on non-exposed surfaces to receive stain finish. All connections shall be made by best approved practice of the cabinet making trade, including dadoes for shelves, mortises and tenon where possible. Wood frame shall be mitered jamb to head.
- D. Prefabricated cabinets (casework) are not included in this section; see specification sections 12304, 12342 and 12345.
- E. Quality Assurance:
- 1) Standards: The latest edition of the "Quality Standards" and "Architectural Casework Details" of the Architectural Woodwork Institute shall apply and by reference are hereby made a part of this specification. Any reference to Premium, Custom, or Economy in the specification shall be as defined in the latest edition of the AWI "Quality Standards". Any item not given a specific quality grade shall be custom grade as defined in the latest edition of the AWI "Quality Standards".
 - 2) Competence: The approved woodwork manufacturer must have a reputation for doing satisfactory work on time and shall have successfully completed comparable work.
- F. Shop Drawings:
- 1) Shop drawings showing complete construction details, kinds of material, size of members and methods of securing members together and to adjacent work shall be submitted to the architect before proceeding with the work.
 - 2) Where plastic countertop surfacing is to be furnished, show location of all joints.
- G. Inspection and Storage:
- 1) As soon as space can be made available where millwork can be stored in a protected area, contractor shall inform millwork subcontractor that he is ready to receive millwork.
 - 2) Upon delivery, contractor shall inspect all millwork for scratches, marks, or other damage and shall reject that which cannot be satisfactorily repaired by millwork subcontractor.
 - 3) Upon delivery, contractor shall arrange for all millwork to receive first coat of finish. Contractor shall also take care that all hardware has been carefully and properly installed.

3. MATERIALS

A. Interior Trim Moldings:

- 1) Utility shelving: Stain grade Douglas Fir.
- 2) All other interior woodwork to be stain grade red oak solid stock lumber.

B. Grades of Interior Plywood:

- 1) Red Oak: A-A Int. APA where both sides exposed; A-D Int. APA where one side exposed.
- 2) Douglas Fir: "Utility shelving" for storage rooms as shown in detail book shall be Douglas fir. A-A Int. APA where both sides exposed; A-D Int. APA where one side exposed.

C. Laminated Plastic Counter Tops: Shall have 3/4" thick exterior grade plywood lumber cores. Standard grade 1/16" laminated plastic in full range of colors and patterns as selected by the architect. Acceptable manufacturers include Pionite, Formica, or Wilson Art including Red Box series. Provide plastic laminate square edges on front and sides. Caulk where wall laminate meets splash. Countertops shall be post-formed with radius edge and one-piece rolled cove splash where indicated on details.

D. Cabinet Hardware: Shall be furnished and installed by the millwork contractor. The following is a list of items referred to on the drawings as manufactured by Knappe & Vogt (K-V) and Stanley.

- 1) Drawer Slides: K&V 8400 lb. requirements.
- 2) Drawer & Cabinet Door Locks: Shall be five-pin tumbler type with grooved key and plated cylinder and cam. Locks in each room or area shall be master keyed alike and shall be individually keyed different. Furnish two keys for each lock and five of each master keys. Install locks on all cabinet drawers and doors in nurse, administrative areas, computer rooms, counselors offices, reception counters, offices, teacher wardrobes, and one on 50% of all remaining cabinet drawers and doors. Owner to select location of remaining locks.
- 3) Cabinet Doors: Stanley No. 1585 and 1591 brushed chrome pin hinges.
- 4) Magnetic Catches: K&V 918 (alum.); use at all cabinet doors.
- 5) Cabinet Door and Drawer Pulls: Stanley No. 4484 (US 28) satin anodized aluminum with flat washer under head of fastening screw.
- 6) Shelf Standards and Shelf Supports: K&V #255 steel standard with #256 steel supports; finish to be ANO (anochrome) finish. Shelf standards and shelf brackets at wall-hung standard conditions and other special conditions specifically detailed to have undershelf standards projecting from the rear-mounted position shall have K & V #80 standard with #180 supports in ANO (anochrome) finish.

Note: At storage and preparation areas provide punched wood upright and end panels (support spacing 1-1/4" o.c. vertically) with nickel-plated metal supports for shelves.

4. WORKMANSHIP/INSTALLATION

A. High Pressure Laminates:

- 1) Shall be pressure glued using water resistant glue.
- 2) Back-up sheets shall be used wherever the top has an unsupported area exceeding 4 square feet.
- 3) Joints are allowed only when required length exceeds 10 feet laminate length.
 - a. Joints shall be flush within .005 inch.
 - b. No gap will be allowed.
- 4) Scribe to wall surface at splash where shown.

- B. Fastening of Exposed Members:
- 1) No exposed nails shall be used.
 - 2) All exposed members are to be glued using either pressure or electrical wood welder.
 - 3) All traces of excess glue shall be removed.
- C. Counter Tops:
- 1) Square Edge: Laminated plastic countertops shall be 3/4" thick exterior grade plywood lumber cores faced with laminated plastic. All tops shall include square front edge and coved integral 4" height back splashes and square end splashes if cabinet butts wall. Refer to drawings and details for countertop construction.
 - 2) Post Formed: Laminated plastic countertops shall be 3/4" thick particleboard post formed with radius front edge and one-piece rolled 4" height cove splash. Provide square end splashes where cabinet butts wall. Refer to drawings and details for countertop construction.
 - 3) Use colored caulking (as selected by Architect to match wall or countertops) to fill minor gaps between cabinet and countertop/splash to wall surfaces. Gaps over 1/8" are not acceptable and wall shall be reworked prior to placing cabinet and top/splash against wall. Tops shall be fastened to sub or web frames with concealed clips, screws, glue blocks, or similar hidden fastening. Install plastic laminate to surface with contact cement/adhesive as approved by laminate plastic manufacturer.
- D. Cabinet Edge Treatment (doors, shelves, drawer fronts, cabinet body, etc.)
- 1) Visible edges shall be banded with lumber edgings, glued under pressure with no nails allowed.
 - 2) Species shall match the face veneers of plywood.
 - 3) Visible edges shall be eased by sanding.
- E. Cabinet Hardware:
- 1) Use appropriate size screws/anchors
 - 2) At cabinet doors, install two (2) hinges per door except install three (3) hinges per door where either dimension of door exceeds 24".
 - 3) Install two magnetic catches at each cabinet door that exceeds 24" in either dimension.
5. CLEANING AND PROTECTION
- A. Protect all millwork and finish carpentry from damage by other trades.
 - B. Contractor shall repair or replace, to the satisfaction of the owner, all millwork and finish carpentry which has been damaged or that is improperly installed in any way.
 - C. Immediately prior to final inspection, clean all millwork and finish carpentry, remove dust, etc.

END OF SECTION 06200

SECTION 064150SOLID SURFACE COUNTERTOPS

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Quartz surfacing fabrications.

1.2 RELATED SECTIONS

- A. Section 06100 - Rough Carpentry: Wall blocking.
- B. Section 06400 - Architectural Woodwork: Cabinetry and trim.
- C. Section 07900 - Joint Sealers: Perimeter caulking.

1.3 REFERENCES

- A. American Society for Testing and Materials (ASTM):
 1. ASTM C97 - Standard Test Methods for Absorption and Bulk Specific Gravity of Dimension Stone.
 2. ASTM C501 - Standard Test Method for Relative Resistance to Wear of Unglazed Ceramic Tile by the Taber Abraser.
 3. ASTM C650 - Standard Test Method for Resistance of Ceramic Tile to Chemical Substances.
 4. ASTM C880 - Standard Test Method for Flexural Strength of Dimension Stone.
 5. ASTM C1026 - Standard Test Method for Measuring the Resistance of Ceramic Tile to Freeze-Thaw Cycling.
 6. ASTM C1028 - Standard Test Method for Determining the Static Coefficient of Friction of Ceramic Tile and Other Like Surfaces by the Horizontal Dynamometer Pull-Meter Method.
 7. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
 8. ASTM E228 - Standard Test Method for Linear Thermal Expansion of Solid Materials With a Push-Rod Dilatometer.
 9. ASTM G21 - Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi.

1.4 SUBMITTALS

- A. Submit under provisions of Section 01300.
- B. Product Data: Manufacturer's data sheets on each product to be used, including:
 1. Preparation instructions and recommendations.
 2. Storage and handling requirements and recommendations.
 3. Complete manufacturer's fabrication and installation instructions.
 4. Provide manufacturer's recommended cleaning procedures.
- C. Shop Drawings: Fabricator shall provide detailed and dimensioned shop drawings showing details of fabrication, edging, sink installation, coving, and seams. Indicate fastener types and locations, sealant proposed for use, and fabrication details of support brackets.
- D. Provide evidence that materials have been supplied by Seieffe Corporation.
- E. Selection Samples: For each finish product specified, submit manufacturer's standard color book showing colors of actual material in not smaller than 1-1/2 inches (38 mm) size.

- F. Verification Samples: For each finish product specified, two samples, minimum size 12 inches (305 mm) square, represent actual product, color, and finish.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: Installation of Quartz Surfacing shall be by a firm that is authorized to fabricate and install Quartz Surfacing, and/or that can demonstrate successful experience in installing finished items similar in type and quality to those required for this project.
- B. Mock-Up: Provide a mock-up for evaluation of surface preparation techniques and application workmanship.
 - 1. Finish areas designated by Architect.
 - 2. Do not proceed with remaining work until workmanship, color, and finish are approved by Architect.
 - 3. Refinish mock-up area as required to produce acceptable work.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Packing and Loading: Finished Quartz Surfacing shall be carefully packed and loaded for shipment using all reasonable and customary precautions against damage in transit. No material which may cause staining or discoloration shall be used for blocking or packing. Transport and handle sheets and fabricated items by methods that will prevent structural and aesthetical damage and defacing.
- B. Site Storage: Upon receipt at the building site, Quartz Surfacing shall remain in the factory-prepared bundles until beginning of the installation. Bundles shall be staged in an area which is least susceptible to damage from ongoing construction activity. If storage is to be prolonged, polyethylene or other suitable, non staining film shall be placed between any wood and finished surfaces of the Quartz Surfacing.
- C. Any holes or slots in the Quartz Surfacing which are capable of collecting water shall be temporarily covered or plugged to prevent freezing of collected water. Such covers or plugs are to be removed immediately prior to installation of the piece.

1.7 PROJECT CONDITIONS

- A. Project Conditions: Maintain ambient temperature between 50 and 95 degrees F (10 and 35 degrees C) for 48 hours before, during and for minimum 7 days after installation.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable Manufacturers:
 - 1. Caesarstone
 - 2. Corian / Zodiaq; Dupont
 - 3. Okite
- B. Requests for substitutions will be considered in accordance with provisions of Section 01600.

2.2 COUNTERTOPS

- A. Product: Quartz Surfacing.
 - 1. Edge Detail: As indicated on the Drawings.
 - 2. Color: To be selected from the manufacturer's full range of colors.
 - a. Finish: Polished only.
 - b. Thickness, Polished Finish: As noted on the drawings.

2.3 MATERIALS

- A. Composition: Non-porous blend of polyester resin and natural quartz filler formed into flat slabs.
- B. Material Characteristics:
 - 1. Flexural Strength (ASTM C880): 5,567.6 psi.
 - 2. Coefficient of Linear Thermal Expansion (COLE) (ASTM E228): 5.9×10^{-6} in/in/ degree F (1.1 x 10⁻⁵ in/in/ degree C).
 - 3. Water Absorption & Bulk Density (ASTM C97): Water Absorption 0.005 wt%, Bulk Density 2.38 gr/cm³ (39.03 gr/in³).
 - 4. Abrasion Resistance (ASTM C501): Abrasive Wear 187.2, Weight Loss (1,000 Cycles, 1,000 gr. Load, H-22 wheels) 0.47 gr.
 - 5. Resistance To Fungal Growth (ASTM G21): Rating 0 (No Effect).
 - 6. Static Coefficient Of Friction (SCOF) (ASTM C1028): Dry: 0.63, Wet: 0.57.
 - 7. Chemical Resistance (ASTM C650): 10% HCL No Effect, 10% KOH No Effect.
 - 8. Flame Spread Test (ASTM E84): Class A for Flame Spread of 25 or less.
 - 9. Freeze-Thaw Cycling Resistance (ASTM C1026): (15 Cycles) No damages. Non-porous, temperature cycle resistant material.
 - 10. Stain Resistance (ANSI 124.6 Section 5.2): 22 Pass (Passing is 64).
 - 11. Wear & Clean ability (ANSI 124.6 Section 5.3): Pass.
 - 12. Cigarette Test (ANSI 124.6 Section 5.4): Pass.
 - 13. Chemical Resistance (ANSI 124.6 Section 5.5): Pass.

2.4 FABRICATION

- A. Fabricate components to greatest extent practical to sizes and shapes indicated, in accordance with "Dimension Stone Design Manual" from MIA (Marble Institute of America). Quartz Surfacing shall be inspected before fabrication. Supplier shall not be held responsible if material is not inspected before fabrication or if defective material is fabricated.
- B. Form joints between components using manufacturer's standard joint adhesive joints. Reinforce as required.
- C. Provide factory cutouts for plumbing fittings and bath accessories as indicated on the drawings.
- D. Rout and finish component edges with clean, sharp returns.
- E. Rout cutouts, radii and contours to template.
- F. Backsplash height shall be according to detail provided. Back splashes shall be field installed, with tight, sealed joints.
- G. Finish of surfaces shall be custom as specified by Architect.
- H. Cutouts for sinks furnished by others shall be smooth and uniform without saw marks. The top and bottom of sink openings shall be finished smooth. Corners of sink cutouts shall be a minimum of 1/4 inch (6mm) radius.

- I. If straight edge is specified, the top and the bottom of the edge shall be eased to avoid chipping.
- J. Dimensional Tolerances:
 - 1. Panel thickness of 3/8 inch (10 mm) or 1/2 inch (13 mm): Plus or minus 1/32 inch (0.80 mm).
 - 2. Panel thickness of 3/4 inch (20 mm) to 1-5/8 inches (41 mm): Plus or minus 1/8 inch (3 mm).
 - 3. Panel thickness greater than 1-5/8 inches (41 mm): Plus or minus 1/4 inch (6 mm).
 - 4. Panel face dimension: Plus or minus 1/16 inch (1.6 mm).
 - 5. Face variation from rectangular (maximum out of square): Plus or minus 1/16 inch (1.6 mm).
 - 6. Heads/calibrated edges: Plus or minus 1/16 inch (1.6 mm).

PART 3 EXECUTION

3.1 EXAMINATION

- A. Do not begin installation until substrates have been properly prepared.
- B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.2 PREPARATION

- A. Clean surfaces thoroughly prior to installation, both finished and unfinished face.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the Project conditions.

3.3 INSTALLATION

- A. Install components plumb and level, in accordance with approved shop drawings and product installation details. Use manufacturer's recommended matching adhesives.
- B. Tops:
 - 1. Flat and true to within 1/8 inch (3 mm) of a flat surface over a 10 feet (3 m) length.
 - 2. Allow a minimum of 1/16 inch (1.6 mm) to a maximum of 1/8 inch (3 mm) clearance between surface and each wall.
 - 3. Form field joints using manufacturer's recommended adhesive, with joint widths no greater than 1/8 inch (3 mm) in finished work.
- C. Sinks:
 - 1. Adhere under mount sinks/bowls to countertops using proper adhesive and mounting hardware.
 - 2. Adhere drop-in sinks/bowls to countertops using proper adhesives and color-matched silicone sealant.
- D. Provide backsplashes and endsplashes as indicated on the drawings.
 - 1. Adhere to countertops using manufacturer's standard color-matched silicone sealant.
- E. Keep components and hands clean during installation.
 - 1. Remove excess adhesives and other stains.
 - 2. Components shall be clean on date of substantial completion.

3.4 CLEANING AND PROTECTION

- A. Keep components clean during installation.
 - 1. Remove adhesives, sealants and other stains.
 - 2. Do not seal surface of finished product.

- B. Protect surfaces from damage until date of substantial completion.
 - 1. Replace damaged work.

END OF SECTION 064150

copy no. _____

Webb County Youth Village Rehabilitation Center

111 Camino Nuevo Road, Hwy 359
Laredo, Texas 78041



County of Webb, State of Texas
1110 Houston Street
Laredo, Texas 78040

specifications

Bidding & Construction Documents Volume 2 of 2

April 7, 2016

SECTION 071113BITUMINOUS DAMPPROOFING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes cold-applied, emulsified-asphalt dampproofing.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL

- A. VOC Content: Products shall comply with VOC content limits of authorities having jurisdiction unless otherwise required.

2.2 COLD-APPLIED, EMULSIFIED-ASPHALT DAMPPROOFING

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. APOC, Inc.; a division of Gardner-Gibson.
 - 2. BASF Construction Chemicals - Building Systems; Sonneborn Brand Products.
 - 3. Euclid Chemical Company (The); an RPM company.
 - 4. Henry Company.
 - 5. Karnak Corporation.
 - 6. Koppers Inc.
 - 7. Meadows, W. R., Inc.
- B. Trowel Coats: ASTM D 1227, Type II, Class 1.
- C. Fibered Brush and Spray Coats: ASTM D 1227, Type II, Class 1.
- D. Brush and Spray Coats: ASTM D 1227, Type III, Class 1.
- E. VOC Content: 30 g/L or less.
- F. Low-Emitting Materials: Dampproofing shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

2.3 AUXILIARY MATERIALS

- A. General: Furnish auxiliary materials recommended in writing by dampproofing manufacturer for intended use and compatible with bituminous dampproofing.
- B. Emulsified-Asphalt Primer: ASTM D 1227, Type III, Class 1, except diluted with water as recommended in writing by manufacturer.
 - 1. Primer shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."
- C. Asphalt-Coated Glass Fabric: ASTM D 1668, Type I.
- D. Protection Course: ASTM D 6506, 1/8-inch- (3-mm-) thick, semirigid sheets of fiberglass or mineral-reinforced-asphaltic core, pressure laminated between two asphalt-saturated fibrous liners.
- E. Protection Course: Fan folded, with a core of extruded-polystyrene board insulationplastic film, nominal thickness 1/4 inch (6 mm), with a compressive strength of not less than 8 psi (55 kPa) per ASTM D 1621, and maximum water absorption by volume of 0.6 percent per ASTM C 272.
- F. Protection Course: Extruded-polystyrene board insulation, unfaced, ASTM C 578, Type X, 1/2 inch (13 mm) thick.
- G. Protection Course: Smooth-surfaced roll roofing complying with ASTM D 6380, Class S, Type III.

PART 3 - EXECUTION

3.1 APPLICATION, GENERAL

- A. Comply with manufacturer's written instructions for substrate preparation, dampproofing application, cure time between coats, and drying time before backfilling unless more stringent requirements are indicated.
 - 1. Apply dampproofing to provide continuous plane of protection.
 - 2. Apply additional coats if recommended in writing by manufacturer or to achieve a smooth surface and uninterrupted coverage.
- B. Where dampproofing footings and foundation walls, apply from finished-grade line to top of footing; extend over top of footing and down a minimum of 6 inches (150 mm) over outside face of footing.
 - 1. Extend dampproofing 12 inches (300 mm) onto intersecting walls and footings, but do not extend onto surfaces exposed to view when Project is completed.
 - 2. Install flashings and corner protection stripping at internal and external corners, changes in plane, construction joints, cracks, and where shown as "reinforced," by embedding an 8-inch- (200-mm-) wide strip of asphalt-coated glass fabric in a heavy coat of dampproofing. Dampproofing coat for embedding fabric is in addition to other coats required.
- C. Where dampproofing exterior face of inner wythe of exterior masonry cavity walls, lap dampproofing at least 1/4 inch (6 mm) onto flashing, masonry reinforcement, veneer ties, and other items that penetrate inner wythe.

1. Extend dampproofing over outer face of structural members and concrete slabs that interrupt inner wythe.
2. Lap dampproofing at least 1/4 inch (6 mm) onto shelf angles supporting veneer.

3.2 COLD-APPLIED, EMULSIFIED-ASPHALT DAMPPROOFING

- A. Concrete Foundations: Apply two brush or spray coats at not less than 1.5 gal./100 sq. ft. (0.6 L/sq. m) for first coat and 1 gal./100 sq. ft. (0.4 L/sq. m) for second coat, one fibered brush or spray coat at not less than 3 gal./100 sq. ft. (1.2 L/sq. m), or one trowel coat at not less than 4 gal./100 sq. ft. (1.6 L/sq. m).

3.3 INSTALLATION OF PROTECTION COURSE

- A. Where indicated, install protection course over completed-and-cured dampproofing. Comply with dampproofing-material and protection-course manufacturers' written instructions for attaching protection course.

END OF SECTION 071113

SECTION 072100THERMAL INSULATION

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Foam-plastic board insulation.
 - 2. Glass-fiber blanket insulation.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.

1.3 INFORMATIONAL SUBMITTALS

- A. Product test reports.
- B. Research/evaluation reports.

PART 2 - PRODUCTS

2.1 FOAM-PLASTIC BOARD INSULATION

- A. Extruded-Polystyrene Board Insulation: ASTM C 578, with maximum flame-spread and smoke-developed indexes of 75 and 450, respectively, per ASTM E 84.
 - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. DiversiFoam Products.
 - b. Dow Chemical Company - Cavitymate Insulation.
 - c. Owens Corning.

2.2 GLASS-FIBER BLANKET INSULATION

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. CertainTeed Corporation.
 - 2. Guardian Building Products, Inc.
 - 3. Johns Manville.
 - 4. Owens Corning.

- B. Unfaced, Glass-Fiber Blanket Insulation: ASTM C 665, Type I; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively, per ASTM E 84; passing ASTM E 136 for combustion characteristics.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Comply with insulation manufacturer's written instructions applicable to products and applications indicated.
- B. Install insulation that is undamaged, dry, and unsoiled and that has not been left exposed to ice, rain, or snow at any time.
- C. Extend insulation to envelop entire area to be insulated. Cut and fit tightly around obstructions and fill voids with insulation. Remove projections that interfere with placement.
- D. Provide sizes to fit applications indicated and selected from manufacturer's standard thicknesses, widths, and lengths. Apply single layer of insulation units to produce thickness indicated unless multiple layers are otherwise shown or required to make up total thickness.

3.2 INSTALLATION OF CAVITY-WALL INSULATION

- A. Foam-Plastic Board Insulation: Install pads of adhesive spaced approximately 24 inches (610 mm) o.c. both ways on inside face, and as recommended by manufacturer. Fit courses of insulation between wall ties and other obstructions, with edges butted tightly in both directions. Press units firmly against inside substrates.
 - 1. Supplement adhesive attachment of insulation by securing boards with two-piece wall ties designed for this purpose and specified in Section 042000 "Unit Masonry."

3.3 INSTALLATION OF INSULATION FOR FRAMED CONSTRUCTION

- A. Apply insulation units to substrates by method indicated, complying with manufacturer's written instructions. If no specific method is indicated, bond units to substrate with adhesive or use mechanical anchorage to provide permanent placement and support of units.
- B. Foam-Plastic Board Insulation: Seal joints between units by applying adhesive, mastic, or sealant to edges of each unit to form a tight seal as units are shoved into place. Fill voids in completed installation with adhesive, mastic, or sealant as recommended by insulation manufacturer.
- C. Glass-Fiber or Mineral-Wool Blanket Insulation: Install in cavities formed by framing members according to the following requirements:
 - 1. Use insulation widths and lengths that fill the cavities formed by framing members. If more than one length is required to fill the cavities, provide lengths that will produce a snug fit between ends.
 - 2. Place insulation in cavities formed by framing members to produce a friction fit between edges of insulation and adjoining framing members.
 - 3. Maintain 3-inch (76-mm) clearance of insulation around recessed lighting fixtures not rated for or protected from contact with insulation.

4. Install eave ventilation troughs between roof framing members in insulated attic spaces at vented eaves.
5. For metal-framed wall cavities where cavity heights exceed 96 inches (2438 mm), support unfaced blankets mechanically and support faced blankets by taping flanges of insulation to flanges of metal studs.
6. For wood-framed construction, install blankets according to ASTM C 1320 and as follows:
 - a. With faced blankets having stapling flanges, secure insulation by inset, stapling flanges to sides of framing members.
 - b. With faced blankets having stapling flanges, lap blanket flange over flange of adjacent blanket to maintain continuity of vapor retarder once finish material is installed over it.

D. **Miscellaneous Voids:** Install insulation in miscellaneous voids and cavity spaces where required to prevent gaps in insulation using the following materials:

1. **Loose-Fill Insulation:** Compact to approximately 40 percent of normal maximum volume equaling a density of approximately 2.5 lb/cu. ft. (40 kg/cu. m).
2. **Spray Polyurethane Insulation:** Apply according to manufacturer's written instructions.

3.4 INSTALLATION OF INSULATION FOR CONCRETE SUBSTRATES

A. Install board insulation on concrete substrates by adhesively attached, spindle-type insulation anchors as follows:

1. Fasten insulation anchors to concrete substrates with insulation anchor adhesive according to anchor manufacturer's written instructions. Space anchors according to insulation manufacturer's written instructions for insulation type, thickness, and application indicated.
2. Apply insulation standoffs to each spindle to create cavity width indicated between concrete substrate and insulation.
3. After adhesive has dried, install board insulation by pressing insulation into position over spindles and securing it tightly in place with insulation-retaining washers, taking care not to compress insulation below indicated thickness.
4. Where insulation will not be covered by other building materials, apply capped washers to tips of spindles.

END OF SECTION 072100

SECTION 072720 FLUID-APPLIED VAPOR PERMEABLE MEMBRANE AIR BARRIER SYSTEM

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Materials and installation methods supplementing a one-component vapor permeable, liquid applied, elastic air, and water barrier, vapor retarder materials and assemblies.
- B. Materials and installation to bridge and seal the following air leakage pathways and gaps:
 - 1. Connections of the walls to the roof air barrier.
 - 2. Connections of the walls to the foundations.
 - 3. Expansion joints.
 - 4. Openings and penetrations of window frames, store front, curtain wall.
 - 5. Barrier precast concrete and other envelope systems.
 - 6. Door frames.
 - 7. Piping, conduit, duct and similar penetrations.
 - 8. Masonry ties, screws, bolts and similar penetrations.
 - 9. All other air leakage pathways in the building envelope.
 - 10. Sealing flashing to wall surface.

1.2 RELATED SECTIONS

- A. Division 04 – 04200 Masonry: Flexible through wall flashing membrane. Sealing flashing to wall surface.
- B. Section 061053 – Miscellaneous Carpentry: Covering preservative-treated materials with self-adhering membranes.
- C. Section 092900 – Gypsum Board: Installing air barrier membrane over glass-faced gypsum sheathing and structural roof decking and roof board.
- E. Section 079000 – Joint Protection: Sealants.

1.3 PERFORMANCE REFERENCES

- A. ASTM E 2178-01: Standard Test for Determining the Air Permeability of Building Materials.
- B. ASTM E 2357, Standard Test Method for Determining Air Leakage of Air Barrier Systems (Full Scale Wall Testing of the Air Barrier System).
- C. ASTM E283-91: Standard Test Method for Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen.
- D. ASTM E330-90: Standard Test Method for Structural Performance of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference.
- E. ASTM E96: Water Vapor Transmission of Materials, Procedure B

- F. AATCC 127 Water Resistance
- G. ASTM D 1970, Self Sealability
- H. ICC-ES AC212, Freeze Thaw, Crack Bridging
- I. Fire Testing: Air Barrier, as a component of a wall assembly, shall have passed a NFPA 285 complete wall fire test.
- J. Listed as an evaluated system by Air Barrier Association of America at www.airbarriers.org/materials/assemblies_e.php

1.4 PERFORMANCE REQUIREMENTS

- A. Provide an air barrier system constructed to perform as a continuous elastic air barrier, and as a liquid water drainage plane flashed to discharge to the exterior any incidental condensation or water penetration. Membrane shall accommodate movements of building materials by providing expansion and control joints as required, with accessory air seal materials at such locations, changes in substrate and perimeter conditions.
 - 1. The air barrier shall have the following characteristics:
 - a. It must be continuous, with all joints made air-tight.
 - b. It shall be capable of withstanding positive and negative combined design wind, fan and stack pressures on the envelope without damage or displacement, and shall transfer the load to the structure. It shall not displace adjacent materials under full load. The air barrier shall be joined in an airtight and flexible manner to the air barrier material of adjacent systems, allowing for the relative movement of systems due to thermal and moisture variations and creep. Connection shall be made between:
 - 1) Foundation and walls.
 - 2) Walls and windows or doors.
 - 3) Different wall systems.
 - 4) Wall and roof.
 - 5) Wall and roof over unconditioned space.
 - 6) Walls, floor and roof across construction, control and expansion joints.
 - 7) Walls, floors and roof to utility, pipe and duct penetrations.
 - 8) Flashing to wall surface.
 - 2. All penetrations of the air barrier and paths of air infiltration/exfiltration shall be made air-tight.
 - 3. Air Permeability: Maximum 0.04 cfm/sq.ft. @ 10.5 psf per ASTM E283.
 - 4. Air Permeability: @ delta P of 0.3 inches water...0.002 CFM/ft² per ASTM E 2178
 - 5. ASTM E 2357, Full Scale Wall Testing of the Air Barrier System
 - a. System Air Leakage, Requirement – 0.0008 CFM/ft² maximum
 - b. Penetration Check, Requirement – 0.00088 CFM/ft² maximum

6. ASTM E96 Water Vapor Permeance:10-20 Perms per Procedure B
7. Elongation: Minimum 75% per ASTM D412.
8. AATC 127 Water Resistance – Pass
9. ASTM D 1970 Self Sealability – Pass
10. ICC-ES AC212, Freeze Thaw, Crack Bridging – Pass
11. Fire Testing: Air Barrier, as a component of a wall assembly, shall have passed a NFPA 285 complete wall fire test.
12. Listed as an evaluated assembly by the Air Barrier Association at www.airbarriers.org/materials/assemblies_e.php

1.5 SUBMITTALS

- A. Section 017500– Submittals: Submittal Procedures.
- B. Prior to commencing the Work, submit manufacturer’s independent Laboratory Report for the Air Barrier Systems testing on ASTM E 2357 tested on a steel stud frame wall, results are to be based on Specimen 2 testing only.
- C. Prior to commencing the Work, submit documentation certifying that the air barrier system has been tested independently, indicating compliance with the performance requirements of the Air Barrier Association of Association.
- D. Prior to commencing the Work, submit copies of manufacturers’ literature for the system, membrane, primers, sealants, adhesives and associated auxiliary materials shall be included as parts of the system that is listed by the Air Barrier Association of America evaluation.
- E. Prior to commencing the Work, submit references clearly indicating that the materials proposed have been installed for not less than three years on projects of similar scope and nature.
- F. Prior to commencing the Work, submit manufacturers’ complete set of standard details for air barrier/vapor retarders. The manufacturer’s representative shall review the contract drawings and note any modifications required to make the system air and water tight.

1.6 QUALITY ASSURANCE

- A. Manufacturer's Qualifications: Provide primary products, including each component of the air barrier membrane system, which has been commercially available for a minimum of 3 years.

- B. Submit in writing, a document stating that the applicator of the primary air barrier membrane specified in this section is recognized by the manufacturer as suitable for the execution of the Work.
- C. Perform Work in accordance with the printed requirements of the air barrier manufacturer and this specification.
- D. Maintain one copy of manufacturer instructions on site.
- E. At the beginning of the Work and at all times during the execution of the Work, allow access to Work site by the air barrier membrane manufacturer's representative.
- F. Components used in this section shall be sourced from one manufacturer, including sheet membrane, air barrier sealants, primers, mastics, tapes and adhesives as listed as an evaluated air barrier assembly by the Air Barrier Association of America.

1.7 MOCK-UP

- A. Construct mock-up in accordance with Division 1 –General Requirements for a mock-up.
- B. Provide mock-up of air barrier materials under provisions of Section 042000 –Unit Masonry.
- C. Items to be incorporated in mock-up include:
 - 1. Where directed by Architect, construct typical exterior wall panel, 8 feet long by 8 feet high, incorporating masonry veneer system, through wall flexible flashing, glass-faced gypsum sheathing, wall ties, board insulation, metal studs, aluminum curtain wall frame, aluminium window frame, showing air barrier membrane application details and transition membranes.
- D. Allow 24 hours for inspection of mock-up by Architect before proceeding with air barrier work.

1.8 PRE-INSTALLATION CONFERENCE

- A. Convene four weeks prior to commencing work of this section, under provisions of Section 011600 – Contractor Requirements: Pre-Installation Meeting. Attendance by the manufacturer's representative along with the installer is mandatory.

DO NOT PROCEED WITH THE INSTALLATION OF THE AIR BARRIER MEMBRANE AND THE THROUGH WALL FLASHING MEMBRANE PRIOR TO THE PRE-INSTALLATION CONFERENCE.

1.9 DELIVERY, STORAGE AND HANDLING

- A. Deliver materials to the job site in undamaged and original packaging indicating the name of the manufacturer and product.
- B. All pail goods shall bear the ABAA Evaluated Air Barrier label
- C. Store roll materials on end in original packaging.

- D. Keep all products stored at above 40°F. Apply to a substrate with a surface T°F of 40°F and rising. DO NOT ALLOW PRODUCT TO FREEZE.
- E. Protect rolls from direct sunlight until ready for use.
- F. Do not double stack pail goods.

1.10 COORDINATION

- A. Ensure continuity of the air seal throughout the scope of this section.

PART 2 - PRODUCTS

2.1 MEMBRANES

- A. Liquid air barrier: One component elastomeric membrane, spray, trowel or brush applied, having the following characteristics and have passed all evaluations by the Air Barrier Association of America (ABAA) and be listed on their web site as having passed all the evaluations :

1. Air permeability:
 - a. Air Leakage Thru Cured Films: <0.04 cfm/ft² @ 10.5 lbs/ ft² or <0.005 L/sm² @ 75 Pa to ASTM E283 (Modified) 24 hours, +/- 10%.
 - b. Air Leakage per ASTM E 2178, dry film, delta P of 0.3 inches of water, 0.002 +/- 10%
2. Air Barrier System Test on Full Scale Wall Assembly, ASTM E 2357
 - a. System Air Leakage, 0.0008 CFM/ft² +/- 10%
 - b. Penetrations Check, MUST PASS ASTM E 2357 requirements
3. Water Vapor permeance: (704 ng/Pa.m².s.) 10 to 20 perms, ASTM E96 Method B. NOTE: THE MATERIAL SPECIFIED IS VAPOR PERMEABLE.
4. Elongation (ASTM D412: >75%)
5. Low temperature flexibility and crack bridging: Pass – ICC-ES AC212
6. ASTM D 1970, Self Sealability – Pass
7. AATCC 127 Water Resistance – Pass

- B. Acceptable Manufacturers

1. STS Coatings, Wall Guardian, 830-995-5177
www.wallguardian.com, a Certified Texas HUB
 - a. FW-100A, a non-asphaltic product

2. W.R. Grace, Perm-a-Barrier VP a non-asphaltic product

- C. Transition Membrane, Self-Adhering: Polymer-based, sheet membrane complete with polyester facing, and having the following physical properties:

1. Thickness: 35 mils (0.5 mm) min.
2. Vapor permeance: <0.1
3. Low temperature flexibility: -20 F to CGSB 37-GP-56M;
4. Elongation: >90% to ASTM D412-modified;
 - a. Acceptable material:
 - 1) UT-40 by STS Coatings for use with the FW-100 system.
 - 2) Others as recommended by manufacturer

2.2 PRIMER

- A. Primer for self-adhering membranes: Synthetic polymer-based adhesive type, quick setting, having the following characteristics:

- a. Acceptable material: As manufactured and/or recommended by the Air Barrier System manufacturer. Note: Primer shall be compatible with specified glass faced gypsum sheathing.
- b. Verify compatibility of self-adhering membranes with preservative treated materials specified in Section 06 10 53. Prime preservative treated materials as required using primer recommended by self-adhering membrane manufacturer or use the non-chemical thermally modified wood known as EcoPrem.

2.3 SEALANTS

- A. Sealants shall be compatible with air barrier systems and shall be approved by the air barrier manufacturer.
- B. Products:
 1. STS Coatings LT-100 Liquid Tape for concealed applications only and Great Seal PE-150 for concealed and exposed applications.
- C. Primers: As recommended by manufacturer for surfaces to be sealed.
- D. Backer Rods: As recommended by sealant manufacturer.
- E. Others as recommended by manufacturer

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify that surfaces and conditions are ready to accept the Work of this section. Notify Architect in writing of any discrepancies. Commencement of the work or any parts thereof shall mean acceptance of the prepared substrate.

3.2 PREPARATION

- A. All surfaces must be sound, dry, clean and free of oil, grease, dirt, excess mortar or other contaminants. Fill spalled areas in substrates to provide an even plane.
- B. Mortar joints in concrete block and form tie holes/voids in poured concrete shall be filled flush and smooth and allowed to be cured for a minimum of 24 hours.
- C. All joints between gypsum sheathing, roof board, masonry and concrete and other substrate joints up to 1/4" wide shall be treated:
 - 1. STS Coatings LT-100 Liquid Tape, www.stscoatings.com.
 - 2. York Manufacturing, US-100, www.yorkmfg.com
 - 3. Others as recommended by manufacturer
- D. All joints between gypsum sheathing, roof board, masonry and concrete and other substrates wider than 1/4" shall be sealed with:
 - 1. UT-40, overlapping each side of joint a minimum of 3 inches
 - 2. Others as recommended by manufacturer
- E. Install backer rod and sealant at the following joints:
 - 1. All expansion/control/erection joints between concrete wall panels.
 - 2. All expansion/control joints in concrete block back-up.
 - 3. All joints between concrete wall panels and concrete block back-up.

3.3 PRIMER FOR TRANSITION MEMBRANE (SELF-ADHERING TYPE ONLY)

- A. Apply primer for self-adhering membranes at rate recommended by manufacturer.
- B. Apply primer to all areas to receive transition sheet membrane as indicated in Drawings by roller or spray and allow minimum 30 minute open time. Primed surfaces not covered by transition membrane during the same working day must be re-primed.

3.4 TRANSITION MEMBRANE (SELF-ADHERING TYPE)

- A. Align and position self-adhering transition membrane, remove protective film and press firmly into place. Ensure minimum 2 inch overlap at all end and side laps unless otherwise noted.
- B. Tie-in to roofing system and at the interface of dissimilar materials as indicated in Drawings.
- C. Promptly roll all laps and membrane with a counter top roller to affect seal.
- D. Ensure all preparatory work is complete prior to applying liquid membrane.

3.5 PRIMARY AIR BARRIER

- A. Apply by spray or roller, a complete and continuous unbroken film at a temperature of 40°F and rising with less than a 30% chance of rain in the next 18 hours and apply at the same rate as listed in the Air Barrier Association of America evaluation
1. Exterior Gypsum Sheathing, Plywood or OSB
 - a. Wall Guardian FW-100A at a minimum of 2.5 gallons per 100 ft² (40 ft²/gallon) (40 wet mils)
 - b. Perm-a-Barrier VP at a minimum rate of 5.5 gallons per 100 ft² (18 ft²/gallon) (90 mils wet)
 - c. Spray around all projections, including masonry veneer anchors, ensuring a complete and continuous air seal.
 2. Concrete Masonry Unit (CMU), Concrete
 - a. Wall Guardian FW-100A at a minimum of 2,5 gallons per 100 ft² (40 ft²/gallon) (equal to 40 wet mils on a smooth surface)
 - b. Perm-A-Barrier VP at a minimum rate of 5.5 gallons per 100 ft² (18 ft²/gallon) (equal to 90 wet mils on a smooth surface)
 - c. Spray around all projections including masonry veneer anchors ensuring a complete and continuous air seal.

3.6 INSPECTION

- A. Notify Architect when sections of work are complete so as to allow for review prior to installing insulation. The manufacturer's representative shall be on site to review the installation along with the Architect.

3.7 PROTECTION OF FINISHED WORK

- A. Liquid membranes are not designed for permanent exposure. Cover the liquid membrane, as recommended by the manufacturer, within the following time frames. Contractor shall verify the number of calendar days with the air barrier manufacturer:
1. Cover the Wall Guardian material within 180 calendar days after installation. The nature of this product is such that some surface weathering may become apparent during exposure. This is a surface effect only and does not impact air barrier system performance.
 2. Transition membranes shall be covered within 180 days after installation
- B. Prepare, treat and seal vertical and horizontal surfaces at terminations and penetrations through the air barrier and at protrusions according to air barrier manufacturer's written instructions.

3.8 SCHEDULE

- A. Install liquid membrane system over the entire surface of the glass faced sheathing in the following area. Seal any masonry anchor penetrations air tight.
1. In the masonry cavity wall.

- B. Install liquid membrane system over the entire surface of the outer surface of the inner wythe of masonry. Seal any masonry anchor penetrations air tight.
- C. Install liquid membrane system over the entire surface of the outer surface of the concrete wall panels. Seal any masonry anchor penetrations air tight.
- D. Install liquid membrane system over the entire surface of the glass faced gypsum sheathing and/or roof board in the following area:
 - 1. Behind the metal parapet panels.
 - 2. Behind the metal wall and soffit panels.
- E. Hollow Metal Door Frames: Seal door frame to wall surface with transition membrane.
- F. Wall and Roof Junction: Seal wall to roof with transition membrane.
- G. Seal joints in glass-faced sheathing with tape in the following areas:
 - 1. Cement plaster soffit.
- H. Seal the top of sheathing to the underside of the roof systems with foam or LT-100.
- I. Openings: Seal around the perimeter of all openings with transition membrane.
- J. Perimeter wood nailers at wall openings: Cover all exposed surfaces of wood nailers with transition membrane. Extend membrane over sheathing, masonry and metal framing as shown.
- K. Aluminum window frames with nailing flanges: Seal the nailing flanges to the wall surface with transition membrane.
- L. Aluminum window frames without nailing flanges: Seal frames to the wall surface with transition membrane.
- M. Aluminum storefront frames: Seal frames to the wall surface with transition membrane.
- N. Aluminum curtain wall frames: Seal frames to wall surface with transition membrane.

END OF SECTION 072726

SECTION 074213

METAL COMPOSITE MATERIAL WALL PANELS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes metal composite material wall and soffit panels.

1.2 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.3 PREINSTALLATION MEETINGS

- A. Preinstallation Meeting: Convene one week before starting work of this section.
 - 1. Review preparation and installation procedures and coordinating and scheduling required with related work.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: Include fabrication and installation layouts of metal composite material panels; details of edge conditions, joints, panel profiles, corners, anchorages, attachment assembly, trim, flashings, closures, and accessories; and special details.
- C. Samples: For each type of metal composite material panel indicated.

1.5 INFORMATIONAL SUBMITTALS

- A. Product test reports.
- B. Warranties: Samples of special warranties.

1.6 CLOSEOUT SUBMITTALS

- A. Maintenance data.

1.7 QUALITY ASSURANCE

- A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer.

1.8 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of metal composite material panel systems that fail in materials or workmanship within specified warranty period.
 - 1. Warranty Period: Two years from date of Substantial Completion.
- B. Special Warranty on Panel Finishes: Manufacturer's standard form in which manufacturer agrees to repair finish or replace metal composite material panels that show evidence of deterioration of factory-applied finishes within specified warranty period.
 - 1. Finish Warranty Period: 20 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Structural Performance: Provide metal composite material panel systems capable of withstanding the effects of the following loads, based on testing according to ASTM E 330:
 - 1. Wind Loads: As indicated on Drawings.
 - 2. Other Design Loads: As indicated on Drawings.
- B. Air Infiltration: Air leakage of not more than 0.06 cfm/sq. ft. (0.3 L/s per sq. m) when tested according to ASTM E 283 at the following test-pressure difference:
 - 1. Test-Pressure Difference: 1.57 lbf/sq. ft. (75 Pa).
- C. Water Penetration under Static Pressure: No water penetration when tested according to ASTM E 331 at the following test-pressure difference:
 - 1. Test-Pressure Difference: 6.24 lbf/sq. ft. (300 Pa).
- D. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes by preventing buckling, opening of joints, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Base calculations on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
 - 1. Temperature Change (Range): 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.

2.2 METAL COMPOSITE MATERIAL SOFFIT PANELS

- A. Metal Composite Material Wall Panel Systems: Provide factory-formed and -assembled, metal composite material wall panels fabricated from two metal facings that are bonded to a solid, extruded thermoplastic core; formed into profile for installation method indicated. Include attachment assemblies components and accessories required for weathertight system.
 - 1. Basis-of-Design Product: Subject to compliance with requirements, provide 3A Composites US, Inc - Alucobond or comparable product by one of the following:

- a. Alcoa Inc.; Reynobond .
 - b. CENTRIA Architectural Systems; Formabond Wall System.
 - c. Firestone Metal Products, LLC; UNA-FAB.
- B. Aluminum-Faced Composite Wall Panels: Formed with 0.020-inch thick, coil-coated or anodized aluminum sheet facings.
1. Panel Thickness: 0.157 inch (4 mm).
 2. Core: Standard.
 3. Exterior Finish: Two-Coat or Three-coat fluoropolymer as required.
 - a. Color: As selected by Architect from manufacturer's full range.
- C. Attachment Assembly Components: Formed from extruded aluminum.
- D. Attachment Assembly: Manufacturer's standard.

2.3 MISCELLANEOUS MATERIALS

- A. Miscellaneous Metal Subframing and Furring: ASTM C 645, cold-formed, metallic-coated steel sheet ASTM A 653/A 653M, G90 (Z275 hot-dip galvanized) coating designation or ASTM A 792/A 792M, Class AZ50 (Class AZM150) aluminum-zinc-alloy coating designation unless otherwise indicated. Provide manufacturer's standard sections as required for support and alignment of metal composite material panel system.
- B. Panel Accessories: Provide components required for a complete, weathertight panel system including trim, copings, fasciae, mullions, sills, corner units, clips, flashings, sealants, gaskets, fillers, closure strips, and similar items. Match material and finish of metal composite material panels unless otherwise indicated.
- C. Flashing and Trim: Provide flashing and trim formed from same material as metal composite material panels as required to seal against weather and to provide finished appearance. Locations include, but are not limited to, bases, drips, sills, jambs, corners, endwalls, framed openings, rakes, fasciae, parapet caps, soffits, reveals, and fillers. Finish flashing and trim with same finish system as adjacent metal composite material panels.
- D. Panel Fasteners: Self-tapping screws designed to withstand design loads. Provide exposed fasteners with heads matching color of metal composite material panels by means of plastic caps or factory-applied coating. Provide EPDM or PVC sealing washers for exposed fasteners.
- E. Panel Sealants: ASTM C 920; as recommended in writing by metal composite material panel manufacturer. Provide sealant types recommended by manufacturer that are compatible with panel materials, are nonstaining, and do not damage panel finish.

2.4 FABRICATION

- A. General: Fabricate and finish metal composite material panels and accessories at the factory, by manufacturer's standard procedures and processes, as necessary to fulfill indicated performance requirements demonstrated by laboratory testing. Comply with indicated profiles and with dimensional and structural requirements.

- B. Fabricate metal composite material panel joints with factory-installed captive gaskets or separator strips that provide a weathertight seal and prevent metal-to-metal contact, and that minimize noise from movements.
- C. Sheet Metal Flashing and Trim: Fabricate flashing and trim to comply with manufacturer's recommendations and recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to design, dimensions, metal, and other characteristics of item indicated.

2.5 FINISHES

A. Panels and Accessories:

1. Two-Coat Fluoropolymer: AAMA 620. Fluoropolymer finish containing not less than 70 percent PVDF resin by weight in color coat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
2. Three-Coat Fluoropolymer: AAMA 620. Fluoropolymer finish containing not less than 70 percent PVDF resin by weight in both color coat and clear topcoat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Miscellaneous Supports: Install subframing, furring, and other miscellaneous panel support members and anchorages according to ASTM C 754 and metal composite material panel manufacturer's written recommendations.

3.2 METAL COMPOSITE MATERIAL PANEL INSTALLATION

- A. Attachment Assembly, General: Install attachment assembly required to support metal composite material wall panels and to provide a complete weathertight wall system, including subgirts, perimeter extrusions, tracks, drainage channels, panel clips, and anchor channels.
 1. Include attachment to supports, panel-to-panel joinery, panel-to-dissimilar-material joinery, and panel-system joint seals.
- B. Installation: Attach metal composite material wall panels to supports at locations, spacings, and with fasteners recommended by manufacturer to achieve performance requirements specified.
 1. Wet Seal Systems: Seal horizontal and vertical joints between adjacent metal composite material wall panels with sealant backing and sealant. Install sealant backing and sealant according to requirements specified in Section 079000 "Caulking and Sealants."
 2. composite material
 3. Rainscreen Systems: Do not apply sealants to joints unless otherwise indicated.
- C. Accessory Installation: Install accessories with positive anchorage to building and weathertight mounting, and provide for thermal expansion. Coordinate installation with flashings and other components.

- D. Flashing and Trim: Comply with performance requirements, manufacturer's written installation instructions, and SMACNA's "Architectural Sheet Metal Manual." Provide concealed fasteners where possible, and set units true to line and level as indicated. Install work with laps, joints, and seams that are permanently watertight.

3.3 CLEANING

- A. Remove temporary protective coverings and strippable films, if any, as metal composite material panels are installed, unless otherwise indicated in manufacturer's written installation instructions. On completion of metal composite material panel installation, clean finished surfaces as recommended by metal composite material panel manufacturer. Maintain in a clean condition during construction.

END OF SECTION 074213

SECTION 075216(SBS) MODIFIED BITUMINOUS MEMBRANE ROOFING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Styrene-butadiene-styrene (SBS)-modified bituminous membrane roofing.
2. Hybrid roofing system that combines built-up ply sheets with styrene-butadiene-styrene (SBS)-modified bituminous membrane roofing.
3. Roof Insulation

1.2 DEFINITIONS

- A. Roofing Terminology: Definitions in ASTM D 1079 and glossary of NRCA's "The NRCA Roofing and Waterproofing Manual" apply to work of this Section.

1.3 REFERENCE STANDARDS

- A. ASTM C1289 - Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board; 2010.
- B. ASTM D41 - Standard Specification for Asphalt Primer Used in Roofing, Dampproofing, and Waterproofing; 2011.
- C. ASTM D312 - Standard Specification for Asphalt Used in Roofing; 2000 (Reapproved 2006).
- D. ASTM D4586 - Standard Specification for Asphalt Roof Cement, Asbestos-Free; 2007.
- E. ASTM D4601 - Standard Specification for Asphalt-Coated Glass Fiber Base Sheet Used in Roofing; 2004.
- F. ASTM D6162 - Standard Specification for Styrene Butadiene Styrene (SBS) Modified Bituminous Sheet Materials Using a Combination of Polyester and Glass Fiber Reinforcements; 2000a (Reapproved 2008).
- G. FM DS 1-28 - Wind Design; Factory Mutual Research Corporation; 2007.
- H. NRCA ML104 - The NRCA Roofing and Waterproofing Manual; National Roofing Contractors Association; Fifth Edition, with interim updates.

1.4 PREINSTALLATION MEETINGS

- A. Coordinate with installation of associated flashings and counterflashings installed by other sections.
- B. Preinstallation Meeting: Convene one week before starting work of this section.
1. Review preparation and installation procedures and coordinating and scheduling required with related work.

1.5 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: For roofing system. Include plans, elevations, sections, details, and attachments to other work.
- C. Samples for Verification: For the following products:
 - 1. Cap sheet, of color required.
 - 2. Flashing sheet, of color required.
 - 3. Aggregate surfacing material in gradation and color required.
 - 4. Walkway pads or rolls, of color required.

1.6 INFORMATIONAL SUBMITTALS

- A. Research/Evaluation Reports: For components of membrane roofing system, from ICC-ES.
- B. Sample Warranties: For manufacturer's special warranties.

1.7 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For roofing system to include in maintenance manuals.

1.8 QUALITY ASSURANCE

- A. Installer Qualifications: A qualified firm that is approved, authorized, or licensed by roofing system manufacturer to install manufacturer's product and that is eligible to receive manufacturer's special warranty.
- B. Manufacturer's Installation Instructions: Indicate special procedures.

1.9 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace components of roofing system that fail in materials or workmanship within specified warranty period.
 - 1. Watertightness Warranty Period: 20 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. CertainTeed Corporation
 - 2. Firestone Building Products.

3. Johns Manville.
4. Siplast, Inc.
5. Tamko Building Products, Inc.
6. Tremco Incorporated.

- B. Source Limitations: Obtain components including roof insulation and fasteners for roofing system from same manufacturer as membrane roofing or manufacturer approved by membrane roofing manufacturer.

2.2 PERFORMANCE REQUIREMENTS

- A. Accelerated Weathering: Roofing system shall withstand 2000 hours of exposure when tested according to ASTM G 152, ASTM G 154, or ASTM G 155.
- B. Impact Resistance: Roofing system shall resist impact damage when tested according to ASTM D 3746 or ASTM D 4272.
- C. Energy Performance: Roofing system shall have an initial solar reflectance index of not less than 0.70 and an emissivity of not less than 0.80 when tested according to CRRC-1.
- D. Fire-Resistance Ratings: Comply with fire-resistance-rated assembly designs indicated. Identify products with appropriate markings of applicable testing agency.

2.3 ROOFING SHEET MATERIALS

- A. Base Sheet: ASTM D 4601, Type II, nonperforated, asphalt-impregnated and -coated, glass-fiber sheet, dusted with fine mineral surfacing on both sides.
- B. Granule-Surfaced Roofing Cap Sheet: ASTM D 6164/D 6164M, Grade G, Type I or II, SBS-modified asphalt sheet (reinforced with polyester fabric) granule surfaced; suitable for application method specified, and as follows:
1. Granule Color: White.

2.4 BASE FLASHING SHEET MATERIALS

- A. Flexible Flashing Material: Same material as membrane.
- B. Separation Sheet: Sheet polyethylene; 6 mil thick.

2.5 AUXILIARY ROOFING MATERIALS

- A. General: Auxiliary materials recommended by roofing system manufacturer for intended use and compatible with roofing.
- B. Asphalt Primer: ASTM D 41/D 41M.
- C. Roofing Asphalt: ASTM D 312, Type IV or as recommended by roofing system manufacturer for application.

- D. Asphalt Roofing Cement: ASTM D 4586, asbestos free, of consistency required by roofing system manufacturer for application.
- E. Fasteners: Factory-coated steel fasteners and metal or plastic plates complying with corrosion-resistance provisions in FM Global 4470, designed for fastening roofing components to substrate; tested by manufacturer for required pullout strength, and acceptable to roofing system manufacturer.

2.6 ROOF INSULATION

- A. Polyisocyanurate Board Insulation: ASTM C 1289, Type II, Class 1, Grade 2, felt or glass-fiber mat facer on both major surfaces.
 - 1. Basis-of-Design Product: Subject to compliance with requirements, provide Johns Manville - Enrgy 3 Roof Insulation or comparable product by one of the following:
 - a. Atlas Roofing Corporation.
 - b. Firestone Building Products.
 - c. GAF Materials Corporation.
- B. Tapered Insulation: Provide factory-tapered insulation boards fabricated to slope of 1/4 inch per 12 inches (1:48) unless otherwise indicated.
- C. Provide preformed saddles, crickets, tapered edge strips, and other insulation shapes where indicated for sloping to drain. Fabricate to slopes indicated.

2.7 INSULATION ACCESSORIES

- A. Fasteners: Factory-coated steel fasteners and metal or plastic plates complying with corrosion-resistance provisions in FM Global 4470, designed for fastening roof insulation to substrate, and acceptable to roofing system manufacturer.
- B. Insulation Adhesive: Insulation manufacturer's recommended adhesive formulated to attach roof insulation to substrate or to another insulation layer.
- C. Insulation Cant Strips: ASTM C 208, Type II, Grade 1, cellulosic-fiber insulation board.
- D. Cover Board: ASTM C 1177/C 1177M, glass-mat, water-resistant gypsum substrate, 1/4 inch thick.
 - 1. Basis-of-Design Product: Subject to compliance with requirements, provide Georgia Pacific Corporation; Dens Deck Prime or comparable product by one of the following:
 - a. CertainTeed Corporation; GlasRoc Sheathing.
 - b. National Gypsum Company; Gold Bond eXP Extended Exposure Sheathing.
 - c. Temple-Inland, Inc; GreenGlass Exterior Sheathing.
 - d. USG Corporation; Securock Glass Mat Roof Board.

2.8 WALKWAYS

- A. Walkway Pads: Suitable for maintenance traffic, contrasting color or otherwise visually distinctive from roof membrane.
 - 1. Composition: Asphaltic with mineral granule surface.

2. Surface Color: White

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Comply with roofing system manufacturer's written instructions.
- B. Substrate-Joint Penetrations: Prevent roofing asphalt and adhesives from penetrating substrate joints, entering building, or damaging roofing system components or adjacent building construction.
- C. Verify that surfaces and site conditions are ready to receive work.
- D. Verify deck is supported and secure.
- E. Verify deck is clean and smooth, flat, free of depressions, waves, or projections, properly sloped and suitable for installation of roof system.
- F. Verify deck surfaces are dry and free of snow or ice.
- G. Verify that roof openings, curbs, and penetrations through roof are solidly set, and cant strips are in place.

3.2 METAL DECK PREPARATION

- A. Install deck sheathing on metal deck:
 1. Lay with long side at right angle to flutes; stagger end joints; provide support at ends.
 2. Cut sheathing cleanly and accurately at roof breaks and protrusions to provide smooth surface.
 3. Mechanically fasten sheathing to roof deck, in accordance with Factory Mutual recommendations and roofing manufacturer's instructions.
 - a. Over entire roof area, fasten sheathing using 6 fasteners with washers per sheathing board.

3.3 INSULATION INSTALLATION

- A. Attachment of Insulation:
 1. Mechanically fasten first layer of insulation to deck in accordance with roofing manufacturer's instructions and Factory Mutual requirements.
 2. Embed second layer of insulation into flood coat mopping of hot bitumen in accordance with roofing and insulation manufacturers' instructions.
- B. Lay boards with edges in moderate contact without forcing. Cut insulation to fit neatly to perimeter blocking and around penetrations through roof.
- C. Install tapered insulation under area of roofing to conform to slopes indicated.

- D. Install insulation under area of roofing to achieve required thickness. Where overall insulation thickness is 2.7 inches or greater, install two or more layers with joints of each succeeding layer staggered from joints of previous layer a minimum of 6 inches in each direction.
 - 1. Where installing composite and noncomposite insulation in two or more layers, install noncomposite board insulation for bottom layer and intermediate layers, if applicable, and install composite board insulation for top layer.
- E. Install tapered edge strips at perimeter edges of roof that do not terminate at vertical surfaces.
- F. Do not apply more insulation than can be covered with membrane in same day.

3.4 MEMBRANE APPLICATION

- A. Apply membrane in accordance with manufacturer's instructions.
- B. Apply membrane; lap and seal edges and ends permanently waterproof.
- C. Apply smooth, free from air pockets, wrinkles, fish-mouths, or tears. Ensure full bond of membrane to substrate.
- D. At end of day's operation, install waterproof cut-off. Remove cut-off before resuming roofing.
- E. At intersections with vertical surfaces:
 - 1. Extend membrane over cant strips and up a minimum of 8 inches onto vertical surfaces.
 - 2. Apply flexible flashing over membrane.
- F. Around roof penetrations, mop in and seal flanges and flashings with flexible flashing.
- G. Coordinate installation of roof drains and sumps and related flashings.

3.5 FLASHING AND STRIPPING INSTALLATION

- A. Install base flashing over cant strips and other sloped and vertical surfaces, at roof edges, and at penetrations through roof, and secure to substrates according to roofing system manufacturer's written instructions.
- B. Extend base flashing up walls or parapets a minimum of 8 inches (200 mm) above roofing membrane and 4 inches (100 mm) onto field of roofing membrane.
- C. Mechanically fasten top of base flashing securely at terminations and perimeter of roofing.
- D. Install roofing cap-sheet stripping where metal flanges and edgings are set on roofing according to roofing system manufacturer's written instructions.

3.6 WALKWAY INSTALLATION

- A. Walkway Pads: Install walkway pads using units of size indicated or, if not indicated, of manufacturer's standard size, according to walkway pad manufacturer's written instructions.

3.7 CLEANING

- A. Remove bituminous markings from finished surfaces.
- B. In areas where finished surfaces are soiled by bitumen or other source of soiling caused by work of this section, consult manufacturer of surfaces for cleaning advice and conform to their documented instructions.
- C. Repair or replace defaced or damaged finishes caused by work of this section.

3.8 PROTECTION

- A. Protect installed roofing and flashings from construction operations.
- B. Where traffic must continue over finished roof membrane, protect surfaces using durable materials.

END OF SECTION 075216

SECTION 076210

THRU WALL FLASHING AND TRIM

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes combination flashing, mortar deflection, and weep as complete one step flashing drainage system.
- B. Related sections:
 - 1. 042000 Unit Masonry
 - 2. 054000 Cold Formed Metal Framing.
 - 3. 061053 Miscellaneous Rough Carpentry.
 - 4. 071113 Bituminous Dampproofing.
 - 5. 072726 Fluid – applied Vapor Permeable Membrane Air barriers.
 - 6. 076210 Thru Wall Flashing and Trim.
 - 7. 079000 Caulking and Sealants.

1.2 REFERENCES

- A. Standards of the following as referenced:
 - 1. ASTM.
 - 2. Brick Industry Association (BIA).
 - 3. Copper Development Association, Inc. (CDA).
- B. Industry standards:
 - 1. *BIA Technical Notes on Brick Construction No. 7, Water Penetration Resistance- Design and Detailing*, August 2005.
 - 2. *BIA Technical Notes on Brick Construction No. 28B, Brick Veneer/Steel Stud Walls*, August 2005.

1.3 DEFINITIONS

- A. Terms:
 - 1. Cavity wall flashing: Same as flexible flashing.
 - 2. Foundation sill flashing: Same as flexible flashing.
 - 3. Flexible flashing: Water-proof material typically used in cavity wall construction to contain and assist in the proper water drainage that may penetrate wall system veneer. Other materials may be required to constitute the system.
 - 4. Head and sill flashing: Same as flexible flashing.
 - 5. Through-wall flashing:
 - a. Generally considered the same as flexible flashing.
 - b. Rare definition referred to full width cap flashing under copings or wall caps.

1.4 SUBMITTALS

- A. Product data: Indicate material type, composition, thickness, and installation procedures.
- B. Samples: 3" by 5" flashing material.
- C. Product Quality & Environmental submittals:
 - 1. Certificates:
 - a. Indicate materials supplied or installed are asbestos free.

- b. Indicate recycled content: >90% total recycled material; based on 80% Post Industrial Recycled Content and 10% Post Consumer Recycled Content.
2. Critical Performance Attributes:
 - a. Tensile Strength, >30,000 psi minimum average
 - b. Puncture Resistant, >270 pound average
 - c. Mold Growth, product resists growth of mold pursuant to test method ASTM D 3273-94.
3. Fire Rating
 - a. Rated Class A, ASTM E84

1.5 QUALITY ASSURANCE

A. Qualifications:

1. Manufacturer: Provide flashing materials by single manufacturer.

1.6 WARRANTY

A. Special warranty:

1. Manufacturer: Warrant flexible flashing/drainage system material for life of the wall.
2. Begin warranty at Date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURED UNITS

A. Copper core flexible flashing/drainage system:

1. Product standard of quality:
 - a. York Manufacturing, Inc.; York Flash-Vent AB, (www.yorkmfg.com)
 - b. STS Coatings: Wall Guardian TWF, (www.stscoatings.com)
 - c. Others provided they meet the requirements in section 1.04.C
2. Characteristics:
 - a. Type: Copper core with non-asphalt adhesive reinforced fabric laminated to one copper face and non-woven drainage fabric laminated to opposing face with non-asphalt adhesive.
 - b. Copper type, ASTM B248-06: CDA Alloy 110, 060 temper.
 - c. Fabrics:
 - 1) Fiberglass or reinforced synthetic fabric; laminated back face copper core.
 - 2) Non-woven drainage fabric: Fabric laminated to front face.
 - d. Size: Manufacturer's standard width rolls.
 - e. Polyether sealant: Suggested manufacturers: York Manufacturing UniverSeal US-100 or STS Coatings GreatSeal LT-100
 - f. Corner and splice material: York Multi-Flash 500/Gorilla Flash CF, 3 ounce, or pre-manufactured corners.

PART 3 – EXECUTION

3.1 INSTALLATION

A. General:

1. Install where indicated, specified, or required in accord with flashing manufacturer's written instructions and as follows.
 - a. Splicing material on material width to manufacture wider pieces is prohibited unless flashing detail requires material wider than normally manufactured.
 - b. Prohibited practice: Bonding or splicing copper to non-woven drainage fabric or

- non-woven drainage fabric to non-woven drainage fabric.
2. Extend flashing 6" minimum, beyond opening, each side without stretching flashing material. Fold flashing ends at end of openings or horizontal flashing terminations to form end dam.
 3. Flashing width: Width required starting flush with outside face of exterior wythe, extending through cavity, rising height required to extend above lintel steel at least 2".
 4. Splice end joints by butting ends together over 12" wide piece of Multi-Flash copper flashing and sealing lap joint with UniverSeal 100 or GreatSeal LT-100 polyether sealant.
 5. Masonry back up:
 - a. Surface apply after dampproofing/air barrier installation specified in dampproofing/air barrier Section in accord with manufacturer's installation instructions.
 - b. Apply flashing with drainage surface to outside.
 - c. Fasten to masonry back-up surface at top by embedding in layer of UniverSeal US-100 polyether sealant using manufacturer's recommended nozzle.
 6. Concrete back up:
 - a. Surface apply after dampproofing/air barrier installation specified in dampproofing Section in accord with manufacturer's installation instructions.
 - b. Apply flashing with drainage surface to outside.
 - c. Fasten to concrete surface at top by embedding in bead of UniverSeal US-100 polyether sealant using manufacturer's recommended nozzle.
 7. Stud back up with sheathing:
 - a. Apply flashing with drainage surface to outside.
 - b. Fasten to stud back-up at top by embedding in bead of UniverSeal US-100 polyether sealant using manufacturer's recommended nozzle.
 8. Leave ready for building felt, dampproofing or air barrier installation lapping flashing top installed in another Section.
 9. Lay flashing in continuous bead of UniverSeal US-100 polyether sealant on masonry supporting steel.
 10. Fold ends of flashing at end of opening to form dam; seal with UniverSeal US-100 polyether sealant.
 11. Inside corners: Make in industry accepted manner using corner and splice material or purchase manufactured corners from manufacturer.
 12. Outside corners: Make in industry accepted manner using corner and splice material or purchase manufactured corners from manufacturer.

3.2 SCHEDULES

- A. Locations:
1. Exterior door heads.
 2. Window heads and sills.
 3. Storefront heads.
 4. Horizontal control joints.
 5. Changes in veneer materials, vertically.
 6. Other wall openings.
 7. Other locations indicated.

END OF SECTION 076210

SECTION 077200

ROOF ACCESSORIES

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes the following:
 - 1. Roof curbs.
 - 2. Equipment supports.
 - 3. Roof hatches.
- B. Related Sections include the following:
 - 1. Division 5 Section "Metal Fabrications" for ladders and miscellaneous metal framing and supports.
 - 2. Division 6 Section "Rough Carpentry" for roof sheathing, wood cants, and wood nailers.
 - 3. Division 7 Section "Sheet Metal Flashing and Trim" for shop- and field-fabricated metal flashing and counterflashing, scuppers, gutters and downspouts, fasciae, roof expansion-joint covers, valleys, and miscellaneous sheet metal trim and accessories.
 - 4. Division 7 Section "Manufactured Roof Specialties" for fasciae, copings, gravel stops, and roof expansion-joint covers.
 - 5. Division 7 Sections for roofing accessories included as part of roofing Work.
 - 6. Division 9 Section "Painting" for shop primers and field painting.
 - 7. Division 15 Section "Rooftop Units" for roof mounted units with associated roof curbs.

1.2 SUBMITTALS

- A. Product Data: For each type of product indicated. Include construction details, materials, dimensions of individual components and profiles, and finishes.
- B. Shop Drawings: Show fabrication and installation details. Indicate dimensions, weights, loadings, required clearances, method of field assembly, accommodation for metal roofing panel profiles, and components. Include plans, elevations, sections, details, and attachments to other Work.

1.3 QUALITY ASSURANCE

- A. Standards: Comply with the following:
 - 1. SMACNA's "Architectural Sheet Metal Manual" details for fabrication of units, including flanges and cap flashing to coordinate with type of roofing indicated.
 - 2. NRCA's "Roofing and Waterproofing Manual" details for installing units.

PART 2 - PRODUCTS

1.1 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. Roof Curbs and Equipment Supports:
 - a. Colony Custom Curbs.
 - b. Commodity Products Company, Inc.
 - c. Conn-Fab Sales, Inc.
 - d. Curbs Plus, Inc.
 - e. Custom Curb, Inc.
 - f. LMCurbs.
 - g. Loren Cook Company.
 - h. Metallic Products Corporation.
 - i. Pate Co.(The).
 - j. Roof Products & Systems Corp.
 - k. ThyCurb, Inc.
 - l. Uni-Curb, Inc.

2. Roof Hatches:
 - a. Babcock-Davis Hatchways, Inc.
 - b. Bilco Company.
 - c. Dur-Red Products, Inc.
 - d. Milcor, Inc.
 - e. Nystrom Products Co.
 - f. Precision Stair Corporation.
 - g. ThyCurb, Inc,
- 1.2 MATERIALS, GENERAL
- A. Galvanized Steel Sheet: ASTM A 653/A 653M with G90 (Z275) coating designation; commercial quality, unless otherwise indicated.
 1. Structural Quality: Grade 40 (Grade 275), where indicated or as required for strength.
 - B. Insulation: Manufacturer's standard rigid or semirigid glass-fiber board of thickness indicated.
 - C. Wood Nailers: Softwood lumber, pressure treated with waterborne preservatives for aboveground use, complying with AWPA C2; not less than 1-1/2 inches (38 mm) thick.
 - D. Fasteners: Same metal as metals being fastened, or nonmagnetic stainless steel or other noncorrosive metal as recommended by manufacturer. Match finish of exposed fasteners with finish of material being fastened.
 1. Where removing exterior exposed fasteners affords access to building, provide nonremovable fastener heads.
 - E. Gaskets: Manufacturer's standard tubular or fingered design of neoprene, EPDM, or PVC; or flat design of foam rubber, sponge neoprene, or cork.
 - F. Bituminous Coating: SSPC-Paint 12, solvent-type bituminous mastic, nominally free of sulfur and containing no asbestos fibers, compounded for 15-mil (0.4-mm) dry film thickness per coating.
 - G. Mastic Sealant: Polyisobutylene; nonhardening, nonskinning, nondrying, nonmigrating sealant.
 - H. Elastomeric Sealant: As specified in Division 7 Section "Joint Sealants".
 - I. Roofing Cement: ASTM D 4586, nonasbestos, fibrated asphalt cement designed for trowel application or other adhesive compatible with roofing system.
- 1.3 ROOF CURBS
- A. General: Provide roof curbs capable of supporting superimposed live and dead loads, including equipment loads and other construction to be supported on roof curbs. Coordinate dimensions with rough-in information or Shop Drawings of equipment to be supported.
 - B. Fabrication: Unless otherwise indicated or required for strength, fabricate units from minimum 0.0747-inch- (1.9-mm-) thick, structural-quality, hot-dip galvanized or aluminum-zinc alloy-coated steel sheet; factory primed and prepared for painting with welded or sealed mechanical corner joints.
 1. Provide preservative-treated wood nailers at tops of curbs and formed flange at perimeter bottom for mounting to roof.
 2. On ribbed or fluted metal roofs, form flange at perimeter bottom to conform to roof profile.
 3. Provide manufacturer's standard rigid or semirigid insulation where indicated.
 4. Provide formed cants and base profile coordinated with roof insulation thickness.
 5. Fabricate units to minimum height of 12 inches (300 mm), unless otherwise indicated.
 6. Sloping Roofs: Where slope of roof deck exceeds 1/4 inch per foot (1:48), fabricate curb units with water diverter or cricket and with height tapered to match slope to level tops of units.
- 1.4 EQUIPMENT SUPPORTS
- A. General: Provide equipment supports capable of supporting superimposed live and dead loads, including equipment loads and other construction to be supported. Coordinate dimensions with rough-in information or Shop Drawings of equipment to be supported.
 - B. Fabrication: Unless otherwise indicated or required for strength, fabricate units from minimum 0.0747-inch- (1.9-mm-) thick, structural-quality, hot-dip galvanized or aluminum-zinc alloy-coated steel sheet; factory primed and prepared for painting with welded or sealed mechanical corner joints.
 1. Provide preservative-treated wood nailers at tops of curbs and formed flange at perimeter bottom for

mounting to roof.

2. On ribbed or fluted metal roofs, form flange at perimeter bottom to conform to roof profile.
3. Fabricate units to minimum height of 12 inches (300 mm), unless otherwise indicated.
4. Sloping Roofs: Where slope of roof deck exceeds 1/4 inch per foot (1:48), fabricate support units with height tapered to match slope to level tops of units.

1.5 ROOF HATCHES

- A. General: Metal roof-hatch units with lids and insulated single-walled curbs, welded or mechanically fastened and sealed corner joints, continuous lid-to-curb counterflashing and weathertight perimeter gasketing, stepped integral metal cant raised the thickness of roof insulation, and integrally formed deck-mounting flange at perimeter bottom.
- B. Basis of Design Product: Subject to compliance with requirements, provide Bilco - Type S Roof hatch or comparable product.
- C. Type: Single-leaf personnel access.
 1. For Ladder Access: 30 by 36 inches (750 by 900 mm).
- A. Loads: Minimum 40-lbf/sq. ft. external live load and 20-lbf/sq. ft. internal uplift load.
- B. Hatch Material: 11 gauge aluminum with a 3" beaded flange with formed reinforcing members. Cover shall have a heavy extruded EPDM rubber gasket that is bonded to the cover interior to assure a continuous seal when compressed to the top surface of the curb.
- C. Roof Hatch insulation: 1" fiberglass.
- D. Sloping Roofs: Where slope or roof deck exceeds 1/4 inch per foot (1:48), fabricate hatch curbs with height tapered to match slope to level tops of units.
- E. Hardware: Galvanized-steel spring latch with turn handles, heavy pintle-type hinge system, and padlock hasps inside and outside.
- F. Ladder-Assist Post: Roof-hatch manufacturer's standard device for attachment to roof-access ladder. Post locks in place on full extension; release mechanism returns post to closed position.

1.8 FINISHES, GENERAL

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- C. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in the same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

1.9 GALVANIZED STEEL SHEET FINISHES

- A. Surface Preparation: Clean surfaces with nonpetroleum solvent so surfaces are free of oil and other contaminants. After cleaning, apply a conversion coating suited to the organic coating to be applied over it. Clean welds, mechanical connections, and abraded areas, and apply galvanizing repair paint specified below to comply with ASTM A 780.
 1. Galvanizing Repair Paint: High-zinc-dust-content paint for regalvanizing welds in steel, complying with SSPC-Paint 20.
- B. Factory Priming for Field-Painted Finish: Where field painting after installation is indicated, apply the air-dried primer specified below immediately after cleaning and pretreating.

PART 3 - EXECUTION

1.1 INSTALLATION

- A. General: Comply with manufacturer's written instructions. Coordinate installation of roof accessories with installation of roof deck, roof insulation, flashing, roofing membranes, penetrations, equipment, and other construction involving roof accessories to ensure that each element of the Work performs properly and that

- combined elements are waterproof and weathertight. Anchor roof accessories securely to supporting structural substrates so they are capable of withstanding lateral and thermal stresses, and inward and outward loading pressures.
- B. Submit product design drawings for review and approved to the architect or specifier before fabrication.
 - C. Installer shall check as-built conditions and verify the manufacturer's roof hatch details for accuracy to fit the application prior to fabrication. The installer shall comply with the roof hatch manufacturer's installation instructions.
 - D. The installer shall furnish mechanical fasteners consistent with the roof requirements.
 - E. Install roof accessory items according to construction details of NRCA's "Roofing and Waterproofing Manual," unless otherwise indicated,
 - F. Separation: Separate metal from incompatible metal or corrosive substrates, including wood, by coating concealed surfaces, at locations of contact, with bituminous coating or providing other permanent separation.
 - G. Flange Seals: Unless otherwise indicated, set flanges of accessory units in a thick bed of roofing cement to form a seal.
 - H. Cap Flashing: Where required as component of accessory, install cap flashing to provide waterproof overlap with roofing or roof flashing (as counterflashing). Seal overlap with thick bead of mastic sealant.
 - I. Operational Units: Test-operate units with operable components. Clean and lubricate joints and hardware. Adjust for proper operation.

1.2 CLEANING AND PROTECTION

- A. Clean exposed surfaces according to manufacturer's written instructions. Touch up damaged metal coatings.

END OF SECTION 077200

SECTION 078400

FIRESTOPPING

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ASTM INTERNATIONAL (ASTM)

ASTM E 119	(2009c) Standard Test Methods for Fire Tests of Building Construction and Materials
ASTM E 1399	(1997; R 2005) Cyclic Movement and Measuring the Minimum and Maximum Joint Widths of Architectural Joint Systems
ASTM E 1966	(2007) Fire-Resistive Joint Systems
ASTM E 814	(2009) Standard Test Method for Fire Tests of Through-Penetration Fire Stops
ASTM E 84	(2009c) Standard Test Method for Surface Burning Characteristics of Building Materials

FM GLOBAL (FM)

FM AS 4991	(2001) Approval of Firestop Contractors
FM P7825a	(2005) Approval Guide Fire Protection

UNDERWRITERS LABORATORIES (UL)

UL 1479	(2003; Rev thru Dec 2008) Standard for Fire Tests of Through-Penetration Fire Stops
UL 2079	(2004; Mar 2006) Tests for Fire Resistance of Building Joint Systems
UL 723	(2008) Standard for Test for Surface Burning Characteristics of Building Materials
UL Fire Resistance	(2009) Fire Resistance Directory

1.2 SYSTEM DESCRIPTION

Furnish and install tested and listed firestopping systems, combination of materials, or devices to form an effective barrier against the spread of flame, smoke and gases, and maintain the integrity of fire resistance rated walls, partitions, floors, and ceiling-floor assemblies, including through-penetrations and construction joints and gaps. Through-penetrations include the annular space around pipes, tubes, conduit, wires, cables and vents. Construction joints include those used to accommodate expansion, contraction, wind, or seismic movement; firestopping material shall not interfere with the required movement of the joint. Gaps requiring firestopping

include gaps between the curtain wall and the floor slab and between the top of the fire-rated walls and the roof or floor deck above.

1.3 SUBMITTALS

A. Shop Drawings

Firestopping Materials.

Detail drawings including manufacturer's descriptive data, typical details conforming to UL Fire Resistance or other details certified by another nationally recognized testing laboratory, installation instructions or UL listing details for a firestopping assembly in lieu of fire-test data or report. For those firestop applications for which no UL tested system is available through a manufacturer, a manufacturer's engineering judgement, derived from similar UL system designs or other tests, shall be submitted for review and approval prior to installation. Submittal shall indicate the firestopping material to be provided for each type of application. When more than a total of 5 penetrations and/or construction joints are to receive firestopping, provide drawings that indicate location, "F" and "T" ratings, and type of application.

B. Certificates

Firestopping Materials.

Certificates attesting that firestopping material complies with the specified requirements. In lieu of certificates, drawings showing UL classified materials as part of a tested assembly may be provided. Drawings showing evidence of testing by an alternate nationally recognized independent laboratory may be substituted.

Installer Qualifications.

Documentation of training and experience.

Inspection.

Manufacturer's representative certification stating that firestopping work has been inspected and found to be applied according to the manufacturer's recommendations and the specified requirements.

1.4 QUALITY ASSURANCE

Engage an experienced Installer who is:

- a. FM Research approved in accordance with FM AS 4991, or
- b. Certified, licensed, or otherwise qualified by the firestopping manufacturer as having the necessary staff, training, and a minimum of 3 years experience in the installation of manufacturer's products in accordance with specified requirements. A manufacturer's willingness to sell its firestopping products to the Contractor or to an installer engaged by the Contractor does not in itself confer installer qualifications on the buyer. The Installer shall have been trained by a direct representative of the manufacturer (not distributor or agent) in the proper selection and installation procedures.

1.5 DELIVERY, STORAGE, AND HANDLING

Deliver materials in the original unopened packages or containers showing name of the manufacturer and the brand name. Store materials off the ground, protected from damage and exposure to elements. Remove damaged or deteriorated materials from the site.

1.6 SEQUENCING

Coordinate the specified work with other trades. Apply firestopping materials, at penetrations of pipes and ducts, prior to insulating, unless insulation meets requirements specified for firestopping. Apply firestopping materials at building joints and construction gaps, prior to completion of enclosing walls or assemblies. Cast-in-place firestop devices shall be located and installed in place before concrete placement. Pipe, conduit or cable bundles shall be installed through cast-in-place device after concrete placement but before area is concealed or made inaccessible.

PART 2 PRODUCTS

2.1 FIRESTOPPING MATERIALS

Provide firestopping materials consisting of commercially manufactured, asbestos-free, noncombustible products FM P7825a approved, or UL listed, for use with applicable construction and penetrating items, complying with the following minimum requirements:

2.1.1 Fire Hazard Classification

Material shall have a flame spread of 25 or less, and a smoke developed rating of 50 or less, when tested in accordance with ASTM E 84 or UL 723. Material shall be an approved firestopping material as listed in UL Fire Resistance or by a nationally recognized testing laboratory.

2.1.2 Toxicity

Material shall be nontoxic to humans at all stages of application or during fire conditions.

2.1.3 Fire Resistance Rating

Firestop systems shall be UL Fire Resistance listed or FM P7825a approved with "F" rating at least equal to fire-rating of fire wall or floor in which penetrated openings are to be protected, except that "F" rating may be 3 hours in through-penetrations of 4 hour fire rated wall or floor. Firestop systems shall also have "T" rating where required.

2.1.3.1 Through-Penetrations

Firestopping materials for through-penetrations, as described in paragraph SYSTEM DESCRIPTION, shall provide "F" and "T" fire resistance ratings in accordance with ASTM E 814 or UL 1479. Fire resistance ratings shall be as follows:

- a. Penetrations of Fire Resistance Rated Walls and Partitions: F Rating = Rating of wall or partition being penetrated.
- b. Penetrations of Fire Resistance Rated Floors, Floor-Ceiling Assemblies and the ceiling membrane of Roof-Ceiling Assemblies: F Rating = fire rating of wall or floor, T Rating = where required.

2.1.3.2 Construction Joints and Gaps

Fire resistance ratings of construction joints, as described in paragraph SYSTEM DESCRIPTION, and gaps such as those between floor slabs or roof decks and curtain walls shall be the same as the construction in which they occur. Construction joints and gaps shall be provided with firestopping materials and systems that have been

tested in accordance with ASTM E 119, ASTM E 1966 or UL 2079 to meet the required fire resistance rating. Systems installed at construction joints shall meet the cycling requirements of ASTM E 1399 or UL 2079.

PART 3 EXECUTION

3.1 PREPARATION

Areas to receive firestopping shall be free of dirt, grease, oil, or loose materials which may affect the fitting or fire resistance of the firestopping system. For cast-in-place firestop devices, formwork or metal deck to receive device prior to concrete placement shall be sound and capable of supporting device. Prepare surfaces as recommended by the manufacturer.

3.2 INSTALLATION

Completely fill void spaces with firestopping material regardless of geometric configuration, subject to tolerance established by the manufacturer. Firestopping systems for filling floor voids 4 inches or more in any direction shall be capable of supporting the same load as the floor is designed to support or shall be protected by a permanent barrier to prevent loading or traffic in the firestopped area. Install firestopping in accordance with manufacturer's written instructions. Provide tested and listed firestop systems in the following locations, except in floor slabs on grade:

- a. Penetrations of duct, conduit, tubing, cable and pipe through floors and through fire-resistance rated walls, partitions, and ceiling-floor assemblies.
- b. Penetrations of vertical shafts such as pipe chases, elevator shafts, and utility chutes.
- c. Gaps at the intersection of floor slabs and curtain walls, including inside of hollow curtain walls at the floor slab.
- d. Gaps at perimeter of fire-resistance rated walls and partitions, such as between the top of the walls and the bottom of roof decks.
- e. Construction joints in floors and fire rated walls and partitions.
- f. Other locations where required to maintain fire resistance rating of the construction.

3.2.1 Insulated Pipes and Ducts

Thermal insulation shall be cut and removed where pipes or ducts pass through firestopping, unless insulation meets requirements specified for firestopping. Replace thermal insulation with a material having equal thermal insulating and firestopping characteristics.

3.2.2 Fire Dampers

Install and firestop fire dampers in accordance with Section for AIR SUPPLY, DISTRIBUTION, VENTILATION, AND EXHAUST SYSTEM.

3.2.3 Data and Communication Cabling

Cabling for data and communication applications shall be sealed with re-enterable firestopping products that do not cure over time. Firestopping shall be modular devices, containing built-in self-sealing intumescent inserts. Firestopping devices shall allow for cable moves, adds or changes without the need to remove or replace any firestop materials.

3.3 INSPECTION

For all projects, the firestopped areas shall not be covered or enclosed until inspection is complete and approved by the manufacturer's technical representative. The manufacturer's representative shall inspect the applications initially to ensure adequate preparations (clean surfaces suitable for application, etc.) and periodically during the work to assure that the completed work has been accomplished according to the manufacturer's written instructions and the specified requirements. Submit written reports indicating locations of and types of penetrations and types of firestopping used at each location; type shall be recorded by UL listed printed numbers.

-- End of Section --

SECTION 079000

CAULKING & SEALANTS

1. SCOPE

Furnish all labor, materials and equipment required for sealing and caulking all joints in accordance with these specifications and applicable drawings. Use only one manufacturer for all components.

- A. Caulking as follows: Joints indicated to be caulked in details and where required on the building interior to provide neatly finished jointing.
- B. Sealant Application as Follows:
 - 1) Exterior and interior side of head and side jambs of exterior metal door frames.
 - 2) Completely around exterior and interior of louvers, fixed glass windows, and all other openings in exterior walls.
 - 3) Bed metal thresholds in sealant.
 - 4) At sheet metal joints and laps to weatherproof metal joints.
 - 5) Seal all joints between exterior materials for a complete waterproof barrier and as barrier to insect infestation..
 - 6) Where shown on drawings or noted in specifications.
- C. Fire Rated System: Install fire-rated sealant, etc. at all locations as required to seal gaps in fire rated partitions, partitions to ceiling/deck, etc., and as required to meet all code requirements.
- D. Contractor shall set up meeting with caulking and sealant manufacturer's representative, contractor, owner's representative and architect to review construction conditions, materials and manufacturer's recommended installation procedures.

2. MATERIALS

- A. Caulking Compound: Tremco Acrylic Latex 834; "Sonolac" as manufactured by Sonneborn; "Latex Acrylic Caulking", as manufactured by Pecora; "Easaply" as manufactured by W. R. Meadows, or approved alternate. Caulking compound shall be one part acrylic latex, gun, consistency, non-shrinking, non-staining.
- B. Sealant: Tremco "Mono" one-part acrylic terpolymer; "Synthacaulk" GC-9 Thiokol Polysulfide base, one part synthetic rubber. Pecora, Sonneborn, W. R. Meadows are approved manufacturers. Color shall be as selected by the architect from the manufacturer's full range of special mix.
- C. Packing/Joint Filler/Backer Rod: For use at joints at masonry walls, etc. shall be butyl rod, polyethylene foam or neoprene sponge; size 1-1/2 times width of joints.
- D. Primers: As recommended by caulking/sealant manufacturer.
- E. Fire Rated System: 3M Brand "Fire Stop System" including Firebarrier CP25 Caulk; FS-195 wrap/strip; CS-195 Composite Sheet. Fire Barrier 79—Series Penetration Sealing Systems; Interam. "FireDam" 150 caulk, etc. G.E. "Pensil" Fire Stop System; Tremco Fire Stopping System, and USG Fire Stop System are also approved manufacturers.

3. GENERAL REQUIREMENTS

- A. Condition of Joints: Joints shall be raked out clean, free of dust, and shall be thoroughly dry. Condition contrary to the requirements for good caulking or sealant application shall be reported to the architect before work is started.
- B. Packing: Preformed closed cell material shall be used where required for caulking or sealant stop.
- C. All joints shall be caulked before paint is applied to adjacent work.

4. INSTALLATION OF CAULKING

- A. Application: Apply with a gun to fill joints and recesses solidly to a depth of not less than 3/8". Keep face of the adjacent materials clean and remove all excess material. The finished caulked joints shall present a smooth and unbroken surface.
.
Leave all joints clean and absolutely watertight with slightly concave joint.
- C. Interior caulking shall include lavatories, water closets, countertops, door and window frames, etc.
- D. The work shall commence at the first installation of exterior facing materials and continue throughout the construction to prevent corrosion and water damage to framing and interior materials. Exterior materials shall be set or bedded in the caulking material, where necessary, to complete a weathertight enclosure and elsewhere to the fullest extent possible.
- E. Fire Rated System: Install fire-rated caulking, foam, wrap, etc. according to manufacturer's printed instructions to achieve 1-hr. fire rating.

5. INSTALLATION OF SEALANTS

- A. Typical Application: Prime all surfaces to receive sealant with primer recommended by the manufacturer. Mix and apply sealant with gun in strict accordance with the manufacturer's directions and these specifications. Fill recesses solidly to depth approximately 3/8" or as recommended by the manufacturer. Keep faces of adjacent materials clean.
- B. Protection: Protect all sealant joints from damage, particularly during the curing state. All marred sealant joints shall be raked clean and replaced.

6. CLEANING

Care shall be exercised to prevent caulking and sealant material from adhering to surfaces other than those intended to receive this material. If in spite of all precautions other surfaces are affected, they shall be carefully and thoroughly cleaned in accordance with the recommendations of the manufacturer of the caulking and sealing materials

7. WARRANTY

General Contractor shall provide a two (2) year Labor and Material Warranty against failure to effectively seal out water or moisture in exterior applications and against cracking, crazing, or separation of the material from the substrate or other failure of the joint.

END OF SECTION 07900

SECTION 081113

HOLLOW METAL DOORS AND FRAMES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes hollow-metal work.

1.2 DEFINITIONS

- A. **Minimum Thickness:** Minimum thickness of base metal without coatings according to NAAMM-HMMA 803 or SDI A250.8.

1.3 ACTION SUBMITTALS

- A. **Product Data:** For each type of product.
- B. **Shop Drawings:** Before fabrication, submit shop drawings. Shop drawings shall include elevations, door edge details, frame profiles, metal thicknesses, preparations for hardware, and other detail, as well as, installation with particular regard to connection and joining to other materials and locations of units in building.
- C. **Measurements:** Obtain all necessary measurements at job site and layout to fit the job conditions. The drawings shall not be scaled nor written dimensions thereon be used without verification in the field.
- D. **Samples for Initial Selection:** For units with factory-applied color finishes.
- E. **Samples for Verification:** For each type of exposed finish required.
- F. **Schedule:** Prepared by or under the supervision of supplier, using same reference numbers for details and openings as those on Drawings.

1.4 INFORMATIONAL SUBMITTALS

- A. Product test reports.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. **Manufacturers:** Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. Amweld International, LLC.
 - 2. Curries Company; an Assa Abloy Group company.
 - 3. Deansteel.

4. Gateway Metal Products
5. Greensteel Industries, Ltd.
6. North American Door Corp.
7. Pearland Industries
8. Premier Products, Inc.
9. Republic Doors and Frames.
10. Steelcraft; an Ingersoll-Rand company.
11. Steward Steel; Door Division.
12. Stiles Custom Metal, Inc.
13. Western Hollow Metal

2.2 REGULATORY REQUIREMENTS

- A. Fire-Rated Assemblies: Complying with NFPA 80 and listed and labeled by a qualified testing agency acceptable to authorities having jurisdiction for fire-protection ratings indicated, based on testing at positive pressure according to NFPA 252 or UL 10C.
 1. Smoke- and Draft-Control Assemblies: Provide an assembly with gaskets listed and labeled for smoke and draft control by a qualified testing agency acceptable to authorities having jurisdiction, based on testing according to UL 1784 and installed in compliance with NFPA 105.
- B. Fire-Rated, Borrowed-Light Assemblies: Complying with NFPA 80 and listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction for fire-protection ratings indicated, based on testing according to NFPA 257 or UL 9.
- C. Doors and frames shall meet the minimum standards of recommended specifications for hollow metal doors and frames as published by the NAAMM (National Association of Architectural Metal Manufacturers) latest edition. Provide label doors and frames at openings noted on drawings. NOTE: Door and frame fabrication shall take into account that they will be painted (Specification Section 09900) utilizing enamel paint. All surfaces shall be smooth; no scratches, dents, ripples, etc. Visible spot welds, transfer effect of "Z" bar stiffeners or other concealed construction members to surface are not allowed.

2.3 HOLLOW METAL DOORS

- A. Flush type, exterior construction, 1-3/4" thick, stile 5-1/2" wide.
- B. Smooth, seamless face panels formed of 16 gauge cold-rolled sheets; joined at unexposed door edges with continuous welding, full height of door. NOTE: Door fabrication shall take into account that doors will be painted under Specification Section 09900 utilizing enamel paint.
- C. Rigid inner construction with not less than 18 gauge vertical "Z" bar stiffeners with interlocking clips spaced not over 6" o.c. and continuous channel 18 gauge horizontal top and bottom channels and 14 gauge closer reinforcement channels, all securely welded to inner surfaces of both face panels with welds at 4" o.c.
- D. Fully insulated with 1-1/2" thick insulation.
- E. Accurate hardware mortising, drilling, tapping, cutouts and reinforcements for specified hardware; continuous 18 gauge channel reinforcement extending full height of door at lock and hinge edges, securely welded to both face panels.

- F. Hollow metal doors shall be reinforced to prevent collapsing when closers or exit devices are attached by through-bolting or sex bolts.
- G. Glass openings shall be properly reinforced, shall have 18 gauge fixed stops, mitered and welded into frames. Loose stops should be secured in place with Phillips head machine screws. Use standard continuous astragal at double doors. Close top of exterior doors, invert top channel, and seal top.
- H. Provide construction numbers required to meet label requirements. Provide U.L. label on door; see drawings and details for label requirements.

2.4 HOLLOW METAL FRAMES

- A. Hollow metal frames shall be of the continuous type pressed steel of the design and section shown.
- B. Frames shall be 16 gauge for opening in 3'-8" in width or less and 14 gauge for openings over 3'-8" in width. Head to jamb corners shall be machine mitered and full throat welded (faces mitered, stops butted) back of butted stops, etc. shall be filled with sealant, joint tooled, and struck off smooth prior to painting.
- C. Temporary channel or angle spreaders shall be tack welded to the bottom of frames to prevent distortion in shipment and storage and shall hold the frame in proper position until adjacent construction has been completed.
- D. Bottoms of frames shall have 12 gauge adjustable floor clips punched for two 1/4" expansion bolts.
- E. Provisions shall be made for installation of door silencers furnished under Finish Hardware.
- F. Provide 20-minute UL labeled doorframes at all doors opening into corridors, window frames into corridors shall be 40-minute UL labeled. Provide 45-minute, 60-minute, 90-minute, 3-hour, etc. doors and frames as required to maintain ratings office wall construction.
- G. All frames, including backside, reinforcement, and anchors shall be cleaned, bonderized, and prime coated.

2.5 FRAME ANCHORS

- A. Jamb Anchors:
 - 1. Masonry Type: Adjustable strap-and-stirrup or T-shaped anchors to suit frame size, not less than 0.042 inch (1.0 mm) thick, with corrugated or perforated straps not less than 2 inches (51 mm) wide by 10 inches (254 mm) long; or wire anchors not less than 0.177 inch (4.5 mm) thick.
 - 2. Stud-Wall Type: Designed to engage stud, welded to back of frames; not less than 0.042 inch (1.0 mm) thick.
 - 3. Compression Type for Drywall Slip-on Frames: Adjustable compression anchors.
 - 4. Postinstalled Expansion Type for In-Place Concrete or Masonry: Minimum 3/8-inch- (9.5-mm-) diameter bolts with expansion shields or inserts. Provide pipe spacer from frame to wall, with throat reinforcement plate, welded to frame at each anchor location.
- B. Floor Anchors: Formed from same material as frames, minimum thickness of 0.042 inch (1.0 mm), and as follows:
 - 1. Monolithic Concrete Slabs: Clip-type anchors, with two holes to receive fasteners.

2. Separate Topping Concrete Slabs: Adjustable-type anchors with extension clips, allowing not less than 2-inch (51-mm) height adjustment. Terminate bottom of frames at finish floor surface.

2.6 MATERIALS

- A. All steel for exposed parts of hollow metal work shall be first quality cold-rolled pickled and pattern leveled bonderized open hearth furniture steel. Gauges of steel shall be such that the work shall be substantially constructed and its surfaces shall be smooth and level under normal use, but in no case shall the metal be lighter than the gauge specified herein or shown on the drawings.
- B. Sound and fire retarding materials for hollow metal doors shall be heat-retarding filler conforming to the requirements of the National Fire Protection Association.
- C. Expansion bolts shall be cinched tight, galvanized.
- D. Baked-on minimum filler plus baked-on rust inhibited primer. Exterior doors and hollow metal frames shall be fabricated from galvanized sheet; cut edges shall be gray galvanized after fabrication.
- E. Frame Anchors: ASTM A 879/A 879M, Commercial Steel (CS), 04Z (12G) coating designation; mill phosphatized.
 1. For anchors built into exterior walls, steel sheet complying with ASTM A 1008/A 1008M or ASTM A 1011/A 1011M, hot-dip galvanized according to ASTM A 153/A 153M, Class B.
- F. Inserts, Bolts, and Fasteners: Hot-dip galvanized according to ASTM A 153/A 153M.
- G. Power-Actuated Fasteners in Concrete: From corrosion-resistant materials.
- H. Grout: ASTM C 476, except with a maximum slump of 4 inches (102 mm), as measured according to ASTM C 143/C 143M.
- I. Mineral-Fiber Insulation: ASTM C 665, Type I (blankets without membrane facing).
- J. Glazing: Section 088000 "Glazing."
- K. Bituminous Coating: Cold-applied asphalt mastic, compounded for 15-mil (0.4-mm) dry film thickness per coat.

2.7 FABRICATION

- A. Fabricate hollow-metal work to be rigid and free of defects, warp, or buckle. Accurately form metal to required sizes and profiles, with minimum radius for metal thickness. Where practical, fit and assemble units in manufacturer's plant. To ensure proper assembly at Project site, clearly identify work that cannot be permanently factory assembled before shipment.
- B. Hollow-Metal Doors:
 1. Exterior Doors: Provide weep-hole openings in bottoms of exterior doors to permit moisture to escape. Seal joints in top edges of doors against water penetration.
 2. Astragals: Provide overlapping astragal on one leaf of pairs of doors where required by NFPA 80 for fire-performance rating or where indicated.

- C. Hollow-Metal Frames: Where frames are fabricated in sections due to shipping or handling limitations, provide alignment plates or angles at each joint, fabricated of same thickness metal as frames.
1. Transom Bar Frames: Provide closed tubular members with no visible face seams or joints, fabricated from same material as door frame. Fasten members at crossings and to jambs by butt welding.
 2. Provide countersunk, flat- or oval-head exposed screws and bolts for exposed fasteners unless otherwise indicated.
 3. Grout Guards: Weld guards to frame at back of hardware mortises in frames to be grouted.
 4. Floor Anchors: Weld anchors to bottoms of jambs with at least four spot welds per anchor; however, for slip-on drywall frames, provide anchor clips or countersunk holes at bottoms of jambs.
 5. Jamb Anchors: Provide number and spacing of anchors as follows:
 - a. Masonry Type: Locate anchors not more than 16 inches (406 mm) from top and bottom of frame. Space anchors not more than 32 inches (813 mm) o.c., to match coursing, and as follows:
 - 1) Two anchors per jamb up to 60 inches (1524 mm) high.
 - 2) Three anchors per jamb from 60 to 90 inches (1524 to 2286 mm) high.
 - 3) Four anchors per jamb from 90 to 120 inches (2286 to 3048 mm) high.
 - 4) Four anchors per jamb plus one additional anchor per jamb for each 24 inches (610 mm) or fraction thereof above 120 inches (3048 mm) high.
 - b. Stud-Wall Type: Locate anchors not more than 18 inches (457 mm) from top and bottom of frame. Space anchors not more than 32 inches (813 mm) o.c. and as follows:
 - 1) Three anchors per jamb up to 60 inches (1524 mm) high.
 - 2) Four anchors per jamb from 60 to 90 inches (1524 to 2286 mm) high.
 - 3) Five anchors per jamb from 90 to 96 inches (2286 to 2438 mm) high.
 - 4) Five anchors per jamb plus one additional anchor per jamb for each 24 inches (610 mm) or fraction thereof above 96 inches (2438 mm) high.
 - c. Compression Type: Not less than two anchors in each frame.
 - d. Postinstalled Expansion Type: Locate anchors not more than 6 inches (152 mm) from top and bottom of frame. Space anchors not more than 26 inches (660 mm) o.c.
 6. Door Silencers: Except on weather-stripped frames, drill stops to receive door silencers.
 - a. Single-Door Frames: Drill stop in strike jamb to receive three door silencers.
 - b. Double-Door Frames: Drill stop in head jamb to receive two door silencers.
- D. Hardware Preparation: Factory prepare hollow-metal work to receive templated mortised hardware; include cutouts, reinforcement, mortising, drilling, and tapping according to SDI A250.6, the Door Hardware Schedule, and templates.
1. Doors and frames shall be mortised and reinforced with not less than 1/8" steel and shall be drilled and tapped to receive the specified mortised hardware.
 2. Reinforce doors and frames to receive nontemplated, mortised, and surface-mounted door hardware with a tapping thickness of not less than 1/8".
 3. Metal covers formed of not less than 26 gauge steel shall be provided for all mortises to prevent mortar or plaster from filling openings and tapped holes.
 4. Plates for butt reinforcement shall be at least 8" longer than the butt and shall be not less than 3/16" thickness for tapping.

5. The hollow metal supplier shall supply an approved set of hollow metal shop drawings for the finish hardware supplier's use when requesting hardware templates.
 6. Comply with applicable requirements in SDI A250.6 and BHMA A156.115 for preparation of hollow-metal work for hardware.
- E. Stops and Moldings: Provide stops and moldings around glazed lites and louvers where indicated. Form corners of stops and moldings with mitered hairline joints.
1. Single Glazed Lites: Provide fixed stops and moldings welded on secure side of hollow-metal work.
 2. Multiple Glazed Lites: Provide fixed and removable stops and moldings so that each glazed lite is capable of being removed independently.
 3. Provide fixed frame moldings on outside of exterior and on secure side of interior doors and frames.
 4. Provide loose stops and moldings on inside of hollow-metal work.
 5. Coordinate rabbet width between fixed and removable stops with glazing and installation types indicated.

2.8 STEEL FINISHES

- A. Prime Finish: Clean, pretreat, and apply manufacturer's standard primer.
1. Shop Primer: SDI A250.10.

2.9 ACCESSORIES

- A. Mullions and Transom Bars: Join to adjacent members by welding or rigid mechanical anchors.
- B. Grout Guards: Formed from same material as frames, not less than 0.016 inch (0.4 mm) thick.

PART 3 - EXECUTION

3.1 GENERAL REQUIREMENTS AND WORKMANSHIP

- A. Exposed surfaces shall be free from warp, waves, and buckles with all corners square. All members shall be set in proper alignment with all surfaces straight and in true plane. Mitered joints shall be well formed. Exposed welds shall be ground smooth and flush on exposed surfaces. Face of metal and contact shall have hairline joints.
- B. Hollow metal work shall be of approved manufacturer, strong and rigid, neat in appearance, and free from defects, fabricated in accordance with the best shop practices.
- C. Hollow metal doors and frames shall be of the type, thickness and dimensions shown on the drawings. Fastenings shall be concealed where practical. Construction joints shall be continuously welded their full length and ground flush on exposed surfaces. Doors shall have proper bevel to operate without binding. Where assemblies of doors and frames occur in opening noted to be labeled, such assemblies shall conform to the label requirements of the National Fire Protection Association and shall bear the label of the Underwriters' Laboratory, Inc.

3.2 INSTALLATION

- A. Hollow-Metal Frames: Install hollow-metal frames of size and profile indicated. Comply with SDI A250.11 or NAAMM-HMMA 840 as required by standards specified.
1. Set frames accurately in position; plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is complete, remove temporary braces, leaving surfaces smooth and undamaged.
 - a. At fire-rated openings, install frames according to NFPA 80.
 - b. Where frames are fabricated in sections because of shipping or handling limitations, field splice at approved locations by welding face joint continuously; grind, fill, dress, and make splice smooth, flush, and invisible on exposed faces.
 - c. Install frames with removable stops located on secure side of opening.
 - d. Install door silencers in frames before grouting.
 - e. Remove temporary braces necessary for installation only after frames have been properly set and secured.
 - f. Check plumb, square, and twist of frames as walls are constructed. Shim as necessary to comply with installation tolerances.
 - g. Field apply bituminous coating to backs of frames that will be filled with grout containing antifreezing agents.
 2. Floor Anchors: Provide floor anchors for each jamb and mullion that extends to floor, and secure with postinstalled expansion anchors.
 - a. Floor anchors may be set with power-actuated fasteners instead of postinstalled expansion anchors if so indicated and approved on Shop Drawings.
 3. Metal-Stud Partitions: Solidly pack mineral-fiber insulation inside frames.
 4. Masonry Walls: Coordinate installation of frames to allow for solidly filling space between frames and masonry with grout.
 5. Concrete Walls: Solidly fill space between frames and concrete with mineral-fiber insulation.
 6. In-Place Concrete or Masonry Construction: Secure frames in place with postinstalled expansion anchors. Countersink anchors, and fill and make smooth, flush, and invisible on exposed faces.
 7. In-Place Metal or Wood-Stud Partitions: Secure slip-on drywall frames in place according to manufacturer's written instructions.
 8. Installation Tolerances: Adjust hollow-metal door frames for squareness, alignment, twist, and plumb to the following tolerances:
 - a. Squareness: Plus or minus 1/16 inch (1.6 mm), measured at door rabbet on a line 90 degrees from jamb perpendicular to frame head.
 - b. Alignment: Plus or minus 1/16 inch (1.6 mm), measured at jambs on a horizontal line parallel to plane of wall.
 - c. Twist: Plus or minus 1/16 inch (1.6 mm), measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.
 - d. Plumbness: Plus or minus 1/16 inch (1.6 mm), measured at jambs at floor.
- B. Hollow-Metal Doors: Fit hollow-metal doors accurately in frames, within clearances specified below. Shim as necessary.
1. Non-Fire-Rated Steel Doors:
 - a. Between Door and Frame Jambs and Head: 1/8 inch (3.2 mm) plus or minus 1/32 inch (0.8 mm).

- b. Between Edges of Pairs of Doors: 1/8 inch (3.2 mm) to 1/4 inch (6.3 mm) plus or minus 1/32 inch (0.8 mm).
 - c. At Bottom of Door: 5/8 inch (15.8 mm) plus or minus 1/32 inch (0.8 mm).
 - d. Between Door Face and Stop: 1/16 inch (1.6 mm) to 1/8 inch (3.2 mm) plus or minus 1/32 inch (0.8 mm).
- 2. Fire-Rated Doors: Install doors with clearances according to NFPA 80.
 - 3. Smoke-Control Doors: Install doors and gaskets according to NFPA 105.
- C. Glazing: Comply with installation requirements in Section 088000 "Glazing" and with hollow-metal manufacturer's written instructions.
- 1. Secure stops with countersunk flat- or oval-head machine screws spaced uniformly not more than 9 inches (230 mm) o.c. and not more than 2 inches (51 mm) o.c. from each corner.

3.3 ADJUSTING AND CLEANING

- A. Final Adjustments: Check and readjust operating hardware items immediately before final inspection. Leave work in complete and proper operating condition. Remove and replace defective work, including hollow-metal work that is warped, bowed, or otherwise unacceptable.
- B. Remove grout and other bonding material from hollow-metal work immediately after installation.
- C. Prime-Coat Touchup: Immediately after erection, sand smooth rusted or damaged areas of prime coat and apply touchup of compatible air-drying, rust-inhibitive primer.
- D. Touchup Painting: Cleaning and touchup painting of abraded areas of paint are specified in painting Sections.

3.4 SHOP PAINTING

- A. All surfaces are to be thoroughly cleaned of all oil, grease and rust and other impurities with a degreasing volatile cleaner. All inaccessible surfaces such as insides of doors, panels, and closed frames shall be given a coat of rust inhibitive primer before being assembled. All exposed surfaces of metal shall receive a mineral filler baked on and sanded between coats followed by a coat of primer baked at 300° F. Finish painting shall be done under Painting Section 099100.

END OF SECTION 081113

SECTION 081416FLUSH WOOD DOORS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Solid-core doors with plastic-laminate faces.
- B. Related Requirements:
 - 1. Section 088000 "Glazing" for glass view panels in flush wood doors.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of door.
- B. Shop Drawings: Indicate location, size, and hand of each door; elevation of each kind of door; construction details not covered in Product Data; and the following:
 - 1. Dimensions and locations of blocking.
 - 2. Dimensions and locations of mortises and holes for hardware.
 - 3. Dimensions and locations of cutouts.
 - 4. Undercuts.
 - 5. Requirements for veneer matching.
 - 6. Doors to be factory finished and finish requirements.
 - 7. Fire-protection ratings for fire-rated doors.

1.3 INFORMATIONAL SUBMITTALS

- A. Quality Standard Compliance Certificates: AWI Quality Certification Program certificates.

1.4 QUALITY ASSURANCE

- A. Manufacturer Qualifications: A qualified manufacturer that is a certified participant in AWI's Quality Certification Program.
- B. NWMA Quality Marking: Mark each wood door with NWMA Wood Flush requirements of ANSI/NWMA I.S. 1 Series. For manufacturers not participating in NWMA Hallmark Program, a certification of compliance may be substituted for marking of individual doors.
- C. Manufacturer: Obtain doors from a single manufacturer to ensure uniformity in quality of appearance and construction, unless otherwise indicated.

1.5 GENERAL REQUIREMENTS

- A. Moisture Content: All material shall be kiln dried to average not more than 7% to 10%.
- B. Delivery: No doors shall be delivered to the job until a completely dry storage area can be provided. Do not install doors until building is completely closed in.
- C. Standards: Architectural Woodwork Institute Brochure - "Architectural Woodwork Quality Standards and Guide Specification", latest edition. For details not shown, architect will furnish details on request or else standard AWI Details, Section 1300 shall govern.
- D. Guarantee: The doors shall have a "lifetime warranty" against defects in materials and workmanship. Contractor to furnish written guarantee.

1.6 REFERENCES

- A. Comply with the applicable requirements of the following standards unless otherwise indicated:
 - 1. ANSI/NWMA I.S. 1, "Industry Standard for Wood Flush Doors" published by the National Woodwork Manufacturers Association (NWMA).

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. Algoma Hardwoods, Inc.
 - 2. Ampco.
 - 3. Chappell Door Co.
 - 4. Eggers Industries.
 - 5. General Veneer Manufacturing Co.
 - 6. Graham Wood Doors; an Assa Abloy Group company.
 - 7. Haley Brothers, Inc.
 - 8. Ipik Door Company.
 - 9. Lambton Doors.
 - 10. Marlite.
 - 11. Marshfield Door Systems, Inc.
 - 12. Mohawk Doors; a Masonite company.
 - 13. Oshkosh Door Company.
 - 14. Poncraft Door Company.
 - 15. Vancouver Door Company.
 - 16. VT Industries, Inc.

2.2 FLUSH WOOD DOORS, GENERAL

- A. Quality Standard: In addition to requirements specified, comply with AWI's, AWMAC's, and WI's "Architectural Woodwork Standards.

1. Provide AWI Quality Certification Labels indicating that doors comply with requirements of grades specified.
- B. WDMA I.S.1-A Performance Grade:
1. Heavy Duty unless otherwise indicated.
 2. Extra Heavy Duty: Public toilets, storage & janitor's closets, assembly spaces, and exits.
- C. Fire-Rated Wood Doors: Doors complying with NFPA 80 that are listed and labeled by a qualified testing agency, for fire-protection ratings indicated, based on testing at positive pressure according to NFPA 252.
1. Cores: Provide core specified or mineral core as needed to provide fire-protection rating indicated.
 2. Edge Construction: Provide edge construction with intumescent seals concealed by outer stile. Comply with specified requirements for exposed edges.
 3. Pairs: Provide fire-retardant stiles that are listed and labeled for applications indicated without formed-steel edges and astragals. Provide stiles with concealed intumescent seals. Comply with specified requirements for exposed edges.
- D. Smoke- and Draft-Control Door Assemblies: Listed and labeled for smoke and draft control, based on testing according to UL 1784.
- E. Structural-Composite-Lumber-Core Doors:
1. Structural Composite Lumber: WDMA I.S.10.
 - a. Screw Withdrawal, Face: 700 lbf (3100 N).
 - b. Screw Withdrawal, Edge: 400 lbf (1780 N).
- F. Mineral-Core Doors:
1. Core: Noncombustible mineral product complying with requirements of referenced quality standard and testing and inspecting agency for fire-protection rating indicated.
 2. Blocking: Provide composite blocking with improved screw-holding capability approved for use in doors of fire-protection ratings indicated as needed to eliminate through-bolting hardware.
 3. Edge Construction: At hinge stiles, provide laminated-edge construction with improved screw-holding capability and split resistance. Comply with specified requirements for exposed edges.
- 2.3 PLASTIC-LAMINATE-FACED DOORS
- A. Interior Solid-Core Doors: (SCW)
1. Grade: Custom.
 2. Plastic-Laminate Faces: High-pressure decorative laminates complying with NEMA LD 3.
 3. Colors, Patterns, and Finishes: Manufacturer shall be Pionite or Fomica as selected by Architect from laminate manufacturer's full range of products.
 4. Exposed Vertical Edges: Plastic laminate that matches faces, applied before faces.
 5. Core: Particleboard
 6. Construction: Five plies. Stiles and rails are bonded to core, then entire unit is abrasive planed before faces and crossbands are applied. Faces are bonded to core using a hot press.

2.4 FABRICATION

- A. Factory fit doors to suit frame-opening sizes indicated. Comply with clearance requirements of referenced quality standard for fitting unless otherwise indicated.
 - 1. Comply with NFPA 80 requirements for fire-rated doors.
- B. Factory machine doors for hardware that is not surface applied.
- C. Transom and Side Panels: Wherever transom panels or side panels of wood are shown in same framing and systems as wood doors, provide panels which match quality and appearance of associated wood doors, unless otherwise noted. Fabricate matching panels with same construction, exposed surfaces and finish as specified for associated doors.
- D. Openings: Factory cut and trim openings through doors.
 - 1. Light Openings: Trim openings with moldings of material and profile indicated.
 - 2. Glazing: Factory install glazing in doors indicated to be factory finished. Comply with applicable requirements in Section 088000 "Glazing."
 - 3. Louvers: Factory install louvers in prepared openings.

2.5 PREFITTING AND PREPARATION FOR HARDWARE

- A. Comply with tolerance requirements of AWI for prefitting. Machine doors for hardware requiring cutting of doors. Comply with final hardware schedules and door frame shop drawings and with hardware templates and other essential information required to ensure proper fit of doors and hardware.
- B. Take accurate field measurements of hardware mortises in metal frames to verify dimensions and alignment before proceeding with machining in factory.

PART 3 - EXECUTION

3.1 INSPECTION

- A. Installer must examine door frames and verify that frame correct type has been installed as required for proper hanging of corresponding doors and notify Contractor in writing of condition detrimental to proper and timely installation of wood doors. Do not proceed with installation until unsatisfactory conditions have been corrected in a manner acceptable to the Installer.

3.2 INSTALLATION

- A. Condition doors to average prevailing humidity in installation area prior to hanging.
- B. Hardware: For installation, see Section 087100 "Door Hardware."
- C. Installation Instructions: Install doors to comply with manufacturer's written instructions and referenced quality standard, and as indicated.
 - 1. Install fire-rated doors according to NFPA 80.
 - 2. Install smoke- and draft-control doors according to NFPA 105.

- D. Job-Fitted Doors: Align and fit doors in frames with uniform clearances and bevels as indicated below; do not trim stiles and rails in excess of limits set by manufacturer or permitted for fire-rated doors. Machine doors for hardware. Seal edges of doors, edges of cutouts, and mortises after fitting and machining.
1. Clearances: Provide 1/8 inch (3.2 mm) at heads, jambs, and between pairs of doors. Provide 1/8 inch (3.2 mm) from bottom of door to top of decorative floor finish or covering unless otherwise indicated. Where threshold is shown or scheduled, provide 1/4 inch (6.4 mm) from bottom of door to top of threshold unless otherwise indicated.
 - a. Comply with NFPA 80 for fire-rated doors.
- E. Bevel non-rated doors 1/8" in 2" at lock and hinge edges.
- F. Prefit Doors: Fit to frames and machine for hardware to whatever extent not previously worked at factory as required for proper fit and uniform clearance at each edge.
- G. Factory-Fitted Doors: Align in frames for uniform clearance at each edge.
- H. Clearance: For non-rated doors provide clearances of 1/8" at jambs and heads; 1/8" at meeting stiles for pairs of doors; and 1/2" from bottom of top of decorative floor finish or covering. Where threshold is shown or scheduled, provide 1/4" clearance from bottom of door to top of threshold.

3.3 ADJUST AND CLEAN

- A. Operation: Rehand or replace door which do not swing or operate freely as directed by Architect.
- B. Protection of Completed Work: Advise Contractor of proper procedures required for protection of installed wood doors from damage or deterioration until acceptance of work.

END OF SECTION 081416

SECTION 083323

OVERHEAD COILING DOORS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Service doors.
- B. Related Requirements:
 - 1. Section 055000 "Metal Fabrications" for miscellaneous steel supports.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type and size of overhead coiling door and accessory.
- B. Shop Drawings: For each installation and for special components not dimensioned or detailed in manufacturer's product data.
 - 1. Include points of attachment and their corresponding static and dynamic loads imposed on structure.
 - 2. Show locations of controls, locking devices, and other accessories.
 - 3. Include diagrams for power, signal, and control wiring.
- C. Samples: For each exposed product and for each color and texture specified.

1.3 CLOSEOUT SUBMITTALS

- A. Maintenance data.

1.4 QUALITY ASSURANCE

- A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer for both installation and maintenance of units required for this Project.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Structural Performance, Exterior Doors: Capable of withstanding the design wind loads.
 - 1. Design Wind Load: Uniform pressure (velocity pressure) of 20 lbf/sq. ft. (960 Pa), acting inward and outward

2. Testing: According to ASTM E 330 or DASMA 108 for garage doors and meeting the acceptance criteria of DASMA 108.

B. Windborne-Debris Impact Resistance: Provide overhead coiling doors that pass missile-impact and cyclic-pressure tests according to ASTM E 1996 for Wind Zone 1.

1. Large-Missile Test: For overhead coiling doors located within 30 feet (9.144 m) of grade.

C. Seismic Performance: Overhead coiling doors shall withstand the effects of earthquake motions determined according to ASCE/SEI 7

2.2 DOOR ASSEMBLY: Door Type F

A. Service Door: Install one (1) overhead coiling door formed with curtain of interlocking metal slats. Doors shall be 11'-0" wide or as required by length of counter at Kitchen 116.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

- a. ACME Rolling Doors.
- b. Clopay Building Products.
- c. Cookson Company.
- d. McKeon Rolling Steel Door Company, Inc.
- e. Overhead Door Corporation.
- f. Wayne-Dalton Corp.

B. Door Curtain Material: Galvanized steel.

C. Door Curtain Slats: Flat profile slats of 3-1/4-inch (83-mm) center-to-center height.

D. Bottom Bar: Two angles, each not less than 1-1/2 by 1-1/2 by 1/8 inch (38 by 38 by 3 mm) thick; fabricated from hot-dip galvanized steel

E. Curtain Jamb Guides: Galvanized steel with exposed finish matching curtain slats.

F. Hood: Match curtain material and finish.

1. Mounting: Face of wall.

G. Locking Devices: Equip door with slide bolt for padlock, locking device assembly, or chain lock keeper as directed by the District.

H. Manual Door Operator: Chain-hoist operator

I. Curtain Accessories: Equip door with weatherseals

J. Door Finish:

1. Baked-Enamel or Powder-Coated Finish: Color matching Architect's sample.
2. Interior Curtain-Slat Facing: Match finish of exterior curtain-slat face

2.3 MATERIALS, GENERAL

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

2.4 DOOR CURTAIN MATERIALS AND CONSTRUCTION

- A. Door Curtains: Fabricate overhead coiling-door curtain of interlocking metal slats, designed to withstand wind loading indicated, in a continuous length for width of door without splices. Unless otherwise indicated, provide slats of thickness and mechanical properties recommended by door manufacturer for performance, size, and type of door indicated, and as follows:
 - 1. Metal Interior Curtain-Slat Facing: Match metal of exterior curtain-slat face, with minimum steel thickness of 0.010 inch (0.25 mm)
- B. Curtain Jamb Guides: Manufacturer's standard angles or channels and angles of same material and finish as curtain slats unless otherwise indicated, with sufficient depth and strength to retain curtain, to allow curtain to operate smoothly, and to withstand loading. Slot bolt holes for guide adjustment. Provide removable stops on guides to prevent overtravel of curtain.

2.5 HOODS

- A. General: Form sheet metal hood to entirely enclose coiled curtain and operating mechanism at opening head. Contour to fit end brackets to which hood is attached. Roll and reinforce top and bottom edges for stiffness. Form closed ends for surface-mounted hoods and fascia for any portion of between-jamb mounting that projects beyond wall face. Equip hood with intermediate support brackets as required to prevent sagging.
 - 1. Include automatic drop baffle on fire-rated doors to guard against passage of smoke or flame.
 - 2. Exterior-Mounted Doors: Fabricate hood to act as weather protection and with a perimeter sealant-joint-bead profile for applying joint sealant.

2.6 LOCKING DEVICES

- A. Slide Bolt: Fabricate with side-locking bolts to engage through slots in tracks for locking by padlock, located on both left and right jamb sides, operable from coil side.
- B. Locking Device Assembly: Fabricate with cylinder lock, spring-loaded dead bolt, operating handle, cam plate, and adjustable locking bars to engage through slots in tracks.
 - 1. Lock Cylinders: Cylinders standard with manufacturer and keyed to building keying system.
 - 2. Keys: Three for each cylinder.
- C. Chain Lock Keeper: Suitable for padlock.

2.7 CURTAIN ACCESSORIES

- A. Smoke Seals: Equip each fire-rated door with replaceable smoke-seal perimeter gaskets or brushes for smoke and draft control as required for door listing and labeling by a qualified testing agency.

- B. Weatherseals for Exterior Doors: Equip each exterior door with weather-stripping gaskets fitted to entire exterior perimeter of door for a weather-resistant installation unless otherwise indicated.
- C. Astragal for Interior Doors: Equip each door bottom bar with a replaceable, adjustable, continuous, compressible gasket of flexible vinyl, rubber, or neoprene as a cushion bumper.
- D. Push/Pull Handles: Equip each push-up-operated or emergency-operated door with lifting handles on each side of door, finished to match door.
- E. Pull-Down Strap: Provide pull-down straps for doors more than 84 inches (2130 mm) high.
- F. Poll Hooks: Provide pole hooks and poles for doors more than 84 inches (2130 mm) high.

2.8 COUNTERBALANCING MECHANISM

- A. General: Counterbalance doors by means of manufacturer's standard mechanism with an adjustable-tension, steel helical torsion spring mounted around a steel shaft and contained in a spring barrel connected to top of curtain with barrel rings. Use grease-sealed bearings or self-lubricating graphite bearings for rotating members.
- B. Brackets: Manufacturer's standard mounting brackets of either cast iron or cold-rolled steel plate.

2.9 MANUAL DOOR OPERATORS

- A. General: Equip door with manual door operator by door manufacturer.
- B. Chain-Hoist Operator: Consisting of endless steel hand chain, chain-pocket wheel and guard, and gear-reduction unit with a maximum 25-lbf (111-N) force for door operation. Provide alloy-steel hand chain with chain holder secured to operator guide.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install overhead coiling doors and operating equipment complete with necessary hardware, anchors, inserts, hangers, and equipment supports; according to manufacturer's written instructions and as specified.
- B. Adjust hardware and moving parts to function smoothly so that doors operate easily, free of warp, twist, or distortion. Lubricate bearings and sliding parts as recommended by manufacturer. Adjust seals to provide tight fit around entire perimeter.

3.2 DEMONSTRATION

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain overhead coiling doors.

END OF SECTION 083323

SECTION 084113ALUMINUM-FRAMED ENTRANCES AND STOREFRONTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Exterior storefront framing.
2. Exterior manual-swing entrance doors and door frame units.

1.2 PERFORMANCE REQUIREMENTS

A. General Performance: Aluminum-framed systems shall withstand the effects of the following performance requirements without exceeding performance criteria or failure due to defective manufacture, fabrication, installation, or other defects in construction:

1. Movements of supporting structure indicated on Drawings including, but not limited to, story drift and deflection from uniformly distributed and concentrated live loads.
2. Dimensional tolerances of building frame and other adjacent construction.
3. Failure includes the following:
 - a. Deflection exceeding specified limits.
 - b. Thermal stresses transferring to building structure.
 - c. Framing members transferring stresses, including those caused by thermal and structural movements to glazing.
 - d. Noise or vibration created by wind and by thermal and structural movements.
 - e. Loosening or weakening of fasteners, attachments, and other components.
 - f. Failure of operating units.

B. Delegated Design: Design aluminum-framed systems, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.

C. Wind Loads: As indicated on Drawings.

D. Deflection of Framing Members:

1. Deflection Normal to Wall Plane: Limited to edge of glass in a direction perpendicular to glass plane shall not exceed $L/175$ of the glass edge length for each individual glazing lite or an amount that restricts edge deflection of individual glazing lites to $3/4$ inch (19 mm), whichever is less.
2. Deflection Parallel to Glazing Plane: Limited to $L/360$ of clear span or $1/8$ inch (3.2 mm), whichever is smaller.

E. Structural-Test Performance: Provide aluminum-framed systems tested according to ASTM E 330.

F. ASTM E 283 requires using a static-air-pressure difference of 1.57 lbf/sq. ft. (75 Pa) unless otherwise indicated, which is equivalent to a 25-mph (40-km/h) wind. Static-air-pressure difference of 6.24 lbf/sq. ft. (300 Pa) is equivalent to a 50-mph (80-km/h) wind.

- G. Air Infiltration: Provide aluminum-framed systems with maximum air leakage through fixed glazing and framing areas of 0.06 cfm/sq. ft. (0.03 L/s per sq. m) of fixed wall area when tested according to ASTM E 283 at a minimum static-air-pressure difference of 1.57 lbf/sq. ft. (75 Pa).
- H. Water Penetration under Static Pressure: Provide aluminum-framed systems that do not evidence water penetration through fixed glazing and framing areas when tested according to ASTM E 331 at a minimum static-air-pressure difference of 20 percent of positive wind-load design pressure, but not less than 6.24 lbf/sq. ft. (300 Pa).

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: For aluminum-framed systems. Include plans, elevations, sections, details, and attachments to other work.
 - 1. Include details of provisions for system expansion and contraction and for drainage of moisture in the system to the exterior.
- C. Samples: For each type of exposed finish required.
- D. Other Action Submittals:
 - 1. Entrance Door Hardware Schedule: Prepared by or under the supervision of supplier, detailing fabrication and assembly of entrance door hardware, as well as procedures and diagrams.
- E. Delegated-Design Submittal: For aluminum-framed systems indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.4 INFORMATIONAL SUBMITTALS

- A. Product test reports.
- B. Field quality-control reports.
- C. Warranties: Sample of special warranties.

1.5 CLOSEOUT SUBMITTALS

- A. Maintenance data.

1.6 QUALITY ASSURANCE

- A. Installer Qualifications: Manufacturer's authorized representative who is trained and approved for installation of units required for this Project.
- B. Testing Agency Qualifications: Qualified according to ASTM E 699 for testing indicated.
- C. Engineering Responsibility: Prepare data for aluminum-framed systems, including Shop Drawings, based on testing and engineering analysis of manufacturer's standard units in systems similar to those indicated for this Project.

- D. Product Options: Information on Drawings and in Specifications establishes requirements for systems' aesthetic effects and performance characteristics. Aesthetic effects are indicated by dimensions, arrangements, alignment, and profiles of components and assemblies as they relate to sightlines, to one another, and to adjoining construction. Performance characteristics are indicated by criteria subject to verification by one or more methods including preconstruction testing, field testing, and in-service performance.
- E. Accessible Entrances: Comply with applicable provisions in the Texas Accessibility Standards.
- F. Source Limitations for Aluminum-Framed Systems: Obtain from single source from single manufacturer.
- G. Preinstallation Conference: Conduct conference at Project site.

1.7 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of aluminum-framed systems that do not comply with requirements or that fail in materials or workmanship within specified warranty period.
 - 1. Warranty Period: Two years from date of Substantial Completion.
- B. Special Finish Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components on which finishes do not comply with requirements or that fail in materials or workmanship within specified warranty period. Warranty does not include normal weathering.
 - 1. Warranty Period: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Basis-of-Design Product: Subject to compliance with requirements, provide Kawneer North America – Trifab VG 451 T and VG 450 as noted in the drawings or comparable product by one of the following:
 - 1. EFCO Corporation.
 - 2. United States Aluminum.
 - 3. Vistawall Architectural Products; The Vistawall Group; a Bluescope Steel company.

2.2 MATERIALS

- A. Aluminum: Alloy and temper recommended by manufacturer for type of use and finish indicated.
 - 1. Sheet and Plate: ASTM B 209 (ASTM B 209M).
 - 2. Extruded Bars, Rods, Profiles, and Tubes: ASTM B 221 (ASTM B 221M).
 - 3. Extruded Structural Pipe and Tubes: ASTM B 429.
 - 4. Structural Profiles: ASTM B 308/B 308M.
 - 5. Welding Rods and Bare Electrodes: AWS A5.10/A5.10M.
- B. Steel Reinforcement: Manufacturer's standard zinc-rich, corrosion-resistant primer, complying with SSPC-PS Guide No. 12.00; applied immediately after surface preparation and pretreatment. Select

surface preparation methods according to recommendations in SSPC-SP COM and prepare surfaces according to applicable SSPC standard.

1. Structural Shapes, Plates, and Bars: ASTM A 36/A 36M.
2. Cold-Rolled Sheet and Strip: ASTM A 1008/A 1008M.
3. Hot-Rolled Sheet and Strip: ASTM A 1011/A 1011M.

2.3 FRAMING SYSTEMS

- A. Framing Members: Manufacturer's standard extruded-aluminum framing members of thickness required and reinforced as required to support imposed loads.
 1. Construction: Thermally broken.
 2. Glazing System: Retained mechanically with gaskets on four sides.
 3. Glazing Plane: Front.
- B. Brackets and Reinforcements: Manufacturer's standard high-strength aluminum with nonstaining, nonferrous shims for aligning system components.
- C. Fasteners and Accessories: Manufacturer's standard corrosion-resistant, nonstaining, nonbleeding fasteners and accessories compatible with adjacent materials.
 1. Use self-locking devices where fasteners are subject to loosening or turning out from thermal and structural movements, wind loads, or vibration.
 2. Reinforce members as required to receive fastener threads.
 3. Use exposed fasteners with countersunk Phillips screw heads , fabricated from stainless steel.
- D. Concrete and Masonry Inserts: Hot-dip galvanized cast-iron, malleable-iron, or steel inserts, complying with ASTM A 123/A 123M or ASTM A 153/A 153M.
- E. Concealed Flashing: Manufacturer's standard corrosion-resistant, nonstaining, nonbleeding flashing compatible with adjacent materials.
- F. Framing System Gaskets and Sealants: Manufacturer's standard, recommended by manufacturer for joint type.
 1. Sealants used inside the weatherproofing system shall have a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
 2. Sealants used inside the weatherproofing system shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

2.4 GLAZING SYSTEMS

- A. Glazing: As specified in Section 088000 "Glazing."
- B. Glazing Gaskets: Manufacturer's standard compression types; replaceable, molded or extruded, of profile and hardness required to maintain watertight seal.
- C. Spacers and Setting Blocks: Manufacturer's standard elastomeric type.

2.5 ENTRANCE DOOR SYSTEMS

- A. Entrance Doors: Manufacturer's standard glazed entrance doors for manual-swing operation.
1. Door Construction: 2-inch (50.8-mm) overall thickness, with minimum 0.188-inch- (4.8-mm-) thick, extruded-aluminum tubular rail and stile members. Mechanically fasten corners with reinforcing brackets that are deeply penetrated and fillet welded or that incorporate concealed tie rods.
 - a. Thermal Construction: High-performance plastic connectors separate aluminum members exposed to the exterior from members exposed to the interior.
 2. Door Design: Wide stile; 5-inch (127-mm) nominal width.
 - a. Accessible Doors: Smooth surfaced for width of door in area within 10 inches (255 mm) above floor or ground plane.
 3. Glazing Stops and Gaskets: Square, snap-on, extruded-aluminum stops and preformed gaskets.
 - a. Provide nonremovable glazing stops on outside of door.
- B. Entrance Door Hardware: As specified in Section 087100 "Door Hardware."

2.6 ENTRANCE DOOR HARDWARE

- A. General: Provide entrance door hardware and entrance door hardware sets indicated in door and frame schedule for each entrance door to comply with requirements in this Section.
1. Entrance Door Hardware Sets: Provide quantity, item, size, finish or color indicated, and products complying with BHMA standard referenced.
 2. Sequence of Operation: Provide electrified door hardware function, sequence of operation, and interface with other building control systems indicated.
 3. Opening-Force Requirements:
 - a. Egress Doors: Not more than 15 lbf (67 N) to release the latch and not more than 30 lbf (133 N) to set the door in motion and not more than 15 lbf (67 N) to open the door to its minimum required width.
 - b. Accessible Interior Doors: Not more than 5 lbf (22.2 N) to fully open door.
- B. Opening-Force Requirements:
1. Delayed-Egress Locks: Lock releases within 15 seconds after applying a force of not more than 15 lbf (67 N) for not more than 3 seconds.
 2. Latches and Exit Devices: Not more than 15 lbf (67 N) required to release latch.
- C. Continuous-Gear Hinges: Manufacturer's standard with stainless-steel bearings between knuckles, fabricated to full height of door and frame.
- D. Mortise Auxiliary Locks: BHMA A156.5, Grade 1.
- E. Automatic and Self-Latching Flush Bolts: BHMA A156.3, Grade 1.

- F. Panic Exit Devices: BHMA A156.3, Grade 1, listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for panic protection, based on testing according to UL 305.
- G. Cylinders: As specified in Section 087100 "Door Hardware."
- H. Strikes: Provide strike with black-plastic dust box for each latch or lock bolt; fabricated for aluminum framing.
- I. Operating Trim: BHMA A156.6.
- J. Closers: BHMA A156.4, Grade 1, with accessories required for a complete installation, sized as required by door size, exposure to weather, and anticipated frequency of use; adjustable to meet field conditions and requirements for opening force.
- K. Door Stops: BHMA A156.16, Grade 1, floor or wall mounted, as appropriate for door location indicated, with integral rubber bumper.
- L. Weather Stripping: Manufacturer's standard replaceable components.
- M. Weather Sweeps: Manufacturer's standard exterior-door bottom sweep with concealed fasteners on mounting strip.
- N. Silencers: BHMA A156.16, Grade 1.
- O. Thresholds: BHMA A156.21, raised thresholds beveled with a slope of not more than 1:2, with maximum height of 1/2 inch (13 mm).
- P. Finger Guards: Manufacturer's standard collapsible neoprene or PVC gasket anchored to frame hinge-jamb at center-pivoted doors.

2.7 ACCESSORY MATERIALS

- A. Bituminous Paint: Cold-applied, asphalt-mastic paint complying with SSPC-Paint 12 requirements except containing no asbestos; formulated for 30-mil (0.762-mm) thickness per coat.

2.8 FABRICATION

- A. Form or extrude aluminum shapes before finishing.
- B. Weld in concealed locations to greatest extent possible to minimize distortion or discoloration of finish. Remove weld spatter and welding oxides from exposed surfaces by descaling or grinding.
- C. Framing Members, General: Fabricate components that, when assembled, have the following characteristics:
 - 1. Profiles that are sharp, straight, and free of defects or deformations.
 - 2. Accurately fitted joints with ends coped or mitered.
 - 3. Means to drain water passing joints, condensation within framing members, and moisture migrating within the system to exterior.
 - 4. Physical and thermal isolation of glazing from framing members.
 - 5. Accommodations for thermal and mechanical movements of glazing and framing to maintain required glazing edge clearances.

6. Provisions for field replacement of glazing from interior for vision glass and exterior for spandrel glazing or metal panels.
 7. Fasteners, anchors, and connection devices that are concealed from view to greatest extent possible.
- D. Mechanically Glazed Framing Members: Fabricate for flush glazing without projecting stops.
- E. Entrance Door Frames: Reinforce as required to support loads imposed by door operation and for installing entrance door hardware.
- F. Entrance Doors: Reinforce doors as required for installing entrance door hardware.
- G. Entrance Door Hardware Installation: Factory install entrance door hardware to the greatest extent possible. Cut, drill, and tap for factory-installed entrance door hardware before applying finishes.
- H. After fabrication, clearly mark components to identify their locations in Project according to Shop Drawings.

2.9 ALUMINUM FINISHES

- A. Clear Anodic Finish: AAMA 611, AA-M12C22A41, Class I, 0.018 mm or thicker

PART 3 - EXECUTION

3.1 INSTALLATION

- A. General:
1. Comply with manufacturer's written instructions.
 2. Do not install damaged components.
 3. Fit joints to produce hairline joints free of burrs and distortion.
 4. Rigidly secure nonmovement joints.
 5. Install anchors with separators and isolators to prevent metal corrosion and electrolytic deterioration.
 6. Seal joints watertight unless otherwise indicated.
- B. Metal Protection:
1. Where aluminum will contact dissimilar metals, protect against galvanic action by painting contact surfaces with primer or applying sealant or tape, or by installing nonconductive spacers as recommended by manufacturer for this purpose.
 2. Where aluminum will contact concrete or masonry, protect against corrosion by painting contact surfaces with bituminous paint.
- C. Install components to drain water passing joints, condensation occurring within framing members, and moisture migrating within the system to exterior.
- D. Set continuous sill members and flashing in full sealant bed to produce weathertight installation.
- E. Install components plumb and true in alignment with established lines and grades, and without warp or rack.

- F. Install glazing as specified in Section 088000 "Glazing."
- G. Entrance Doors: Install doors to produce smooth operation and tight fit at contact points.
 - 1. Exterior Doors: Install to produce weathertight enclosure and tight fit at weather stripping.
 - 2. Field-Installed Entrance Door Hardware: Install surface-mounted entrance door hardware according to entrance door hardware manufacturers' written instructions using concealed fasteners to greatest extent possible.

3.2 FIELD QUALITY CONTROL

- A. Testing Agency: Engage a qualified independent testing and inspecting agency to perform field tests and inspections.
- B. Testing Services: Testing and inspecting of representative areas to determine compliance of installed systems with specified requirements shall take place as follows. Do not proceed with installation of the next area until test results for previously completed areas show compliance with requirements.
 - 1. Water Spray Test: Before installation of interior finishes has begun, areas designated by Architect shall be tested according to AAMA 501.2 and shall not evidence water penetration.
- C. Repair or remove work if test results and inspections indicate that it does not comply with specified requirements.
- D. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.
- E. Aluminum-framed assemblies will be considered defective if they do not pass tests and inspections.
- F. Prepare test and inspection reports.

END OF SECTION 084113

SECTION 084413

GLAZED ALUMINUM CURTAIN WALLS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes glazed aluminum curtain walls.

1.2 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: Include plans, elevations, sections, full-size details, and attachments to other work.
 - 1. Show connection to and continuity with adjacent thermal, weather, air, and vapor barriers.
- C. Samples: For each exposed finish required.
- D. Delegated-Design Submittal: For glazed aluminum curtain walls indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.4 INFORMATIONAL SUBMITTALS

- A. Energy Performance Certificates: NFRC-certified energy performance values from manufacturer.
- B. Product test reports.
- C. Field quality-control reports.
- D. Sample warranties.

1.5 CLOSEOUT SUBMITTALS

- A. Maintenance data.

1.6 QUALITY ASSURANCE

- A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer.
- B. Testing Agency Qualifications: Qualified according to ASTM E 699 for testing indicated.

- C. Product Options: Information on Drawings and in Specifications establishes requirements for aesthetic effects and performance characteristics of assemblies. Aesthetic effects are indicated by dimensions, arrangements, alignment, and profiles of components and assemblies as they relate to sightlines, to one another, and to adjoining construction.
 - 1. Do not change intended aesthetic effects, as judged solely by Architect, except with Architect's approval. If changes are proposed, submit comprehensive explanatory data to Architect for review.

1.7 WARRANTY

- A. Special Assembly Warranty: Manufacturer agrees to repair or replace components of glazed aluminum curtain wall that do not comply with requirements or that fail in materials or workmanship within specified warranty period.
 - 1. Warranty Period: Two years from date of Substantial Completion.
- B. Special Finish Warranty: Standard form in which manufacturer agrees to repair finishes or replace aluminum that shows evidence of deterioration of factory-applied finishes within specified warranty period.
 - 1. Warranty Period: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Engage a qualified professional engineer, as defined in Section 014000 "Quality Requirements," to design glazed aluminum curtain walls.
- B. General Performance: Comply with performance requirements specified, as determined by testing of glazed aluminum curtain walls representing those indicated for this Project without failure due to defective manufacture, fabrication, installation, or other defects in construction.
 - 1. Glazed aluminum curtain walls shall withstand movements of supporting structure including, but not limited to, story drift, twist, column shortening, long-term creep, and deflection from uniformly distributed and concentrated live loads.
 - 2. Failure also includes the following:
 - a. Thermal stresses transferring to building structure.
 - b. Glass breakage.
 - c. Noise or vibration created by wind and thermal and structural movements.
 - d. Loosening or weakening of fasteners, attachments, and other components.
 - e. Failure of operating units.
- C. Wind loads: Provide Curtain Wall system; include anchorage, capable of withstanding wind load design pressures as shown on the drawings and as based on the International Building Code; 2012 Edition
- D. Air Infiltration: The test specimen shall be tested in accordance with ASTM E 283. Air infiltration rate shall not exceed 0.06 cfm/ft² (0.3 l/s · m²) at a static air pressure differential of 6.24 psf (300 Pa).

- E. Water Resistance, (static): The test specimen shall be tested in accordance with ASTM E 331. There shall be no leakage at a static air pressure differential of 12 psf (575 Pa) as defined in AAMA 501.
- F. Water Resistance, (dynamic): The test specimen shall be tested in accordance with AAMA 501.1. There shall be no leakage at an air pressure differential of 12 psf (575 Pa) as defined in AAMA 501.
- G. Uniform Load: A static air design load of 40 psf (1915 Pa) shall be applied in the positive and negative direction in accordance with ASTM E 330. There shall be no deflection in excess of $L/175$ of the span of any framing member at design load. At structural test load equal to 1.5 times the specified design load, no glass breakage or permanent set in the framing members in excess of 0.2% of their clear spans shall occur.
- H. Seismic: When tested to AAMA 501.4, system must meet design displacement of $0.010 \times$ the story height and ultimate displacement of $1.5 \times$ the design displacement.
- I. Windborne-Debris Impact Resistance: Pass missile-impact and cyclic-pressure tests when tested according to ASTM E 1886 and testing information in ASTM E 1996 for Wind Zone 1.
 - 1. Large-Missile Test: For glazed openings located within 30 feet (9.1 m) of grade.
 - 2. Small-Missile Test: For glazed openings located more than 30 feet (9.1 m) above grade.
- J. Thermal Transmittance (U-factor): When tested to AAMA Specification 1503, the thermal transmittance (U-factor) shall not be more than: 0.36 (HP glass).
- K. Thermal Movements: Allow for thermal movements resulting from ambient and surface temperature changes:
 - 1. Temperature Change: 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.
- L. Condensation Resistance (CRF): When tested to AAMA Specification 1503, the condensation resistance factor shall not be less than 75_{frame} and 72_{glass} (HP glass).
- M. Sound Transmission Loss: When tested to ASTM E90, the Sound Transmission Class (STC) shall not be less than 31 and the outdoor-indoor transmission class (OITC) shall not be less than 25 based upon 1" laminated glass (1/4" laminated, 1/2" AS, 1/4" laminated).

2.2 MANUFACTURERS

- A. Basis-of-Design Product: Subject to compliance with requirements, provide Kawneer 1600 System 2 or comparable product by one of the following:
 - 1. EFCO Corporation.
 - 2. Oldcastle, Inc.
 - 3. United States Aluminum.
 - 4. Wausau Window and Wall Systems.

2.3 FRAMING

- A. Framing Members: Manufacturer's extruded- or formed-aluminum framing members of thickness required and reinforced as required to support imposed loads.
 - 1. Construction: 6" deep with steel infill.

2. Glazing System: Retained mechanically with gaskets on four sides.
 3. Glazing Plane: Front.
 4. Finish: Clear anodic finish.
 5. Fabrication Method: Either factory- or field-fabricated stick system.
- B. Pressure Caps: Manufacturer's standard aluminum components that mechanically retain glazing.
1. Include snap-on aluminum trim that conceals fasteners.
- C. Brackets and Reinforcements: Manufacturer's standard high-strength aluminum with nonstaining, nonferrous shims for aligning system components.
- D. Materials:
1. Aluminum: Alloy and temper recommended by manufacturer for type of use and finish indicated.
 - a. Sheet and Plate: ASTM B 209 (ASTM B 209M).
 - b. Extruded Bars, Rods, Profiles, and Tubes: ASTM B 221 (ASTM B 221M).
 - c. Extruded Structural Pipe and Tubes: ASTM B 429/B 429M.
 - d. Structural Profiles: ASTM B 308/B 308M.
 2. Steel Reinforcement: Manufacturer's standard zinc-rich, corrosion-resistant primer complying with SSPC-PS Guide No. 12.00; applied immediately after surface preparation and pretreatment. Select surface preparation methods according to recommendations in SSPC-SP COM, and prepare surfaces according to applicable SSPC standard.
 - a. Structural Shapes, Plates, and Bars: ASTM A 36/A 36M.
 - b. Cold-Rolled Sheet and Strip: ASTM A 1008/A 1008M.
 - c. Hot-Rolled Sheet and Strip: ASTM A 1011/A 1011M.

2.4 GLAZING

- A. Glazing: Comply with Section 088000 "Glazing."
- B. Glazing Gaskets: Manufacturer's standard sealed-corner pressure-glazing system of black, resilient elastomeric glazing gaskets, setting blocks, and shims or spacers.
- C. Glazing Sealants: As recommended by manufacturer.
- D. Sealants used inside the weatherproofing system shall comply with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

2.5 FABRICATION

- A. Form or extrude aluminum shapes before finishing.
- B. Weld in concealed locations to greatest extent possible to minimize distortion or discoloration of finish. Remove weld spatter and welding oxides from exposed surfaces by descaling or grinding.
- C. Fabricate components that, when assembled, have the following characteristics:

1. Profiles that are sharp, straight, and free of defects or deformations.
2. Accurately fitted joints with ends coped or mitered.
3. Physical and thermal isolation of glazing from framing members.
4. Accommodations for thermal and mechanical movements of glazing and framing to maintain required glazing edge clearances.
5. Provisions for field replacement of glazing from exterior.
6. Fasteners, anchors, and connection devices that are concealed from view to greatest extent possible.
7. Components curved to indicated radii.

D. Fabricate components to resist water penetration as follows:

1. Internal guttering system or other means to drain water passing joints, condensation occurring within framing members, and moisture migrating within glazed aluminum curtain wall to exterior.
2. Pressure-equalized system or double barrier design with primary air and vapor barrier at interior side of glazed aluminum curtain wall and secondary seal weeped and vented to exterior.

E. Factory-Assembled Frame Units:

1. Rigidly secure nonmovement joints.
2. Prepare surfaces that are in contact structural sealant according to sealant manufacturer's written instructions to ensure compatibility and adhesion.
3. Preparation includes, but is not limited to, cleaning and priming surfaces.
4. Seal joints watertight unless otherwise indicated.
5. Install glazing to comply with requirements in Section 088000 "Glazing."

F. After fabrication, clearly mark components to identify their locations in Project according to Shop Drawings.

2.6 ALUMINUM FINISHES

- A. Clear Anodic Finish: AAMA 611, AA-M12C22A41, Class I, 0.018 mm or thicker.

PART 3 - EXECUTION

3.1 INSTALLATION

A. General:

1. Comply with manufacturer's written instructions.
2. Do not install damaged components.
3. Fit joints to produce hairline joints free of burrs and distortion.
4. Rigidly secure nonmovement joints.
5. Install anchors with separators and isolators to prevent metal corrosion and electrolytic deterioration and to prevent impeding movement of moving joints.
6. Where welding is required, weld components in concealed locations to minimize distortion or discoloration of finish. Protect glazing surfaces from welding.
7. Seal joints watertight unless otherwise indicated.

- B. Metal Protection:
 - 1. Where aluminum is in contact with dissimilar metals, protect against galvanic action by painting contact surfaces with primer, applying sealant or tape, or installing nonconductive spacers as recommended by manufacturer for this purpose.
 - 2. Where aluminum is in contact concrete or masonry, protect against corrosion by painting contact surfaces with bituminous paint.
- C. Install components to drain water passing joints, condensation occurring within framing members, and moisture migrating within glazed aluminum curtain wall to exterior.
- D. Install components plumb and true in alignment with established lines and grades.
- E. Install glazing as specified in Section 088000 "Glazing."

3.2 FIELD QUALITY CONTROL

- A. Testing Agency: Engage a qualified testing agency to perform tests and inspections.
- B. Test Area: Perform tests on mockups.
- C. Field Quality-Control Testing: Perform the following test on mockups.
 - 1. Water-Spray Test: Before installation of interior finishes has begun, areas designated by Architect shall be tested according to AAMA 501.2 and shall not evidence water penetration.
 - a. Perform a minimum of two tests in areas as directed by Architect.
- D. Glazed aluminum curtain walls will be considered defective if they do not pass tests and inspections.
- E. Prepare test and inspection reports.

END OF SECTION 084413

SECTION 087100

DOOR HARDWARE

PART 1 - GENERAL

1.1 SUMMARY:

- A. Section Includes: Finish Hardware for door openings, except as otherwise specified herein.
 - 1. Door hardware for steel (hollow metal) doors.
 - 2. Door hardware for aluminum doors.
 - 3. Door hardware for wood doors.
 - 4. Door hardware for other doors indicated.
 - 5. Keyed cylinders as indicated.

- B. Related Sections:
 - 1. Division 6: Rough Carpentry.
 - 2. Division 8: Aluminum Doors and Frames
 - 3. Division 8: Hollow Metal Doors and Frames.
 - 4. Division 8: Wood Doors.
 - 5. Division 16 Electrical

- C. References: Comply with applicable requirements of the following standards. Where these standards conflict with other specific requirements, the most restrictive shall govern.
 - 1. Builders Hardware Manufacturing Association (BHMA)
 - 2. NFPA 101 Life Safety Code
 - 3. NFPA 80 -Fire Doors and Windows
 - 4. ANSI-A156.xx- Various Performance Standards for Finish Hardware
 - 5. UL10C – Positive Pressure Fire Test of Door Assemblies
 - 6. ANSI-A117.1 – Accessible and Usable Buildings and Facilities
 - 7. DHI /ANSI A115.IG – Installation Guide for Doors and Hardware
 - 8. ICC – International Building Code

- D. Intent of Hardware Groups
 - 1. Should items of hardware not definitely specified be required for completion of the Work, furnish such items of type and quality comparable to adjacent hardware and appropriate for service required.
 - 2. Where items of hardware aren't definitely or correctly specified, are required for completion of the Work, a written statement of such omission, error, or other discrepancy to be submitted to Architect, prior to date specified for receipt of bids for clarification by addendum; or, furnish such items in the type and quality established by this specification, and appropriate to the service intended.

1.2 SUBSTITUTIONS:

- A. Comply with Division 1.

1.3 SUBMITTALS:

- A. Comply with Division 1.

- B. Special Submittal Requirements: Combine submittals of this Section with Sections listed below to ensure the "design intent" of the system/assembly is understood and can be reviewed together.
- C. Product Data: Manufacturer's specifications and technical data including the following:
1. Detailed specification of construction and fabrication.
 2. Manufacturer's installation instructions.
 3. Wiring diagrams for each electric product specified. Coordinate voltage with electrical before submitting.
 4. Submit 6 copies of catalog cuts with hardware schedule.
 5. Provide 9001-Quality Management and 14001-Environmental Management for products listed in Materials Section 2.2
- D. Shop Drawings - Hardware Schedule: Submit 6 complete reproducible copy of detailed hardware schedule in a vertical format.
1. List groups and suffixes in proper sequence.
 2. Completely describe door and list architectural door number.
 3. Manufacturer, product name, and catalog number.
 4. Function, type, and style.
 5. Size and finish of each item.
 6. Mounting heights.
 7. Explanation of abbreviations and symbols used within schedule.
 8. Detailed wiring diagrams, specially developed for each opening, indicating all electric hardware, security equipment and access control equipment, and door and frame rough-ins required for specific opening.
- E. Templates: Submit templates and "reviewed Hardware Schedule" to door and frame supplier and others as applicable to enable proper and accurate sizing and locations of cutouts and reinforcing.
1. Templates, wiring diagrams and "reviewed Hardware Schedule" of electrical terms to electrical for coordination and verification of voltages and locations.
- F. Samples: (If requested by the Architect)
1. 1 sample of Lever and Rose/Escutcheon design, (pair).
 2. 3 samples of metal finishes
- G. Contract Closeout Submittals: Comply with Division 1 including specific requirements indicated.
1. Operating and maintenance manuals: Submit 3 sets containing the following.
 - a. Complete information in care, maintenance, and adjustment, and data on repair and replacement parts, and information on preservation of finishes.
 - b. Catalog pages for each product.
 - c. Name, address, and phone number of local representative for each manufacturer.
 - d. Parts list for each product.
 2. Copy of final hardware schedule, edited to reflect, "As installed".
 3. Copy of final keying schedule
 4. As installed "Wiring Diagrams" for each piece of hardware connected to power, both low voltage and 110 volts.
 5. One set of special tools required for maintenance and adjustment of hardware, including changing of cylinders.

1.4 QUALITY ASSURANCE

A. Comply with Division 1.

1. Statement of qualification for distributor and installers.
2. Statement of compliance with regulatory requirements and single source responsibility.
3. Distributor's Qualifications: Firm with 3 years experience in the distribution of commercial hardware.
 - a. Distributor to employ full time Architectural Hardware Consultants (AHC) for the purpose of scheduling and coordinating hardware and establishing keying schedule.
 - b. Hardware Schedule shall be prepared and signed by an AHC.
4. Installer's Qualifications: Firm with 3 years experienced in installation of similar hardware to that required for this Project, including specific requirements indicated.
5. Regulatory Label Requirements: Provide testing agency label or stamp on hardware for labeled openings.
 - a. Provide UL listed hardware for labeled and 20 minute openings in conformance with requirements for class of opening scheduled.
 - b. Underwriters Laboratories requirements have precedence over this specification where conflict exists.
6. Single Source Responsibility: Except where specified in hardware schedule, furnish products of only one manufacturer for each type of hardware.

- ##### B. Review Project for extent of finish hardware required to complete the Work. Where there is a conflict between these Specifications and the existing hardware, notify the Architect in writing and furnish hardware in compliance with the Specification unless otherwise directed in writing by the Architect.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Packing and Shipping: Comply with Division 1.

1. Deliver products in original unopened packaging with legible manufacturer's identification.
2. Package hardware to prevent damage during transit and storage.
3. Mark hardware to correspond with "reviewed hardware schedule".
4. Deliver hardware to door and frame manufacturer upon request.

- ##### B. Storage and Protection: Comply with manufacturer's recommendations.

1.6 PROJECT CONDITIONS:

- ##### A. Coordinate hardware with other work. Furnish hardware items of proper design for use on doors and frames of the thickness, profile, swing, security and similar requirements indicated, as necessary for the proper installation and function, regardless of omissions or conflicts in the information on the Contract Documents.
- ##### B. Review Shop Drawings for doors and entrances to confirm that adequate provisions will be made for the proper installation of hardware.

1.7 WARRANTY:

- ##### A. Refer to Conditions of the Contract

- B. Manufacturer’s Warranty:
 - 1. Closers: Ten years
 - 2. Exit Devices: Five Years
 - 3. Locksets & Cylinders: Three years
 - 4. All other Hardware: Two years.

1.8 OWNER’S INSTRUCTION:

- A. Instruct Owner’s personnel in operation and maintenance of hardware units.

1.9 MAINTENANCE:

- A. Extra Service Materials: Deliver to Owner extra materials from same production run as products installed. Package products with protective covering and identify with descriptive labels. Comply with Division 1 Closeout Submittals Section.
 - 1. Special Tools: Provide special wrenches and tools applicable to each different or special hardware component.
 - 2. Maintenance Tools: Provide maintenance tools and accessories supplied by hardware component manufacturer.
 - 3. Delivery, Storage and Protection: Comply with Owner’s requirements for delivery, storage and protection of extra service materials.
- B. Maintenance Service: Submit for Owner’s consideration maintenance service agreement for electronic products installed.

PART 2 - PRODUCTS

2.1 MANUFACTURERS:

- A. The following manufacturers are approved subject to compliance with requirements of the Contract Documents. Approval of manufacturers other than those listed shall be in accordance with Division 1.

<u>Item:</u>	<u>Manufacturer:</u>	<u>Approved:</u>
Hinges	Stanley	
Continuous Hinges	Stanley	
Locksets & Cylinders	Best	
Exit Devices	Precision	
Closers	Stanley	
Push/Pull Plates	Trimco	
Protection Plates	Trimco	
Door Stops	Trimco	
Threshold & Gasketing	Pemko	

2.2 MATERIALS:

- A. Hinges: Shall be Five Knuckle Ball bearing hinges
 - 1. Template screw hole locations
 - 2. Bearings are to be fully hardened.
 - 3. Bearing shell is to be consistent shape with barrel.
 - 4. Minimum of 2 permanently lubricated non-detachable bearings on standard weight hinge and 4 permanently lubricated bearing on heavy weight hinges.

5. Equip with easily seated, non-rising pins.
6. Non Removable Pin screws shall be slotted stainless steel screws.
7. Hinges shall be full polished, front, back and barrel.
8. Hinge pin is to be fully plated.
9. Bearing assembly is to be installed after plating.
10. Sufficient size to allow 180-degree swing of door
11. Furnish five knuckles with flush ball bearings
12. Provide hinge type as listed in schedule.
13. Furnish 3 hinges per leaf to 7 foot 6 inch height. Add one for each additional 30 inches in height or fraction thereof.
14. Tested and approved by BHMA for all applicable ANSI Standards for type, size, function and finish
15. UL10C listed for Fire rated doors.

B. Geared Continuous Hinges:

1. Tested and approved by BHMA for ANSI A156.26-1996 Grade 1
2. Anti-spinning through fastener
3. UL10C listed for 3 hour Fire rating
4. Non-handed
5. Lifetime warranty
6. Provide Fire Pins for 3-hour fire ratings
7. Sufficient size to permit door to swing 180 degrees

C. Cylindrical Type Locks and Latchsets:

1. Tested and approved by BHMA for ANSI A156.2, Series 4000, Operational Grade 1, Extra-Heavy Duty, and be UL10C listed.
2. Provide 9001-Quality Management and 14001-Environmental Management.
3. Fit modified ANSI A115.2 door preparation.
4. Locksets and cores to be of the same manufacturer to maintain complete lockset warranty
5. Locksets to have anti-rotational studs that are thru-bolted
6. Keyed lever shall not have exposed "keeper" hole
7. Each lever to have independent spring mechanism controlling it
8. 2-3/4 inch (70 mm) backset
9. 9/16 inch (14 mm) throw latchbolt
10. Provide sufficient curved strike lip to protect door trim
11. Outside lever sleeve to be seamless, of one-piece construction made of a hardened steel alloy
12. Keyed lever to be removable only after core is removed, by authorized control key
13. Provide locksets with 7-pin removable and interchangeable core cylinders
14. Hub, side plate, shrouded rose, locking pin to be a one-piece casting with a shrouded locking lug.
15. Locksets outside locked lever must withstand minimum 1400 inch pounds of torque. In excess of that, a replaceable part will shear. Key from outside and inside lever will still operate lockset.
16. Core face must be the same finish as the lockset.
17. Functions and design as indicated in the hardware groups.

D. Exit Devices shall:

1. Tested and approved by BHMA for ANSI 156.3, Grade 1
2. Provide 9001-Quality Management and 14001-Environmental Management.
3. Furnish UL or recognized independent laboratory certified mechanical operational testing to 9 million cycles minimum.
4. Provide a deadlocking latchbolt
5. Non-fire rated exit devices shall have cylinder dogging.

6. Touchpad shall be "T" style
 7. Exposed components shall be of architectural metals and finishes.
 8. Lever design shall match lockset lever design
 9. Provide strikes as required by application.
 10. Fire exit devices to be listed for UL10C
 11. UL listed for Accident Hazard
 12. Shall consist of a cross bar or push pad, the actuating portion of which extends across, shall not be less than one half the width of the door leaf.
 13. Provide vandal resistant or breakaway trim
 14. Aluminum vertical rod assemblies are acceptable only when provide with the manufacturers optional top and bottom stainless steel rod guard protectors.
- E. Cylinders:
1. Provide the necessary cylinder housings, collars, rings & springs as recommended by the manufacturer for proper installation.
 2. Provide the proper cylinder cams or tail piece as required to operate all locksets and other keyed hardware items listed in the hardware sets.
 3. Coordinate and provide as required for related sections.
- F. Door Closers shall:
1. Tested and approved by BHMA for ANSI 156.4, Grade 1
 2. UL10C certified
 3. Provide 9001-Quality Management and 14001-Environmental Management.
 4. Closer shall have extra-duty arms and knuckles
 5. Conform to ANSI 117.1
 6. Maximum 2 7/16 inch case projection with non-ferrous cover
 7. Separate adjusting valves for closing and latching speed, and backcheck
 8. Provide adapter plates, shim spacers and blade stop spacers as required by frame and door conditions
 9. Full rack and pinion type closer with 1½" minimum bore
 10. Mount closers on non-public side of door, unless otherwise noted in specification
 11. Closers shall be non-handed, non-sized and multi-sized.
- G. Door Stops: Provide a dome floor or wall stop for every opening as listed in the hardware sets.
1. Wall stop and floor stop shall be wrought bronze, brass or stainless steel.
 2. Provide fastener suitable for wall construction.
 3. Coordinate reinforcement of walls where wall stop is specified.
 4. Provide dome stops where wall stops are not practical. Provide spacers or carpet riser for floor conditions encountered
- H. Over Head Stops: Provide a Surface mounted or concealed overhead when a floor or wall stop cannot be used or when listed in the hardware set.
1. Concealed overhead stops shall be heavy duty bronze or stainless steel.
 2. Surface overhead stops shall be heavy duty bronze or stainless steel.
- I. Push Plates: Provide with four beveled edges ANSI J301, .050 thickness, size as indicated in hardware set. Furnish oval-head countersunk screws to match finish.
- J. Pulls with plates: Provide with four beveled edges ANSI J301, .050 thickness Plate s with ANSI J401 Pull as listed in hardware set. Provide proper fasteners for door construction.

- K. Kickplates: Provide with four beveled edges ANSI J102, 10 inches high by width less 2 inches on single doors and 1 inch on pairs of doors. Furnish oval-head countersunk screws to match finish.
- L. Mop plates: Provide with four beveled edges ANSI J103, 4 inches high by width less 1 inch on single doors and 1 inch on pairs of doors. Furnish oval-head countersunk screws to match finish.
- M. Power Supply: Provide power supply for (ELR) Electric Latch Retraction exit devices
1. Motherboard will accept up to four plug-in Control Modules. Provide the appropriate necessary control module to operate the number of ELR exit devices used at each opening. The Control Module shall include a Time delay Feature, variable (0-4 minutes) latch retraction period in response to a momentary input.
 2. UL Listed for class II output
 3. Include circuit breakers for protection of motherboard
 4. 115 or 230 Volt user selectable switch, with AC input= 115 Volt at 1 Amp
 5. Control module shall include Fire alarm terminal and Auxiliary contacts for remote signaling.
 6. Optional card for Battery Backup (BT) power tap module to operate a Card reader or when ELR devices require battery backup (Lead Acid Batteries are not included and is to be furnished by others)
 7. Precision ELR150 Series with the required modules.
- N. Power Transfer: Power transfer device shall be a steel housing and flexible tube. Secure and inconspicuous channel is to bring power from the frame to the door.
1. Precision EPT-5
 2. Tube shall accept up to 5/16" wire bundle and accommodate a door swing of 120 Deg.
 3. Wires as required by others
- O. Surface mounted Door Loop Power Transfer: Armored flex conduit is to bring power from the frame to the door. The tube shall accept up to 1/4" wire bundle and is 18" long.
1. ABH PT1000
 2. Wires as required by others.
- P. Door Position Switch: Provide door position switch for door status monitoring as indicated in hardware sets.
1. At all fired rated doors the door and frames, position switch preparation will be provided by the door and frame manufacturer or by an authorized label service agent.
- Q. Seals: All seals shall be finished to match adjacent frame color. Seals shall be furnished as listed in schedule. Material shall be UL listed for labeled openings.
- R. Weatherstripping: Provide at head and jambs only those units where resilient or flexible seal strip is easily replaceable. Where bar-type weatherstrip is used with parallel arm mounted closers install weatherstrip first.
1. Weatherstrip shall be resilient seal of (Neoprene, Polyurethane, Vinyl, Pile, Nylon Brush, Silicone)
 2. UL10C Positive Pressure rated seal set when required.
- S. Door Bottoms/Sweeps: Surface mounted or concealed door bottom where listed in the hardware sets.
1. Door seal shall be resilient seal of (Neoprene, Polyurethane, Nylon Brush, Silicone)

2. UL10C Positive Pressure rated seal set when required.

- T. Thresholds: Thresholds shall be aluminum beveled type with maximum height of ½” for conformance with ADA requirements. Furnish as specified and per details. Provide fasteners and screws suitable for floor conditions.
- U. Provide one wall mounted Telkee, Lund or MMF series key cabinet complete with hooks, index and tags to accommodate 50% expansion. Coordinate mounting location with architect.
- V. Silencers: Furnish silencers on all interior frames, 3 for single doors, 2 for pairs. Omit where any type of seals occur.

2.3 FINISH:

- A. Designations used in Schedule of Finish Hardware - 3.5, and elsewhere to indicate hardware finishes are those listed in ANSI/BHMA A156.18 including coordination with traditional U.S. finishes shown by certain manufacturers for their products
- B. Powder coat door closers to match other hardware, unless otherwise noted.
- C. Aluminum items shall be finished to match predominant adjacent material. Seals to coordinate with frame color.

2.4 KEYS AND KEYING:

- A. Provide keyed brass construction cores and keys during the construction period. Construction control and operating keys and core shall not be part of the Owner's permanent keying system or furnished in the same keyway (or key section) as the Owner's permanent keying system. Permanent cores and keys (prepared according to the accepted keying schedule) will be furnished to the Owner.
- B. Cylinders, removable and interchangeable core system: Best Cormax Patented 7-pin.
- C. Permanent keys and cores: Stamped with the applicable key mark for identification. These visual key control marks or codes will not include the actual key cuts. Permanent keys will also be stamped "Do Not Duplicate."
- D. Transmit Grand Masterkeys, Masterkeys and other Security keys to Owner by Registered Mail, return receipt requested.
- E. Furnish keys in the following quantities:
 - 1. 1 each Grand Masterkeys
 - 2. 2 each Control keys
 - 3. 4 each Masterkeys
 - 4. 3 each Change keys each keyed core
 - 5. 10 each Construction masterkeys
 - 6. 2 each Construction Control keys
- F. The Owner, or the Owner's agent, will install permanent cores and return the construction cores to the Hardware Supplier. Construction cores and keys remain the property of the Hardware Supplier.

- G. Keying Schedule: Arrange for a keying meeting, with Architect Owner and hardware supplier, and other involved parties to ensure locksets and locking hardware, are functionally correct and keying complies with project requirements. Furnish 3 typed copies of keying schedule to Architect.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verification of conditions: Examine doors, frames, related items and conditions under which Work is to be performed and identify conditions detrimental to proper and or timely completion.
1. Do not proceed until unsatisfactory conditions have been corrected.

3.2 HARDWARE LOCATIONS:

- A. Mount hardware units at heights indicated in the following publications except as specifically indicated or required to comply with the governing regulations.
1. Recommended Locations for Builder's Hardware for Standard Steel Doors and Frames, by the Door and Hardware Institute (DHI).
 2. Recommended locations for Architectural Hardware for flush wood doors (DHI).
 3. WDMA Industry Standard I.S.-1A-04, Industry Standard for Architectural wood flush doors.

3.3 INSTALLATION:

- A. Install each hardware item per manufacturer's instructions and recommendations. Do not install surface mounted items until finishes have been completed on the substrate. Set units level, plumb and true to line and location. Adjust and reinforce the attachment substrate as necessary for proper installation and operation.
- B. Conform to local governing agency security ordinance.
- C. Install Conforming to ICC/ANSI A117.1 Accessible and Usable Building and Facilities.
1. Adjust door closer sweep periods so that from the open position of 70 degrees, the door will take at least 3 seconds to move to a point 3 inches from the latch, measured to the landing side of the door.
- D. Installed hardware using the manufacturers fasteners provided. Drill and tap all screw holes located in metallic materials. Do not use "Riv-Nuts" or similar products.

3.4 FIELD QUALITY CONTROL AND FINAL ADJUSTMENT

- A. Contractor/Installers, Field Services: After installation is complete, contractor shall inspect the completed door openings on site to verify installation of hardware is complete and properly adjusted, in accordance with both the Contract Documents and final shop drawings.
1. Check and adjust closers to ensure proper operation.
 2. Check latchset, lockset, and exit devices are properly installed and adjusted to ensure proper operation.

- a. Verify levers are free from binding.
 - b. Ensure latchbolts and dead bolts are engaged into strike and hardware is functioning.
3. Report findings, in writing, to architect indicating that all hardware is installed and functioning properly. Include recommendations outlining corrective actions for improperly functioning hardware if required.

3.5 SCHEDULE OF FINISH HARDWARE:

Manufacturer List

<u>Code</u>	<u>Name</u>
AB	ABH Manufacturing Inc.
BE	Best Access Systems
BY	By Others
PE	Pemko
PR	Precision
SD	Security Door Controls
ST	Stanley
TR	Trimco

Option List

<u>Code</u>	<u>Description</u>
CD	CYLINDER DOGGING
S3	ANSI Strike Package
TS	TOUCHBAR MONITORING SWITCH
B4E	BEVELED 4 EDGES - KICK PLATES
ELR	ELECTRIC LATCH RETRACTION
EPT Prep	EPT Prep (full mortise)
P45-180D	Drop Plate for Narrow Top Rail
P45HD-110	Spacer Block HD Arm on Rabbet
C-Sunk	COUNTER SINKING OF PLATES

Finish List

<u>Code</u>	<u>Description</u>
626	Satin Chromium Plated
628	Satin Aluminum, Clear Anodized
630	Satin Stainless Steel
652	Chromium Plated, Dull
689	Aluminum Painted
GRE	Grey

Hardware Sets

SET #1 - Entrance Alum

2 Continuous Hinge	661HD	628	ST
1 Exit Device	2602 CD	630	PR

1	Exit Device	2603 CD	630	PR
1	Rim Cylinder	1E-72 PATD	626	BE
2	Mortise Cylinder	1E-74 PATD	626	BE
2	Door Closer	CLD-4550 CS P45-180D P45HD-110	689	ST
2	Door Pull	1191-3	630	TR
1	Threshold	171A		PE
2	Door Bottom	315 CN		PE

NOTE: Weatherseals by door manufacturer.

SET #2 - Entrance Alum CR

1	Continuous Hinge	661HD EPT Prep	628	ST
1	Power Transfer	PT1000	628	AB
1	Power Supply	ELR151		PR
1	Exit Device	ELR TS 2403 CD	630	PR
1	Rim Cylinder	1E-72 PATD	626	BE
1	Mortise Cylinder	1E-74 PATD	626	BE
1	Card Reader	By Security Cointractor		BY
1	Door Closer	CLD-4550 CS P45-180D P45HD-110	689	ST
1	Door Pull	1191-3	630	TR
1	Door Position Switch (10)	MC-4M	628	SD
1	Threshold	171A		PE
1	Door Bottom	315 CN		PE

NOTE: Weatherseals by door manufacturer.

Card Reader by Security

Power connections by electrical

Description of Operation:

Door secured by electric exit device

Card Reader retracts latch bolt of exit to allow entry, then re-locks

Door position switch for monitor

TS Switch to shunt access system for exiting

Free egress at all times by depressing touchbar of exit.

SET #2A - Entrance HM CR

1	Continuous Hinge	661HD EPT Prep	628	ST
1	Power Transfer	PT1000	628	AB
1	Power Supply	ELR151		PR
1	Exit Device	ELR TS 2103 CD x 1703A	630	PR
1	Rim Cylinder	1E-72 PATD	626	BE
1	Mortise Cylinder	1E-74 PATD	626	BE
1	Card Reader	By Security Contractor		BY
1	Door Closer	CLD-4550 CS	689	ST
1	Door Position Switch (10)	MC-4M	628	SD
1	Threshold	171A		PE
1	Weatherstrip	303AV Head & Jambs		PE
1	Door Bottom	315 CN		PE

NOTE: Card Reader by Security

Power connections by electrical

Description of Operation:

Door secured by electric exit device

Card Reader retracts latch bolt of exit to allow entry, then re-locks
 Door position switch for monitor
 TS Switch to shunt access system for exiting
 Free egress at all times by depressing touchbar of exit.

SET #2B - Entrance HM

1	Continuous Hinge	661HD	628	ST
1	Exit Device	2103 CD x 1703A	630	PR
1	Rim Cylinder	1E-72 PATD	626	BE
1	Mortise Cylinder	1E-74 PATD	626	BE
1	Door Closer	CLD-4550 CS	689	ST
1	Door Position Switch (10)	MC-4M	628	SD
1	Threshold	171A		PE
1	Weatherstrip	303AV Head & Jambs		PE
1	Door Bottom	315 CN		PE

SET #3 - Mech

3	Hinges	FBB191 4 1/2 X 4 1/2 NRP	630	ST
1	Lockset	9K3-7D14D PATD S3	626	BE
1	Door Closer	CLD-4550 CS	689	ST
1	Threshold	171A		PE
1	Weatherstrip	303 AS x Head & Jambs		PE
1	Door Bottom	315 CN		PE

SET #100 - Corridor Glass

1	Mortise Cylinder	1E-74 PATD	626	BE
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NOTE: Verify mortise cylinder is type required. Remaining hardware by glass door manufacturer.

SET #101 - Office

4	Hinges	FBB179 4 1/2 X 4 1/2	652	ST
1	Lockset	9K3-7B14D PATD S3	626	BE
1	Wall Bumper	1270CV	626	TR
3	Door Silencers	1229A	GRE	TR

SET #102 - Restroom

4	Hinges	FBB168 4 1/2 X 4 1/2	652	ST
1	Push Plate	1001-3	630	TR
1	Pull Plate	1013-3	630	TR
1	Door Closer	CLD-4551 REG	689	ST
1	Kick Plate	KO050 10" x 2" LDW B4E C-Sunk	630	TR
1	Mop Plate	KM050 4" X 1" LDW B4E C-SUNK	630	TR
1	Wall Bumper	1270CV	626	TR
1	Smoke Seal	S88 D x Head & Jambs		PE

SET #103 - Toilet

4	Hinges	FBB179 4 1/2 X 4 1/2	652	ST
1	Privacy Set	9K3-0L14D S3	626	BE
1	Door Closer	CLD-4551 REG	689	ST
1	Kick Plate	KO050 10" x 2" LDW B4E C-Sunk	630	TR
1	Mop Plate	KM050 4" X 1" LDW B4E C-SUNK	630	TR
1	Wall Bumper	1270CV	626	TR
1	Smoke Seal	S88 D x Head & Jambs		PE

SET #104 - Janitor

4 Hinges	FBB179 4 1/2 X 4 1/2	652	ST
1 Lockset	9K3-7D14D PATD S3	626	BE
1 Door Closer	CLD-4550 CS	689	ST
1 Kick Plate	KO050 10" x 2" LDW B4E C-Sunk	630	TR
1 Mop Plate	KM050 4" X 1" LDW B4E C-SUNK	630	TR
1 Smoke Seal	S88 D x Head & Jambs		PE

SET #105 - Mech

4 Hinges	FBB179 4 1/2 X 4 1/2	652	ST
1 Lockset	9K3-7D14D PATD S3	626	BE
1 Door Closer	CLD-4550 CS	689	ST
1 Smoke Seal	S88 D x Head & Jambs		PE

SET #106 - Mech

4 Hinges	FBB179 4 1/2 X 4 1/2	652	ST
1 Lockset	9K3-7D14D PATD S3	626	BE
1 Door Closer	CLD-4550 EDA	689	ST
1 Wall Bumper	1270CV	626	TR
1 Smoke Seal	S88 D x Head & Jambs		PE

Opening List

<u>Opening</u>	<u>Hdw Set</u>
101	1
103	105
104	104
106	106
111	3
112	105
113	101
114	103
115	103
116	3
117	3
118	101
119	101
120	101
121	101
122	101
123	102
124	102
125	100
125A	100
126	2A
127	2
201	100
202	2B
203	106

SECTION 088000

GLAZING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes glazing for the following products and applications, including those specified in other Sections where glazing requirements are specified by reference to this Section:
1. Windows.
 2. Doors.
 3. Glazed curtain walls.
 4. Storefront framing.
 5. Glazed entrances.
 6. Interior borrowed lites.

1.2 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Design glass, including comprehensive engineering analysis according to ASTM E 1300 by a qualified professional engineer, using the following design criteria:
1. Design Wind Pressures: As indicated on Drawings.
 2. Vertical Glazing: For glass surfaces sloped 15 degrees or less from vertical, design glass to resist design wind pressure based on glass type factors for short-duration load.
 3. Thickness of Patterned Glass: Base design of patterned glass on thickness at thinnest part of the glass.
 4. Differential Shading: Design glass to resist thermal stresses induced by differential shading within individual glass lites.

1.3 PRECONSTRUCTION TESTING

- A. Preconstruction Adhesion and Compatibility Testing: Test each glazing material type, tape sealant, gasket, glazing accessory, and glass-framing member for adhesion to and compatibility with elastomeric glazing sealants.
1. Testing will not be required if data are submitted based on previous testing of current sealant products and glazing materials matching those submitted.

1.4 ACTION SUBMITTALS

- A. Product Data: For each glass product and glazing material indicated.
- B. Glass Samples: For each type of glass product other than clear monolithic vision glass; 12 inches (300 mm) square.
- C. Glazing Schedule: List glass types and thicknesses for each size opening and location. Use same designations indicated on Drawings.

- D. Delegated-Design Submittal: For glass indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.5 INFORMATIONAL SUBMITTALS

- A. Preconstruction adhesion and compatibility test report.

1.6 QUALITY ASSURANCE

- A. Safety Glazing Labeling: Where safety glazing labeling is indicated, permanently mark glazing with certification label of the SGCC or another certification agency acceptable to authorities having jurisdiction or the manufacturer. Label shall indicate manufacturer's name, type of glass, thickness, and safety glazing standard with which glass complies.
- B. Fire-Protection-Rated Glazing Labeling: Permanently mark fire-protection-rated glazing with certification label of a testing agency acceptable to authorities having jurisdiction. Label shall indicate manufacturer's name, test standard, whether glazing is for use in fire doors or other openings, whether or not glazing passes hose-stream test, whether or not glazing has a temperature rise rating of 450 deg F (250 deg C), and the fire-resistance rating in minutes.
- C. Insulating-Glass Certification Program: Permanently marked either on spacers or on at least one component lite of units with appropriate certification label of IGCC.

1.7 WARRANTY

- A. Manufacturer's Special Warranty for Coated-Glass Products: Manufacturer's standard form in which coated-glass manufacturer agrees to replace coated-glass units that deteriorate within specified warranty period. Deterioration of coated glass is defined as defects developed from normal use that are not attributed to glass breakage or to maintaining and cleaning coated glass contrary to manufacturer's written instructions. Defects include peeling, cracking, and other indications of deterioration in coating.
 - 1. Warranty Period: 10 years from date of Substantial Completion.
- B. Manufacturer's Special Warranty on Laminated Glass: Manufacturer's standard form in which laminated-glass manufacturer agrees to replace laminated-glass units that deteriorate within specified warranty period. Deterioration of laminated glass is defined as defects developed from normal use that are not attributed to glass breakage or to maintaining and cleaning laminated glass contrary to manufacturer's written instructions. Defects include edge separation, delamination materially obstructing vision through glass, and blemishes exceeding those allowed by referenced laminated-glass standard.
 - 1. Warranty Period: Five years from date of Substantial Completion.
- C. Manufacturer's Special Warranty on Insulating Glass: Manufacturer's standard form in which insulating-glass manufacturer agrees to replace insulating-glass units that deteriorate within specified warranty period. Deterioration of insulating glass is defined as failure of hermetic seal under normal use that is not attributed to glass breakage or to maintaining and cleaning insulating glass contrary to manufacturer's written instructions. Evidence of failure is the obstruction of vision by dust, moisture, or film on interior surfaces of glass.
 - 1. Warranty Period: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 GLASS PRODUCTS, GENERAL

- A. Thickness: Where glass thickness is indicated, it is a minimum. Provide glass lites in thicknesses as needed to comply with requirements indicated.
- B. Strength: Where float glass is indicated, provide annealed float glass, Kind HS heat-treated float glass, or Kind FT heat-treated float glass. Where heat-strengthened glass is indicated, provide Kind HS heat-treated float glass or Kind FT heat-treated float glass. Where fully tempered glass is indicated, provide Kind FT heat-treated float glass.
- C. Thermal and Optical Performance Properties: Provide glass with performance properties specified, as indicated in manufacturer's published test data, based on procedures indicated below:
 - 1. U-Factors: Center-of-glazing values, according to NFRC 100 and based on LBL's WINDOW 5.2 computer program, expressed as Btu/sq. ft. x h x deg F (W/sq. m x K).
 - 2. Solar Heat-Gain Coefficient and Visible Transmittance: Center-of-glazing values, according to NFRC 200 and based on LBL's WINDOW 5.2 computer program.
 - 3. Visible Reflectance: Center-of-glazing values, according to NFRC 300.

2.2 GLASS PRODUCTS

- A. Heat-Treated Float Glass: ASTM C 1048; Type I; Quality-Q3; Class I (clear) unless otherwise indicated; of kind and condition indicated.

2.3 INSULATING GLASS

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. PPG Industries.
 - 2. Viracon, Inc.
 - 3. AGC, Inc.
- B. Insulating-Glass Units: Factory-assembled units consisting of sealed lites of glass separated by a dehydrated interspace, qualified according to ASTM E 2190, and complying with other requirements specified.
 - 1. Sealing System: Dual seal.
 - 2. Spacer: Manufacturer's standard spacer material and construction.

2.4 GLAZING GASKETS

- A. Dense Compression Gaskets: Molded or extruded gaskets of profile and hardness required to maintain watertight seal, made from the following:
 - 1. Neoprene complying with ASTM C 864.

- B. Soft Compression Gaskets: Extruded or molded, closed-cell, integral-skinned neoprene gaskets complying with ASTM C 509, Type II, black; of profile and hardness required to maintain watertight seal.
 - 1. Application: Use where soft compression gaskets will be compressed by inserting dense compression gaskets on opposite side of glazing or pressure applied by means of pressure-glazing stops on opposite side of glazing.

2.5 GLAZING SEALANTS

- A. General:
 - 1. Compatibility: Provide glazing sealants that are compatible with one another and with other materials they will contact, including glass products, seals of insulating-glass units, and glazing channel substrates, under conditions of service and application, as demonstrated by sealant manufacturer based on testing and field experience.
 - 2. Suitability: Comply with sealant and glass manufacturers' written instructions for selecting glazing sealants suitable for applications indicated and for conditions existing at time of installation.
 - 3. Sealants used inside the weatherproofing system, shall have a VOC content of not more than 250 g/L when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
 - 4. Sealants used inside the weatherproofing system shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."
 - 5. Colors of Exposed Glazing Sealants: As selected by Architect from manufacturer's full range.
- B. Glazing Sealant: Neutral-curing silicone glazing sealant complying with ASTM C 920, Type S, Grade NS, Class 100/50, Use NT.
- C. Glazing Sealants for Fire-Rated Glazing Products: Products that are approved by testing agencies that listed and labeled fire-resistant glazing products with which they are used for applications and fire-protection ratings indicated.

2.6 GLAZING TAPES

- A. Back-Bedding Mastic Glazing Tapes: Preformed, butyl-based, 100 percent solids elastomeric tape; nonstaining and nonmigrating in contact with nonporous surfaces; with or without spacer rod as recommended in writing by tape and glass manufacturers for application indicated; and complying with ASTM C 1281 and AAMA 800 for products indicated below:
 - 1. AAMA 804.3 tape, where indicated.
 - 2. AAMA 806.3 tape, for glazing applications in which tape is subject to continuous pressure.
 - 3. AAMA 807.3 tape, for glazing applications in which tape is not subject to continuous pressure.

2.7 MISCELLANEOUS GLAZING MATERIALS

- A. Cleaners, Primers, and Sealers: Types recommended by sealant or gasket manufacturer.
- B. Setting Blocks: Elastomeric material with a Shore, Type A durometer hardness of 85, plus or minus 5.

- C. Spacers: Elastomeric blocks or continuous extrusions of hardness required by glass manufacturer to maintain glass lites in place for installation indicated.
- D. Edge Blocks: Elastomeric material of hardness needed to limit glass lateral movement (side walking).
- E. Cylindrical Glazing Sealant Backing: ASTM C 1330, Type O (open-cell material), of size and density to control glazing sealant depth and otherwise produce optimum glazing sealant performance.
- F. Perimeter Insulation for Fire-Resistive Glazing: Product that is approved by testing agency that listed and labeled fire-resistant glazing product with which it is used for application and fire-protection rating indicated.

2.8 MONOLITHIC-GLASS TYPES

- A. Glass Type 4: Clear heat-strengthened float glass.
 - 1. Thickness: 1/4".
 - 2. Provide safety glazing labeling.
- B. Glass Type 5: Clear fully tempered float glass.
 - 1. Thickness: 1/4".
 - 2. Provide safety glazing labeling.
- C. Glass Type 8: Clear fully tempered float glass.
 - 1. Thickness: 1/2".
 - 2. Provide safety glazing labeling.

2.9 INSULATING-GLASS TYPES

- A. Glass Type 1: Low-e-coated, clear insulating glass; similar to PPG Solarban 60.
 - 1. Overall Unit Thickness: 1 inch (25 mm).
 - 2. Thickness of Each Glass Lite: 1/4".
 - 3. Outdoor Lite: Heat-strengthened float glass.
 - 4. Interspace Content: Air.
 - 5. Indoor Lite: Heat-strengthened float glass.
 - 6. Low-E Coating: Pyrolytic on second surface.
 - 7. Visible Light Transmittance: 65 percent minimum.
 - 8. Winter Nighttime U-Factor: .29 maximum.
 - 9. Summer Daytime U-Factor: .27 maximum.
 - 10. Solar Heat Gain Coefficient: .40 maximum.
 - 11. Provide safety glazing labeling.
- B. Glass Type 2: Tempered Low-e-coated, clear insulating glass; similar to PPG Solarban 60.
 - 1. Overall Unit Thickness: 1 inch (25 mm).
 - 2. Thickness of Each Glass Lite: 1/4".
 - 3. Outdoor Lite: Fully tempered float glass.
 - 4. Interspace Content: Air.
 - 5. Indoor Lite: Fully tempered float glass.
 - 6. Low-E Coating: Pyrolytic on second surface.

7. Visible Light Transmittance: 65 percent minimum.
8. Winter Nighttime U-Factor: .29 maximum.
9. Summer Daytime U-Factor: .27 maximum.
10. Solar Heat Gain Coefficient: .40 maximum.
11. Provide safety glazing labeling.

PART 3 - EXECUTION

3.1 GLAZING, GENERAL

- A. Comply with combined written instructions of manufacturers of glass, sealants, gaskets, and other glazing materials, unless more stringent requirements are indicated, including those in referenced glazing publications.
- B. Adjust glazing channel dimensions as required by Project conditions during installation to provide necessary bite on glass, minimum edge and face clearances, and adequate sealant thicknesses, with reasonable tolerances.
- C. Protect glass edges from damage during handling and installation. Remove damaged glass from Project site and legally dispose of off Project site. Damaged glass is glass with edge damage or other imperfections that, when installed, could weaken glass and impair performance and appearance.
- D. Apply primers to joint surfaces where required for adhesion of sealants, as determined by preconstruction testing.
- E. Install setting blocks in sill rabbets, sized and located to comply with referenced glazing publications, unless otherwise required by glass manufacturer. Set blocks in thin course of compatible sealant suitable for heel bead.
- F. Do not exceed edge pressures stipulated by glass manufacturers for installing glass lites.
- G. Provide spacers for glass lites where length plus width is larger than 50 inches (1270 mm).
- H. Provide edge blocking where indicated or needed to prevent glass lites from moving sideways in glazing channel, as recommended in writing by glass manufacturer and according to requirements in referenced glazing publications.

3.2 TAPE GLAZING

- A. Position tapes on fixed stops so that, when compressed by glass, their exposed edges are flush with or protrude slightly above sightline of stops.
- B. Install tapes continuously, but not necessarily in one continuous length. Do not stretch tapes to make them fit opening.
- C. Cover vertical framing joints by applying tapes to heads and sills first and then to jambs. Cover horizontal framing joints by applying tapes to jambs and then to heads and sills.
- D. Place joints in tapes at corners of opening with adjoining lengths butted together, not lapped. Seal joints in tapes with compatible sealant approved by tape manufacturer.
- E. Apply heel bead of elastomeric sealant.

- F. Center glass lites in openings on setting blocks and press firmly against tape by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings.
- G. Apply cap bead of elastomeric sealant over exposed edge of tape.

3.3 GASKET GLAZING (DRY)

- A. Cut compression gaskets to lengths recommended by gasket manufacturer to fit openings exactly, with allowance for stretch during installation.
- B. Insert soft compression gasket between glass and frame or fixed stop so it is securely in place with joints miter cut and bonded together at corners.
- C. Installation with Drive-in Wedge Gaskets: Center glass lites in openings on setting blocks and press firmly against soft compression gasket by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings. Compress gaskets to produce a weathertight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended by gasket manufacturer.
- D. Installation with Pressure-Glazing Stops: Center glass lites in openings on setting blocks and press firmly against soft compression gasket. Install dense compression gaskets and pressure-glazing stops, applying pressure uniformly to compression gaskets. Compress gaskets to produce a weathertight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended by gasket manufacturer.
- E. Install gaskets so they protrude past face of glazing stops.

3.4 SEALANT GLAZING (WET)

- A. Install continuous spacers, or spacers combined with cylindrical sealant backing, between glass lites and glazing stops to maintain glass face clearances and to prevent sealant from extruding into glass channel and blocking weep systems until sealants cure. Secure spacers or spacers and backings in place and in position to control depth of installed sealant relative to edge clearance for optimum sealant performance.
- B. Force sealants into glazing channels to eliminate voids and to ensure complete wetting or bond of sealant to glass and channel surfaces.
- C. Tool exposed surfaces of sealants to provide a substantial wash away from glass.

3.5 CLEANING AND PROTECTION

- A. Protect exterior glass from damage immediately after installation by attaching crossed streamers to framing held away from glass. Do not apply markers to glass surface. Remove nonpermanent labels and clean surfaces.
- B. Protect glass from contact with contaminating substances resulting from construction operations. If, despite such protection, contaminating substances do come into contact with glass, remove substances immediately as recommended in writing by glass manufacturer.

- C. Examine glass surfaces adjacent to or below exterior concrete and other masonry surfaces at frequent intervals during construction, but not less than once a month, for buildup of dirt, scum, alkaline deposits, or stains; remove as recommended in writing by glass manufacturer.
- D. Remove and replace glass that is broken, chipped, cracked, or abraded or that is damaged from natural causes, accidents, and vandalism, during construction period.

END OF SECTION 088000

SECTION 092900

GYPSUM BOARD

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Interior gypsum board.
2. Exterior gypsum board for ceilings and soffits.
3. Tile backing panels.
4. Texture finishes.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Samples:

1. Textured Finishes: Manufacturer's standard size for each textured finish indicated and on same backing indicated for Work.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Fire-Resistance-Rated Assemblies: For fire-resistance-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E 119 by an independent testing agency.
- B. STC-Rated Assemblies: For STC-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E 90 and classified according to ASTM E 413 by an independent testing agency.
- C. Low Emitting Materials: For ceiling and wall assemblies, provide materials and construction identical to those tested in assembly and complying with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

2.2 INTERIOR GYPSUM BOARD

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. American Gypsum.
2. CertainTeed Corp.
3. Georgia-Pacific Gypsum LLC.
4. Temple-Inland.

5. USG Corporation.

B. Gypsum Board, Type X: ASTM C 1396/C 1396M.

1. Thickness: 5/8 inch (15.9 mm).

C. Gypsum Ceiling Board: ASTM C 1396/C 1396M.

1. Thickness: 1/2 inch (12.7 mm).

2. Long Edges: Tapered.

D. Moisture- and Mold-Resistant Gypsum Board: ASTM C 1396/C 1396M. With moisture- and mold-resistant core and paper surfaces.

1. Core: 5/8 inch (15.9 mm), Type X.

2. Long Edges: Tapered.

3. Mold Resistance: ASTM D 3273, score of 10 as rated according to ASTM D 3274.

2.3 SPECIALTY GYPSUM BOARD

A. Glass-Mat Interior Gypsum Board: ASTM C 1658/C 1658M. With fiberglass mat laminated to both sides. Specifically designed for interior use.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. Georgia-Pacific Gypsum LLC; DensArmour Plus.

2. Core: 5/8 inch (15.9 mm), Type X.

3. Long Edges: Tapered.

4. Mold Resistance: ASTM D 3273, score of 10 as rated according to ASTM D 3274.

2.4 EXTERIOR GYPSUM BOARD

A. Glass-Mat Gypsum Sheathing Board: ASTM C 1177/C 1177M, with fiberglass mat laminated to both sides and with manufacturer's standard edges.

1. Products: Subject to compliance with requirements, provide one of the following:

a. CertainTeed Corp.; GlasRoc Sheathing.

b. Georgia-Pacific Gypsum LLC; Dens-Glass Gold.

c. National Gypsum Company; Gold Bond, e(2)XP.

d. USG Corporation; Secureck Glass Mat Sheathing.

2. Core: 5/8 inch (15.9 mm), Type X.

2.5 TILE BACKING PANELS

A. Glass-Mat, Water-Resistant Backing Board: ASTM C 1178/C 1178M, with manufacturer's standard edges.

1. Products: Subject to compliance with requirements, provide one of the following:

- a. CertainTeed Corp.; GlasRoc Tile Backer.
- b. Georgia-Pacific Gypsum LLC; DensShield Tile Backer.

2. Core: 5/8 inch (15.9 mm), Type X.

3. Mold Resistance: ASTM D 3273, score of 10 as rated according to ASTM D 3274.

B. Cementitious Backer Units: ANSI A118.9 and ASTM C 1288 or 1325, with manufacturer's standard edges.

1. Products: Subject to compliance with requirements, provide one of the following:

- a. CertainTeed Corp.; FiberCement BackerBoard.
- b. James Hardie Building Products, Inc.; Hardiebacker.
- c. USG Corporation; DUROCK Cement Board.

2. Thickness: 5/8 inch (15.9 mm).

3. Mold Resistance: ASTM D 3273, score of 10 as rated according to ASTM D 3274.

2.6 TRIM ACCESSORIES

A. Interior Trim: ASTM C 1047.

1. Material: Galvanized or aluminum-coated steel sheet, rolled zinc, plastic, or paper-faced galvanized steel sheet.

B. Exterior Trim: ASTM C 1047.

1. Material: Hot-dip galvanized steel sheet, plastic, or rolled zinc.

C. Aluminum Trim: ASTM B 221 (ASTM B 221M), Alloy 6063-T5.

2.7 JOINT TREATMENT MATERIALS

A. General: Comply with ASTM C 475/C 475M.

B. Joint Tape:

1. Interior Gypsum Board: Paper.
2. Exterior Gypsum Soffit Board: Paper.
3. Glass-Mat Gypsum Sheathing Board: 10-by-10 glass mesh.
4. Tile Backing Panels: As recommended by panel manufacturer.

C. Joint Compound for Interior Gypsum Board: For each coat use formulation that is compatible with other compounds applied on previous or for successive coats.

2.8 AUXILIARY MATERIALS

A. Laminating Adhesive: Adhesive or joint compound recommended for directly adhering gypsum panels to continuous substrate.

1. Laminating adhesive shall have a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
 2. Laminating adhesive shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."
- B. Steel Drill Screws: ASTM C 1002, unless otherwise indicated.
- C. Sound Attenuation Blankets: ASTM C 665, Type I (blankets without membrane facing).
1. Recycled Content of Blankets: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 20% percent.
- D. Acoustical Joint Sealant: ASTM C 834. Product effectively reduces airborne sound transmission through perimeter joints and openings as demonstrated by testing according to ASTM E 90.
1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Accumetric LLC; BOSS 824 Acoustical Sound Sealant.
 - b. Grabber Construction Products; Acoustical Sealant GSC.
 - c. Specified Technologies, Inc.; Smoke N Sound Acoustical Sealant.
 - d. USG Corporation; SHEETROCK Acoustical Sealant.
 2. Acoustical joint sealant shall have a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
 3. Acoustical joint sealant shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."
- E. Thermal Insulation: As specified in Section 072100 "Thermal Insulation."
- F. Vapor Retarder: As specified in Section 072100 "Thermal Insulation."

PART 3 - EXECUTION

3.1 APPLYING AND FINISHING PANELS

- A. Comply with ASTM C 840.
- B. Examine panels before installation. Reject panels that are wet, moisture damaged, and mold damaged.
- C. Isolate perimeter of gypsum board applied to non-load-bearing partitions at structural abutments, except floors. Provide 1/4- to 1/2-inch- (6.4- to 12.7-mm-) wide spaces at these locations and trim edges with edge trim where edges of panels are exposed. Seal joints between edges and abutting structural surfaces with acoustical sealant.
- D. Install trim with back flanges intended for fasteners, attach to framing with same fasteners used for panels. Otherwise, attach trim according to manufacturer's written instructions.
 1. Control Joints: Install control joints according to ASTM C 840 and in specific locations approved by Architect for visual effect.

- E. Prefill open joints and damaged surface areas.
- F. Apply joint tape over gypsum board joints, except for trim products specifically indicated as not intended to receive tape.
- G. Gypsum Board Finish Levels: Finish panels to levels indicated below and according to ASTM C 840:
 - 1. Level 1: Ceiling plenum areas, concealed areas, and where indicated.
 - 2. Level 2: Panels that are substrate for tile.
 - 3. Level 3: Where indicated on Drawings.
 - 4. Level 4: At panel surfaces that will be exposed to view unless otherwise indicated.
 - a. Primer and its application to surfaces are specified in Section 099100 "Painting."
 - 5. Level 5: Where indicated on Drawings.
 - a. Primer and its application to surfaces are specified in Section 099100 "Painting."
- H. Texture Finish Application: Prepare and apply primer to gypsum panels and other surfaces receiving texture finishes. Mix and apply finish using powered spray equipment, to produce a uniform texture free of starved spots or other evidence of thin application or of application patterns.
- I. Protect adjacent surfaces from drywall compound and texture finishes and promptly remove from floors and other non-drywall surfaces. Repair surfaces stained, marred, or otherwise damaged during drywall application.
- J. Remove and replace panels that are wet, moisture damaged, and mold damaged.

END OF SECTION 092900

SECTION 092923DRYWALL METAL SUSPENSION SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Suspension System Framing and Furring for Plaster and Gypsum Board Assemblies.
 - 2. Wire hangers, fasteners, main runners, cross tees, and wall angle moldings.

- B. Related Sections:
 - 1. Section 09250 - Gypsum Board
 - 2. Section 09150 - Acoustical Ceilings
 - 3. Division 15 Sections - Mechanical Work
 - 4. Division 16 Sections - Electrical Work

1.2 REFERENCES

- A. American Society for Testing and Materials (ASTM):
 - 1. ASTM A 641 Standard Specification for Zinc-Coated (Galvanized) Carbon Steel Wire.
 - 2. ASTM A 653 Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process.
 - 3. ASTM A 1008 Standard Specification for Steel, Sheet, Cold Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability"
 - 4. ASTM D 610 Standard Test Method for Evaluating Degree of Rusting on Painted Steel Surfaces
 - 5. ASTM B 117 Standard Practice for Operating Salt Spray (Fog) Apparatus
 - 6. ASTM C 635 Standard Specification for Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings.
 - 7. ASTM C 636 Recommended Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels.
 - 8. ASTM C 645 Standard Specification for Nonstructural Steel Framing Members
 - 9. ASTM C 754 Installation of Steel Framing Members to Receive Screw-Attached Gypsum Board
 - 10. ASTM C1002 Standard Specification for Steel Drill Screws for the Application of Gypsum Board or Metal Plaster Bases.
 - 11. ASTM E 119 Standard Test Method for Fire Tests of Building Construction and Material (if applicable).
 - 12. NOA #07-0119.02 Miami/Dade Wind Uplift.
 - 13. NAO #09-0512.02 Miami/Dade Impact.
 - 14. ESR-1289 ICC-ES Evaluation Report.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.

- B. Samples: 8 inch long samples of suspension system components, including main runner, cross tees and angle molding.

- C. Certifications: Manufacturer's certifications that products comply with specified requirements, including laboratory reports showing compliance with specified tests and standards.

1.4 QUALITY ASSURANCE

- A. Single-Source Responsibility: To ensure proper interface, all drywall furring components shall be produced or supplied by a single manufacturer.
- B. All accessory components from other manufacturers shall conform to ASTM standards.
- C. Fire Resistance Ratings: As indicated by reference to design designations in UL Fire Resistance Directory, for types of assemblies in which drywall ceilings function as a fire protective membrane and tested per ASTM E 119. Installation in accordance with the UL Design being referenced.
- D. Coordination of Work:
 - 1. Coordinate drywall furring work with installers of related work including, but not limited to acoustical ceilings, building insulation, gypsum board, light fixtures, mechanical systems, electrical systems, and sprinklers.
 - 2. All work above the ceiling line should be completed prior to installing the drywall sheet goods. There should be no materials resting against or wrapped around the suspension system, hanger wires or ties.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials to project site in original, unopened packages and store them in a fully enclosed space where they will be protected against damage from moisture, direct sunlight, surface contamination, and other causes.

1.6 WARRANTY

- A. Suspensions System: Submit a written limited warranty executed by the manufacturer, agreeing to repair or replace grid components that are supplied with a hot-dipped galvanized coating or aluminum base material. Failures include, but are not limited to:
The occurrence of 50% red rust as defined by ASTM D 610 test procedures as a result of defects in materials or factory workmanship.
- B. Warranty Period:
Grid: Ten years from date of installation.
- C. The Warranty shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and will be in addition to and run concurrent with other warranties made by the Contractor under the requirements of the Contract Documents.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Suspension Systems by Armstrong World Industries

2.2 SUSPENSION SYSTEMS

A. Components

1. Main Beam: Shall be double-web construction (minimum 0.0179 inch prior to protective coating, ASTM C645), hot dipped galvanized (per ASTM A653).
2. Primary Cross Tees: Shall be double-web steel construction (minimum 0.0179 inch prior to protective coating, ASTM C645), hot dipped galvanized (minimum G40 or G90 per ASTM A653)
3. QuikStix Soffits DGS: Shall be double web steel construction (minimum 0.0179 inch prior to protective coating, ASTM C645), Tees designed for creating soffits; 1-1/2 inch web height. 1-1/2 inch flange, flattened bulb, bending crimp, knockouts and alignment holes to facilitate creating 15, 30, 45, 60 and 90 degree angles; available with G40 or G90 hot dipped galvanization.
4. Wall Moldings: As required
5. Transition Molding: Drywall to Acoustical ceiling.
 - a. Axiom Aluminum extrusion Pre-Painted Armstrong Global White integral acoustical flange and drywall taping flange.
6. Clips: As required
7. Screws for wallboard application shall be bugle head screws in accordance with thickness of material used.
8. Metal Trim or Plastic Members (by others):
 - a. Corner bead: Minimum #26 gauge, zinc alloy or plastic square edge type with expanded flanges.
 - b. Casing bead: Minimum #24 gauge, zinc alloy or plastic square edge type with expanded flanges.
 - c. Control Joints: Minimum #26 gauge, roll-formed zinc alloy, extruded aluminum or plastic with expanded flanges.
 - d. Special Trim Shapes: As detailed on plans, extruded aluminum with acrylic coating by Fry Reglet or approved equal.
 - e. Metal Lath: 3.4 lbs/square yard, galvanized 3/8 inch diamond mesh or flat rib lath; security lath for applications requiring high degree of security.

B. Structural Classification:

1. Main Beam shall be heavy duty per ASTM C 635.
2. Classification can require wires to be closer together for additional loading when used to support double layer gypsum, verticals, slopes, domes, half barrels, circles, soffits, canopies, and step conditions which call for loading or unusual designs and shapes in drywall construction. Using cross tees in the construction of circles, barrels, etc. is common in order to hold the radius.
3. Deflection of fastening suspension system supporting light fixtures, ceiling grilles, access doors, verticals and horizontal loads shall have a maximum deflection of 1/360 of the span.

PART 3 - EXECUTION

3.1 INSTALLATION - GENERAL

- A. Install suspension system and panels in accordance with the manufacturer's instructions, in compliance with ASTM installation standard, and with applicable codes as required by the authorities having jurisdiction.
- B. The Armstrong Drywall Grid System can be installed in interior or exterior applications.
- C. To secure to metal clips, concrete inserts, steel bar joist or steel deck, use power actuated fastener, or insert. Coordinate placement for hanger wire spaced as required for expected ceiling loads and layout.
- D. Install hanger wire as required with necessary on center spacing to support expected ceiling load requirements, following local practices, codes and regulations. Provide additional wires at light fixtures, grilles, and access doors where necessary. A pigtail knot shall be used with three tight wraps at top and bottom fastening locations.
- E. Add additional wire as needed when using compatible clips and accessories.
- F. Control Joints: Roll formed zinc alloy, aluminum, or plastic as required for expansion and contraction as shown on drawings.
- G. Expansion Joints: Roll formed zinc alloy, aluminum, or plastic as required for expansion and contraction as shown on drawings.
- H. Main beams shall be suspended from the overhead construction with hanger wire, spaced as required for expected ceiling loads, along the length of the main beams.
- I. Install cross tees at on center spacing as specified by the drywall manufacturer. Typical drywall cross tee spacing:
 - 1. 16 inches on center with 5/8 or 1/2 inch gypsum board
 - 2. 24 inches on center with 5/8 inch gypsum board
- J. Other items such as wood, sheet metal, or plastic panels should be screwed to comply with deflection limit equivalent to that of the ceiling installation.
- K. Use channel molding or angle molding to interface with Drywall Grid System to provide perimeter attachment or to obtain drop soffits, verticals, slopes, etc.
- L. To suspend a second ceiling beneath a new or existing drywall ceiling, without breaching the integrity of the upper ceiling, use the Drywall Clip. To form a transition from a drywall ceiling to an acoustical ceiling, use the Drywall Transition Clips spaced as required for expected loads.
- M. For light fixtures, use secondary framing cross tees as required to frame opening.
- N. Single cross tees in a route hole to be secured by 7/16 inch framing screw or alternative methods.

3.2 INSTALLATION - EXTERIOR APPLICATIONS

- A. Use G90 components for exterior applications.

- B. Use vertical bracing as required by codes and standards in accordance with local jurisdiction (non-fire rated installations).
- C. Install main beams as required according to Wind Uplift Design or local codes and standards.
- D. Install cross tees as required according to Wind Uplift Design or local codes and standards, with additional tees when point loading (vertical), and with additional hanger at midspan of cross tee, as needed.

3.3 INSTALLATION - INTERIOR APPLICATIONS

- A. Install main beams and cross tees at the on center spacing required for ceiling loading, and location of in-ceiling services.
- B. Additional bracing as required by code.

END OF SECTION 092923

SECTION 093000

TILING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Ceramic tile.
 - 2. Porcelain tile
 - 3. Quarry Tile
 - 4. Metal edge strips.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Samples:
 - 1. Each type and composition of tile and for each color and finish required.
 - 2. Assembled samples, with grouted joints, for each type and composition of tile and for each color and finish required.

1.3 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials that match and are from same production runs as products installed and that are packaged with protective covering and identified with labels describing contents.
 - 1. Tile and Trim Units: Furnish quantity of full-size units equal to 3 percent of amount installed for each type, composition, color, pattern, and size indicated.

1.4 QUALITY ASSURANCE

- A. Mockups: Build mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
 - 1. Build mockup of floor tile installation.
 - 2. Build mockup of wall tile installation.
 - 3. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

PART 2 - PRODUCTS

2.1 TILE PRODUCTS

- A. ANSI Ceramic Tile Standard: Provide Standard grade tile that complies with ANSI A137.1 for types, compositions, and other characteristics indicated.

- B. Floor Score Compliance: Tile for floors shall comply with requirements of FloorScore Standard.
- C. Floor and Wall Ceramic Tile
1. Floor Tile (Restrooms): shall be Dal-Tile Keystones unglazed porcelain ceramic mosaics, size 2" x 2" nominal, 1/4" thick, cushioned edge. Provide "Dal-Mount" factory-mounted patterns from pattern catalog book of special patterns and murals in 12" x 24" standard sheets for field tile and custom border patterns in multiple colors. Refer to drawings for patterns and price groupings. If patterns and price groups are not indicated, allow:
 - a. 50% to be selected from Price Group 1 & 2
 - b. 30% to be selected from Price Group 3
 - c. 20% to be selected from Price Group 4
 2. Wall Tile: shall be Marazzi System C glazed wall tile semi-gloss and/or matte series, size 4" x 12". Allow for multiple wall tile colors and multiple patterns. Refer to drawings for patterns and price groupings. Provide bullnose trim. If patterns and price groups are not indicated, allow:
 - a. 50% to be selected from Price Group 1 (From other acceptable manufacturer)
 - b. 50% to be selected from Price Group 2(From other acceptable manufacturer)
 3. Acceptable Manufacturers:
 - a. Dal-Tile
 - b. American Olean Company
 4. Porcelain Tile Base: 2" x 2" mounted, built-up cove square top base with two rows of 2" x 2" and one row of C-833 cove floor tile above (Dal-Tile System MB-5A-5A). Architect to select color from Price Group 2-4.
 5. Trim: Supply all trim as required including inside and outside corners and finished ends; tile trim shall match surrounding tile, color, etc.
 6. Please provide for a 10-week lead time from date of order.
- D. Quarry Tile
1. Floor tile shall be shall be Dal-Tile Tile, size 6" x 6" Quarry Textures. Allow for multiple wall tile colors and multiple patterns. Provide all floor base, cove base, and trim and transition floor reduces as needed. Refer to drawings for patterns and price groupings
 2. Acceptable Manufacturers:
 - a. Dal-Tile
 - b. American Olean Company
 3. Trim: Supply all trim as required including inside and outside corners and finished ends; tile trim shall match surrounding tile, color, etc.
 4. Please provide for a 10-week lead time from date of order.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions where tile will be installed, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of installed tile.
 - 1. Verify that substrates for setting tile are firm, dry, clean, free of coatings that are incompatible with tile-setting materials including curing compounds and other substances that contain soap, wax, oil, or silicone; and comply with flatness tolerances required by ANSI A108.01 for installations indicated.
- B. Report all unacceptable surfaces to the architect and do not tile surfaces until they are leveled enough to meet above requirements.

3.2 PREPARATION

- A. Fill cracks, holes, and depressions in concrete substrates for tile floors installed with adhesives thin-set mortar with trowel able leveling and patching compound specifically recommended by tile-setting material manufacturer.
- B. Where indicated, prepare substrates to receive waterproofing by applying a reinforced mortar bed that complies with ANSI A108.1A and is sloped 1/4 inch per foot (1:50) toward drains.
- C. Blending: For tile exhibiting color variations, use factory blended tile or blend tiles at Project site before installing.

3.3 INSTALLATION

- A. Comply with TCA's "Handbook for Ceramic Tile Installation" for TCA installation methods specified in tile installation schedules. Comply with parts of the ANSI A108 Series "Specifications for Installation of Ceramic Tile" that are referenced in TCA installation methods, specified in tile installation schedules, and apply to types of setting and grouting materials used.
- B. Acceptability of Surfaces: Surfaces to receive tile and thin-setting bed material to be brought up to level by this contractor and shall be straight, level, and true. This backing surface shall provide a mechanical bond. Surfaces shall be clean, free from oil, coatings, dust, etc.
 - 1. Priming of backing surfaces, where required as recommended by the thin-set manufacturer, to be done with L & M Polycrete Seal and Bond Coat or approved alternate, by this contractor.
 - 2. Report all unacceptable surfaces to the architect and do not tile such surfaces until they are leveled enough to meet above requirements.
- C. Extend tile work into recesses and under or behind equipment and fixtures to form complete covering without interruptions unless otherwise indicated. Terminate work neatly at obstructions, edges, and corners without disrupting pattern or joint alignments.
- D. Accurately form intersections and returns. Perform cutting and drilling of tile without marring visible surfaces. Carefully grind cut edges of tile abutting trim, finish, or built-in items for straight aligned

joints. Fit tile closely to electrical outlets, piping, fixtures, and other penetrations so plates, collars, or covers overlap tile.

- E. Provide manufacturer's standard trim shapes where necessary to eliminate exposed tile edges.
- F. Jointing Pattern:
 - 1. Lay out all tile work so as to minimize cuts less than one-half in size.
 - 2. Locate cuts in both walls and floors so as to be least conspicuous.
 - 3. Lay out any tile wainscots to next full tile beyond dimensions shown.
 - 4. Align all wall joints to give straight uniform grout lines, parallel with walls.
 - 5. Align all floor joints to give straight, uniform grout lines, parallel with walls.
 - 6. Make joints between tile sheets same width as joints within sheets so extent of each sheet is not apparent in finished work.
 - 7. Install small area of floor, base, and wall tile for architect's approval prior to proceeding.
 - 8. Verify location, alignment, etc. of floor and wall tile joints with Architect prior to start of work. Where same size tile is used on both floor and walls, align wall joints to floor joints.
- G. Lay out tile wainscots to dimensions indicated or to next full tile beyond dimensions indicated.
- H. Install small area of floor, base, and wall tile for architect's approval prior to proceeding.
- I. Verify location, alignment, etc., of floor and wall tile joints with Architect prior to the start of work. Where same size tile is used for both floor and walls, align wall joints to floor joints.
- J. Expansion Joints: Provide expansion joints and other sealant-filled joints, including control, contraction, and isolation joints, where indicated. Form joints during installation of setting materials, mortar beds, and tile. Do not saw-cut joints after installing tiles.
 - 1. Where joints occur in concrete substrates, locate joints in tile surfaces directly above them.
 - 2. Prepare joints and apply sealants to comply with requirements in Section 079200 "Joint Sealants."
- K. Workmanship:
 - 1. Supply first-class workmanship in all tile work.
 - 2. Use all products in strict accordance with recommendations and directions of manufacturers.
 - 3. Proportion all mixes in accordance with latest ANSI Standard Specifications.
 - 4. Smooth all exposed edges.
 - 5. Be sure cut edges are clean before installing tiles.
 - 6. Fit tile carefully against trim and accessories, also around pipes, electric boxes and other built-in fixtures so that escutcheons, plates, and collars will completely overlap cut edges.
 - 7. When using tile sheets, minimize tearing sheets apart by drilling pipe holes as much as possible.
 - 8. Be sure all tile work is clean of grout film upon completion.
- L. Grout Sealer: Apply grout sealer to grout joints according to grout-sealer manufacturer's written instructions. As soon as grout sealer has penetrated grout joints, remove excess sealer and sealer from tile faces by wiping with soft cloth.
- M. Install cementitious backer units and/or fiber-cement underlayment and treat joints according to ANSI A108.11 and manufacturer's written instructions for type of application indicated.
- N. Setting Methods: Contractor to set tile in accordance with the Latest Edition TCA Installation Detail Manual.
 - 1. On Concrete Sub-Floor
 - a. Reference TCA Detail for thick set latex grout.

- b. Reference TCA Detail for thin set latex grout.
- c. Reference TCA Detail for thick set epoxy grout
- d. Reference TCA Detail for thin set epoxy grout
2. On Concrete Block: Reference TCA Detail W202-02.
3. On Metal Stud Partitions: Reference TCA Detail W245-02.

O. Cleaning:

1. Clean tile surfaces on completion of grouting.
2. Remove all grout haze observing tile manufacturer's recommendations as to use of acid and chemical cleaners.
3. Rinse tile work thoroughly with clean water before and after using chemical cleaners.
4. Polish surface of tile work with soft cloth.
5. Clean tile surfaces on completion of grouting. Remove all grout haze observing tile manufacturer's recommendations as to use of acid and chemical cleaners. Rinse tile work thoroughly with clean water before and after using chemical cleaners. Polish surface of tile work with soft cloth.

- P. Curing Floor: Immediately after grouting and cleaning, cure all tile floors by applying polyethylene (.002" maximum thickness) sheet over all floor areas. Lap sheets 4" and seal laps and all edges against escape of moisture. Leave in place for at least three (3) days.

3.4 PROTECTION

- A. At the completion of all work, thoroughly clean all tile of foreign matter and cement film, leaving color of the tile clean and distinct. Insure proper protection of all work. Repair or replace to "as new" condition any work damaged for any cause.

END OF SECTION 093000

SECTION 095123

ACOUSTICAL TILE CEILINGS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes acoustical tiles and concealed suspension systems for ceilings.

1.2 PREINSTALLATION MEETINGS

- A. Pre-installation Conference: Conduct conference at Project site.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Samples: For each exposed product and for each color and texture specified.

1.4 INFORMATIONAL SUBMITTALS

- A. Product test reports.
- B. Evaluation reports.
- C. Field quality-control reports.

1.5 CLOSEOUT SUBMITTALS

- A. Maintenance data.

1.6 QUALITY ASSURANCE

- A. Testing Agency Qualifications: Qualified according to NVLAP.
- B. Mockups: Build mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
 - 1. Build mockup of typical ceiling area as shown on Drawings.
 - 2. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.7 WARRANTY

- A. Acoustical Panel: Submit a written warranty executed by the manufacturer, agreeing to repair or replace acoustical panels that fail within the warranty period. Failures include, but are not limited to:

1. Acoustical Panels: Sagging and warping as a result of defects in materials or factory workmanship.
2. Grid System: Rusting and manufacturer's defects
3. Acoustical Panels with BioBlock Plus or designated as inherently resistive to the growth of micro-organisms installed with Armstrong suspension systems: Visible sag and will resist the growth of mold/mildew and gram positive and gram negative odor and stain causing bacteria.

- B. The Warranty shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and will be in addition to and run concurrent with other warranties made by the Contractor under the requirements of the Contract Documents.

1.8 MAINTENANCE

- A. Extra Materials: Deliver extra materials to Owner. Furnish extra materials described below that match products installed. Packaged with protective covering for storage and identified with appropriate labels.
1. Acoustical Ceiling Units: Furnish quality of full-size units equal to 5.0 percent of amount installed.
 2. Exposed Suspension System Components: Furnish quantity of each exposed suspension component equal to 2.0 percent of amount installed.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Surface-Burning Characteristics: Comply with ASTM E 84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
1. Flame-Spread Index: Comply with ASTM E 1264 for Class A materials.
 2. Smoke-Developed Index: 50 or less.

2.2 ACOUSTICAL TILE CEILINGS, GENERAL

- A. Acoustical Tile Standard: Comply with ASTM E 1264.
- B. Metal Suspension System Standard: Comply with ASTM C 635.
- C. Attachment Devices: Size for five times the design load indicated in ASTM C 635, Table 1, "Direct Hung," unless otherwise indicated. Comply with seismic design requirements.

2.3 ACOUSTICAL TILES SAP-1

- A. Manufacturers: Subject to compliance with requirements, provide products by the following:
1. Armstrong World Industries, Inc.
- B. Classification: Cortega 704
- C. Color: White.
- D. LR: .82 - .88.

- E. NRC: .50- .85, Type E-400 mounting according to ASTM E 795.
- F. Edge/Joint Detail: Square Tegular.
- G. Thickness: 1 inch.
- H. Modular Size: 24 by 24 inches.

2.4 ACOUSTICAL TILES SAP-2

- A. Manufacturers: Subject to compliance with requirements, provide products by the following:
 - 1. Armstrong World Industries, Inc.
- B. Classification: Ceramaguard 607
- C. Color: White.
- D. LR: .82 - .88.
- E. NRC: .50- .85, Type E-400 mounting according to ASTM E 795.
- F. Edge/Joint Detail: Square Tegular.
- G. Thickness: 1 inch.
- H. Modular Size: 24 by 96 inches.

2.5 METAL GRID SUSPENSION SYSTEM

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Armstrong World Industries, Inc.
 - 2. USG Interiors, Inc.; Subsidiary of USG Corporation.
- B. Classification: Prelude 15/16" exposed tee grid.
- C. Roll-Formed, Sheet-Metal Edge Moldings and Trim: Manufacturer's standard moldings for edges and penetrations complying with seismic design requirements; formed from sheet metal of same material, finish, and color as that used for exposed flanges of suspension-system runners.
- D. Edge Trim: Axiom Classic Trim (4" High) as required on floating ceiling edges.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Do not proceed with installation until all wet work such as concrete, terrazzo, plastering and painting has been completed and thoroughly dried out, unless expressly permitted by manufacturer's printed recommendations.

3.2 PREPARATION

- A. Measure each ceiling area and establish layout of acoustical units to balance border widths at opposite edges of each ceiling. Avoid use of less than half width units at borders, and comply with reflected ceiling plans. Coordinate panel layout with mechanical and electrical fixtures.
- B. Coordination: Furnish layouts for preset inserts, clips, and other ceiling anchors whose installation is specified in other sections.
 - 1. Furnish concrete inserts and similar devices to other trades for installation well in advance of time needed for coordination of other work.

3.3 INSTALLATION

- A. Install acoustical tile ceilings to comply with ASTM C 636/C 636M and seismic design requirements indicated, according to manufacturer's written instructions and CISCA's "Ceiling Systems Handbook."
- B. Measure each ceiling area and establish layout of acoustical tiles to balance border widths at opposite edges of each ceiling. Avoid using less-than-half-width tiles at borders, and comply with layout shown on reflected ceiling plans.
- C. Arrange directionally patterned acoustical tiles as indicated on reflected ceiling plans.
- D. Suspend main beam from overhead construction with hanger wires spaced 4'-0" on center along the length of the main runner. Install hanger wires plumb and straight.
- E. Install wall moldings at intersection of suspended ceiling and vertical surfaces. Miter corners where wall moldings intersect or install corner caps.
- F. For reveal edge panels: Cut and reveal or rabbet edges of ceiling panels at border areas and vertical surfaces.
- G. Install acoustical panels in coordination with suspended system, with edges resting on flanges of main runner and cross tees. Cut and fit panels neatly against abutting surfaces. Support edges by wall moldings.

3.4 ADJUSTING AND CLEANING

- A. Replace damaged and broken panels.
- B. Clean exposed surfaces of acoustical ceilings, including trim, edge moldings, and suspension members. Comply with manufacturer's instructions for cleaning and touch up of minor finish damage.
 - 1. Ceiling Touch-Up Paint, (Item #5760, 8oz. bottles) (Item #5761, quart size cans), "global white" latex paint should be used to hide minor scratches and nicks in the surface and to cover field regularized edges that are exposed to view.
- C. Remove and replace work that cannot be successfully cleaned and repaired to permanently eliminate evidence of damage.

END OF SECTION 095123

SECTION 096513RESILIENT BASE AND ACCESSORIES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Resilient base.

1.2 SCOPE

- A. Furnish and install resilient floor coverings and vinyl bases as shown, scheduled, and specified.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated. For purpose of this specification, materials manufactured by Azrock, Burke, and Roppe Flooring Products are used as references.
- B. Submit product data and samples under provisions of Specification Section 01340
- C. Samples: Submit two 12-inch long samples of base material for each color available.

1.4 QUALITY ASSURANCE

- A. Fire-Test-Response Characteristics: As determined by testing identical products according to ASTM E 648 or NFPA 253 by a qualified testing agency.
 1. Critical Radiant Flux Classification: Class I, not less than 0.45 W/sq. cm.

1.5 PROJECT CONDITIONS

- A. Maintain ambient temperatures within range recommended by manufacturer in spaces to receive resilient products.
- B. Materials shall be delivered to the job site in original containers and clearly labeled. Adhesives shall be in full sealed containers.
- C. Store materials for three days prior to installation in area of installation to achieve temperature stability.
- D. Until Substantial Completion, maintain ambient temperatures within range recommended by manufacturer.
- E. Install resilient products after other finishing operations, including painting, have been completed.

1.6 CLEAN UP

- A. After resilient flooring materials have sufficiently sealed, clean floors in accordance with tile manufacturer's recommendations.

1.7 PROTECTION

- A. General contractor shall protect resilient flooring work in this section until acceptance by owner.

1.8 REPLACEMENT MATERIALS

- A. At completion of job, deliver to the owner two percent (2%) of each floor tile color and pattern used in job for owner's future use; tile shall be full size and undamaged. (For example, if one floor tile color/pattern is used in a 10,000 square foot area, then provide 200 SF (200 pieces) of the tile for owner's future use.) Provide 50 lineal feet (full length base, not cut pieces) of each base material).

1.9 REFERENCES:

- A. ASTM-E84 - Surface Burning Characteristics of Building Materials.
- B. FS-SS-T-312 - Tile, Floor: Vinyl Composition.
- C. FS-SS-W-40 - Wall Base: Rubber.

1.10 REGULATORY REQUIREMENTS

- A. Conform to applicable UBC and NFPA code for flame/fuel/smoke rating.

1.11 OPERATION AND MAINTENANCE DATA

- A. Submit cleaning and maintenance data.
- B. Include maintenance procedures, recommended maintenance materials, and suggested schedule for cleaning, stripping, and re-waxing.

1.12 GUARANTEE

- A. Contractor shall furnish written guarantee that all work required by this section shall be free from defects in materials and workmanship for a period of one year from date of acceptance of installation.

PART 2 - PRODUCTS

2.1 RESILIENT BASE (RB)

- A. Resilient Base:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

- a. Allstate Rubber CorpArmstrong World Industries, Inc.
- b. Johnsonite.
- c. Roppe Corporation, USA.

B. Resilient Base Standard: ASTM F 1861.

1. Material Requirement: Type TS (rubber, vulcanized thermoset) or Type TP (rubber, thermoplastic).
2. Manufacturing Method: Group I (solid, homogeneous).
3. Style: Cove (base with toe).

C. Minimum Thickness: 0.125 inch (3.2 mm).

D. Height: As indicated on Drawings.

E. Lengths: Coils in manufacturer's standard length.

F. Outside Corners: Job formed or preformed.

G. Inside Corners: Job formed or preformed.

H. Finish: As selected by Architect from manufacturer's full range.

I. Colors and Patterns: As selected by Architect from full range of industry colors.

2.2 INSTALLATION MATERIALS

A. Trowelable Leveling and Patching Compounds: Latex-modified, portland cement based or blended hydraulic-cement-based formulation provided or approved by manufacturer for applications indicated.

B. Adhesives: Water-resistant type recommended by manufacturer to suit resilient products and substrate conditions indicated.

C. Floor Polish: Provide protective liquid floor polish products as recommended by resilient stair tread manufacturer.

2.3 ACCESSORIES

A. Subfloor Filler: White premix latex; type recommended by flooring material manufacturer. Floor stone is not allowed.

B. Primers and Adhesives: Waterproof; types recommended by flooring manufacturer

C. Edge Strips: Metal.

D. Sealer: Types recommended by flooring manufacturer.

E. Tile Reducer: Provide tile reducer (similar to No. RRS-XX-C reducer strip by Johnsonite) in color to match adjacent flooring at areas where flooring transitions from resilient tile to concrete.

- F. Stair Treads: Roppe Rubber Co., heavy duty stair tread; diamond safety pattern, square nose, Type No. 30. Provide matching risers.
- G. CMC./Rop-Cord Tire Transition: Recess No. FR-14 Musson Aluminum Mat Frame 7/16" at all edges of Rop-Cord Tire Tile except where edge meets a wall surface.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify that surfaces are smooth and flat with maximum variation of 1/8-inch in 10 feet and are ready to receive work. Do not begin installation until all floor areas have been properly prepared by grinding or filling uneven conditions.
- B. Verify concrete floors are dry to a maximum moisture content of five percent (5%) and exhibit negative alkalinity, carbonization, or dusting.
- C. Beginning of installation means acceptance of existing substrate and site conditions.

3.2 PREPARATION

- A. Prepare substrates according to manufacturer's written instructions to ensure adhesion of resilient products.
- B. Concrete Substrates for Resilient Stair Treads and Accessories: Prepare according to ASTM F 710.
 - 1. Verify that substrates are dry and free of curing compounds, sealers, and hardeners.
 - 2. Remove substrate coatings and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, using mechanical methods recommended by manufacturer. Do not use solvents.
 - 3. Alkalinity and Adhesion Testing: Perform tests recommended by manufacturer.
 - 4. Moisture Testing: Perform tests recommended by manufacturer. Proceed with installation only after substrates pass testing.
 - a. Perform anhydrous calcium chloride test, ASTM F 1869. Proceed with installation only after substrates have maximum moisture-vapor-emission rate of 3 lb of water/1000 sq. ft. (1.36 kg of water/92.9 sq. m) in 24 hours.
 - b. Perform relative humidity test using in situ probes, ASTM F 2170. Proceed with installation only after substrates have maximum 75 percent relative humidity level measurement.
- C. Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound and remove bumps and ridges to produce a uniform and smooth substrate.
- D. Do not install resilient products until they are same temperature as the space where they are to be installed.
 - 1. Move resilient products and installation materials into spaces where they will be installed at least 48 hours in advance of installation.

- E. Sweep and vacuum clean substrates to be covered by resilient products immediately before installation.
- F. Remove subfloor ridges and bumps; fill low spots, cracks, joints, holes, and other defects with subfloor filler.
- G. Concrete floor shall be scraped free of any foreign matter that would impair adhesive bond.
- H. Apply, trowel, and float filler to leave a smooth, flat, hard surface.
- I. Prohibit traffic from area until filler is cured.
- J. Vacuum clean substrate. Remove sand or any material that could cause damage to tile or reflect as imperfection in tile installation.
- K. Apply primer to concrete surfaces.

3.3 RESILIENT BASE INSTALLATION

- A. Comply with manufacturer's written instructions for installing resilient base.
- B. Apply resilient base to walls, columns, pilasters, casework and cabinets in toe spaces, and other permanent fixtures in rooms and areas where base is required.
- C. Install resilient base in lengths as long as practicable without gaps at seams and with tops of adjacent pieces aligned.
- D. Tightly adhere resilient base to substrate throughout length of each piece, with base in continuous contact with horizontal and vertical substrates.
- E. Do not stretch resilient base during installation.
- F. Fit joints tight and vertical. Use min. 4 ft. lengths of base except final piece to end run; short pieces of base installed (other than end pieces) will not be accepted.
- G. Miter internal corners. At external corners, use premolded units. At exposed ends, use premolded units.
- H. Install base on solid backing; bond tight to wall and floor surfaces.
- I. Scribe and fit to door frames and other interruptions.

3.4 CLEANING AND PROTECTION

- A. Comply with manufacturer's written instructions for cleaning and protection of resilient products.
- B. Cover resilient products until Substantial Completion.

END OF SECTION 096513

SECTION 096519

RESILIENT FLOOR COVERING

1. SCOPE

Furnish and install resilient floor coverings and vinyl bases and accessories as shown, scheduled, and specified.

2. GENERAL REQUIREMENTS

- A. Guarantee: Contractor shall furnish written guarantee that all work required by this section shall be free from defects in materials and workmanship for a period of one year from date of acceptance of installation.
- B. Manufacturer's Data: For purpose of this specification, materials manufactured by Armstrong, Burke, and Roppe Flooring Products are used as references.
- C. Submittals:
- 1) Submit product data and samples under provisions of Specification Section 017500.
 - 2) Samples: Submit samples of each type of floor covering for color selection by Architect. Architect will select several colors and patterns of tile for use on the project. Manufacturer selected shall provide the same or more color selections as the specified manufacturer.
 - 3) Submit two 12-inch long samples of base material for each color available.
- D. Delivery and Storage:
- 1) Materials shall be delivered to the job site in original containers and clearly labeled. Adhesives shall be in full sealed containers.
 - 2) Store materials for three days prior to installation in area of installation to achieve temperature stability.
 - 3) Maintain ambient temperature in rooms and subfloors required by adhesive manufacturer three days prior to, during, and 24 hours after installation of materials.
- E. Clean Up: After resilient flooring materials have sufficiently sealed, clean floors in accordance with tile manufacturer's recommendations.
- F. Protection: General contractor shall protect resilient flooring work in this section until acceptance by owner.
- G. Replacement Materials: At completion of job, deliver to the owner fifty (50) pieces of each floor tile used in job for owner's future use; tile shall be full size and undamaged. Provide 50 lineal feet of each base material (full length, not cut pieces).
- H. References:
- 1) ASTM-E84 - Surface Burning Characteristics of Building Materials.
 - 2) FS-SS-T-312 - Tile, Floor: Vinyl Composition.
 - 3) FS-SS-W-40 - Wall Base: Rubber.
 - 4) ASTM-F-1861-Type TS thermoset vulcanized rubber.
- I. Regulatory Requirements: Conform to applicable UBC, SBC, and NFPA code for flame/fuel/smoke rating.

J. Operation and Maintenance Data:

- 1) Submit cleaning and maintenance data.
- 2) Include maintenance procedures, recommended maintenance materials, and suggested schedule for cleaning, stripping, and re-waxing.

3. MATERIALS

A. Vinyl Composition Tile: Shall be standard size 12" x 12" x 1/8" thick, Mannington Commercial Essentials and Designer Essentials Vinyl Composition Tile, Tarkett Expressions, Azrock Cortina Colors, and Armstrong Standard Excelon are approved manufacturers. Allow for multiple colors in main field and accent tile patterns.

B. Accessories:

- 1) Subfloor Filler: White premix latex; type recommended by flooring material manufacturer. Floor stone is not allowed.
- 2) Primers and Adhesives: Waterproof; types recommended by flooring manufacturer.
- 3) Edge Strips: Metal.
- 4) Sealer: Types recommended by flooring manufacturer.
- 5) Tile Reducer: Provide tile reducer (similar to No. RRS-XX-C reducer strip by Johnsonite or Roppe) in color to match adjacent flooring at areas where flooring transitions from resilient tile to concrete.

4. INSTALLATION

A. Examination:

- 1) Verify that surfaces are smooth and flat with maximum variation of 1/8-inch in 10 feet and are ready to receive work. Do not begin installation until all floor areas have been properly prepared by grinding or filling uneven conditions.
- 2) Verify concrete floors are dry to a maximum moisture content of five percent (5%) and exhibit negative alkalinity, carbonization, or dusting.
- 3) Beginning of installation means acceptance of existing substrate and site conditions.

B. Preparation:

- 1) Remove subfloor ridges and bumps; fill low spots, cracks, joints, holes, and other defects with subfloor filler.
- 2) Concrete floor shall be scraped free of any foreign matter that would impair adhesive bond.
- 3) Apply, trowel, and float filler to leave a smooth, flat, hard surface.
- 4) Prohibit traffic from area until filler is cured.
- 5) Vacuum clean substrate. Remove sand or any material that could cause damage to tile or reflect as imperfection in tile installation.
- 6) Apply primer to concrete surfaces.

C. Installation - Tile Material:

- 1) Install in accordance with manufacturer's instructions.
- 2) Unless indicated otherwise, lay all tile from center of area with variation (not less than 6") taken up in border tiles. Tile shall be laid square with room axis. Use only full, unbroken tile without cracks, chips, or deformation.
- 3) Mix tile from container to ensure shade variations are consistent. Lay tile with reverse grains in alternating tiles with tight, straight joints without open cracks, voids, raising, puckering at joints. Tiles shall be laid to come together at corners without any offset or voids.
- 4) Spread only enough adhesive to permit installation of materials before initial set.
- 5) Terminate flooring at centerline of door openings where adjacent floor finish is dissimilar.
- 6) Install metal edge strips at unprotected or exposed edges.
- 7) Scribe flooring to walls, columns, cabinets, floor outlets, and other appurtenances to produce tight joints.
- 8) Surfaces shall be rolled, weighted, etc. as directed by manufacturers of tile and/or adhesive.
- 9) Prohibit traffic on floor finish for 48 hours after installation.

D. Installation - Base Material:

- 1) Fit joints tight and vertical; maintain minimum measurement of 18 inches between joints.
- 2) Miter internal corners. At external corners, use premolded units. At exposed ends, use premolded units.
- 3) Install base on solid backing; bond tight to wall and floor surfaces.
- 4) Scribe and fit to door frames and other interruptions.

E. Cleaning:

- 1) Immediately after setting tile and base, remove excess adhesive from floor and base surfaces and from other adjacent materials and surfaces (do not damage any surface while cleaning).
- 2) Clean and seal floor and base surfaces in accordance with manufacturer's instructions.
- 3) No moisture or dirt, etc. shall be allowed under tile.
- 4) Protect floor and base from stains, marks, scratches, and other damage.

- F. Replace any defective or damaged tile or work evidencing poor workmanship. Reclean and buff all tile again just before final acceptance of building.

END OF SECTION 096519

SECTION 096813

TILE CARPETING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes modular, carpet tile.

1.2 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: Show the following:
 - 1. Columns, doorways, enclosing walls or partitions, built-in cabinets, and locations where cutouts are required in carpet tiles.
 - 2. Type of subfloor.
 - 3. Type of installation.
 - 4. Pattern of installation.
 - 5. Pattern type, location, and direction.
 - 6. Pile direction.
- C. Samples: For each exposed product and for each color and texture specified.

1.4 INFORMATIONAL SUBMITTALS

- A. Product test reports.
- B. Sample warranty.

1.5 CLOSEOUT SUBMITTALS

- A. Maintenance data.

1.6 QUALITY ASSURANCE

- A. Installer Qualifications: An experienced installer who is certified by the International Certified Floorcovering Installers Association.
- B. Fire-Test-Response Ratings: Where indicated, provide carpet tile identical to those of assemblies tested for fire response according to NFPA 253 by a qualified testing agency.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Comply with CRI 104.

1.8 FIELD CONDITIONS

- A. Comply with CRI 104 for temperature, humidity, and ventilation limitations.

1.9 WARRANTY

- A. Special Warranty for Carpet Tiles: Manufacturer agrees to repair or replace components of carpet tile installation that fail in materials or workmanship within specified warranty period.
1. Warranty does not include deterioration or failure of carpet tile due to unusual traffic, failure of substrate, vandalism, or abuse.
 2. Failures include, but are not limited to, more than 10 percent edge raveling, snags, runs, dimensional stability, excess static discharge, loss of tuft bind strength, loss of face fiber, and delamination.
 3. Warranty Period: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 CARPET TILE CPT-1 & CPT-2

- A. Basis-of-Design Product: Subject to compliance with requirements, provide product or comparable product by one of the following:
1. Milliken Contract – Colorwash Collection (CPT-1)
 2. Boylu –SVELTE Level (CPT-2) Floors & Walls
- B. Color: As selected by Architect from manufacturer's full range.
- C. Pattern: Match Architect's samples.
- D. Fiber Content: 100 percent nylon 6, 6.
- E. Total Weight: 85 – 95 oz./sq. yd. (g/sq. m) for finished carpet tile.
- F. Primary Backing/Backcoating: Manufacturer's standard composite materials.
- G. Secondary Backing: Manufacturer's standard material.
- H. Size: 39.4 by 39.4 inches.
- I. Applied Soil-Resistance Treatment: Manufacturer's standard material.
- J. Antimicrobial Treatment: Manufacturer's standard material.
- K. Performance Characteristics: As follows:

1. Appearance Retention Rating: Severe traffic, 3.5 minimum according to ASTM D 7330.
2. Dimensional Tolerance: Within 1/32 inch (0.8 mm) of specified size dimensions, as determined by physical measurement.
3. Dimensional Stability: 0.2 percent or less according to ISO 2551 (Aachen Test).
4. Resistance to Insects: Comply with AATCC 24.
5. Colorfastness to Crocking: Not less than 4, wet and dry, according to AATCC 165.
6. Antimicrobial Activity: Not less than 2-mm halo of inhibition for gram-positive bacteria, not less than 1-mm halo of inhibition for gram-negative bacteria, and no fungal growth, according to AATCC 174.
7. Electrostatic Propensity: Less than 3.5 kV according to AATCC 134.
8. Emissions: Provide carpet tile that complies with testing and product requirements of CRI's "Green Label Plus" program.
9. Emissions: Provide carpet tile that complies with the product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

2.2 INSTALLATION ACCESSORIES

- A. Trowelable Leveling and Patching Compounds: Latex-modified, hydraulic-cement-based formulation provided or recommended by carpet tile manufacturer.
- B. Adhesives: Water-resistant, mildew-resistant, nonstaining, pressure-sensitive type to suit products and subfloor conditions indicated, that complies with flammability requirements for installed carpet tile and is recommended by carpet tile manufacturer for releasable installation.
 1. Adhesives shall have a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
 2. Adhesives shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for maximum moisture content, alkalinity range, installation tolerances, and other conditions affecting carpet tile performance. Examine carpet tile for type, color, pattern, and potential defects.
- B. Concrete Subfloors: Verify that concrete slabs comply with ASTM F 710.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.
- D. Preparation: Comply with CRI 104, Section 6.2, "Site Conditions; Floor Preparation," and with carpet tile manufacturer's written installation instructions for preparing substrates indicated to receive carpet tile installation.
- E. Installation: Comply with CRI 104, Section 14, "Carpet Modules," and with carpet tile manufacturer's written installation instructions.
- F. Installation Method: As recommended in writing by carpet tile manufacturer.

- G. Maintain dye lot integrity. Do not mix dye lots in same area.
- H. Cut and fit carpet tile to butt tightly to vertical surfaces, permanent fixtures, and built-in furniture including cabinets, pipes, outlets, edgings, thresholds, and nosings. Bind or seal cut edges as recommended by carpet tile manufacturer.
- I. Extend carpet tile into toe spaces, door reveals, closets, open-bottomed obstructions, removable flanges, alcoves, and similar openings.
- J. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on finish flooring as marked on subfloor. Use nonpermanent, nonstaining marking device.
- K. Install pattern parallel to walls and borders.
- L. Perform the following operations immediately after installing carpet tile:
 - 1. Remove excess adhesive, seam sealer, and other surface blemishes using cleaner recommended by carpet tile manufacturer.
 - 2. Remove yarns that protrude from carpet tile surface.
 - 3. Vacuum carpet tile using commercial machine with face-beater element.
- M. Protect installed carpet tile to comply with CRI 104, Section 16, "Protecting Indoor Installations."

END OF SECTION 096813

SECTION 097200 - WALL COVERINGS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. MDC Custom Digital Vinyl wall covering, MDC Dreamscape Smooth Matte, Suede, Artist Canvas. Pattern (Art work approval per Architect)

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: Show location and extent of each wall-covering type. Indicate pattern placement, seams and termination points.
- C. Samples: Full width by 36-inch- (914-mm-) long section of wall covering from same print run or dye lot to be used for the Work, with specified treatments and paint applied. Show complete pattern repeat. Mark top and face of fabric.

1.3 INFORMATIONAL SUBMITTALS

- A. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for wall covering.

1.4 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For wall coverings to include in maintenance manuals.

1.5 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 1. Wall-Covering Materials: For each type, full-size units equal to 5 percent of amount installed.

1.6 QUALITY ASSURANCE

- A. Fire-Test-Response Characteristics: As determined by testing identical wall coverings applied with identical adhesives to substrates according to test method indicated below by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
 - 1. Surface-Burning Characteristics: As follows, per ASTM E 84: Class A
 - a. Flame-Spread Index: 25 or less.
 - b. Smoke-Developed Index: 50 or less.
 - 2. Fire-Growth Contribution: Textile wall coverings complying with acceptance criteria of UBC Standard 8-2.
 - 3. Fire-Growth Contribution: Textile wall coverings tested according to NFPA 265 and complying with test protocol and criteria in the 2003 IBC.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Low-Emitting Materials: Wall covering system shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

2.2 WALL COVERINGS

- A. General: Provide rolls of each type of wall covering from same print run or dye lot.

2.3 VINYL WALL COVERING

- A. Vinyl Wall-Covering Standards: Provide mildew-resistant products complying with the following:
 - 1. Products: Subject to compliance with requirements, provide the following:
 - a. MDC Wall Coverings – Chicago, IL.
- B. Total Weight Excluding Coatings: 14 oz/sq. yd.
- C. Width: 54 inches (1372 mm).
- D. Backing: Osaburg fabric.
- E. Fire Rating: Class A
- F. Stain-Resistant Coating: Manufacturer's standard coating.

- G. Colors, Textures, and Patterns:
 - 1. Type: Len-Tex Contract
 - 2. Color: Kampala – Beach Mat (2870KP)
 - 3. Pattern Match: Random Reversible

2.4 ACCESSORIES

- A. Adhesive: Mildew-resistant, nonstaining adhesive, for use with specific wall covering and substrate application; as recommended in writing by wall-covering manufacturer.
 - 1. Adhesive shall have VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
 - 2. Adhesive shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."
- B. Primer/Sealer: Mildew resistant, complying with requirements in Section 099123 "Interior Painting" and recommended in writing by wall-covering manufacturer for intended substrate.
- C. Wall Liner: Nonwoven, synthetic underlayment and adhesive as recommended by wall-covering manufacturer.
- D. Seam Tape: As recommended in writing by wall-covering manufacturer.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Clean substrates of substances that could impair bond of wall covering, including dirt, oil, grease, mold, mildew, and incompatible primers.
- B. Prepare substrates to achieve a smooth, dry, clean, structurally sound surface free of flaking, unsound coatings, cracks, and defects.
 - 1. Moisture Content: Maximum of 5 percent on new plaster, concrete, and concrete masonry units when tested with an electronic moisture meter.
 - 2. Plaster: Allow new plaster to cure. Neutralize areas of high alkalinity. Prime with primer as recommended in writing by primer/sealer manufacturer and wall-covering manufacturer.
 - 3. Metals: If not factory primed, clean and apply metal as recommended in writing by primer/sealer manufacturer and wall-covering manufacturer.
 - 4. Gypsum Board: Prime with primer as recommended in writing by primer/sealer manufacturer and wall-covering manufacturer.
 - 5. Painted Surfaces: Treat areas susceptible to pigment bleeding.
- C. Remove hardware and hardware accessories, electrical plates and covers, light fixture trims, and similar items.

- D. Acclimatize wall-covering materials by removing them from packaging in the installation areas not less than 24 hours before installation.
- E. Install wall liner, with no gaps or overlaps, where required by wall-covering manufacturer. Form smooth wrinkle-free surface for finished installation. Do not begin wall-covering installation until wall liner has dried.
- F. Cut wall-covering strips in roll number sequence. Change roll numbers at partition breaks and corners.
- G. Install strips in same order as cut from roll.
- H. Install reversing every other strip.
- I. Install wall covering with no gaps or overlaps, no lifted or curling edges, and no visible shrinkage.
- J. Install seams vertical and plumb at least 6 inches (150 mm) from outside corners and 3 inches (75 mm) from inside corners unless a change of pattern or color exists at corner. No horizontal seams are permitted.
- K. Fully bond wall covering to substrate. Remove air bubbles, wrinkles, blisters, and other defects.
- L. Trim edges and seams for color uniformity, pattern match, and tight closure. Butt seams without any overlay or spacing between strips.
- M. Remove excess adhesive at finished seams, perimeter edges, and adjacent surfaces.
- N. Reinstall hardware and hardware accessories, electrical plates and covers, light fixture trims, and similar items.

END OF SECTION 097200

SECTION 099100

PAINTING

PART 1 - GENERAL

1.1 SECTION INCLUDES

1. Surface preparation.
2. Field application of paints, stains, varnishes, and other coatings.
3. See Schedule - Surfaces to be Finished, at end of Section.

1.2 SUBMITTALS

- A. See Section 01300 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data on all finishing products, including VOC content.
- C. Paint Schedule: Submit schedule for all conditions where paints or coatings are used.
- D. Submit a manufacturer's authorized representative "Schedule for Materials" for approval within thirty (30) days after the contract date, giving the manufacturer and specifications as to type of each material intended for use on the work. Provide manufacturer's letter certifying that the total list of materials are "first-line products" and that proposed application methods at respective surfaces are in accordance with manufacturer's recommended application. Do not start any work until all materials are approved as conforming to specifications.
- E. The architect will issue a color schedule showing the various colors and their locations before samples are made.
- F. Prepare samples of finishes on the job for review by owner and architect. Submit one 12" x 12" sample of each color and material, with texture to simulate actual conditions. Resubmit samples as requested by the Architect until acceptable sheen, color, and texture are achieved. Submit one sample 12" x 24" of each type natural or stained finish on specified wood.

1.3 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with minimum three years documented experience.
- B. Applicator Qualifications: Company specializing in performing the work of this section with minimum 3 years experience.

1.4 REGULATORY REQUIREMENTS

- A. Conform to applicable code for flame and smoke rating requirements for products and finishes.

1.5 MOCK-UP

- A. See Division 1 - General Requirements, for general requirements for mock-up.
- B. Provide panel, 8 feet long by 8 feet wide, illustrating special coating color, texture, and finish.
- C. Mock-up may remain as part of the Work.

1.6 DELIVERY, STORAGE, AND PROTECTION

- A. Deliver products to site in sealed and labeled containers; inspect to verify acceptability.
- B. Container Label: Include manufacturer's name, type of paint, brand name, lot number, brand code, coverage, surface preparation, drying time, cleanup requirements, color designation, and instructions for mixing and reducing.
- C. Paint Materials: Store at minimum ambient temperature of 45 degrees F and a maximum of 90 degrees F, in ventilated area, and as required by manufacturer's instructions.

1.7 ENVIRONMENTAL REQUIREMENTS

- A. Do not apply materials when surface and ambient temperatures are outside the temperature ranges required by the paint product manufacturer.
- B. Provide lighting level of 80 ft candles measured mid-height at substrate surface.

1.8 EXTRA MATERIALS

- A. See Section 01600 – Material and equipment, for additional provisions.
- B. Supply 1 gallon of each color; store where directed.
- C. Label each container with color in addition to the manufacturer's label.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Paints and Coatings:
 - 1. Sherwin Williams Paint: www.sherwin-williams.com
 - 2. ICI Paints North America: www.icipaintsinna.com.
 - 3. Benjamin Moore & Co: www.benjaminmoore.com.
 - 4. PPG Architectural Finishes, Inc: www.ppgaf.com.
 - 5. American Pride Paint: www.americanpridepaint.com
 - 6. EnviroSafe Paint: www.envirosafepaint.com

- B. Substitutions: See Section 01600 - Product Requirements.

2.2 PAINTS AND COATINGS – GENERAL

- A. Paints and Coatings: Ready mixed, except field-catalyzed coatings. Prepare pigments:
 - 1. To a soft paste consistency, capable of being readily and uniformly dispersed to a homogeneous coating.
 - 2. For good flow and brushing properties.
 - 3. Capable of drying or curing free of streaks or sags.
- B. Chemical Content: The following compounds are prohibited:
 - 1. Aromatic Compounds: In excess of 1.0 percent by weight of total aromatic compounds (hydrocarbon compounds containing one or more benzene rings).
 - 2. Acrolein, acrylonitrile, antimony, benzene, butyl benzyl phthalate, cadmium, di (2-ethylhexyl) phthalate, di-n-butyl phthalate, di-n-octyl phthalate, 1,2-dichlorobenzene, diethyl phthalate, dimethyl phthalate, ethylbenzene, formaldehyde, hexavalent chromium, isophorone, lead, mercury, methyl ethyl ketone, methyl isobutyl ketone, methylene chloride, naphthalene, toluene (methylbenzene), 1,1,1-trichloroethane, vinyl chloride.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Furnish all materials, labor, services, tools, and incidentals necessary for completion of this section of the work.
- B. Paint and/or finish the entire work, whether every item is herein specified or not. Where a specific item is not mentioned but requires painting or finishing, it shall be painted or finished to the specifications of similar work.
- C. Includes examination of the plans, finish schedules, specifications of other divisions, and thorough familiarization with all provisions regarding painting of items left unfinished by other divisions that shall be painted to completion. If necessary, move scaffold to permit installation of other work without additional expense to the owner.
- D. Verify that surfaces are ready to receive Work as instructed by the product manufacturer.
- E. Examine surfaces scheduled to be finished prior to commencement of work. Report any condition that may potentially affect proper application.
- F. Test shop-applied primer for compatibility with subsequent cover materials.
- G. Rooms may be painted with neutral color walls and one or two accent color walls.

3.2 PREPARATION

- A. Surface Appurtenances: Remove or mask electrical plates, hardware, light fixture trim, escutcheons, and fittings prior to preparing surfaces or finishing. When spray painting, protect adjacent surfaces as required or directed. Caulking shall be uniformly and properly applied.
- B. Surfaces: Correct defects and clean surfaces which affect work of this section. Remove or repair existing coatings that exhibit surface defects.
- C. Marks: Seal with shellac those which may bleed through surface finishes.
- D. Impervious Surfaces: Remove mildew by scrubbing with solution of tetra-sodium phosphate and bleach. Rinse with clean water and allow surface to dry.
- E. Concrete and Unit Masonry Surfaces to be Painted: Remove dirt, loose mortar, scale, salt or alkali powder, and other foreign matter. Remove oil and grease with a solution of tri-sodium phosphate; rinse well and allow to dry. Remove stains caused by weathering of corroding metals with a solution of sodium metasilicate after thoroughly wetting with water. Allow all work to dry completely (usually 60 to 90 days before painting). Contractor shall remove all mortar daubs, eliminate pin holes, remove chipped or otherwise unacceptable CMU before start of block filler work. When surface preparation is complete, including complete coverage of block filler, notify Architect for review prior to application of finish coats.
- F. Wood: Sandpapered to smooth, even surface and dusted off. After applying prime or stain coat, fill nail holes and other holes and cracks with putty, stained to match wood. Sandpaper all trim edges to ease edge before start of work. Putty only wood scheduled for color stain; do not putty wood left natural. All knots, pitch pockets, and sappy spots shall be covered with sealer/shellac before priming or finishing. Sand between each paint coat to produce an even, smooth finish free from scratches, brush marks, paint brush hairs, etc...
- G. Gypsum Board Surfaces to be Painted: Fill minor defects with filler compound. Spot prime defects after repair. Apply orange peel texture to all gypsum board.
- H. Shop-Primed Steel Surfaces to be Finish Painted: Sand and scrape to remove loose primer and rust. Feather edges to make touch-up patches inconspicuous. Clean surfaces with solvent. Prime bare steel surfaces. Re-prime entire shop-primed item.
- I. Galvanized Steel Surfaces to be Finish Painted: Thoroughly clean with solvent and wipe surface with surface conditioner.

3.3 APPLICATION

- A. Apply products in accordance with manufacturer's instructions.
- B. Do not apply finishes to surfaces that are not dry. Allow applied coats to dry before next coat is applied. Do not paint while damp, during rainy or frosty weather, or when temperature is below 45 deg. F., not while exposed to hot sun or above 90 deg. F.
- C. No interior painting or finishing shall be permitted until building has thoroughly dried out by natural or artificial heat.

- D. Apply each coat to uniform appearance. Apply each coat of paint slightly darker than preceding coat unless otherwise approved. All coats shall be thoroughly dry before applying succeeding coats; sand lightly between all coats on all materials.
- E. Vacuum clean surfaces of loose particles. Use tack cloth to remove dust and particles just prior to applying next coat.
- F. All closets shall be finished the same as the adjoining room unless otherwise specified.
- G. All “hot” and “flat” spots that may appear in the cement surfaces after the priming coat has been applied shall be “spotted in” with the same material before the second coat. “Hot” or “flat” spots showing after the finish coat has been applied shall be refinished as before.
- H. The inside of all cases, cabinets, etc. shall be finished exactly as specified for the exterior face of same unless otherwise specified.
- I. Apply additional coats when undercoats, stains, or other conditions show through the final coat of paint, until paint film is of uniform finish color or appearance. Give special attention to insure that surfaces, including edges, corners, crevices, welds, and exposed fasteners receive a dry film thickness equivalent to that of the final surfaces.

3.4 FINISHING MECHANICAL AND ELECTRICAL EQUIPMENT

- A. Refer to Mechanical and Electrical Specifications for schedule of color coding of equipment, duct work, piping, and conduit.
- B. Remove unfinished louvers, grilles, covers, and access panels on mechanical and electrical components and paint separately.
- C. Reinstall electrical cover plates, hardware, light fixture trim, escutcheons, and fittings removed prior to finishing.

3.5 PROTECTION OF WORK AND CLEANING

- A. Materials shall be stored in a satisfactory manner or where directed. Collect waste material which may constitute a fire hazard, place in closed metal containers, and remove daily from site.
- B. Drop cloths shall be laid in all areas where painting to protect floors and other work from paint damage. Protect all existing materials and furnishings.
- C. In order to avoid excessive amounts of latex paint wash water from impacting the soil on the site, the following handling is recommended:
 - 1. Minimize the number of tools requiring cleaning by exposing to paint only those brushes, rollers and containers needed to do the work.
 - 2. When work must be interrupted for relatively short periods of time, place brushes/rollers in plastic bags rather than washing out, re-exposing to paint and washing again.
 - 3. Return as much liquid, reusable paint to the original container s possible before proceeding with cleanup. Use paint comb and /or roller cleaner.

4. Remove as much excess paint as possible from brushes and rollers by brushing/rolling over multiple sheets of newspaper. Discard paper in trash.
 5. Using a hose at the site, wash brushes and rollers with soap and water, only in areas designated by general contractor. Avoid accumulation of paint in any given area of the ground.
- D. Contractor is responsible for any damage done to the work of others caused by executing the work herein. Replace or repair, at own expense, materials damaged to such an extent that they cannot be restored to “as new” condition.

3.6 WORKMANSHIP

- A. Top quality, using skilled painters only.
- B. Only the best workmanship is acceptable. All material shall be spread and smoothly flowed on without runs, streaks, sags, brush marks, unfinished patches or other blemishes.
- C. Provide adequate illumination. Poor illumination will be grounds for rejection of work. Minimum of 20 foot candles for all surfaces.
- D. Thin material only when directed. All coats to veer; edges to be sharp and clear.

3.7 SPRAY AND ROLLER WORK

- A. Spray work not allowed except as specifically approved by architect in writing.
- B. Finish coats on interior gypsum board and where else specified may be applied with approved roller provided such work is first class in nature.

3.8 REVIEW OF WORK

- A. Unless otherwise directed, each coat shall be viewed by the architect before applying succeeding coat.
 1. Each coat of paint shall have a different value but be of the same hue except first coat which shall be white except for varnishes and stains.
 2. Should a question arise over the number of coats applied to an area or space which was not inspected as stated before, the architect may, at his option, require additional coats to be applied and the work shall be performed without additional charge.
- B. Any areas or surfaces not covered or showing variation of shades due to uneven application of materials shall receive additional coats as required to correct said defects.

3.9 SCHEDULE - SURFACES TO BE FINISHED

- A. Do Not Paint or Finish the Following Items:
 1. Items fully factory-finished unless specifically noted.

2. Fire rating labels, equipment serial number and capacity labels.

B. Exterior Work

1. Exterior Work:

- a. Metal: (including Hollow Metal Doors & Frames)
 - 1) Clean thoroughly with vinegar, rinse, and dry.
 - 2) One coat Kem Kronik Universal Metal Primer B50-Z Series
 - 3) Two coats DTM Alkyd Semi-Gloss B55 Series
- b. Galvanized Metal:
 - 1) One coat: DTM primer finish B66W1.
 - 2) Two coats: Metaltex S/G B42 Series.

2. Interior Work:

- a. Wood (all wood surfaces, except natural or stained finishes).
 - 1) One coat Prep Rite Classic Wood Primer B28W101 series.
 - 2) Two coats Pro-Classic Acrylic S/G B31W20 series.
- b. Wood (natural or stained finishes).
 - 1) One coat Wood Classics oil stain A49 series
 - 2) Two coats Wood Classics varnish stain A66-300 series.
- c. Metal Doors, Frames, and Trim; Fixed Glass Metal Frames & Misc. Trim
 - 1) Shop coat by fabricator B50-Z series
 - 2) One coat Pro-Industrial Enamel 100
 - 3) Two coats Pro-Mar 200 Zero VOC Semi-Gloss B31-2600 Series

Paint hollow metal doors and frames to color as selected by architect for each side of the wall. Allow for the termination point of two colors of paint on door and frame as directed by architect. Paint hollow metal frames for glass in doors.

- d. Gypsum Board - Enamel
 - 1) One coat primer: Harmony Low Odor Interior Latex Primer B11
 - 2) Two coats Harmony Semi-Gloss B10
- e. Gypsum Board – Acrylic Finish (“Epoxy”)
 - 1) One coat primer: Harmony Low Odor Interior Latex Primer B11
 - 2) Two coats Pro-Industrial Zero VOC Catalyzed Epoxy, B73-300 Series
- f. Painted Woodwork and Hardboard
 - 1) One coat Prep Rite Classic Wood Primer B28W101 series.
 - 2) Two coats Pro-Classic Acrylic S/G B31W20 series.
- g. Painted CMU Gloss Finish Epoxy
 - 1) One coat Prep Rite Block Filler B25W25.
 - 2) Two coats Harmony Semi-Gloss B10

- C. Mechanical and Electrical: Use paint systems defined for the substrates to be finished.

1. Paint all insulated and exposed pipes occurring in finished areas to match background surfaces, unless otherwise indicated.
2. Paint shop-primed items occurring in finished areas.
3. Paint interior surfaces of air ducts and convector and baseboard heating cabinets that are visible through grilles and louvers with one coat of flat black paint to visible surfaces.
4. Paint dampers exposed behind louvers, grilles, and convector and baseboard cabinets to match face panels.

END OF SECTION 099100

SECTION 10050

MISCELLANEOUS SPECIALTIES

1. SCOPE

- A. Furnish and install all of the following equipment as shown on drawings and specified herein. Coordinate with other trades where such cooperation is indicated by furnishing installation requirements and details along with the material in adequate time for progress of the work. Furnish shop drawings.
- B. All items shall be installed with anchors appropriate to the wall construction. See Section 05200.
- C. Securely install, plumb, level, square with surrounding area to height and location as directed by architect.

2. TACK BOARDS

- A. Furnish and install tack board as shown on drawings. All tack boards shall be 4'-0" height x width as shown on drawings.
- B. Tack board shall be 1/2" homosote vinyl covered. Vinyl wall covering shall be Borden-Columbus Coated Fabrics - Guard Vinyl Wall Covering, 15-oz. Gunny Type I. Vinyl shall extend over all edges and lap 2" on back. All corners shall be double wrapped with concealed vinyl layer at corners. Fabric at corners shall be installed to provide neat mitered appearance. Colors as selected by architect. Install with concealed fasteners. Best-Rite Vin-Tak #20-410, Peninsular Company, Triadco Manufacturing Co., and Greensteel are also approved.

3. MARKER BOARDS

This performance specification is based on products manufactured by Best-Rite, Inc., Cameron, Texas. Ghent, Lemco, Triadco Manufacturing Co., and Tac-Rite are approved manufacturers providing the product meets the following specifications. Marker boards shall be capable of utilizing any dry erase marker on the board and shall be easily removed with a dry eraser without residual ghosting or shadows. Marker boards shall combine writing surface with high-resolution projection screen which will also accept magnetized accessories.

- A. Shop Drawing Submittal: Provide minimum 24" x 36" sample with all trim and accessories specified above with submittal data for review and approval prior to manufacture.
- B. Material:
 - 1) Porcelain Enamel Marker Boards: Provide balanced, high-pressure laminated porcelain enamel marker board of 3-ply construction of face sheet, core material and backing.
 - a. Face Sheet: Provide face sheet of 28-ga. enameling grade steel especially processed for temperatures used in coating porcelain on steel. Coat the exposed face and exposed edges with a 3-coat process consisting of primer, ground coat, and color cover coat. Coat the concealed face with a 2-coat process consisting of primer and ground coat only. Fuse cover and ground coats to steel at standard firming temperatures, but no less than 1200 degrees F. (649 degrees C.).
 - b. Cover Coat: Provide the standard gloss finish cover coat intended for use with liquid felt-tipped markers.
 - c. Core: Provide 1/2" thick gypsum board or particle board. All surfaces must be concealed and coated to prevent off-gassing. Note that formaldehyde is prohibited from any use on this project.
 - d. Backing Sheet: Provide .005 aluminum foil backing.
- C. Size: All marker boards shall be 4'-0" height by width shown on drawings. All marker boards shall be one continuous length with no splices of divider trims acceptable.

- D. Accessories: Provide trim and accessories. #36 top trim with tack strip; #33 chalk tray with end caps; #18 end trim. Provide ten (10) No. 85-013 combination map, hook, paper holders for each marker board. Provide two (2) flag holders at top rail of each board. Mount marker boards with concealed clips and anchors to securely attach boards to all wall surfaces.

4. BROOM AND MOP RACK

Furnish and install one broom and mop rack similar to Charles Parker No. 608 stainless steel at janitor's closet above mop sink. Length shall be 36" with four holders. Metalines, Bobrick, and Valley Aluminum Products are also approved manufacturers. Furnish and install one (1) at each janitor's closet.

5. SHOWER/DRESSING COMPARTMENTS

- A. Combination shower and dressing compartments (rooms) shall be Capital Partition, Inc., "Poly Pro", size as shown on drawings. Install in each shower/dressing compartments; total four (4) shower/dressing compartments required. Provide(2) curtain per compartment. Provide one (1) ADA (handicap) accessible wheelchair compartment.
- B. All walls shall be "Poly Pro", 1-inch thick. All materials shall be impervious to water. Connections shall be made by means of continuous aluminum corner section. Headrail shall be "Brite" anodized aluminum of "Anti-Grip" design with integral shower curtain track. Provide track hooks and two (2) shower curtains at each compartment. Provide braced seat in dressing area unless noted otherwise on drawings. Each compartment shall be 36" x 36" x 82" ht. Shower area and 36" x 36" x 82" ht. Dressing area; provide soap dish in shower and robe hook in dressing area.
- C. Shower receptor shall be precast, one piece terrazzo 6" high. Receptor shoulders shall be rabbeted to receive panels. Brass drain shall be cast integrally and shall provide for sealant connection not less than 1" deep to a 2' pipe and shall have removable stainless steel strainer plate. Provide ADA accessible receptor at handicapped shower stalls. Provide grab bars, hinged seat shower spray and controls, etc at each handicap shower. Accessories shall be brush stainless steel finish. Design and mounting locations shall meet State of Texas Disabled Accessibility requirements.
- D. Use sealant at all panel to panel; setting trim sealant shall be similar to "Synthacaulk" GC-9 Thiokol polysulfide base, one part, synthetic rubber.
- E. Installation: Panels shall be connected to (1) walls with #201C continuous (58" long) brackets; (2) pilasters with #001C continuous channel; and (3) at panel to pilaster to panel connections; utilize #201C continuous bracket with two continuous channels. Fasten pilaster to floor with 1/8" thick aluminum clip angles covered by stainless steel cover (floor shoe). All anchors into floor and walls shall be with stainless steel screws into lead shields.
- F. Santana Products Co., "Poly-Mar HD" and Sany Metal, "Solid Polymer" are approved manufacturers. Same products by Comtec and General Partitions are also approved manufacturers.

6. PROJECTION SCREEN

- A. Provide and install one (2) 10' wide & (1) 8' wide; matte white, electrol automatic roller stop, 22-gauge steel case equal to Da-Lite "Model C" in Dining 107 , Conference 122, and Social Area 201, total (3)_required. Fabric should be mounted to rod and roller in such a way as to minimize tearing or loosening and to facilitate fabric replacement. Model shall be ceiling flush mounted, if ceiling is not provided provide wall mounted unless indicated. Refer to Draper Inc. Luma 2 is an approved equal.

7. SECTIONAL DOOR (OVERHEAD DOOR)

Clopay Model No. 630S (20-ga. standard ribbed steel exterior panels and 24-ga. interior panels). Exterior panel prefinished with 3-coat baked-on polyester topcoat over primer on phosphate coating; interior prefinished baked-on polyester over primer. Interior and exterior finishes guaranteed for five (5) years. Provide polyurethane insulation with fire-retardant additive. Provide all hardware, tracks, spring counterbalances, spring loaded slide bolt, locks, vinyl floor seal, perimeter jambs and head seal weatherstripping, etc. for complete finished installation. Provide steel closure trim at jambs and head. Attach vertical track sections to wall at 2 ft. o.c. and attach horizontal track sections to roof structure at 3 ft. o.c. Berger, Ideal, Overhead, Wayne/Dalton, and Windsor are approved manufacturers. Doors shall be 11'-0" wide or as required by length of counter at Kitchen 116. Install one (1).

22. WINDOW BLINDS

- A. Window blinds shall be equal to Levelor's Riviera mini-blind (1"). Provide blinds at all exterior aluminum windows. Exception: Windows noted for a roll-down shade. Blinds to be sheer view or as selected by owner.
- B. Provide all accessories including steel head channel with mechanical drive and wand tilter; drum, cradle, cord lock, tilt rod, end braces and installation brackets, intermediate brackets, braided ladders, 1-inch wide aluminum slats, 0.008" minimum thickness (color and type as selected by owner), bottom rail, lift cord, etc.
- C. Window blinds shall be full height of window; see drawings for widths and locations.
- D. Install straight, plumb, and square to window and wall. All attachments shall be into wood or metal blocking or into masonry (attachment to gyp. Bd. only will not be allowed).

23. AUTOMATIC FIRE/SMOKE VENTS

Install where shown on drawings (Stage roof), four (4) "Bilco" Model, DSH 60120B vents or approved equal with inside manual release cable system rigged to location shown on drawings. The cable system shall consist of 1/8", 6 x 7 stainless steel, swagged end fittings, (forks and eyes as required). Such wire rope shall be reaved through approximate sized pulleys down to winches where shown. Provide shop drawings of a proposed system. Provide a permanent sign of red plastic laminate; working, letter size(s) and types as determined by local fire marshal; Milcor is an approved manufacturer. Naturalite / EPI Skylight System is an approved manufacturer.

25. WALL GARMENT HOOKS

Ives Model No. 405 or 572 double prong hooks. See drawings and details for location, attachment to hard base, etc.

END OF SECTION 10050

SECTION 102113

TOILET COMPARTMENTS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Stainless-steel toilet compartments configured as toilet enclosures and urinal screens.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: For toilet compartments. Include plans, elevations, sections, details, and attachments to other work.
- C. Samples for each exposed product and for each color and texture specified.

1.3 INFORMATIONAL SUBMITTALS

- A. Product certificates.

1.4 CLOSEOUT SUBMITTALS

- A. Maintenance data.

1.5 QUALITY ASSURANCE

- A. Surface-Burning Characteristics: As determined by testing identical products according to ASTM E 84, or another standard acceptable to authorities having jurisdiction, by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
 - 1. Flame-Spread Index: 25 or less.
 - 2. Smoke-Developed Index: 450 or less.
- B. Regulatory Requirements: Comply with applicable provisions in the U.S. Architectural & Transportation Barriers Compliance Board's "Americans with Disabilities Act (ADA) and Architectural Barriers Act (ABA) Accessibility Guidelines for Buildings and Facilities" and ICC/ANSI A117.1 for toilet compartments designated as accessible.

PART 2 - PRODUCTS

2.1 STAINLESS-STEEL UNITS

- A. Basis-of-Design Product: Subject to compliance with requirements, provide Global Partitions Stainless Steel Toilet Compartments or comparable product by one of the following:

1. Accurate Partitions Corporation.
2. All American Metal Corp.
3. American Sanitary Partition Corporation.
4. Ampco, Inc.
5. Bradley Corporation; Mills Partitions.
6. Flush Metal Partition Corp.
7. General Partitions Mfg. Corp.
8. Hadrian Manufacturing Inc.
9. Knickerbocker Partition Corporation.
10. Metpar Corp.
11. Rockville Partitions Incorporated.
12. Sanymetal; a Crane Plumbing company.
13. Shanahan's Limited.
14. Weis-Robart Partitions, Inc.

B. Toilet-Enclosure Style: Overhead braced.

C. Urinal-Screen Style: Wall hung flat panel.

D. Door, Panel, and Pilaster Construction: Seamless, metal facing sheets pressure laminated to core material; with continuous, interlocking molding strip or lapped-and-formed edge closures; corners secured by welding or clips and exposed welds ground smooth. Exposed surfaces shall be free of pitting, seam marks, roller marks, stains, discolorations, telegraphing of core material, or other imperfections.

1. Core Material: Manufacturer's standard sound-deadening honeycomb of resin-impregnated kraft paper in thickness required to provide finished thickness of 1 inch (25 mm) for doors and panels and 1-1/4 inches (32 mm) for pilasters.
2. Grab-Bar Reinforcement: Provide concealed internal reinforcement for grab bars mounted on units.
3. Tapping Reinforcement: Provide concealed reinforcement for tapping (threading) at locations where machine screws are used for attaching items to units.

E. Urinal-Screen Construction:

1. Flat-Panel Urinal Screen: Matching panel construction.

F. Facing Sheets and Closures: Stainless-steel sheet of nominal thicknesses standard with manufacturer:

G. Pilaster Shoes and Sleeves (Caps): Stainless-steel sheet, not less than 3 inches (76 mm) high, finished to match hardware.

H. Brackets (Fittings):

1. Stirrup Type: Ear or U-brackets; stainless steel.
2. Full-Height (Continuous) Type: Manufacturer's standard design; stainless steel.

I. Stainless-Steel Finish: No. 4 bright, directional polish on exposed faces. Protect exposed surfaces from damage by application of strippable, temporary protective covering before shipment.

2.2 ACCESSORIES

A. Hardware and Accessories: Manufacturer's standard design, heavy-duty operating hardware and accessories.

1. Material: Stainless steel.
 2. Hinges: Manufacturer's standard paired, self-closing type that can be adjusted to hold doors open at any angle up to 90 degrees.
 3. Latch and Keeper: Manufacturer's standard surface-mounted latch unit designed for emergency access and with combination rubber-faced door strike and keeper. Provide units that comply with regulatory requirements for accessibility at compartments designated as accessible.
 4. Coat Hook: Manufacturer's standard combination hook and rubber-tipped bumper, sized to prevent in-swinging door from hitting compartment-mounted accessories.
 5. Door Bumper: Manufacturer's standard rubber-tipped bumper at out-swinging doors.
 6. Door Pull: Manufacturer's standard unit at out-swinging doors that complies with regulatory requirements for accessibility. Provide units on both sides of doors at compartments designated as accessible.
- B. Anchorages and Fasteners: Manufacturer's standard exposed fasteners of stainless steel or chrome-plated steel or brass, finished to match the items they are securing, with theft-resistant-type heads. Provide sex-type bolts for through-bolt applications. For concealed anchors, use stainless steel, hot-dip galvanized steel, or other rust-resistant, protective-coated steel.

2.3 FABRICATION

- A. Floor-Anchored Units: Provide manufacturer's standard corrosion-resistant anchoring assemblies with leveling adjustment nuts at pilasters for structural connection to floor. Provide shoes at pilasters to conceal anchorage.
- B. Door Size and Swings: Unless otherwise indicated, provide 24-inch- (610-mm-) wide, in-swinging doors for standard toilet compartments and 36-inch- (914-mm-) wide, out-swinging doors with a minimum 32-inch- (813-mm-) wide, clear opening for compartments designated as accessible.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. General: Comply with manufacturer's written installation instructions. Install units rigid, straight, level, and plumb. Secure units in position with manufacturer's recommended anchoring devices.
- B. Clearances: Maximum 1/2 inch (13 mm) between pilasters and panels; 1 inch (25 mm) between panels and walls.
- C. Stirrup Brackets: Secure panels to walls and to pilasters with no fewer than three brackets attached at midpoint and near top and bottom of panel. Locate wall brackets so holes for wall anchors occur in masonry or tile joints. Align brackets at pilasters with brackets at walls.

3.2 ADJUSTING

- A. Hardware Adjustment: Adjust and lubricate hardware according to hardware manufacturer's written instructions for proper operation. Set hinges on in-swinging doors to hold doors open approximately 30 degrees from closed position when unlatched. Set hinges on out-swinging doors to return doors to fully closed position.

END OF SECTION 102113

SECTION 104000

ARCHITECTURAL SIGNAGE

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Building Plaque
2. Dimensional Letters
3. Interior Signage

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product indicated, including finishing materials.

B. Manufacturer's Data Sheets: For each product to be used, include the following:

1. Preparation instructions and recommendations
2. Storage and handling requirements and recommendations
3. Installation methods

C. Shop Drawings: Show fabrication and installation details. Indicate materials, panel sizes, thickness, finishes, fasteners, anchorages, and accessory items.

D. Samples: For each exposed product and for each color and texture specified.

1.3 INFORMATIONAL SUBMITTALS

A. Sample warranty.

1.4 CLOSEOUT SUBMITTALS

A. Maintenance Data

1.5 WARRANTY

A. Special Warranty: Manufacturer agrees to repair or replace components of signs that fail in materials or workmanship within specified warranty period.

1. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
1. Southwell Company, San Antonio, Texas.
 2. Mohawk Sign Systems.
 3. Metal Arts.
 4. ASI Sign Systems, Inc.
 5. Mills Mfg. Company.
 6. Sign International.
- B. Requests for substitutions will be considered in accordance with provisions of the General Requirements.

2.2 MATERIALS

A. Building Plaque:

1. Furnish and install 24" x 36" aluminum plaque as manufactured by Southwell Company, San Antonio, Texas. Plaque shall contain no more than five hundred (500) letters and thirty (30) lines. Building plaque location to be determined by the Architect.
 - a. Cast virgin ingots, F-214 aluminum alloy. Casting shall be free of pits and gas holes and all letters shall be sharp and hand tooled.
 - b. Double line border; border and faces of raised letters are to be satin finish and plaque background to be leatherette texture. Background shall be sprayed with black acrylic lacquer. Plaque shall be chemically cleaned and etched and treated with alodine. Two coats of clear acrylic lacquer shall be sprayed on completed plaque.
 - c. Letter style shall be selected by the architect.
 - d. Plaque shall be mounted on masonry wall with concealed fastening.
 - e. Architect will furnish plaque design and general layout. Contractor will furnish rubbing of actual pattern for owner's approval prior to casting.

B. City of Laredo Seal(s):

1. Furnish and install (2) two aluminum seals. See construction documents for exact size and location.

C. Dimensional Letters:

1. Allow for seventeen (17) 50" height letters, one (1) 36" height letter, and twelve (12) 24" height letter as selected by architect; Prismatic K-410, at heights as noted, 1" thick, stainless steel letters, as manufactured by Southwell.
 - a. Provide anchorage as required to offset 1" from face of trelliage.
2. Interior letters: Allow for one hundred (100) 3-1/2" height letters as selected by architect; Prismatic K-410, 3-1/2" height, 3/4" thick, stainless steel letters as manufactured by Southwell.
3. Interior letters: Allow for twenty (20) 2-1/2" height letters as selected by architect; Prismatic K-410, 2-1/2" height, 3/4" thick, stainless steel letters as manufactured by Southwell.
4. Letters shall be mounted with concealed anchors.

- D. Interior Signage:
1. Submit Product Data, Shop Drawings, and material Samples,
 2. Provide electrical components that are labeled and listed by UL and that comply with applicable NEMA standards.
 3. Refer to room finish schedule for number of interior room signs.
 4. Signage to be selected and approved by the Architect and Webb County prior to the Contractor ordering and installing interior signage.

2.3 SIGN SCHEDULE

- A. Emergency Notification Signs:
1. Emergency notification: Provide sizes and text as required by regulatory authorities having jurisdiction.
 2. Graphics: International symbols for indicated information, with directional arrows.
- B. Restroom Accessibility Signs:
1. Colors: Face color to be selected by Architect; graphics and letter color to be selected by Architect.
 2. Sign Size: 8 inches by 8 inches.
 3. Graphics: International symbols for indicated information with number 2 Braille coding.
- C. All rooms as indicated on the projects room finish schedules. The Architects and City of Laredo to determine room numbers prior to Contractor ordering signage.
- D. Room Signage:
1. Signage to be Mohawk Series 100 — engraved process/ metal finish —or equal.
 2. Sign Size: 8 inch x 8 inch. to meet TAS Standards.
- E. Accessories: Installation accessories specified in manufacturer's instructions.
- F. Tape Adhesive: Double sided tape, permanent adhesive.
- G. Accessible Parking Signage: See construction documents.
- H. Attachment System: Custom system as indicated on the Drawing.

2.4 FABRICATION

- A. General: Provide manufacturer's standard sign assemblies according to requirements indicated.
1. Mill joints to a tight, hairline fit. Form assemblies and joints exposed to weather to resist water penetration and retention.
 2. Provide welds and brazes behind finished surfaces without distorting or discoloring exposed side. Clean exposed welded and brazed connections of flux, and dress exposed and contact surfaces.
 3. Conceal connections if possible; otherwise, locate connections where they are inconspicuous.
 4. Internally brace signs for stability and for securing fasteners.

5. Provide rebates, lugs, and brackets necessary to assemble components and to attach to existing work. Drill and tap for required fasteners. Use concealed fasteners where possible; use exposed fasteners that match sign finish.
- B. Surface-Engraved Graphics: Machine engrave characters and other graphic devices into panel surface indicated to produce precisely formed copy, incised to uniform depth.
1. Engraved Metal: Fill engraved graphics with manufacturer's standard baked enamel.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. General: Install signs using mounting methods indicated and according to manufacturer's written instructions.
1. Install signs level, plumb, true to line, and at locations and heights indicated, with sign surfaces free of distortion and other defects in appearance.
 2. Install signs so they do not protrude or obstruct according to the accessibility standard.
 3. Before installation, verify that sign surfaces are clean and free of materials or debris that would impair installation.
 4. Corrosion Protection: Coat concealed surfaces of exterior aluminum in contact with grout, concrete, masonry, wood, or dissimilar metals, with a heavy coat of bituminous paint.
- B. Mounting Methods:
1. Concealed Studs: Using a template, drill holes in substrate aligning with studs on back of sign. Remove loose debris from hole and substrate surface.
 - a. Masonry Substrates: Fill holes with adhesive. Leave recess space in hole for displaced adhesive. Place sign in position and push until flush to surface, embedding studs in holes. Temporarily support sign in position until adhesive fully sets.
 - b. Thin or Hollow Surfaces: Place sign in position and flush to surface, install washers and nuts on studs projecting through opposite side of surface, and tighten.
 2. Projecting Studs: Using a template, drill holes in substrate aligning with studs on back of sign. Remove loose debris from hole and substrate surface.
 - a. Masonry Substrates: Fill holes with adhesive. Leave recess space in hole for displaced adhesive. Place spacers on studs, place sign in position, and push until spacers are pinched between sign and substrate, embedding the stud ends in holes. Temporarily support sign in position until adhesive fully sets.
 - b. Thin or Hollow Surfaces: Place spacers on studs, place sign in position with spacers pinched between sign and substrate, and install washers and nuts on stud ends projecting through opposite side of surface, and tighten.
 3. Through Fasteners: Drill holes in substrate using predrilled holes in sign as template. Countersink holes in sign if required. Place sign in position and flush to surface. Install through fasteners and tighten.
 4. Brackets: Remove loose debris from substrate surface and install backbar or bracket supports in position so that signage is correctly located and aligned.

5. Adhesive: Clean bond-breaking materials from substrate surface and remove loose debris. Apply linear beads or spots of adhesive symmetrically to back of sign and of suitable quantity to support weight of sign after cure without slippage. Keep adhesive away from edges to prevent adhesive extrusion as sign is applied and to prevent visibility of cured adhesive at sign edges. Place sign in position, and push to engage adhesive. Temporarily support sign in position until adhesive fully sets.
 6. Two-Face Tape: Clean bond-breaking materials from substrate surface and remove loose debris. Apply tape strips symmetrically to back of sign and of suitable quantity to support weight of sign without slippage. Keep strips away from edges to prevent visibility at sign edges. Place sign in position, and push to engage tape adhesive.
- C. Remove temporary protective coverings and strippable films as signs are installed.

END OF SECTION 104000

SECTION 104413

FIRE EXTINGUISHER CABINETS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes fire protection cabinets for fire extinguishers.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: For fire protection cabinets. Include plans, elevations, sections, details, and attachments to other work.
- C. Samples: For each exposed product and for each color and texture specified.

1.3 CLOSEOUT SUBMITTALS

- A. Maintenance data.

1.4 QUALITY ASSURANCE

- A. Fire-Rated, Fire Protection Cabinets: Listed and labeled to comply with requirements in ASTM E 814 for fire-resistance rating of walls where they are installed.
- B. Coordinate size of fire protection cabinets to ensure that type and capacity of fire extinguishers indicated are accommodated.
- C. Coordinate sizes and locations of fire protection cabinets with wall depths.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Fire-Rated Fire-Protection Cabinets: Listed and labeled to comply with requirements in ASTM E 814 for fire-resistance rating of walls where they are installed.

2.2 FIRE PROTECTION CABINET – FEC

- A. Cabinet Type: Suitable for fire extinguisher.
 - 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Fire End & Croker Corporation;
 - b. J. L. Industries, Inc., a division of Activar Construction Products Group;.
 - c. Kidde Residential and Commercial Division, Subsidiary of Kidde plc;.

- d. Larsen's Manufacturing Company;.
 - e. Modern Metal Products, Division of Technico Inc.;
 - f. Moon-American;
 - g. Potter Roemer LLC;
 - h. Watrous Division, American Specialties, Inc.;
- B. Cabinet Construction: Per rating of adjacent wall.
- C. Cabinet Material: Aluminum sheet.
- D. Semirecessed Cabinet: Cabinet box partially recessed in walls of sufficient depth to suit style of trim indicated; with one-piece combination trim and perimeter door frame overlapping surrounding wall surface with exposed trim face and wall return at outer edge (backbend). Provide where walls are of insufficient depth for recessed cabinets but are of sufficient depth to accommodate semirecessed cabinet installation.
1. Rolled-Edge Trim: 4-inch (102-mm) backbend depth.
- E. Cabinet Trim Material: Aluminum sheet.
- F. Door Material: Aluminum sheet.
- G. Door Style: Solid Aluminum Door.
- H. Door Hardware: Manufacturer's standard door-operating hardware of proper type for cabinet type, trim style, and door material and style indicated.
- I. Accessories:
1. Mounting Bracket: Manufacturer's standard steel, designed to secure fire extinguisher to fire protection cabinet, of sizes required for types and capacities of fire extinguishers indicated, with plated or baked-enamel finish.
 2. Door Lock: Cam lock that allows door to be opened during emergency by pulling sharply on door handle.
 3. Identification: Lettering complying with authorities having jurisdiction for letter style, size, spacing, and location. Locate as directed by Architect.
 - a. Identify fire extinguisher in fire protection cabinet with the words "FIRE EXTINGUISHER."
 - 1) Location: Applied to cabinet or door cabinet glazing.
 - 2) Application Process: Diecut 3/4" x 18".
 - 3) Lettering Color: Black.
 - 4) Orientation: Vertical.
- J. Finishes:
1. Aluminum: ASTM B 221 (ASTM B 221M), with strength and durability characteristics of not less than Alloy 6063-T5 for aluminum sheet. ASTM B 221 (ASTM B 221M) for extruded shapes.
 - a. Finish: Clear anodic.

2.3 FABRICATION

- A. Fire Protection Cabinets: Provide manufacturer's standard box (tub), with trim, frame, door, and hardware to suit cabinet type, trim style, and door style indicated. Miter and weld joints and grind smooth.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Examine walls and partitions for suitable framing depth and blocking where recessed and semirecessed cabinets will be installed and prepare recesses as required by type and size of cabinet and trim style.
- B. Install fire protection cabinets in locations and at mounting heights indicated or, if not indicated, at heights acceptable to authorities having jurisdiction.
- C. Fire Protection Cabinets: Fasten cabinets to structure, square and plumb.
- D. Identification: Apply decals at locations indicated.
- E. Adjust fire protection cabinet doors to operate easily without binding. Verify that integral locking devices operate properly.
- F. Replace fire protection cabinets that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION 104413

SECTION 108000

TOILET ROOM ACCESSORIES

1. SCOPE

Provide and install toilet room accessories and mounting devices. Install accessories noted to be furnished by owner and installed by contractor. Location, if not shown on drawings, shall be at location as directed by architect at job site.

2. STANDARDS

Bobrick items are specified to be purchased and installed by contractor. Items of equal quality and same design features and standards from the following firms are acceptable: Sloan Valve Co., "Pinnacle" hand dryer, Accessory Specialties, Bradley Corporation, and Gamco.

3. ACCESSORIES

A. Grab Bars:

- 1) At toilets, furnish and install Bobrick B-5507, 42" (except 36" and 18" length as noted on drawings).
Provide anchors as required for permanently secure installation. - TA-1, TA-2, & TA-3.
- 2) Design shall meet State of Texas Senate Bill No. 111 - Sixty-first Legislature, as amended by HB 1319 - Sixty-second Legislature. Mount at 34" height and parallel to floor or height noted on documents.

Handicap shower controls and adjustable head (See MEP drawings and or specifications end or plastic shower partition specifications).

B. Paper Towel Dispenser / Receptacle: Furnish and install one B-3944 paper towel dispensers / receptacle at each toilet room 113 and 114. Install at locations required to meet ADA cane clearance/detection at each lavatory. – TA-4.

C. Toilet Paper Dispensers: Furnish and install toilet paper dispensers B-2888. At each water closet, install one toilet paper dispenser. – TA-5.

D. Electric Hand Dryer: Provide Bobrick Trimline Series B-7128 in type 304 stain-finish stainless steel cover with black plastic trim. - TA-6

E. Soap Dispensers: Supply and install Model B-4063 recessed soap dispenser for anti-bacterial liquid soap at sinks. Install one at each hand wash lavatory or sink in restrooms. –TA-7.

F. Mirrors: Furnish and install 24" x 36", B-165 2436 stainless steel channel framed mirrors, concealed hangers, grade #1, 1/4" polished plate glass. Mount mirrors at handicapped lavatory locations for each grade level/age. Mount non-handicap mirrors at heights as directed by owner in field. Install one mirror at each lavatory/sink on each toilet or restroom shown on plans. – TA-8 – 24" x 36" (B-165 2436), custom sizes as shown on interior elevations.

G. Sanitary Napkin Disposal: Furnish and install one B-5270 at each female toilet location. TA-9

H. Mop Sink: Provide where indicated; see Plumbing Schedules. – TA-10.

I. Mop Rack: Provide where indicated; see Miscellaneous Specialties. – TA-11.

J. Drinking Fountain: Provide where indicated; see Plumbing Schedules. – TA-12.

K. Coat Hooks: Provide Bobrick Double Coat Hooks B-682. Provide where indicated and one in each shower compartment and 4 in each locker areas where directed by architect. – TA-13.

NOTE: If TA numbers are not shown, provide the toilet accessory indicated on the drawings by matching the specification for each item above.

4. INSTALLATION

A. Install all accessories in accordance with manufacturers written instructions, securely anchored, plumb and level.

END OF SECTION 108000

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PART 1 – GENERAL

1.01 RELATED DOCUMENTS

- A. The general provisions of the Contract, including General and Supplementary Conditions and General Documents, apply to the Work specified in this Section.

1.02 SUMMARY OF WORK

- A. **Location:** the project site is: WEBB COUNTY YOUTH VILLAGE REHABILITATION CENTER
111 Camino Nuevo Road, Highway 359
Laredo, Texas 78046
- B. **Approval of Working Surface:** any contractor performing work over the work of other contractors shall notify the Architect and General Contractor of any unsatisfactory conditions. Beginning of work by any contractor shall constitute acceptance of the previous work.
- C. **Checking Dimensions at Site:** before ordering any materials or doing any work, verify all measurements of the building and be responsible for the correctness of them. No extras will be allowed for variations from drawings in existing conditions or for work performed under this contract. Any discrepancies found shall be submitted, in writing, to the Architect and General Contractor for instructions before proceeding.
- D. **Cutting and Patching:** no excessive cutting will be permitted, nor shall any structural members be cut without the written approval of the Architect. Each Contractor shall leave all chases and openings straight, true and of the proper size in his work as may be necessary for the proper installation of his and other contractor's work. After such work has been installed, he shall carefully fit around, close up, repair, patch and point up same as directed, to the entire satisfaction of the Architect.
- E. **Cooperation:** the General Contractor, all other contractors, and all sub-contractors shall coordinate their work with all adjacent work and shall cooperate with all other trades to facilitate the general progress of the work. Each trade shall afford all the other trades every reasonable opportunity for installation of their work and storage of their material.
- F. **Inspection and Tests:** Architect, and his representative, shall at all times have access to the work, whether it is in preparation or progress. Provide proper and safe facilities for such access and inspection.
- G. **Fees, Permits, and Inspections:** secure and pay fees for all permits, licenses, and inspections as required by all authorities having jurisdiction. Give all notices and comply with all laws, ordinances, rules, regulations and contract requirements bearing on the work.

SECTION 11 40 00 – FOOD SERVICE EQUIPMENT

- H. **Drawings/Specifications Complementary:** the bid drawings and bid specifications are complementary, in that any information shown on one, but not the other, shall be treated as if it appears on both.

1.03 SCOPE

- A. **Project Scope:** Include the Work specified, shown, or reasonably inferable as part of the Food Service Equipment. Portions of this Work may be sub-contracted to those qualified to do such work, as may be necessary because of jurisdictional trade agreements and restrictions.
- B. **Contractor Responsibilities:** The General Contractor is responsible for Related Work specified in other Sections: i.e.: final plumbing, electrical, and mechanical connections. The Food Service Equipment Contractor is responsible for all internal connections of his equipment, when specified.

1.04 RELATED WORK SPECIFIED IN OTHER SECTIONS

- A. **Corner Guards:** Division 09.
- B. **Supply and Exhaust Fans:** for food service equipment and exhaust hoods: Division 22.
- C. **Structural steel support members/framing:** above 12'-0" A.F.F. for ceiling mounted appliances/fixtures: Division 05.
- D. **Roughing in and final connection of mechanical, electrical, and plumbing systems:** to Fixed, Movable Food Service Equipment and Cold Storage Assemblies: Division 22/26.
- E. **Millwork Fixtures:** (eg: front/back bars, service counters, wedges, front and end panels, plastic laminate fixtures, unless otherwise specified): Division 06.

1.05 QUALITY ASSURANCE

- A. **Compliance:** In addition to complying with applicable laws, statutes, building codes, and regulations of public authorities, comply with the following:
01. National Sanitation Foundation (all equipment to bear label)(NSF)
 02. National Electric Code (NEC)
 03. Underwriter's Laboratories, Inc. (UL)
 04. American Gas Association (AGA)
 05. National Fire Protection Association (NFPA)

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06. Americans with Disabilities Act (ADA)
 07. Food and Drug Administration HAACP Guidelines (FDA)
 08. Clean Air Act, Title 6
 09. International Mechanical Code 2006-2009, Chapter 5, Section 507 – Commercial Kitchen Hoods, paragraph 507.2.1.1 Operation – and as approved by local code requirements. (IMC)
 10. NSF No. AB-1953 (AB1953)
- B. **Certification:** Furnish certification of regularly manufactured equipment listing, or classification, by Underwriter's Laboratories, Inc., or other recognized test facility, with initial submittal.

1.06 SUBSTITUTION/APPROVED EQUALS

- A. Equipment items or components specified are intended to be the Basis of Bid.
- B. All other brands, including any additional names which may be listed as "Alternates" or "Approved Equal" must conform with the specifications, size, accessories, etc. of the first named brand, and be subject to Paragraph E-03 of this Article.
01. Submitted on Bidder's letterhead, attached to the Proposal Form, with individual deductive amounts stipulated and the documentation required in Paragraph E-03.
 02. All savings for Owner's selection of deductive amounts by acceptance of alternate or substituted items are to be paid to the Owner.
- C. All appliances within common group or category (i.e. refrigerators, kettles, ovens, etc.) must be the same manufacturer.
- D. **Proposed Substitutions/Approved Equals:**
01. Submitted no less than seven (7) calendar days prior to Bid Date.
 02. Submit proposed substitutions with catalog data and/or manufacturer's shop drawings indicating all modifications required to conform to the specified brand.
- E. **Substitutions with prior approval:**
01. Submitted on Bidder's letterhead, attached to Proposal/Bid Form with individual additive/deductive amounts stipulated and the documentation required in Paragraph B-02.
 02. Owner reserves the right to accept or reject any or all substitution proposals

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before the execution of the contract.

03. Section 11 40 00 to provide all design/engineering services required to make adjustments in space, systems, utilities, etc and **pay all additional costs of utilities, construction or professional services** that maybe incurred due to acceptance of any substitution.

1.07 INTERPRETATION OF DOCUMENTS

- A. **During bidding:** contractor's, suppliers, or vendors questions and comments pertaining to Construction Documents' clarity or intent will be addressed by Addendum.
 01. **Bidders shall request complete written quotations from all manufacturer's listed in the Item Specifications, where applicable, and shall not use third party quotation programs to obtain pricing.**
 02. **Bidders will be held responsible for any errors in their bids that occur due to information being submitted that is not in accordance with the actual specifications and drawings for the project.**
- B. **Subsequent to Award:**
 01. Confirmation of Construction Document requirements will be provided by Clarification Bulletin.
 02. Request For Information Bulletins submitted by Contractor should contain Contractor's proposed resolution.

1.08 WARRANTY

- A. Provide a written warranty for a period of one (1) year from the date of Substantial Completion, including extended four (4) year replacement warranty on compressor bodies.
- B. Components of equipment subject to replacement prior to one-year's use (such as refrigerator door gaskets) and those items which may fail due to improper or inadequate periodic maintenance by the Owner/Operator (such as uncleaned refrigeration system condensers) are not intended to be included within the scope of the Warranty.
- C. **Refrigeration Systems/Equipment:** one (1) year free service available within twenty-

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four (24) hours of notification.

- D. Furnish three (3) copies of a list of all equipment and their respective local service agencies, indicating the address, telephone number and name of person to contact. Whenever possible, the service agencies selected shall be factory authorized for the equipment assigned.

1.09 SUBMITTAL DATA

- A. **Special Requirements:** the following are in addition to any general requirements given elsewhere in these Documents.
- B. **All Drawings and Other Submittals:** indicate Five Oaks Kitchen Design as Food Service Consultant.
- C. **Preliminary Submittal:** submit two (2) copies of the “buy-out” equipment brochure, one (1) reproducible, and two (2) prints of all roughing – in and fabrication shop drawings directly to the Food Service Consultant within four (4) weeks after award of contract, Notice to Proceed, or issuance of Letter of Intent. **Partial submittals will not be accepted or processed.**
 - 01. Include information listed in Article 1.13 – Verification and Coordination of Project Data.
- D. **Brochure Format (for regularly manufactured equipment and components):**
 - 01. **Front and rear protective cover:** with labeled project name.
 - 02. **Cover page with Project Location/Address:** name, address and telephone/FAX number of Owner, Architect, General Contractor, Food Service Consultant, Food Service Contractor, Stainless Steel Fabricator, and Equipment Installer (if different than Food Service Contractor)
 - 03. **Brochure index:** indicate functional Area/Room number, item number, quantity, description and manufacturer.
 - 04. **A separate fly sheet:** for each component or item of equipment, indicating item number, name, quantity, manufacturer, optional equipment, modifications, special instructions and utility requirements. An item of equipment or assembly containing more than one “buy-out” sub-assembly or component shall have the secondary item listed in parenthesis beside the primary item name (e.g. Serving

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Count (hot food well).

05. **Catalog specification sheet and/or manufacturer's drawings:**

- a. ***A separate catalog specification sheet, and/or manufacturer's drawing shall be submitted for each item specified in the project.***
- b. ***Each catalog specification sheet and/or manufacturer's drawing shall be annotated with the pertinent information concerning item specified, including, but not limited to: quantity, model number, utility connection requirements, and any modifications to standard specifications.***

06. ***Brochure sets submitted without the above information will be rejected, marked "revise and resubmit" and returned to the Food Service Contractor for correction.***

07. A separate fly sheet for each component or item of equipment, indicating item number, name quantity, manufacturer, optional equipment, modifications, special instructions and utility requirements. An item of equipment or assembly containing more than one "buy-out" sub-assembly or component shall have the secondary item listed in parentheses beside the primary item name (e.g.: Serving Counter (hot food well)).

08. Catalog specification sheet and/or manufacturer's drawing.

09. Certification letter of equipment listing or classification by Underwriter's Laboratories, Inc., or other recognized testing facility.

E. **Shop drawings (Rough-in drawings):**

01. Separate drawings sheets: same size as Contract Drawings (NOTE: Contract Drawings are not to be traced or reproduced)

02. ¼" scale drawing of fixed/mobile Food Service Equipment and pre-fabricated Cold Storage Assemblies, with itemized schedules.

03. **Special Conditions Drawings**, sizing and locating the following conditions:

- a. Blocking grounds or anchor plates required in walls for equipment support/attachment.
- b. Above ceiling hanger assemblies for support of exhaust hoods, utensil racks, etc.
- c. **All dimensions to be indicated from finished exterior wall and column lines.** Finished interior walls may be used if located from finished exterior wall or column lines. **Submittals without this information will be rejected.**

04. **Electrical rough-in drawings:** all dimensions to be indicated from finished exterior walls or column lines. **Submittals without this information will be**

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rejected.

a. Connection numbering/tag system and symbols to be identical to Contract Drawings.

05. **Plumbing/Mechanical rough-in drawings:** all dimensions to be indicated from finished exterior wall or column lines. Finished interior walls may be used if located from finished exterior walls or column lines. **Submittals without this information will be rejected.**

a. Connection numbering/tag system and symbols to be identical to Contract Documents.

06. **Required information:** all general use and convenience utilities or services indicated on Contract Drawings, including those required by or connected to equipment or devices not in this section.

F. Shop Drawings (Manufacturer's and Fabricators):

01. Sheet size shall be identical to Contract Drawings, drawn or plotted at 3/4" scale for plan view and elevations; 1-1/2" scale for sections and construction details.

02. Included information shall be item number, name, and quantity.

03. Construction details, sections, and elevations to reflect requirements of the Specifications and Drawings.

04. Indicate adjacent walls, columns, and equipment

05. Indicate plumbing and electrical schematic drawings for equipment, such as refrigeration lines/systems, exhaust hood, fire protection systems and fabricated fixtures with single electrical (**junction box or load center**) or plumbing connection.

06. Mechanical or electrical operating components or products integrated into a fabricated fixture: ventilation and service access required or recommended by the manufacturer, including panel size and location, to permit easy lubrication, adjustment, or replacement of all moving parts.

G. Regular Submittal:

01. After the return of one copy of the preliminary submittal, make any required corrections and resubmit for approval.

02. Follow routine procedures specified elsewhere, or as directed.

03. All data and material should be thoroughly reviewed for compliance by

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Contractor, **PRIOR TO SUBMITTAL**. Food Service Consultant's repetitive reviewing time (**more than twice**), incurred due to Contractor's failure to comply with the requirements of this Article, **will be invoiced** to this Contractor at Consultant's standard hourly rates.

H. **Project Completion Submittal: (If Required)**

01. Contractor shall submit, as part of the project close-out, in Revit format, if requested, the following information:
 - a. As-built floor plans.
 - b. As-built mechanical/electrical drawings.
 - c. As-built custom fabricated equipment shop drawings.
 - d. Approved brochure submittal.

02. Submittal shall be on flash drives and in the following quantities:
 - a. One (1) for General Contractor.
 - b. Two (2) for Owner.
 - c. One (1) for Architect.
 - d. One (1) for Food Service Consultant.

1.10 **SERVICE MANUAL**

- A. Provide Service Manuals in electronic format (CD disc or adequate Flash Drive) for scope of project, with the same data as approved equipment brochure, at completion of installation (Refer to "Submittal Data").

- B. **Each volume:** section for maintenance of finish materials (e.g. stainless steel, corian, granite, plastic laminate, FRP, Plexiglass, etc)

- C. Catalog specification sheet and/or manufacturer's shop drawings.

- D. **Each volume:** index of items, manufacturer's operating/maintenance information, and replacement parts data and price lists. Provide the name, title, address of personnel at each respective manufacturer to be contacted for spare/replacement parts after warranty period.

- E. To the extent possible, provide two (2) copies of manufacturer's video instructional cassettes for operating, maintenance and service of equipment.

1.11 **VERIFICATION AND COORDINATION OF PROJECT/DATA**

- A. **Utilities Rough-in Drawings/Field Services:** within four (4) weeks after receipt of notice-to-proceed, review Contract Drawings and Submittal Data for accuracy and completeness and notify Food Service Consultant and Architects of conflicts and any proposed amendments. Coordinate work with other sub-contractors.

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- B. **On-site field verification:** Provide on-site field verification of all underground utilities prior to pouring (if applicable) of concrete for capacity and location, coordinate with General Contractor. Provide on-site verification of in-slab utilities installed prior to Contractor Notice-To-Proceed, coordinate with General Contractor. Submit review to Food Service Consultant, Architect, and General Contractor.

01. Provide on-site field verification of all other utility connections and locations, coordinate with General Contractor. Submit review to Food Service Consultant, Architect, and General Contractor.

C. **ON SITE INSPECTION REPORT**

01. **Prior to concrete pour:** submit a copy of the following report to the Architect, General Contractor, and Food Service Consultant, within 24 hours of the inspection.

02. **Prior to delivery of equipment:** submit a copy of the report to the Architect, General Contractor, and Food Service Consultant within 24 hours of the inspection.

ON-SITE INSPECTION REPORT

(PRIOR TO CONCRETE POUR)

INSPECTION DATE: _____

PROJECT: WEBB COUNTY YOUTH VILLAGE REHAB CENTER

PROJECT LOCATION: 111 CAMINI NUEVO RD.

LAREDO, TEXAS

ARCHITECT: AUSLAND ARCHITECTS – METAFORM ARCHITECS

Project Architect: JESSE RUIZ

Telephone/FAX (956) 568-3315 (956) 753-5901 FAX

GENERAL CONTRACTOR: _____

Project Manager: _____

Telephone/FAX _____

FOODSERVICE CONSULTANT: FIVE OAKS KITCHEN DESIGN

Project Manager: Robert Pursell

Telephone/FAX: (713) 705-0952/(281) 778-8536 FAX

An on-site inspection to verify the location of the underground utilities was conducted by:

_____ of _____

The following conditions were observed and brought to the attention of the General Contractor: (KEC to provide a written description and a copy of the utility plan indicating the corrective action required.)

1. _____
2. _____

Add additional pages as necessary as required.

The underground utilities were installed per the contract document with no corrections required.

(FAX COPY OF REPORT AND ANY ADDITIONAL INFORMATION TO THE ARCHITECT, GENERAL CONTRACTOR AND FOODSERVICE CONSULTANT.)

ON-SITE INSPECTION REPORT

(PRIOR TO DELIVERY OF EQUIPMENT)

INSPECTION DATE: _____

PROJECT: WEBB COUNTY YOUTH VILLAGE REHAB CENTER

PROJECT LOCATION: 111 CAMINI NUEVO RD

LAREDO, TEXAS

ARCHITECT: AUSLAND ARCHITECTS – METAFORM STUDIO ARCHITECTS

Project Architect: JESSE RUIZ

Telephone/FAX: (956) 568-3315 (956) 753-5901 FAX

GENERAL CONTRACTOR: _____

Project Manager: _____

Telephone/FAX _____

FOODSERVICE CONSULTANT: FIVE OAKS KITCHEN DESIGN

Project Manager: Robert Pursell

Telephone/FAX: (713) 705-0952/(281) 778-8536 FAX

An on-site inspection to verify location of install utilities was conducted by:

_____ of _____

The following conditions were observed and brought to the attention of the General Contractor: (KEC to provide a written description and a copy of the utility connection plans indicating the corrective action required.)

1. _____

2. _____

Add additional pages as necessary as required.

The utilities were installed per the contract document with no corrections required.

(FAX COPY OF REPORT AND ANY ADDITIONAL INFORMATION TO THE ARCHITECT, GENERAL CONTRACTOR AND FOOD SERVICE CONSULTANT)

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- D. Review critical systems/components for application, performance, and capacity. Submit calculation worksheets with initial submission of brochure/rough-in drawings, with all proposed adjustments noted, including:
01. Exhaust hood, exhaust/supply air volumes, velocity, static pressure, duct collar sizes and locations.
 02. Exhaust hood fire suppression systems (nozzle locations, air handler, and fuel interlocks, piping/distance limitations).
 03. Refrigeration systems (compressor, condenser, and evaporator) capacities/sizes, quantities, and refrigerant piping distances/sizes.
 04. Location of vacuum breakers.
 05. Conformance of refrigerated components/equipment with HACCP guidelines (e.g.: salad/sandwich pans, upright/open refrigerator cabinets, salad bars).
 06. Gas, chilled water lines, hot/cold water line sizes and manifold configurations.
 07. Diameter and length of flexible connector lines for fixed/movable gas appliances.
 08. Fabricated equipment load center panels (individual and total amperage calculations and circuit balance).
 09. ADA compliance of work stations, service positions, passageways, etc.
- E. **Ceiling Mounted Appliances/Fixtures:** verify and coordinate dimensions/location of support framing/hangars with General Contractor. All material and installation below 12'-0" A.F.F., Section 11 40 00.
- F. **Dimension Responsibility:** obtain actual or guaranteed measurements for proper fit of equipment. All dimensions indicated in Contract Documents are approximate and are as accurate as can be determined at the time. Field check all horizontal/vertical measurements and conditions at the building, prior to fabrication or delivery of equipment and notify the Food Service Consultant, Architects, and General Contract of all conflicts or deviation from the dimensions shown in writing.
- G. **Checking Dimensions at Site:** before ordering any materials or doing any work, verify all measurements of the building and be responsible for the correctness of them. No extras will be allowed for variations from drawings in existing conditions or for work performed under this contract. Any discrepancies found shall be submitted to the Food Service Consultant, Architect, and General Contractor, in writing, for instructions before proceeding.
- H. **Scheduling to Fit Openings:** should it become necessary to schedule construction of walls or partitions prior to delivery of fixed equipment, the equipment must be fabricated for passage through finished opening. Maintain close contact with the project and be cognizant of all conditions, including vertical handling limitations within building (elevator cabs, or openings, stairs, etc.) and possible hoisting requirements. Coordinate all procedures with General Contractor and Project Team.
- I. **Refrigerated and Dry Storage Areas:** verify and coordinate dimensions to

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accommodate scheduled modular shelf sections. Notify Food Service Consultant, Architect, and General Contractor of variance between the Contract Documents and actual conditions.

- J. **Color/Pattern Selections:** submit selection samples of solid polymer products, granite, plastic laminate, paint or stain finishes and vinyl coated surface material of equipment as selected by Owner.
- K. **Movable Equipment Interface:** rolling stock (pan racks, carts, dollies, dish/tray/rack dispensers) required to fit through or into Fixed Equipment (roll-in refrigerators, counter bodies, etc.) is to be reviewed and coordinated for compatibility at time of initial shop drawings submittal. Indicate conflicts and proposed adjustments.
- L. **Relocation of Work:** relocated or re-route work, as required, to coordinate related items free of charge, if no extra work is involved.

PART 2 – PRODUCTS

2.01 FABRICATED FIXTURES MATERIAL/COMPONENTS

- A. **Stainless Steel Sheets or Shapes:** 18-8, Type 302, polished to 180 grit, No 4 finish.
 - 01. Stainless steel joints and seams to be heli-arc welded, free of pits and flaws, ground smooth and polished to No. 4 finish.
 - 02. The “grain” direction of horizontal stainless steel surfaces to be longitudinal, including splashback. The polishing procedure at right angle corners of fixtures shall provide a mitered appearance.
- B. **Galvanized Iron Sheets:** Amco copper bearing Zinc grip or Zinc grip/Paint grip
 - 01. Galvanized iron joints and seams to be arc welded, free of pits and flaws and ground smooth.
 - 02. Galvanized sheets or shapes to be washed with mineral spirits and painted with Rustoleum gray semi-glass enamel.
- C. **Sound Deadening:** Schnee Butyl Sealant, ½” rope positioned continuously between all frame members or contact material and underside of stainless steel surfaces (sinks, table tops, food wells, overshelves, and undershelves). Tighten stud bolts for maximum compression of sealant and trim excess.
- D. **Plastic Laminates:** color/pattern as selected by Architect, in 1/16” thickness for flat surfaces; 1/32” thickness for radiused surfaces. Plastic laminate and adhesives must be N.S.F approved (Standard 35).
- E. **Faucets:** All faucets to meet NSF Standard 61, Section 09 for water faucets, and shall meet or exceed lead free standards of NSF No. AB1953 (AB1953).
- F. **Casters:** Fabricated fixtures with “Open Base” construction to be Jarvis and Jarvis Model No. 5-405-113P-NSF swivel casters with grease seals on forks and wheels; Zerk fittings in swivel; two (2) casters to have Model No. E-75 Vertilock brakes. All casters to

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have Model No. B-7 rolling bumpers with stainless steel top discs.

- G. **Cutting Boards:** ¾" thick Read Products, Inc. "Poly-Lite" cutting board, size as indicated.
- H. **Identification Plates, Labels, Tags:**
 - 01. Prohibited Information: names of suppliers, fabricators, and contractors.
 - 02. NSF Labels: required on all pieces of equipment.
 - 03. Required Information: function or purpose of controls such as display light switches, food warmer controls, etc.
 - 04. Identification Plate Construction: engraved phenolic plastics (in colors selected by Architect, secured to equipment with epoxy cement or stainless steel screws. Furnish samples. Provide identification for serving counters, cold storage assembly doors/rooms, refrigeration systems, exhaust hoods, light and fan switches, fire protection system and remote fire pulls, etc.

2.02 PLUMBING/MECHANICAL REQUIREMENTS

- A. **Plumbing Fittings and Components:** furnished under this Section, as follows:

NOTE: FITTINGS AND COMPONENTS DESCRIBED IN ITEMS 1,2,3, AND 4 ARE FURNISHED LOOSE FOR INSTALLATION BY DIVISION 22.

- 01. Control valves, appliance pressure regulators for water, gas, and vacuum breakers: wherever required on Food Service Equipment (chrome-plated where exposed).
- 02. Faucets and drains with connected overflows (unless otherwise indicated) for all sinks.
- 03. Specialty Food Service water fill faucets or hose assemblies indicated in drawings/specifications.
- 04. Wade Model No. W-10 shock-stop absorbers for all Food Service Equipment with quick opening or solenoid water valves.
- 05. Extensions of indirect waste fittings to open sight floor sink or floor drains from sinks, underbar equipment, and food holding components of serving counters (e.g cold pans, hot food wells, refrigerator/freezer coils(not equipped with condensate evaporators) furnished and installed by Division 22. Drains to be type "K" copper, painted with aluminum paint, where exposed, type "K" copper where concealed.
- 06. Piping brackets and supports beneath/within fabricated equipment.
- 07. Closed base bodies to have removable 18 ga stainless steel closure panel at plumbing penetrations, under top.
- 08. Control valves on Open Base fixtures to be mounted on 14 gauge stainless steel gusset shaped panel with 3-1/2" setback from counter top edge/trim to face of control handle.
- 09. In-line water filter system (unless otherwise specified) to be Everpure System filters for steamers, beverage systems, ice machines, water chillers and coffee/tea brewers, etc.

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- B. **Gas Heated Equipment Fittings and Components:** furnished under this Section as follows:
- 01. **Fixed Equipment:** T&S model no. HG-4 (X) - (X) SK (fitting size- hose length) “Smart-Set” with Quick Disconnect fitting at appliance: diameter per fuel volume/connection size requirements. Gas valve model no APBAL: diameter size per fuel volume//connection size requirements.
 - a. **Restraining device:** heavy duty steel cable, fastened to equipment and walls, 3” to 6” shorter than equipment connector length.
 - 02. **Movable Equipment:** T&S model no HG – 4 (X) – (X) SK (fitting size-hose length) “Smart-Set” with Quick Disconnect fitting at appliance: diameter per fuel volume/connection size requirements. Gas valve model no. APBAL: diameter size per fuel volume/connection size requirements.
 - a. **Restraining device:** heavy duty steel cable, fastened to equipment and walls, 3” to 6” shorter than equipment connector length.
- D. **Final Plumbing Connection Provisions:**
- 01. Fabricated equipment containing components, fittings and/or devices indicated on Food Service Connection Drawings, to be connected to the building systems: each component, fitting, or group thereof pre-piped to a utility compartment for final connection by Division 22. Refer to drawings for capacities.
 - 02. Field assembled equipment (e.g. exhaust hoods, warewash machines, convection ovens, etc.) plumbing components completely interconnected under this Section for final connection arrangements indicated on Utility Connection Drawings.
 - 03. All plumbing final connection points of equipment shall eb tagged, indicating:
 - a. Item number.
 - b. Name of devices or components.
 - c. Type of utility (H/C water, gas, drain)

2.03 FOOD SERVICE EQUIPMENT REFRIGERATION SYSTEMS

- A. Install complete with all refrigerant, oil, dials, dehydrators, gauges, controls required for the proper operation of the system.
- B. Self-contained or factory install compressors: check and adjust to proper operating temperature as prescribed by FDA/HACCP.

2.04 PLUMBING TRIM

- A. **Faucets:** furnished for all sinks or equipment requiring open water supply.

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- B. **Drain Fittings:** furnished for all sinks or equipment requiring removal of liquids. Install specified chrome plated or stainless steel fittings in die stamped openings with washers and locknuts. Solder may be used as a sealer but shall not be applied to the top surface of the drain fittings.

2.05 ELECTRICAL REQUIREMENTS

- A. **All electrical systems, components and accessories within the work of this Section:** certified to be in accordance with NEC-70.
- B. **Electrical Fittings and Components:** furnished under this Section as follows:
Coordinate food service equipment loads, voltage and phase with building system and confirm any existing or OF/OI equipment requirements.
- C. **Cords and Caps:**
01. Coordinate all Food Service Equipment cord/caps with related receptacles.
 02. All 120 volt “plug-in” equipment shall have Type SO or SJO cord and plug, with ground wire fastened to frame/body of item.
 03. Cord lengths for fixed equipment: adjusted to eliminate loose hanging excess.
 04. All mobile equipment: equipped with Kellems strain relief assembly at the cord connection of the appliance.
 05. All mobile electrical support equipment (heated cabinets, dish carts, etc.) and counter appliances mounted on mobile stands (mixers, food cutters, slicers, etc.): 8’0” cord and length with cord hangar strap welded to the rear of equipment or mobile stand by Food Service Contractor.
 06. Switches and Controls: Each motor driven appliance or electrically heated unit equipped with switch or starter per Underwriter’s Laboratories, Inc, with low voltage and overload protection.
 07. Equipment which is not provided with built-in circuit breaker or fused terminal block and is indicated on Utility Connections Drawings to be directly connected to the building electrical system: a NEMA Type 4 stainless steel disconnect switch furnished and installed by Division 26, (unless otherwise noted)
 08. All remote manual starters, disconnect switches, magnetic contactors or starters and push button stations: NEMA Type 4 stainless steel enclosure, NEMA Type 1 enclosure on when installed in a Closed Base Body.
 09. All 208/240 volt and 460/480 volt equipment or devices: integral, pre-wired step down transformer to provide 120 volt control circuit.
- D. **Motors:**
01. 120 volt motors: manual tumbler type starter with thermal overload protection and interchangeable heating elements.
 02. 208/240 volt and 460/480 volt motors: magnetic starter with low voltage protection and one interchangeable overload relay per phase.
- E. **Heating Elements:**

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01. Electrically heated equipment: thermostatic controls.
02. Water heated equipment: equipped with positive low water shut – off.

F. Receptacles and Switches:

01. Receptacles installed in vertical panels in closed base bodies: installed in 12" x 8-1/2" x 3" deep recessed mounting panel sloped on 60 degree angle and turned up to top of opening.
02. Pre-wire receptacles in closed base fixtures to a junction box installed within 6" from bottom of utility or compressor compartments.
03. Receptacles mounted on Open Base Fixtures: installed on 12" x 10-1/2" x 4-1/2" deep 14 gauge stainless steel panel with returned ends and sloping recess. Secure panel to underframe of fixture top.
04. Pre-wire receptacles on open base fixtures to a junction box mounted on underside of lower shelf, and welded to same.
05. Receptacles installed in/on fabricated equipment: Hubbell Wiring Device – Kellems GF20WLA, GFCI, 20 Amp, 120 VAC, 5-20R, LED – White Commercial assemblies horizontally mounted in a metal box with stainless steel cover plate.
06. Receptacle provided by Division 26, and installed as wall mounted receptacles in Food Service Areas, should be GFCI rated assemblies horizontally or vertically mounted per electrical schedules.
07. Switches installed in/on fabricated equipment: Hubbell, Inc. with metal box and stainless steel cover plate. Switches: pre-wired to the controlled device and to a junction box installed within 6" from bottom of utility compartment. All refrigeration system switches: installed within the compressor compartment near the door opening.
08. Load centers installed in/on fabricated equipment: to have all fixture components pre-wired to load center with balanced phase loading. Load Center: ready for final connection by Division 26, and flush mounted within completely enclosed utility compartment; rear panel, set back 8" from access door. All breaker/device information: typewritten on circuit schedule on load center door (number corresponding breaker/device) with enclosed wiring diagram of fixture compartments.

G. Light Fixtures:

01. Light fixtures with lamps installed in/on fabricated or field assembled equipment: pre-wired to a junction box for final connection (continuous run fixtures when indicated)
02. Fluorescent Display Light: install light fixtures full length of Display Stand , Serving Shelf and/or solid tray slide, with stud bolts and pre-wire through support posts to an apron mounted switch.
03. LED Display Light: install light fixtures full length of Display Stand, Serving Shelf,

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and/or solid tray slide, in accordance with manufacturer's recommendations, and pre-wire through support posts to an apron mounted switch. Submit LED display light manufacturer for approval prior to fabrication, with full construction details.

04. Heat Lamps: installed to the underside of serving shelf assemblies. When multiple 24" heat lamps are specified, provide maximum length heat lamp chassis. Install all switches remote from lamps.

H. **Final Electrical Connection Provisions:**

01. **Fabricated equipment, containing electrically operated components or fittings, indicated on Utility Connections Drawings:** direct – connected, with each component, fitting, or group pre-wired to a junction box for final connection by Division 26. Refer to drawings for circuit loading.
02. **Fabricated equipment containing electrically operated components and/or devices indicated:** circuit-breaker load center for each component or device pre-wired to a separate circuit-breaker for balanced phase loading and single final connection by Division 26.
03. **Field assembled equipment (e.g. exhaust hoods, warewash machines, etc.):** shall have electrical components completely interconnected in this Section for final connection arrangements as indicated on Utility Connection Drawings, by Division 26.
04. Pre-wire the following groups of cold storage assembly electrical devices to a top-mounted junction box for final connection by Division 26, per compartment grouping (unless otherwise indicated)
 - a. Light fixtures and switches.
 - b. Heated pressure relief vent.
 - c. Door/jamb heaters.
 - d. Evaporator fans, defrost elements, and drain line heaters.
 - e. Wiring from evaporator coils to top of box to be in flexible stainless steel conduit, with exterior poly coating.
05. **All electrical final connection points of equipment shall be tagged, indicating:**
 - a. Item number.
 - b. Name of devices on circuit.
 - c. Total electrical load.

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d. Voltage and phase.

I **Lamps:**

01. In all Food Service Equipment containing light fixtures (unless otherwise specified):

a. Refrigerator or heated cabinets: G.E. model no 40A15 appliance bulbs.

b. All exposed fluorescent lamps above or within a food zone: Shat-R-Shield lamps, or standard lamps, sleeved with end caps.

2.06 CUSTOM FABRICATED/ASSEMBLED UNITS

A. **All custom fabricated fixtures within this Section:** constructed and installed by one manufacturer and shall be of uniform design and finish.

B. **Mechanical or electrical operating components or products integrated into a fabricated fixture:** ventilation and service access required or recommended by the manufacturer. The service access panel(s) size and placement is to permit easy lubrication, adjustment or replacement of all moving parts and is to be indicated on fabrication shop drawings.

2.07 COUNTER/TABLE TOPS

A. 14 gauge stainless steel: all free edges turned down 2" with $\frac{3}{4}$ " tight hem at bottom. Free corners rounded on $\frac{3}{4}$ " radius.

B. Marine edges: turned up $\frac{1}{2}$ " on 45 degree angle and turned down 2", with tight hem at bottom.

C. Tops abutting high fixtures or walls: cove up specified height and slope back 1-1/2" at top on 45 degree angle (2-1/2" slope where piping occurs). Turn down 1" at rear of splash and weld closed ends to bottom of top turn down. Secure splash turndown to wall with 4" long 14 gauge stainless steel "Z" clip anchored to wall at 36" O.C.

D. Freestanding tables and all serving counter splash risers: turn back on 90 degree angle with 1" turndown at rear.

E. **Brace tops:** with rigid-welded 1-1/2" x 1-1/2" x 1/8" galvanized steel angle frame at perimeter with cross-bracing 2'-0" O.C. maximum. Provide 4" x 4" x 12 gauge stainless steel triangular pads where leg gusset welds to frame. Paint entire frame with Rust-O-Leum gray semi-gloss enamel.

01. Angle frames: secured to underside of top surfaces with $\frac{1}{4}$ " studs, welded 9" O.C., maximum, with chrome plated washer, lockwasher, and capnut.

02. Studs: such length that capnuts can be made up tight, bringing top down snugly on angle frame, eliminating all vibrations or "oil canning".

F. **Tops:** 1-1/2" overhang at free sides of under frame or closed base body.

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- G. **All openings in tops:** 3/16" raised die formed edges.
 - 01. **Grommets for top openings:** Mockett model no SG5-26 chrome plated/plastic grommet assembly where service utilities penetrate top surfaces.
- H. **All top openings for pans and inserts:** 20 gauge stainless steel, watertight liners, 8-1/2" deep, secured to underside of counter top.
- I. **All "built-in" and "drop-in" counter equipment/appliances:** with framing members at perimeter of opening.

2.08 BREATH PROTECTOR/SERVING SHELF (unless otherwise specified in itemized specifications)

- A. **Support Posts:** front posts to be 15" high x 1-1/8" square, 16 gauge stainless steel tubing with eased corners, set on 10° slope at 42" O.C. maximum. Rear corner posts to be vertical. Front and rear posts welded to counter top with continuous fillets, ground smooth and polished. Front posts to be welded at 3" O.C. from leading edge of counter top. All surfaces of posts to No. 8 finish. Shelf brackets to be 2" x 13" x 1/4" stainless steel plate welded to level top of front posts. Attach overshelf to brackets with stud-bolt. Carefully coordinate intermediate shelf brackets and/or rear posts with raceway access panels for heat/display light modules.
- B. **Serving Shelf:** full length x 14" wide 16 gauge stainless steel turned down 1" at front and ends; 1" x 3/4" channel edge at rear, full tight hem on three sides with 3/4" radius at free corners. Front edge match slope of front posts. 12' wide (or as specified) x full length x 5/8" 18 gauge stainless steel hat channel secured to undershelf with stud bolt/capnut 8" O.C. maximum. Insulate with 5/8" USDA approved thermal insulation. Mount heat/display light fixtures to panels and install all wiring within cavity. Insulate cavity at heat lamps for maximum shelf temperature of 120° F.
- C. **Breath Protector:** 3/8" tempered plate glass with eased and polished edges, set 1" above counter top. Glass channel to be 5/16" deep, 18 gauge stainless steel with closed bottom, welded to front posts.
- D. **Heat Lamps:** Hatco Corporation model no GRAH – Series with units (in length(s) to fill the allotted space) with consolidated chassis full-length of serving shelf raceway panels for multiple sections. Secure heat lamp assembly tight to insulated hat channel at underside of serving shelf. Center each 24" heat lamp section above each pair of food wells.
 - 01. **Accessories:** remote pilot light and infinite controls for each separate section.
- E. **LED Display Lights:** full length at front (customer's side) of serving shelf. Provide LED display light fixture, in lengths as required, in stainless steel finish. Wire all display lights to single apron mounted master switch, per serving shelf.
- F. Conceal heat lamp/display within a 16 gauge stainless steel housing turned down 2-1/2" at all sides with 1/2" tight hem at interior. Secure housing to insulated hat channel under serving shelf.
- G. Conceal all heat lamps/display light wiring within insulated hat channel under serving shelf and extend through rear corner post.
- H. All breath protectors shall be in accordance with NSF Standard No 2.

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2.09 BREATH PROTECTOR/SELF-SERVE (unless otherwise specified in itemized specifications)

- A. **Posts:** vertical 18" high x 1-1/8" square 16 gauge stainless steel tubing with eased corners; set at 42" O.C., maximum. Front posts to be welded at 3" O.C. from leading edge of counter top with continuous fillets, ground smooth and polished. Rear corner posts to be vertical and welded to counter top with continuous fillets, ground smooth and polished. Protector mounting bracket to be 1-1/8" square 16 gauge stainless steel tubing with eased corners, sloped at 45°, with lower edge set at 15" above countertop, parallel with leading edge of counter. Close all ends of tubing and provide 1-1/8" x 1/2" deep channel retainers for 3/8" glass protector on sloping protector brackets. Cover bands at face of protector brackets. 1-1/8" x full height x 18 gauge stainless steel with all edges dressed. All surfaces of posts, brackets, and joiner plates polished to No. 8 finish.
- B. **Breath Protector:** 3/8" tempered glass with eased and polished edges, set at 15" above counter top. Component Hardware model no B70-1002 glass capping at lower edge.
- C. **Capping/Display Light:** full length x 6" wide x 16 gauge stainless steel, turned down 1" at all sides (tight to sloping glass at front edge). Finish to be No. 8. Secure to post/brackets with 5-1/2" x 2" x 1/4" plate welded to level top of protector brackets.
 - 01. **Display lights:** to be LED type fixtures in lengths as required, stainless steel finish. Wire all display lights to single apron-mounted master switch per serving shelf.
- D. All breath protectors shall be in accordance with NSF Standard No. 2.

2.10 DRAWERS

- A. **Linners:** Component Hardware model no S80-1520 (20" x 15", easily removable with drawer in fully extended position).
- B. **Drawer Frame:** 16 gauge stainless steel flanged out at top. Weld frame to double panned 16 gauge stainless steel drawer front, with full-length recessed pull at top with closed ends.
- C. **Channel Formed Horizontal Pull:** 3/4" turndown at front and ends, with 1/2" tight hem. Front edge of pull to be flush with face of drawer. Recess behind pull, sloped up on 60° angle, terminating 1" below bottom edge of pull.
- D. **Mounting Drawer Frame:** mount on Component Hardware model no S26-0024 self closing slides (full extension slides, KEC to verify number at submittal), with solid nylon rollers, full depth of fixture. Secure slides to body or brackets to eliminate lateral movement in extended position.
 - 01. **Refrigerator Drawers:** Component Hardware model no. S52-2024 stainless steel slides (full extension; KEC to verify number at submittal) with Delrin rollers.
- E. **Each Drawer Housing (Kitchen):** welded 14 gauge locking hasp fitted neatly through a slot in drawer front to accommodate padlock (padlock supplied by Owner).
- F. **Each Drawer Housing (Servery):** stainless steel faced cylinder lock fitted through drawer front, Component Hardware model no P30-4780.
- G. **Drawer Enclosure in Open Base Fixture:** 18 gauge stainless steel flange out at top for attachment at underside of table top. Lower edge of enclosure is flanged in toward open bottom. Mount drawer slides to enclosure and brace as required. Face of enclosure to be same length and height as face of drawer. Provide 3/4" deep offset in front of

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enclosure and 2-1/2" from underside of table top for flush fitting appearance. Drawer enclosure on free standing fixture to be full depth of table framing.

- H. **Drawer Liners (other than tool/utility):** Bread drawer to be Component Hardware model no S83-2020. Refrigerated Drawer to be Component Hardware model no S81-1520 stainless steel liner.
- I. **Cash Drawer:** integral stainless steel body, 3" deep, with locking drawer face and money insert.

2.11 FOOD WELLS (Unless otherwise specified in Item Specifications)

- A. **Food Warmer Controls:** remote mounted in sloping recessed apron panel. Control panel to be recessed 2-1/2" from body line at top of 60°, 1" at lower edge. Terminate slope angle 2-1/2" below counter top. Mount panel on concealed stainless steel NSF piano hinge at bottom edge, secure with thumb screws at upper corners.
- B. **Drains:** manifold all warmer drains and extend to within utility compartment for indirect waste connection. Install ball valve in drain line.
- C. **Closure Panel:** removable 18 gauge stainless steel closure panel at underside of warmers.
- D. **Plate Shelf:** 14 gauge stainless steel plate/utensil shelf full length of hot food station, unless noted otherwise mounted 10" below counter top x 9" deep, with rear panel covered up to underside of counter top, end panels turned up square. Front of shelf turned down 1-1/2" and returned under for closure panel attachment.
- E. **Food Wells:** Wells model no SS-206-ERD, or equal, insulated food warmer (1200 watts, 208 volts, single phase) secured to the underside of 12" x 20" die stamped counter top openings, with thermal breaker mastic rope applied at perimeter of food well flange. Maximum allowable temperature at counter top contact surface to 110° F.

2.12 SINKS

- A. **Construction:** 14 gauge stainless steel, all interior corners (horizontal/vertical) coved on 3/4" radius; 1-1/2" wide double walled partitions, with flat tops, between sink compartments.
- B. **Continuous exterior panels of multi-compartment sinks:** 14 gauge stainless steel filler panel, welded, ground smooth and polished between compartments.
- C. **Sinks:** score and slope sink bottom 1/2" to die-stamped opening filled with T&S model no. B-3950-01 rotary drain with connected overflow and tailpiece (unless otherwise specified in Item Specifications), with 14 gauge stainless steel bracket, mounted and welded to sink bottom for drain stem with 1-1/2" handle clearance.

2.13 TRAY SLIDES

- A. **Trayslides:** 12" wide 16 gauge stainless steel, unless otherwise indicated in Item Specifications), turned up 2" at rear behind counter top turndown, turned down 2" at front and free ends (unless otherwise indicated in Item Specifications).
 - 01. Two (2) 1/4" high die formed inverted "vee" ridges 8" O.C., 2" from leading edge, terminating 2" from ends of tray slide with tapered ridge ends.

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02. Ridges formed on radius, equal length segments, with 2" separations between cords.
03. Secure trayslides to counter-top/body frame, same as "Counter Tops". Enclose exposed underside of trayslide with 18 ga stainless steel..

2.14 UTENSIL WASH SINKS

- A. **Top:** 14 gauge stainless steel, all free edges covered up 3" with 1-1/2" diameter rolled rim and bull nosed corners.
- B. **Backsplash:** edges of utensil wash counters, next to high fixtures and/or walls, to be covered up 10" and sloped back 1-1/2" on 45° angle (2-1/2" slope where piping occurs). Turn down 1" at rear of splash and secure back splash to wall with 4" long, 14 gauge stainless steel "Z" clips, anchored to wall at 36" O.C. Vacuum breaker pockets in rear splash to be 4" long, square turn back sections, aligned with slope breakline.
- C. **Internal Coving:** cove all interior corners (horizontal/vertical) on 3/4" radius and slope tables 1/8" per foot, maintaining level crown.
- D. **Exposed Splash:** 16 gauge stainless steel finish panel from top of splash to bottom edge of rolled rim with welded vertical joint at end. Secured panel with concealed attachment and install bracing at 24" O.C.
- E. **Bracing:** brace utensil-wash counters with 1" x 4" x 12 gauge stainless steel channels down centerline of top and between each pair of legs, with closed ends. Secured to underside of dishtable with 1/4" studs welded at 6" O.C., maximum, with chrome plated washer, lockwasher, and cap nut. Studs shall be such length that the cap nuts can be made up tight, bringing the counter down on channel members, eliminating all vibration and "oil canning".
- F. **Flanging/Gusseting:** integrally welded stainless steel flange or inverted gusset, where service utilities or support posts penetrate or abut tops. Grind smooth and polish to match top.

2.15 UTENSIL RACKS

- A. **Rack:** 1/4" x 2" 300 series stainless steel flat bar with No. 4 finish, fully welded and formed to match shape shown on drawings. Top band to be located 7'-0" A.F.F., unless otherwise indicated.
- B. **Table Mount Supports:** 1-5/8" diameter 16 gauge stainless steel tubing, extended thru countertop. Secure to closed base framing, or crossrail/undershelf on open base fixtures. (freestanding fixtures only). Tubing penetrations of counter tops to have integrally welded stainless steel inverted gusset.
- C. **Utensil Rack Hooks:** Component Hardware model no J77-4401 stainless steel hooks, spaced 8" O.C.

2.16 DOORS

- A. **Double Pan formed all welded construction:** 18 gauge x 1" stainless steel, insulated with 1" thick polyurethane boards. Seal perimeter joints of pans. Offset lower horizontal framing member of Closed Base Body to align access door flush with bottom of body.
- B.

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- C. **Channel formed full length horizontal pull:** ¾" turndown at front and ends with ½" tight hem. Front edge of pull to be flush with face of door. Recess behind pull sloped up on 60° angle and terminated 1" below bottom edge of pull.
- D. **Door Hardware:**
 - 01. **Hinges:** Two (2) Component Hardware model no M75-1002 stainless steel hinges (notch door/jamb at hinge locations).
 - 02. **Concealed Magnetic Catch:** Component Hardware model no M35-2000.
 - 03. **Lock:** (if specified) Component Hardware model no P30-4780 installed in upper free corner of door.
- F. **Offset Lower Horizontal Framing Member:** for Closed Base Body/Utility Compartment, Compressor Compartment, and Load Center Compartment to align flush with the bottom of the body.

2.17 CLOSED BASE BODIES

- A. **Frame:** rigid welded 1-1/2" x 1-1/2" x 1/8" galvanized steel angle, forming a continuous structure around the top and bottom perimeters of the fixture, a post at each corner, studs spaced 48" O.C., maximum. Top of frame is cross-braced with 1-1/2" angles, 2'-0" O.C., maximum.
- B. **Stainless Steel Panels/Trim:** 18 gauge stainless steel panels and trim with concealed attachment. All seams welded, ground smooth and polished.
- C. **Exposed Vertical Corners:** rounded on ¾" radius.
 - 01. **Closed Base Bodies:** adjacent to walls or fixture to have square corners.
- D. **Channel Members:** Vertical and horizontal channel members at shelf interior or drawer enclosures, such as corners and center mullions to be closed and sealed.
- E. **Closed Base Bodies:** Component Hardware model no A54-2-6 6" legs spaced at 5'-0" O.C., maximum. Component Hardware model no. A10-0854C flanged feet at corners.

2.18 UTILITY COMPARTMENTS

- A. **Closed Base Bodies:** fitted with utility compartments, wherever piping or wiring is required in/on the fixture.
- B. **Material:** Same material as Closed Base Bodies with full height back and end partitions. Omit bottoms except at hose reel locations. (NOTE: no shelves of Closed Base Fixtures are to be penetrated.)
- C. **Access Door:** 18 gauge stainless steel double pan type, with channel formed horizontal recessed pull full length of top with closed ends. ¾" turndown at front and face of door. Recess behind pull slopes up on 60° angle, terminating 1" below bottom edge of pull. Offset lower horizontal framing member of Closed Base Body to align flush access door with bottom of body.
- D. **Access Door Louvers:** (Contractor shall submit sample of design for approval prior to fabrication)
 - 01. Full-height 18 gauge stainless steel louver with 1" vanes set at 45° angle, full width

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vanes 1" x width plus 1/2" with 1/2" spacing. Perimeter channel formed of 1-1/2" x 1".

02. Tack weld tab of louver flange to back panel of door.

E. No shelves of Closed Base Fixtures are to be penetrated.

2.19 PLASTIC LAMINATED FIXTURES

- A. **Exterior Body Panels:** 3/4" thick marine grade hardwood plywood with plastic laminate or solid polymer at all exposed surfaces. Panels in Architect's selection of color/pattern. Backing sheet where concealed. Position, size and finish, horizontal and/or vertical reveal, as directed by Architect.
- B. **Securing Panels to Base:** Secure exterior front or end panels to counter body framing in concealed manner. Install removable panels with "Z" clips, overlapping body framing members.
- C. **Rear Side/Interior of Serving Counters:** "Closed Base Bodies" to have vertical juncture of plastic laminate/solid polymer and stainless steel panels at rear corners of body. 1/2" wrap-around of stainless steel set in routed recess for flush joining with plastic laminate/solid polymer.
- D. **Plastic Laminate Fixture:** all joints, seams, blocking, etc, in accordance with AWI "custom" grade standards.

2.20 OPEN BASE STRUCTURES

- A. **Legs:** 1-5/8" diameter x 16 gauge seamless stainless steel tubing legs, beveled at bottom. Top of leg inserted into Component Hardware model no A20-0206 gusset that is fully welded to table frame or sink bottom.
- B. **Crossrails:** 1-1/4" diameter cross rails, fully welded (360° ground smooth and polished) to legs at 10" A.F.F. O.C.
- C. **Bullet Foot:** Component Hardware no A10-0851 bullet feet, legs spaced 5'-0" O.C., maximum. Component Hardware model no A10-0854C flanged feet at all corners.
- D. **Freestanding Fixtures Requiring Utility Connections:** Component Hardware model no A10-0854C flanged feet at fixture corners, anchored to floor with non-corrosive bolts.
- E. **Table Bases:** maximum leg spacing of 6'-0" O.C. Dishtable and utensil wash counter bases at 5'-0" O.C.

2.21 UNDERSHELVES

- A. **Open Base Structures:** 16 gauge stainless steel turned down 1-1/2", with tight hem at bottom. Notch all corners to fit tubular legs and weld from the underside to completely fill gap, grind smooth and polish. Cove up 2" at rear or ends adjacent to walls, columns, or tall equipment. The turn-up at freestanding fixtures is to be hemmed tight to bottom of turndown. Brace undershelf with 1" x 4" 14 gauge stainless steel channel at longitudinal centerline and at each intermediate pair of legs. Exposed channel ends to be integrally welded closed, ground smooth and polished to original finish.
- B. **Closed Base Fixtures:** 16 gauge stainless steel turned down 1-1/2" at front. Front edge of bottom shelf to be boxed for leg application or turned back and sealed to finished masonry platform. Center shelf to have a 3/4" tight hem.

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01. **Shelves:** turn up square at ends (coved up at rear only) to the shelf above, or counter top, flanged out for attachment with no open spaces at interior. Unless otherwise noted, all closed base undershelves are to be 22”.
02. **Shelf Partitions:** All shelf partitions at exposed ends of cabinet bodies or interiors to be free of exposed framing members.
03. **Shelf Reinforcement:** reinforce shelves with full length 1” x 4” x 14 gauge stainless steel closed hat channel.
04. Fully weld smooth and polish the vertical seam of shelf turndown/turn up with face of body partition.
05. Seal the vertical seam of square turn-in at exposed interior of open shelf sections.

2.22 ANCHOR PLATES/WOOD GROUNDS

- A. **Location:** Behind finish surface, wherever building wall, partitions, or ceiling construction will not accommodate direct attachment of equipment, such as overshelves, wall cabinets, hose reels, utensil racks, exhaust hoods, display cases, etc. Material and installation by General Contractor. Location and coordination with other trades by section 11 40 00.
- B. **Anchor Plates:** not less than 12” x 12” x ¼” thick steel, secured to the structure above or behind the finished surface, positioned at attachment points.
- C. **Wood Grounds:** length as required by fixture, component or device, 24” wide x ¾” thick plywood secured to partition system prior to gypsum board installation.
- D. **Above Ceiling Supports:** structural shapes (4” x 8.0 lb channel) suspended from structure. Maximum height 15’-0” A.F.F, size to be width of equipment x length of equipment plus 6’-0” O.C. maximum.

2.23 OVERSHELVES

- A. **Material:** 16 gauge stainless steel with free edges turned down 1” with ½” tight hem at bottom. ¾” radius at free corners.
- B. **Construction:** turn-up 2” raw at walls or adjoining high fixtures with horizontal coved corners at rear. Round front corners of turn-up on ¾” radius. Where shelf exceeds 12” width, reinforce with ½” x 4” x 14 gauge stainless steel closed channel full length of shelf.
- C. **Wall Mounted Shelves:** 14 gauge stainless steel brackets, 48” O.C., maximum, set in 6” from ends.
- D. **Free Standing Shelves:** where splash is required at free overshelves, turn up square 2” at ends, cove up at rear and hem tight to lower edge of front turndown. Weld exposed corners.
 01. **Free Standing Overshelves:** 14 gauge stainless steel cantilevered brackets at rear of table, double cantilever brackets at center of table. Posts for cantilevered

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overshelves to be 1-5/8" diameter x 16 gauge stainless steel secured to underframe, 4'-0" O.C. Ends of shelves to be secured to adjacent wall/fixture or mounted on 1-1/4" diameter stainless steel posts.

02. Free Standing Overshelves, not on Cantilevered Brackets: 1-1/4" diameter x 16 gauge stainless steel posts, each pair at 4'-0" O.C., maximum.

2.24 WALL PANELS

- A. **Wall Panels:** 18 gauge stainless steel, double pan formed 1/2" thick with internal stiffener members. Fill with USDA approved thermal insulation, full height and width of panel, attached to interior with mastic. Maximum allowable temperature at rear side of panel is 120° F.
 01. Height of panels: from top of tile base to underside of hood; top of tile base to top cap of stub wall; or top of splash to underside of hood.
 02. Level and square lower edge and sides.
 03. Butt joint all wall panels.
 04. Mount panels to wall under exhaust hoods with stainless steel molly bolts. Secure top under exhaust hood. Mount panels at sinks and/or dishtables with mastic.
 05. K.E.C. to verify size and wall construction with field visit BEFORE fabrication of panels.

2.25 EXHAUST HOOD FIRE EXTINGUISHING SYSTEM (FUSIBLE LINK/LIQUID CHEMICAL)

- A. **System:** installed in accordance with manufacturer's recommendations and applicable codes or standards. **NOTE: Submit Installation Certification Form to Architect.**
- B. **Automatic Chemical System:** in each filtered exhaust hood/duct assembly and also surface protection above/in all equipment required by NFPA Bulletin No 96 and local Fire Marshall's regulations. Refer to Contract Drawings for quantity of exhaust fan units serving single or multiple exhaust hoods and coordinate with hood/fan controls.
- C. **Chemical Cylinder Installation:** install chemical cylinders within 18 gauge stainless steel cabinet, as indicated on drawings, and install piping to exhaust hoods in totally concealed manner. Set cylinders and cabinets at 7'-0" A.F.F , unless noted otherwise. Exposed piping/fittings within cylinder location and exhaust hood to be chrome plated or sleeved with stainless steel tubing. Exposed pipe threads in/above food zone not acceptable. 18 gauge stainless steel enclosure from top of cabinet to finished ceiling (if required). **Submit schematic diagram of installation and confirm critical distances from cylinders to nozzles.**
- D. **System Components:** Ansul model no R-102 system assemblies, in system components, required by dimensions and configuration of equipment and hoods. All components must be UL-300 certified.

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- E. **Remote Manual Release:** located in path of egress from protected exhaust hood area. Division 26 to provide 4" octagonal box in wall (at 42" A.F.F.) with EMT conduit stub to 6" above finished ceiling.
- F. **Each System:** Ansul Automan cylinder control assembly, with electric switch. Provide electrical dry contactors within cylinder control cabinet.
- G. **Fusible Links:** installed in duct collar of filtered hood/ducts. Locate directly above each cooking device as required by Code, in quantity required by length of protected appliance.
- H. **Cylinder Location:** Ansul Sentry 40-BC fire extinguisher located at each exhaust hood install at 42" A.F.F. to center of control valve of cylinder.
- I. **Mechanical Gas Valves:** required quantity and sizes of mechanically operated gas valves (maximum size furnished by K.E.C. to be 2" diameter).

2.26 SHOP/FIELD JOINTS

- A. **Field Joints:** least possible number, used only when equipment size must be limited for access into building or interior space.
- B. **Stainless steel tops:** (including edges and splashes) fully welded ground smooth and polished to match adjacent surface.
- C. **Closed Base Bodies:** draw-type with hairline seam, fully field welded.
- D. **Millwork:** plastic laminated material joints shall be doweled, glued, and draw bolted with fasteners..

2.27 SOURCE INFORMATION

- 01. (as needed)

2.28 APPROVED KITCHEN SUPPLIERS

- A. Only the following Food Service Sub-Contractors, and those that might be approved later, if any, are approved for inclusion in the Contractor's Bid:

- 01. Custom Kitchen Equipment Company
Mr. Glen Redmon
2801 Wilson Road
Humble, Texas 77396
281.446.8187 FAX: 281.446.8180
e-mail: gredmon@custkit.com
- 02. Texas Metal Equipment Company
Mr. Andrew Harman
6707 Mayard
Houston, Texas 77041

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713.466.8722 FAX: 713.466.0166
e-mail: aharman@txmetalequip.com

03. Mission Restaurant Supply
Mr. Brian Mosher
1126 St. Mary's
San Antonio, Texas 78210
210.354.0690 FAX: 210.354.0746
e-mail: brianm@missionrs.com

B. Proposed Substitutions:

01. Submit A.I.A. Document A405, no less than seven (7) days prior to Bid Date, for approval.
02. Submit proposed substitution of Kitchen Supplier, providing name of firm, address, telephone, fax number, e-mail, contact person, project references, business references, and qualifications.
03. Owner reserves the right to accept or reject any substitution, before the execution of the contract.

PART 3 – EXECUTION

3.01 DELIVERY AND INSTALLATION

- A. **Supervision:** provide a competent foreman, or supervisor, who shall remain on the job during the entire installation.
- B. **Delivery:** coordinate with progress of construction and Owner's operation schedules. Unless otherwise instructed and documented by Owner, or General Contractor, the following procedures apply:
01. Field assembled Fixed Equipment integrated into the structure (e.g. exhaust hoods, drain trench/grate assemblies, ceiling mounted utensil racks, etc) are to be sent to the job-site, when directed by the General Contractor and installed/protected accordingly.
02. All other Fixed Equipment to be delivered after completion of work on adjacent finished ceilings, lighting, finished floor and wall systems, including painting.
03. Major Movable Equipment to be delivered, when possible, and inventoried, in secured area for interim job-site storage, or, if secured area is not available, when fixed equipment installation/clean up has been completed.
04. Minor appliances and loose items (e.g. pans, covers, flatware containers, etc) delivered only when Owner is prepared to receive and inventory such items.
- C. **Installation:** performed by manufacturer of custom fabrication fixtures.
01. Assemble square, level, and make ready, all items for the final utilities connections.
02. Cut neatly around obstructions to provide sanitary conditions.
03. Where gaps of ¼" or less occur adjacent to, or between, equipment, insert rope

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backing and smoothly applied General Electric construction sealant Series SE-1200 silicone mastic (white/clear). Mask both sides of gap for neat application of sealant and remove excess. If space exceeds ¼", neatly install 18 gauge stainless steel trim molding of proper shape with concealed attachment. Use epoxy cement or "Z" clips wherever possible to secure stainless steel trim. Exposed edges or corners of trim to be eased and smooth.

D. **Protection of Work:**

01. Fabricated Equipment: fiberboard or plywood taped to tops and exposed body panels/components.
02. Manufactured Equipment: fiberboard or plywood taped as required by equipment shape and installation access requirements.
03. Prohibited Use of Equipment: tools and materials storage, workbench, scaffold, stacking area, etc.
04. Damaged Equipment: immediately documented and submitted to Owner with Contractor's recommendation of action for repair or replacement. Include its impact on the Project Schedule and Contract Amount, if any.

3.02 **CLEAN AND ADJUST**

- A. Clean up, and remove from the job-site, all debris resulting from this Work, as the installation progresses.
- B. Thoroughly clean and polish interior/exterior of all Food Service Equipment, prior to demonstration and final observation, ready for Owner's use.
- C. Lubricate and adjust drawer slides, hinges, casters.
- D. Adjust pressure regulating valves, timed-delay relays, thermostatic controls, temperature sensors, exhaust hood grilles, etc.
- E. Clean or replace faucet aerators, line strainers.
- F. Touch-up damage to painted finishes.
- G. Start-up and check operation of all refrigeration systems for at least 72 hours prior to acceptance.

3.03 **EQUIPMENT START-UP/DEMONSTRATION**

- A. Carefully test, adjust and regulate all equipment in accordance with the manufacturer's instructions and certify, in writing, to the Owner that the installation, adjustments, and performance are in full compliance.
- B. Provide the Owner, or Food Service Operator, with a thorough operational demonstration of all equipment and furnish instructions for general and specific care and maintenance. Coordinate and schedule selected items of equipment and attendees with Owner, at least two (2) weeks in advance of demonstration periods.

3.04 **FINAL OBSERVATION**

- A. Preliminary observation will be made when the Contractor has delivered all field

SECTION 11 40 00 – FOOD SERVICE EQUIPMENT

assembled and fixed equipment to the job site and set the equipment.

- B. Final observation will be made when the Contractor will certify that he has completed his work, made a thorough review of the installation/operation of each item in the contract, and found it to be in compliance with the Construction Documents.
- C. Repetitive final observations (**more than two**) and all costs associated thereto, which may be incurred due to Contractor's failure to comply with the requirements of this Article, will be invoiced to this Contractor on a time and expense basis.

PART 4 – EQUIPMENT SCHEDULE

-
- 4.01 REGULARLY MANUFACTURED EQUIPMENT/COMPONENTS:** standard finishes and accessories, unless specifically deleted or superseded by the Contract Documents.
 - 4.02 FABRICATED AND FIELD-ASSEMBLED EQUIPMENT:** arrangement and configuration as shown on Plans, Elevations, and Detail Drawings.
 - 4.03 REFER TO DRAWINGS:** for unit quantities and electrical and/or mechanical provisions required, including manufacturer's optional voltages, wattages, burner capacities, etc.
 - 4.04 REFER TO PART 2 – PRODUCTS:** for accessories, fittings, requirements, and procedures related to the listed buy-out and fabricated equipment..
 - 4.05 FOOD SERVICE BASE BID EQUIPMENT:**

ITEM NO 101 – DRY STORAGE SHELVING

Quantity: One (1) only lot

Manufacturer: InterMetro Industries (Metro)

Model No.: Metro Max "Q"

Utilities:

Size and Shape: Refer to drawings

Equipment:

- 01. Size and shape as shown on drawings.
- 02. Each section to have five (5) only gridded type shelves.
- 03. Each section to have four (4) only 86" high posts.
- 04. Mount lower shelf of each section at 8" A.F.F. with balance of shelves evenly spaced in height of the post.
- 05. Four (4) only 24" x 48" sections, configured as shown on drawings.

ITEM NO 102 – REFRIGERATOR/FREEZER

Quantity: One (1) only

Manufacturer: G.E. Appliances

Model No.: PWE23KSD-SS

Utilities: 15.0 amps, 120 volt, single phase

Size and Shape: Refer to drawings

Equipment:

- 01. Size and shape as shown on drawings.
- 02. 23.1 cubic ft capacity.
- 03. French door refrigerator with bottom mounted freezer
- 04. Internal water dispenser and factory installed ice maker.
- 05. In-the-door controls.
- 06. Showcase LED lighting in refrigerator and freezer compartments.
- 07. Drop-down tray and Quick Space shelf.

ITEM NO 103 – CABINETS

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Quantity: Two (2) only
Manufacturer: Custom Fabrication
Model No.:
Utilities:
Size and Shape: Refer to drawings
Equipment:

01. Size and shape as shown on drawings.
02. 14 ga stainless steel top with all free edges turned down 2" straight and hemmed for stiffness.
03. Working top to be of same height as adjacent range.
04. Form up rear of cabinet 6", return to wall 1-1/2" on 45 degree angle and then down for stiffening.
05. Enclosed base body construction with 18 ga stainless steel exterior.
06. One (1) only 15" x 20" x 5" stainless steel standard drawer mounted under top where shown.
07. Balance of area under top to be enclosed with double panned insulated hinged door. Right hand cabinet to have door hinged right and left hand cabinet to have door hinged left.
08. Provide bottom and intermediate shelf behind each door.
09. Mount cabinets on 6" stainless steel legs with adjustable flanged feet.
10. Enclose front of cabinet with 20 ga stainless steel removable kick plate. Bond stainless steel to 3/4" thick marine grade plywood and secure to legs by means of stainless steel spring loaded clips.

ITEM NO 104 – RANGE

Quantity: One (1) only
Manufacturer: General Electric
Model No.: PB930SH-RC-SS
Utilities: 40.0 amps, 208 volt, single phase
Size and Shape: Refer to drawings
Equipment:

01. Size and shape as shown on drawings.
02. Radiant smooth top black ceramic glass cook top.
03. Convection oven base.
04. Stainless steel exterior.
05. Warming drawer under oven.
06. "Power Boil" element.
07. Digital Temperature Display with electronic oven controls.

ITEM NO 105 – EXHAUST HOOD

Quantity: One (1) only
Manufacturer: Mod-U-Serve
Model No.: W-FM
Utilities: 15.0 amps, 120 volt, single phase
Size and Shape: Refer to drawings
Equipment:

01. Size and shape as shown on drawings.
02. 18 ga stainless steel all welded construction
03. Continuous capture area with no transverse interior partitions.
04. Ductwork and final connections to hood above ceiling to be by Mechanical Contractor.
05. Factory installed insulation on top of hood, above ceiling to conform to local code requirements.
06. Provide heat sensors.
07. Stainless steel fire dampers.
08. Stainless steel filters and stainless steel grease cup.
09. 1/2" diameter hanger rods at 4;-0" O.C., maximum, furnished by K.E.C., but to be

SECTION 11 40 00 – FOOD SERVICE EQUIPMENT

- anchored to supporting structure (or slab) by General Contractor, in locations as required by exhaust hood shop drawings.
10. Flush mounted LED lights, pre-wired to junction box on top of hood, for final connections by Division 26.
 11. 3" air space at rear.
 12. 18 ga stainless steel enclosure panels on all free sides of hood from top of hood to finished ceiling.
 13. 18 ga stainless steel double walled insulated wall panels for full height from bottom of hood to top of coved base. Top of panel secured under hood. Install wall panels to wall with stainless steel oval head molly bolts.

Special Instructions:

Install hoods at 6'-10" above finished floor to bottom of hood. Coordinate duct and fan requirements with Mechanical Contractor. Interconnect to wall mounted light/fan switches by Division 26.

ITEM NO 106 – FIRE PROTECTION SYSTEM

Quantity: One (1) only
Manufacturer: Ansul Fire Protection
Model No.: R-102/UL-300
Utilities: 15.0 amps, 120 volt, single phase
Size and Shape: Refer to drawings
Equipment:

01. Size and shape as shown on drawings.
02. Duct and plenum protection to Item no 105 - Exhaust Hood
03. Surface protection for cooking equipment as required.
04. Locate remote fire pulls as indicated on plans, recessed into wall.
05. Supply electrical switches for automatic equipment shut down upon activation of fire protection system. Switches supplied by Section 11 40 00 and installed by Division 26.
06. System to meet UL-300 requirements.
07. One (1) only hand held fire extinguisher (10#), wall mounted where indicated on drawings.
08. All distribution piping to be run at exterior top of hood.
09. Exposed threads are unacceptable.
10. All exposed piping for drops to be chrome plated.
11. All hood penetrations to have stainless steel escutcheons.
12. Provide phenolic I.D. Labels for exhaust hoods, remote fire pulls, light/fan switches, and fire protection systems.
13. 20 ga stainless steel enclosure from top of systems to finished ceiling by K.E.C.

Special Instructions:

Install hand held extinguishers as indicated on drawings, maximum of 3'-2" above finished floor.

ITEM NO 107 – HAND LAVATORY

Quantity: One (1) only
Manufacturer: Advance-Tabco
Model No.: 7-PS-79
Utilities: 1/2" hot/cold water
Size and Shape: Refer to drawings
Equipment:

01. Size and shape as shown on drawings.
02. One piece deep drawn sink bowl, measuring approximately 10" x 14" x 5".
03. Keyhole wall mount brackets.
04. 1-1/2" IPS stainless steel basket drain.
05. P-trap
06. Towel dispenser with hinged towel box.
07. Liquid soap dispenser.
08. Splash mounted heavy duty gooseneck faucet with aerator and wrist handles.

SECTION 11 40 00 – FOOD SERVICE EQUIPMENT

09. Stainless steel rear and side splashes.

ITEM NO 108 – 3 BASIN SINK

Quantity: One (1) only
Manufacturer: The Eagle Group
Model No.: 312-14-3-12
Utilities: ¾" hot/cold water
Size and Shape: Refer to drawings
Equipment:

01. Size and shape as shown on drawings.
02. Three (3) only 14" x 16" x 12" deep drawn sink bowls.
03. Provide integral stainless steel apron on front of sink bowls.
04. Two (2) only 12" wide integral drainboards.
05. Stainless steel legs, cross rails and adjustable stainless steel feet. Rear legs to have bullet shaped feet, front legs to have flanged feet. Omit rear rails at sink and disposer.
06. 10" high full length stainless steel backsplash with left end splash. Tops of splash turned down and provided with "z" clips to secure to wall.
07. Provide for mounting vacuum breaker of Item no 109 – disposer in back splash.
08. One (1) only T&S model no B-0290 fast flo faucet with ¾" fittings. Center faucet over left and middle sink compartment divider.
09. One (1) only T&S model no B-0133-B08C pre-rinse unit, with low flow spray head. Mount pre-rinse unit centered over right hand sink compartment.
10. Two (2) only T & S model no B-3950-01 lever handled drains with connected rear overflows. Provide rear of sink compartment with overflow hole to accommodate lever drains.
11. Provide modification in right hand sink compartment to accommodate Item no 109 – disposer, including disposal provision package for collar.
12. Sink unit to be all welded construction, not bolted.
13. One (1) only 16 ga stainless steel wall mounted elevated shelf for full length of this unit.. Mount shelf to wall with 14 ga stainless steel webshaped brackets at 18" above working surface.
14. One (1) only wall mounted full length open tubular elevated shelf. Mount tubular shelf at 84" above finished floor on 14 ga stainless steel webshaped brackets. Provide Component Hardware model no J77-4401 stainless steel pot hooks spaced on 8" centers.
15. One (1) only 14 ga stainless steel disposer control panel mounting bracket, sized to disposer control panel of Item no 109. Weld bracket to underside of right hand drainboard.

Special Instructions:

Secure wall mounted equipment/components to in wall anchors or grounds. Coordinate location of in wall anchors with General Contractor. Secure flanged feet to floor with non-corrosive bolts.

ITEM NO 109 – DISPOSER

Quantity: One (1) only
Manufacturer: In-Sink-Erator
Model No.: SS-150-5-CC101
Utilities: ¾" hot/cold water; 3.2 amps, 208 volt, three phase
Size and Shape: Refer to drawings
Equipment:

01. Size and shape as shown on drawings.
02. 1-1/2 HP motor
03. One (1) only model no 5 sink flange mounting assembly. Mount into right hand sink compartment of Item no 108.
04. One (1) only model no CC-101 auto reversing control panel. Mount to stainless steel bracket on the underside of the right hand drainboard of Item no 108.

SECTION 11 40 00 – FOOD SERVICE EQUIPMENT

05. One (1) only water inlet, in addition to standard package. Mount water inlets on opposite sides of sink compartment to create swirling motion when water is activated.

ITEM NO 110 – NUMBER NOT USED

ITEM NO 111 – SERVING COUNTER

Quantity: One (1) only

Manufacturer: Custom Fabrication

Model No.:

Utilities: ¾" hot/cold water

Size and Shape: Refer to drawings

Equipment:

01. Size and shape as shown on drawings.
02. 14 ga stainless steel top with all free edges turned down 2" straight and hemmed for stiffening.
03. Extend top thru window opening for 12" forming a tray slide, turn down 2" straight and back to wall for stiffening. Turn ends of tray slide up 2" straight and seal to walls
04. One (1) only 16 ga stainless steel three (3) sided 2" wide framework mounted into wall opening. Framework to trim out interior and exterior surface of wall opening. Return wall framework ¾" to wall surface and seal to same. Coordinate location of framework with roll down door mechanism and door track. Weld stainless steel framework to counter top, grind all welds smooth and polish to original finish.
05. Ends against wall to be turned up 4" and back to the wall 1" on 90 degree angle. Seal end splashes to wall.
06. Base construction to be open base with stainless steel legs and rails. Terminate stainless steel legs with stainless steel adjustable bullet shaped feet on front and stainless steel adjustable flanged feet on the rear or service side.
07. Omit rear rail where shown to accommodate Item no 133 – mobile hot cabinet.
08. 16 ga stainless steel full sized stationary undershelf, where not interfered with by other equipment.
09. Cut-out top sized to accommodate the drop-in frost top unit. Reinforce perimeter of cutout to support weight of drop-in equipment.
10. One (1) only Atlas Metal model no WF-4 drop-in frost top unit with self-contained refrigeration. Provide unit with model no RS remote on/off switch for counter mounting, a model no WFFT flush recessed top, and model no RDVE rear drain extension. Extend drain, thru globe valve to nearest floor sink. Mount switch in control panel on rear of counter. Refrigeration unit shall be 1/3 HP unit for 15.0 amps, wired 120 volt, single phase and terminate in a 6'-0" cord and plug. .
11. One (1) only breath guard with single deck glass display shelf for full length of frost top unit. Construct breath guard in accordance with General Specifications. Mounted under display shelf and mounted to direct light on product below to be full length LED display lights. Lights to be wired, concealed in leg supports, to on/off switch located in control panel on rear and then to load center. Sneeze guard to be installed on front of display stand and should be designed for operator service.
12. One (1) only stainless steel duplex receptacle mounted on rear control panel. Pre-wire receptacle to load center.
13. One (1) only Fisher model no 9159 hose assembly. Interconnect hose assembly to one (1) Fisher model no 2805-CV remote mixing valve. Mount valve to rear control panel. Provide hole in counter top, at rear corner of display stand, for filler hose. Finish cutout with stainless steel grommet. Hole diameter of hole to minimum to accommodate hose assembly.
14. One (1) only breath guard with glass serving shelf, for full length as shown on drawings. Construct breath guard in accordance with General Specifications. Mounted under serving shelf for full length and mounted so as to direct light on product below to be LED display lights.
15. One (1) only Hatco model no GRAH-48 high watt strip heater, 1100 watt, mounted to

SECTION 11 40 00 – FOOD SERVICE EQUIPMENT

underside of serving shelf. Center strip heater on underside of shelf from front to back. Extend wiring from strip heater, concealed, thru leg supports to infinite control and remote enclosure. Mount and recess infinite control and remote enclosure in rear control panel. Pre-wire to load center.

16. One (1) only 14 ga stainless steel load center bracket welded to underside of top at right end of counter adjacent to end wall. Size bracket to fit load center and locate so that front of load center does not protrude beyond top turn down.
17. One (1) only Square “D” model no QO324L125G load center complete with door enclosure. Mount load center to support bracket previously specified. Provide load center with visi-trip circuit breakers and grounding bar kit. All electrical in this counter is to be pre-wired to this load center for single final connection to building services by Division 26.
18. Two (2) only 16 ga stainless steel wall mounted elevated shelves located where shown on elevations to the left of the roll down door unit. Mount shelves on 14 ga stainless steel web-shaped brackets. Lower shelf to be 18” above working surface of counter. Upper shelf is to be mounted 18” above lower shelf.

Special Instructions:

Secure wall mounted equipment/components to in wall anchors or grounds. Coordinate location of in wall grounds with General Contractor. Secure flanged feet to floor with non-corrosive bolts.

ITEM NO 112 – ROLL-DOWN DOOR - BY GENERAL CONTRACTOR

ITEM NO 113 – TRAY/TRASH RETURN

Quantity: One(1) only

Manufacturer: Custom Fabrication

Model No.:

Utilities:

Size and Shape: Refer to drawings.

Equipment:

01. Size and shape as shown on drawings.
02. 14 ga stainless steel top with all free edges formed down 2” straight and hemmed for stiffening.
03. Rear and left end formed into 6” high splash, returned to wall 1” on 90 degree angle and down for stiffening. Seal splash to all walls.
04. Base to be ¾” marine grade plywood. All exposed exterior surfaces of base to be covered in plastic laminate in color and pattern as selected by the Architect.
05. Interior of base to be furnished with bottom and intermediate undershelves. Intermediate undershelf to be adjustable on 2” centers.
06. All interior surfaces, including shelves, of unit to be painted black
07. Enclose base with hinged lock doors.
08. Top to be furnished with 6-1/2” diameter trash hole on right side, as shown. Line hole with Component Hardware model no J92-1000 stainless steel scrap chute.
09. Base of unit under scrap chute to be held to a minimum to accommodate trash can and to be completely lined in 18 ga stainless steel including floor.
10. One (1) only Rubbermaid model no FG-3540 “slim jim” trash can provided and installed under scrap chute. Color of trash can to be as per selected by Architect from manufacturer’s standard color chart.
11. Base to be enclosed with 6” kickplate covered in black plastic laminate. Kick plate in front of trash can to be part of the door at this point for access to trash can.

ITEM NO 114 – DRY STORAGE SHELIVING

Quantity: One (1) only lot

Manufacturer: InterMetro Industries (Metro)

Model No.: Metro Max “Q”

Utilities:

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Size and Shape: Refer to drawings

Equipment:

01. Size and shape as shown on drawings.
02. Each section to have five (5) only gridded shelves.
03. Each section to have four (4) only 86 posts.
04. Install lower shelf at 8" above finished floor, with balance of shelves evenly spaced in height of posts.
05. Two (2) only 24" x 48" sections.

ITEM NO 115 – ROLL-IN HEATED CABINET

Quantity: One (1) only

Manufacturer: Victory Refrigeration

Model No.: HISA-2D-S1

Utilities: 12.5 amps, 208 volt, single phase

Size and Shape: Refer to drawings

Equipment:

01. Size and shape as shown on drawings.
02. Two (2) section roll-in heated cabinet.
03. Stainless steel exterior and aluminum interior.
04. Doors full height stainless steel and to be hinged as shown on drawing.
05. Stainless steel ramps for each door.
06. Stainless steel trim strips between this Item and Item no 117.
07. Stainless steel trim strip between cabinet and adjacent wall.

ITEM NO 116 – MOBILE RACKS

Quantity: Six (6) only

Manufacturer: Crescent Metal Products (Cres Cor)

Model No.: 207-UA12-AD

Utilities:

Size and Shape: Refer to drawings

Equipment:

01. Size and shape as shown on drawings.
02. "Deluxe" version including perimeter bumpers and enclosed base.
03. All welded aluminum construction,
04. Chrome plated universal angles spaced on 1-1/2" centers.

Special Instructions:

K.E.C. shall be responsible for coordinating size of this equipment with entrance into roll-in equipment specified for this project.

ITEM NO 117 – ROLL-IN FREEZER

Quantity: One (1) only

Manufacturer: Victory Refrigeration

Model No.: FISA-1D-S1

Utilities: 10.9 amps, 120 volt, single phase

Size and Shape: Refer to drawings

Equipment:

01. Size and shape as shown on drawings.
02. One (1) section roll-in freezer cabinet.
03. Stainless steel exterior and aluminum interior.
04. Doors full height stainless steel and to be hinged as shown on drawing.
05. Stainless steel ramps for each door.
06. Stainless steel trim strips between this Item and Item no 118.

ITEM NO 118 – ROLL-IN REFRIGERATOR

Quantity: One (1) only

Manufacturer: Victory Refrigeration

SECTION 11 40 00 – FOOD SERVICE EQUIPMENT

Model No.: RISA-2D-S1
Utilities: 11.9 amps, 120 volt, single phase
Size and Shape: Refer to drawings
Equipment:
01. Size and shape as shown on drawings.
02. Two (2) section roll-in refrigerator cabinet.
03. Stainless steel exterior and aluminum interior.
04. Doors full height stainless steel and to be hinged as shown on drawing.
05. Stainless steel ramps for each door.

ITEM NO 119 – HAND LAVATORY

Quantity: Two (2) only
Manufacturer: Advance-Tabco
Model No.: 7-PS-79
Utilities: ½" hot/cold water
Size and Shape: Refer to drawings
Equipment:
01. Size and shape as shown on drawings.
02. One piece deep drawn sink bowl, measuring approximately 10" x 14" x 5".
03. Keyhole wall mount brackets.
04. 1-1/2" IPS stainless steel basket drain.
05. P-trap
06. Towel dispenser with hinged towel box.
07. Liquid soap dispenser.
08. Splash mounted heavy duty gooseneck faucet with aerator and wrist handles.
09. Stainless steel rear.

ITEM NO 120 – NUMBER NOT USED

ITEM NO 121 – 3 BASIN SINK

Quantity: One (1) only
Manufacturer: Custom Fabrication
Model No.:
Utilities: ¾" hot/cold water
Size and Shape: Refer to drawings
Equipment:
01. Size and shape as shown on drawings.
02. 14 ga stainless steel top with all free edges formed into 3" x 1-1/2" rolled rim construction.
03. Rear to be formed into 10" splash. Turn top of splash back 2" on 45 degree angle and then down for stiffening. Provide provision for vacuum breaker from Item no 122 – disposer.
04. Three (3) only 24" x 27" x 15" deep sink compartments.
05. Stainless steel open base construction with 16 ga stainless steel legs and rails.
06. Terminate rear legs with stainless steel adjustable bullet shaped feet. Terminate front legs with stainless steel flanged feet.
07. Omit rear rail behind sinks for utility connections.
08. One (1) only each 16 ga stainless steel stationary full sized undershelf under left and right hand drainboards.
09. One (1) only T&S model no B-0290 fast flo faucets with ¾" fittings. Mount faucet centered over the divider between left two sink compartments.
10. One (1) only T&S model no B-0133-B08C pre-rinse unit with low flow spray head. Mount pre-rinse unit centered over right hand sink compartment.
11. Two (2) only T&S model no B-3950-01 lever handled drains with connected rear overflows.
12. One (1) only 14 ga stainless steel disposer control panel bracket. Size bracket to control panel for Item no 122. Weld bracket to underside of right hand drainboard. Position

SECTION 11 40 00 – FOOD SERVICE EQUIPMENT

- bracket so that control panel does not protrude beyond top turndown.
13. Extend rear leg supports to 84" above finished floor, form forward 12" and terminate in 2" x 1/4" stainless steel bar. Integrally weld stainless bar to end of leg supports, grind welds smooth and polish to original finish. Provide Component Hardware model no J77-4401 stainless steel pot hooks on 8" centers.
 14. One (1) only 16 ga stainless steel post mounted elevated shelf for full length of equipment. Mount shelf to 14 ga stainless steel webshaped brackets welded to leg support posts. Shelf to be positioned in front of leg supports.

Special Instructions:

Secure flanged feet to floor with non-corrosive bolts.

ITEM NO 122 – DISPOSER

Quantity: One (1) only

Manufacturer: In-Sink-Erator

Model No.: SS-200-5-CC101

Utilities: 3/4" hot/cold water; 3.3 amps, 208 volt, three phase

Size and Shape: Refer to drawings

Equipment:

01. Size and shape as shown on drawings.
02. 2 HP motor
03. One (1) only model no 5 sink flange mounting assembly. Mount into right hand sink compartment of Item no 121.
04. One (1) only model no CC-101 auto reversing control panel. Mount to stainless steel bracket on the underside of the right hand drainboard of Item no 121.
05. One (1) only water inlet, in addition to standard package. Mount water inlets on opposite sides of sink compartment to create swirling motion when water is activated.

ITEM NO 123 – RANGE

Quantity: One (1) only

Manufacturer: Garland Commercial Ranges, LTD

Model No.: SS-686

Utilities: 62.0 amps, 208 volt, three phase

Size and Shape: Refer to drawings

Equipment:

01. Size and shape as shown on drawings.
02. Six (6) tubular heating elements.
03. Convection oven base.
04. Stainless steel exterior.
05. 6" high stainless steel legs.
06. One (1) only single deck high shelf back mounted on range.

ITEM NO 124 – EXHAUST HOOD

Quantity: One (1) only

Manufacturer: Mod-U-Serve

Model No.: W-FM

Utilities: 15.0 amps, 120 volt, single phase

Size and Shape: Refer to drawings

Equipment:

01. Size and shape as shown on drawings.
02. 18 ga stainless steel all welded construction
03. Continuous capture area with no transverse interior partitions.
04. Ductwork and final connections to hood above ceiling to be by Mechanical Contractor.
05. Factory installed insulation on top of hood, above ceiling to conform to local code requirements.
06. Provide heat sensors.
07. Stainless steel fire dampers.

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08. Stainless steel filters and stainless steel grease cup.
09. 1/2" diameter hanger rods at 4'-0" O.C., maximum, furnished by K.E.C., but to be anchored to supporting structure (or slab) by General Contractor, in locations as required by exhaust hood shop drawings.
10. Flush mounted LED lights, pre-wired to junction box on top of hood, for final connections by Division 26.
11. 3" air space at rear.
12. 18 ga stainless steel enclosure panels on all free sides of hood from top of hood to finished ceiling.
13. 18 ga stainless steel double walled insulated wall panels for full height from bottom of hood to top of coved base. Top of panel secured under hood. Install wall panels to wall with stainless steel oval head molly bolts.

Special Instructions:

Install hood at 6'-10" above finished floor to bottom of hood. Coordinate duct and fan requirements with Mechanical Contractor. Interconnect to wall mounted light/fan switches by Division 26.

ITEM NO 125 – FIRE PROTECTION SYSTEM

Quantity: One (1) only
Manufacturer: Ansul Fire Protection
Model No.: R-102/UL-300
Utilities: 15.0 amps, 120 volt, single phase
Size and Shape: Refer to drawings
Equipment:

01. Size and shape as shown on drawings.
02. Duct and plenum protection to Item no 124 - Exhaust Hood
03. Surface protection for cooking equipment as required.
04. Locate remote fire pulls as indicated on plans, recessed into wall.
05. Supply electrical switches for automatic equipment shut down upon activation of fire protection system. Switches supplied by Section 11 40 00 and installed by Division 26.
06. System to meet UL-300 requirements.
07. One (1) only hand held fire extinguisher (10#), wall mounted where indicated on drawings.
08. All distribution piping to be run at exterior top of hood.
09. Exposed threads are unacceptable.
14. All exposed piping for drops to be chrome plated.
15. All hood penetrations to have stainless steel escutcheons.
16. Provide phenolic I.D. Labels for exhaust hoods, remote fire pulls, light/fan switches, and fire protection systems.
17. 20 ga stainless steel enclosure from top of systems to finished ceiling by K.E.C.

Special Instructions:

Install hand held extinguishers as indicated on drawings, maximum of 3'-2" above finished floor.

ITEM NO 126 – WORK TABLE

Quantity: One (1) only
Manufacturer: Advance Tabco
Model No.: KMS-304
Utilities:
Size and Shape: Refer to drawings
Equipment:

01. Size and shape as shown on drawings.
02. 14 ga stainless steel top with 5" splash on rear. Stainless steel understructure.
03. Right side splash against adjacent wall.
04. Paint on sound deadening.
05. Stainless steel legs and rails with stainless steel gussets
06. Stainless steel bullet shaped feet.
07. Table to be all welded construction.

SECTION 11 40 00 – FOOD SERVICE EQUIPMENT

08. 16 ga stationary stainless steel undershelf for full length.
09. One (1) only model no SS-2015 drawer assembly, centered in length of table.
10. Two (2) only 16 ga custom fabricated stainless steel wall mounted elevated shelves. Mount shelves on 14 ga stainless steel web shaped brackets. Mount lower elevated shelf at 18" above working surface of table. Mount upper elevated shelf at 18" above lower shelf.

Special Instructions:

Secure wall mounted equipment/components on in wall anchors or grounds. Coordinate location of in wall grounds with General Contractor.

ITEM NO 127 – SERVING COUNTER

Quantity: One (1) only

Manufacturer: Custom Fabrication

Model No.:

Utilities: ¾" hot/cold water; 50.0 amps, 120/208 volt, three phase

Size and Shape: Refer to drawings

Equipment:

01. Size and shape as shown on drawings
02. 14 ga stainless steel top with all free edges formed down 2" straight and the hemmed for stiffening.
03. Open base construction with stainless steel legs and rails. Terminate legs on customer side of counter with stainless steel adjustable bullet feet. Terminate legs on operator's side of counter with stainless steel adjustable flanged feet.
04. Front and exposed ends to be enclosed with removable plastic laminate covered panels. Color and pattern on panels to be as selected by Architect.
05. Front and exposed ends to be enclosed with removable 20 ga stainless steel kickplate. Bond stainless steel to ¾" marine grade plywood. Secure kickplate to legs by means of stainless steel spring clips.
06. 14 ga stainless steel solid tray slide for full length and configuration of counter. Provide counter with three (3) inverted "v" tray runners. Mount tray slide to front of counter with 14 ga stainless steel web shaped brackets.
07. 16 ga stainless steel stationary undershelf, where not interfered with by other equipment.
08. Top to be cutout in three (3) locations, as shown on drawings, to accommodate drop-in equipment. Perimeter of each cutout to be reinforced to accommodate the fully loaded weight of the drop-in equipment.
09. One (1) only Atlas Metal model no WF-3 drop-in frost top unit. To have self-contained ¼ HP refrigeration unit, 6.8 amps, 120 volt, single phase, with 6'-0" cord and plug. Provide unit with model no WFFT flush recessed top, model no RS remote switch for counter mounting, and model no RDVE rear drain valve extension. Mount remote switch in slanted control panel on rear of counter. Extend switch to Load Center. Extend drain from frost top unit, thru globe valve to nearest floor drain. Mount unit in accordance with manufacturer's recommendations.
10. One (1) only Atlas Metal model no WIH-3 drop-in hot food unit, 1000 watt, 208 volt, single phase, with 6'-0" cord and plug. Provide hot food unit with model no DME individual drains with manifolding to single valve with extension for counter mounting. Extend drain to nearest floor sink. Provide model no RTL remote thermostats. Mount controls on rear control panel as well as master on/off switch. Extend all wiring to Load Center.
11. Two (2) Fisher model no 9159 pre-rinse filler hose assemblies. Interconnect hose assemblies to two (2) only Fisher model no 2805-CV remote mixing valves. Mount mixing valves to rear control panel. Provide holes in counter top, minimum diameter to accommodate hoses. Close holes with stainless steel grommets.
12. One (1) only Atlas Metal model no WIC-2 drop-in cold pan, with model no WFB stainless steel perforated false bottom, and model no RDVE rear drain valve extension. Extend drain thru globe valve to nearest floor sink. Mount cold pan in counter top where shown.
13. One (1) only single level display stand with glass display shelf, and adjustable sneeze guards, length as shown on drawings covering both cold food unit and to the end of

SECTION 11 40 00 – FOOD SERVICE EQUIPMENT

serving counter. Construct display stand in accordance with General Specifications. Set sneeze guards for operator serve over cold unit and self-serve from cold unit to end of counter. Provide full length LED display lighting. Pre-wire lights, concealed in support legs to on/off switches located in rear control panel, and then to load center. Position lights to focus on product.

14. One (1) only single level serving shelf, with glass serving shelf and adjustable sneeze guards, length to cover hot foot unit. Construct serving shelf in accordance with General Specifications. Set sneeze guards for operator serve. Provide full length LED display lights. Pre-wire lights, concealed in support legs to on/off switched located in rear control panel, and then to load center. Position lights to focus on product. One (1) only Hatco model no GRAH-48 heat strip. Provide with remote control enclosure, infinite controls and pilot light. Mount heat strip to focus on products below. Extend wiring of heat strip, concealed, in leg supports, to control panel on rear of counter and then to Load Center. Recess control enclosure in control panel.
15. One (1) only single level display stand with glass display shelf, and adjustable sneeze guards, length as shown on drawings extending from serving shelf to end of counter as shown. Construct display stand in accordance with General Specifications. Set sneeze guards for self-serve from hot food unit to end of counter. Provide full length LED display lighting. Pre-wire lights, concealed in support legs to on/off switches located in rear control panel, and then to load center. Position lights to focus on product.
16. Area at left end of counter, as shown, to be constructed as closed base construction and enclosed with hinged double panned door, with lock. Interior of area to be sealed and waterproofed to protect the load center.
17. One (1) only Square "D" model no QO324L125G load center complete with door enclosure. Mount load center into load center compartment. Provide load center with visi-trip circuit breakers and grounding bar kit. All electrical in this counter is to be pre-wired to this load center for single final connection to building services by Division 26.

Special Instructions:

Secure flanged feet to floor with non-corrosive bolts.

ITEM NO 128 – TRAY/TRASH RETURN

Quantity: One (1) only

Manufacturer: Custom Fabrication

Model No.:

Utilities:

Size and Shape: Refer to drawings.

Equipment:

01. Size and shape as shown on drawings.
02. 14 ga stainless steel top with all free edges formed down 2" straight and hemmed for stiffening.
03. Rear and right end formed into 6" high splash, returned to wall 1" on 90 degree angle and down for stiffening. Seal splash to all walls.
04. Base to be 3/4" marine grade plywood. All exposed exterior surfaces of base to be covered in plastic laminate in color and pattern as selected by the Architect. .
05. Enclose base with hinged lock doors.
06. Base of unit, where not interfered with by trash cans to be supplied with bottom and intermediate undershelves. Intermediate undershelf to be adjustable with key hole slots.
07. Top to be furnished with three (3) only 6-1/2" diameter trash holes, as shown. Line each hole with Component Hardware model no J92-1000 stainless steel scrap chute.
08. Base of unit under each scrap chute to be held to a minimum to accommodate trash can and to be completely lined in 18 ga stainless steel including floor.
09. Three (3) only Rubbermaid model no FG-3540 "slim jim" trash cans provided and installed under scrap chutes. Color of trash can to be as per selected by Architect from manufacturer's standard color chart.
10. Base to be enclosed with 6" kickplate covered in black plastic laminate. Kick plate in front of trash can to be part of the door at this point for access to trash can.

ITEM NO 129 – NUMBER NOT USED

ITEM NO 130 – NUMBER NOT USED

ITEM NO 131 – NUMBER NOT USED

ITEM NO 132 – NUMBER NOT USED

ITEM NO 133 – MOBILE HOT CABINET

Quantity: One (1) only

Manufacturer: Crescent Metal Products (Cres Cor)

Model No.: H-137-SUA-5D

Utilities: 8.0 amps, 120 volt, single phase

Size and Shape: Refer to drawings.

Equipment:

01. Size and shape as shown on drawings.
02. Fully insulated construction.
03. Stainless steel construction.
04. Field reversible insulated door.
05. Five (5) only sets of chrome plated universal angles adjustable on 1-1/2" centers.
06. Full perimeter bumper.
07. Cord and plug set.
08. Install under Item no 111 – Serving Counter

ITEM NO 134 – ICE MACHINE

Quantity: One (1) only

Manufacturer: Scotsman Ice Systems

Model No.: CU0920-MA1

Utilities: 15.0 amps, 120 volt, single phase

Size and Shape: Refer to drawings

Equipment:

01. Size and shape as shown on drawings.
02. 100 pound self-contained unit.
03. Cuber type to produce up to 100 pounds of ice in 24 hour period and store up to 57 pounds.
04. 6" stainless steel legs.
05. Cord and plug set.

ALTERNATES:

Please show an **add or deduct** price in the appropriate location on the bid form for furnishing these alternates to the base bid equipment.

ITEM NO 123A - RANGE

Quantity: One (1) only

Manufacturer: Garland/US Range

Model No.: SS-684

Utilities: 100.0 amps, 208 volt, three phase

Size and Shape: Refer to drawings

Equipment:

01. Size and shape as shown on drawings.
02. Ten (10) only tubular heating elements.
03. Two (2) only convection oven bases..
04. Stainless steel exterior.
05. 6" high stainless steel legs.

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06. One (1) only single deck high shelf back mounted on range.

ITEM NO 124A – EXHAUST HOOD

Quantity: One (1) only
Manufacturer: Mod-U-Serve
Model No.: W-FM
Utilities: 15.0 amps, 120 volt, single phase
Size and Shape: Refer to drawings
Equipment:

01. Size and shape to accommodate Alternate Item no 123A Left to right dimension to be 6'-0"
02. 18 ga stainless steel all welded construction
03. Continuous capture area with no transverse interior partitions.
04. Ductwork and final connections to hood above ceiling to be by Mechanical Contractor.
05. Factory installed insulation on top of hood, above ceiling to conform to local code requirements.
06. Provide heat sensors.
07. Stainless steel fire dampers.
08. Stainless steel filters and stainless steel grease cup.
09. 1/2" diameter hanger rods at 4;-0" O.C., maximum, furnished by K.E.C., but to be anchored to supporting structure (or slab) by General Contractor, in locations as required by exhaust hood shop drawings.
10. Flush mounted LED lights, pre-wired to junction box on top of hood, for final connections by Division 26.
11. 3" air space at rear.
12. 18 ga stainless steel enclosure panels on all free sides of hood from top of hood to finished ceiling.
13. 18 ga stainless steel double walled insulated wall panels for full height from bottom of hood to top of coved base. Top of panel secured under hood. Install wall panels to wall with stainless steel oval head molly bolts.

Special Instructions:

Install hood at 6'-10" above finished floor to bottom of hood. Coordinate duct and fan requirements with Mechanical Contractor. Interconnect to wall mounted light/fan switches by Division 26.

ITEM NO 126A – REFRIGERATED PREP TABLE

Quantity: One (1) only
Manufacturer: True Food Service Equipment
Model No.: TWT-44D-2
Utilities: 5.1 amps, 120 volt, single phase
Size and Shape: Refer to drawings
Equipment:

01. In place of Advance Tabco work table shown on base bid, please show, on the bid form in the proper place, an add or deduction to furnish this unit in lieu of work table.
02. Stainless steel refrigerated work top unit.
03. 16 ga stainless steel heavy duty work top.
04. Stainless steel exterior and aluminum inner liner with stainless steel floor.
05. Two (2) stainless steel drawers with stainless steel drawer slides.
06. Four (4) only Vollrath model no 2028D full size steam table pans.
07. Exterior round digital temperature display.

END OF SECTION 11 40 00

ITEMIZED BID FORM

- Instructions:**
1. Fully fill out and sign this form.
 2. Attach bid security in the amount of five (5%) percent of the total base bid.
 3. Seal and mail, or deliver to: _____
 4. Front of sealed envelope to have bidder's company name and contents of envelope: _____

PROJECT NAME: WEBB COUNTY YOUTH VILLAGE REHAB CENTER

PROJECT LOCATION: LAREDO, TEXAS

BID DUE DATE: _____

PLEASE NOTE, BEFORE YOU SUBMIT YOUR PROPOSAL:

Bidders will be held responsible for any errors in their bids that occur due to information being submitted that is not in accordance with the actual specifications, drawings, and/or pre-approved substitutions for this project. (Ref: Section 1.10-Interpretation of Documents, paragraph A, subparagraph 01 and 02)

We, the undersigned, do hereby submit the following proposal for furnishing and installing the equipment for the above referenced project. The listed equipment will be delivered, uncrated, set-in-place, leveled, and completely installed, exclusive of final mechanical and electrical connections to building services, which shall be by others.

<u>ITEM NO.</u>	<u>QTY</u>	<u>DESCRIPTION</u>	<u>MANUFACTURER</u>	<u>AMOUNT</u>
101	ONE LT	DRY STORAGE SHELVING	METRO	\$ _____
102	ONE	REFRIGERATOR/FREEZER	GE	\$ _____
103	TWO	CABINETS	CUSTOM FAB	\$ _____
104	ONE	RANGE	GE	\$ _____
105	ONE	EXHAUST HOOD	MOD-U-SERV	\$ _____
106	ONE LT	FIRE PROTECTION SYSTEM	ANSUL	\$ _____
107	ONE	HAND LAVATORY	ADVANCE-TABCO	\$ _____
108	ONE	3 BASIN SINK	THE EAGLE GROUP	\$ _____
109	ONE	DISPOSER	IN-SINK-ERATOR	\$ _____
110		NUMBER NOT USED		
111	ONE	SERVING COUNTER	CUSTOM FAB	\$ _____
112	ONE	ROLL DOWN DOOR	BY GEN. CONTR.	
113	ONE	TRY/TRASH RETURN	CUSTOM FAB	\$ _____
114	ONE LT	DRY STORAGE SHELVING	METRO	\$ _____
115	ONE	ROLL-IN HTD CABINET	VICTORY	\$ _____
116	SIX	MOBILE RACKS	CRES COR	\$ _____
117	ONE	ROLL-IN FREEZER	VICTORY	\$ _____
118	ONE	ROLL-IN REFRIGERATOR	VICTORY	\$ _____
119	TWO	HAND LAVATORY	ADVANCE-TABCO	\$ _____
120		NUMBER NOT USED		
121	ONE	3 BASIN SINK	CUSTOM FAB	\$ _____
122	ONE	DISPOSER	IN-SINK-ERATOR	\$ _____
123	ONE	RANGE	GARLAND	\$ _____
124	ONE	EXHAUST HOOD	MOD-U-SERVE	\$ _____
125	ONE	FIRE PROTECTION SYSTEM	ANSUL	\$ _____

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126	ONE	WORK TABLE	ADVANCE-TABCO	\$ _____
127	ONE	SERVING COUNTER	CUSTOM FAB	\$ _____
128	ONE	TRAY/TRASH RETURN	CUSTOM FAB	\$ _____
129		NUMBER NOT USED		
130		NUMBER NOT USED		
131		NUMBER NOT USED		
132		NUMBER NOT USED		
133	ONE	MOBILE HOT CABINET	CRES COR	\$ _____
134	ONE	ICE MACHINE	SCOTSMAN	\$ _____

Food Service Equipment	\$ _____
Freight, Delivery, and Placement	\$ _____
Total Base Bid	\$ _____
Performance and Payment Bond, (if required by Owner)	\$ _____
TOTAL BID	\$ _____

ALTERNATES (please indicate amount to add or deduct from base bid)

<u>ITEM NO.</u>	<u>QTY</u>	<u>DESCRIPTION</u>	<u>MANUFACTURER</u>		<u>AMOUNT</u>
123A	ONE	RANGE	GARLAND	ADD/DEDUCT	\$ _____
124A	ONE	EXHAUST HOOD	MOD-U-SERVE	ADD/DEDUCT	\$ _____
126A	ONE	REFRIG PREP TABLE	TRUE	ADD/DEDUCT	\$ _____

We anticipate that delivery and installation of this equipment could begin _____ days after receipt of contract and notice to proceed. We anticipate that completion of our delivery and installation of this equipment would take _____ days.

We would like to propose the following alternates to the base bid equipment manufacturer:

Note: Submission of any alternate equipment to the base bid documents must be in accordance with Section 1.08 of the General Specifications to be considered.

BIDDER'S COMPANY NAME: _____

BIDDER'S CONTACT TELEPHONE NO.: _____

BIDDER'S REPRESENTATIVE (AUTHORIZED TO SIGN) _____

SIGNATURE: _____ PRINT NAME: _____

SECTION 122413ROLLER WINDOW SHADES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Electrically operated sunscreen roller shades.
 - 2. Local group and master control system for shade operation.

1.2 RELATED SECTIONS

- A. Section 06100 - Rough Carpentry: Wood blocking and grounds for mounting roller shades and accessories
- B. Section 09260 - Gypsum Board Assemblies: Coordination with gypsum board assemblies for installation of shade pockets, closures and related accessories.
- C. Section 09510 - Acoustical Ceilings: Coordination with acoustical ceiling systems for installation of shade pockets, closures and related accessories.
- D. Division 16 - Electrical: Electric service for motor controls.

1.3 REFERENCES:

- A. ASTM G 21 - Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi.
- B. NFPA 70 - National Electrical Code.
- C. NFPA 701-99 - Fire Tests for Flame-Resistant Textiles and Films.

1.4 ACTION SUBMITTALS

- A. Submit under provisions of Section 01300.
- B. Product Data: Manufacturer's data sheets on each product to be used, including:
 - 1. Preparation instructions and recommendations.
 - 2. Styles, material descriptions, dimensions of individual components, profiles, features, finishes and operating instructions.
 - 3. Storage and handling requirements and recommendations.
 - 4. Mounting details and installation methods.
 - 5. Typical wiring diagrams including integration of motor controllers with building management system, audiovisual and lighting control systems as applicable.
- C. Shop Drawings: Plans, elevations, sections, product details, installation details, operational clearances, wiring diagrams and relationship to adjacent work.
 - 1. Prepare shop drawings on Autocad format using base sheets provided electronically by the Architect.

- D. Window Treatment Schedule: For all roller shades. Use same room designations as indicated on the Drawings and include opening sizes and key to typical mounting details.
- E. Selection Samples: For each finish product specified, one set of shade cloth options and aluminum finish color samples representing manufacturer's full range of available colors and patterns.
- F. Verification Samples: For each finish product specified, one complete set of shade components, unassembled, demonstrating compliance with specified requirements. Shadecloth sample and aluminum finish sample as selected. Mark face of material to indicate interior faces.
- G. Maintenance Data: Methods for maintaining roller shades, precautions regarding cleaning materials and methods, instructions for operating hardware and controls.

1.5 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Obtain roller shades through one source from a single manufacturer with a minimum of twenty years experience in manufacturing products comparable to those specified in this section.
- B. Installer Qualifications: Installer trained and certified by the manufacturer with a minimum of ten years experience in installing products comparable to those specified in this section.
- C. Fire-Test-Response Characteristics: Passes NFPA 701-99 small and large-scale vertical burn. Materials tested shall be identical to products proposed for use.
- D. Electrical Components: NFPA Article 100 listed and labeled by either UL or ETL or other testing agency acceptable to authorities having jurisdiction, marked for intended use, and tested as a system. Individual testing of components will not be acceptable in lieu of system testing.
- E. Anti-Microbial Characteristics: 'No Growth' per ASTM G 21 results for fungi ATCC9642, ATCC 9644, ATCC9645.
- F. Mock-Up: Provide a mock-up (manual shades only) of one roller shade assembly for evaluation of mounting, appearance and accessories.
 - 1. Locate mock-up in window designated by Architect.
 - 2. Do not proceed with remaining work until, mock-up is accepted by Architect.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver shades in factory-labeled packages, marked with manufacturer and product name, fire-test-response characteristics, and location of installation using same room designations indicated on Drawings and in the Window Treatment Schedule.

1.7 PROJECT CONDITIONS

- A. Environmental Limitations: Install roller shades after finish work including painting is complete and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.

1.8 WARRANTY

- A. Roller Shade Hardware, Chain and Shadecloth (except EcoVeil™): Manufacturer's standard non-depreciating twenty-five year limited warranty.
- B. Roller Shade Motors and Motor Control Systems: Manufacturer's standard non-depreciating five-year warranty.
- C. Roller Shade Installation: One year from date of Substantial Completion, not including scaffolding, lifts or other means to reach inaccessible areas.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURER

- A. MechoShade Systems, Inc.; 42-03 35th Street, Long Island City, NY 11101. ASD. Tel: (718) 729-2020. Fax: (718) 729-2941. Email: info@mechoshade.com, www.mechoshade.com.
- B. Requests for substitutions will be considered in accordance with provisions of Section 01600.

2.2 APPLICATION / SCOPE

- A. Roller Shade Schedule
 - 1. Shade Type 1: Motorized interior solar roller shades in spaces shown on Drawings, and related motor control systems.
 - 2. Provide Electro /3 Double Shade at Social Area 201. Shade shall be provided in sections, full length of window WA-12.

2.3 SHADE CLOTH

- A. Visually Transparent Single-Fabric Shadecloth: MechoShade Systems, Inc., EuroTwill "6000" Series: 0.010 diameter (0.254 mm) non-raveling vinyl/polyester yarn, fabric thickness 0.025 inches (0.635 mm).
 - 1. Extra Dense Twill Weave "6000" series, 2-3 percent open.
 - 2. Color: Selected from manufacturer's standard colors.

2.4 SHADE BAND

- A. Shade Bands: Construction of shade band includes the fabric, the hem weight, hem-pocket, shade roller tube, and the attachment of the shade band to the roller tube. Sewn hems and open hem pockets are not acceptable.
 - 1. Hem Pockets and Hem Weights: Fabric hem pocket with RF-welded seams (including welded ends) and concealed hem weights. Hem weights shall be of appropriate size and weight for shade band. Hem weight shall be continuous inside a sealed hem pocket. Hem pocket construction and hem weights shall be similar, for all shades within one room.
 - 2. Shade band and Shade Roller Attachment
 - a. Use extruded aluminum shade roller tube of a diameter and wall thickness required to support shade fabric without excessive deflection. Roller tubes less than 1.55 inch (39.37 mm) in diameter for manual shades, and less than 2.55 inches (64.77 mm) for motorized shades are not acceptable.
 - b. Provide for positive mechanical engagement with drive / brake mechanism.

- c. Provide for positive mechanical attachment of shade band to roller tube; shade band shall be made removable / replaceable with a "snap-on" snap-off" spline mounting, without having to remove shade roller from shade brackets.
- d. Mounting spline shall not require use of adhesives, adhesive tapes, staples, and/or rivets.
- e. Any method of attaching shade band to roller tube that requires the use of: adhesive, adhesive tapes, staples, and/or rivets are not acceptable.

2.5 SHADE FABRICATION

- A. Fabricate units to completely fill existing openings from head to sill and jamb-to-jamb, unless specifically indicated otherwise.
- B. Fabricate shadecloth to hang flat without buckling or distortion. Fabricate with heat-sealed trimmed edges to hang straight without curling or raveling. Fabricate unguided shadecloth to roll true and straight without shifting sideways more than 1/8 inch (3.18 mm) in either direction per 8 feet (2438 mm) of shade height due to warp distortion or weave design. Fabricate hem as follows:
 1. Concealed hemtube
- C. Provide battens in standard shades as required to assure proper tracking and uniform rolling of the shadebands. Contractor shall be responsible for assuring the width-to-height (W:H) ratios shall not exceed manufacturer's standards or, in absence of such standards, shall be responsible for establishing appropriate standards to assure proper tracking and rolling of the shadecloth within specified standards. Battens shall be roll-formed stainless steel or tempered steel, as required.
- D. For railroaded shadebands, provide seams in railroaded multi-width shadebands as required to meet size requirements and in accordance with seam alignment as acceptable to Architect. Seams shall be properly located. Furnish battens in place of plain seams when the width, height, or weight of the shade exceeds manufacturer's standards. In absence of such standards, assure proper use of seams or battens as required to, and assure the proper tracking of the railroaded multi-width shadebands.
- E. Provide battens for railroaded shades when width-to-height (W:H) ratios meet or exceed manufacturer's standards. In absence of manufacturer's standards, be responsible for proper use and placement of battens to assure proper tracking and roll of shadebands.

2.6 COMPONENTS

- A. Access and Material Requirements
 1. Provide shade hardware allowing for the removal of shade roller tube from brackets without removing hardware from opening and without requiring end or center supports to be removed.
 2. Provide shade hardware that allows for removal and re-mounting of the shade bands without having to remove the shade tube, drive or operating support brackets.
 3. Use only Delrin engineered plastics by DuPont for all plastic components of shade hardware. Styrene based plastics, and /or polyester, or reinforced polyester will not be acceptable.
- B. Motorized Shade Hardware and Shade Brackets:
 1. Provide shade hardware constructed of minimum 1/8-inch (3.18 mm) thick plated steel, or heavier, thicker, as required to support 150 percent of the full weight of each shade.
 2. Provide shade hardware system that allows for field adjustment of motor or replacement of any operable hardware component without requiring removal of brackets, regardless of mounting position (inside, or outside mount).
 3. Provide shade hardware system that allows for operation of multiple shade bands offset by a maximum of 8-45 degrees from the motor axis between shade bands (4-22.5 degrees) on each side

of the radial line, by a single shade motor (multi-banded shade, subject to manufacturer's design criteria).

C. Manual Operated Chain Drive Hardware and Brackets:

1. Provide for universal, regular and offset drive capacity, allowing drive chain to fall at front, rear or non-offset for all shade drive end brackets. Universal offset shall be adjustable for future change.
2. Provide hardware capable for installation of a removable fascia, for both regular and/or reverse roll, which shall be installed without exposed fastening devices of any kind.
3. Provide shade hardware system that allows for removable regular and/or reverse roll fascias to be mounted continuously across two or more shade bands without requiring exposed fasteners of any kind.
4. Provide shade hardware system that allows for operation of multiple shade bands (multi-banded shades) by a single chain operator, subject to manufacturer's design criteria. Connectors shall be offset to assure alignment from the first to the last shade band.
5. Provide shade hardware system that allows multi-banded manually operated shades to be capable of smooth operation when the axis is offset a maximum of 6 degrees on each side of the plane perpendicular to the radial line of the curve, for a 12 degrees total offset.
6. Provide positive mechanical engagement of drive mechanism to shade roller tube. Friction fit connectors for drive mechanism connection to shade roller tube are not acceptable
7. Provide shade hardware constructed of minimum 1/8-inch (3.18 mm) thick plated steel or heavier as required to support 150 percent of the full weight of each shade.
8. Drive Bracket / Brake Assembly:
 - a. MechoShade Drive Bracket model M5 shall be fully integrated with all MechoShade accessories, including, but not limited to: SnapLoc fascia, room darkening side / sill channels, center supports and connectors for multi-banded shades.
 - b. M5 drive sprocket and brake assembly shall rotate and be supported on a welded 3/8 inch (9.525 mm) steel pin.
 - c. The brake shall be an over -unning clutch design which disengages to 90 percent during the raising and lowering of a shade. The brake shall withstand a pull force of 50 lbs. (22 kg) in the stopped position.
 - d. The braking mechanism shall be applied to an oil-impregnated hub on to which the brake system is mounted. The oil impregnated hub design includes an articulated brake assembly, which assures a smooth, non-jerky operation in raising and lowering the shades. The assembly shall be permanently lubricated. Products that require externally applied lubrication and or not permanently lubricated are not acceptable.
 - e. The entire M5 assembly shall be fully mounted on the steel support bracket, and fully independent of the shade tube assembly, which may be removed and reinstalled without effecting the roller shade limit adjustments.

- D. Drive Chain: #10 qualified stainless steel chain rated to 90 lb. (41 kg) minimum breaking strength. Nickel plate chain shall not be accepted.

2.7 SHADE MOTOR DRIVE SYSTEM

A. Shade Motors:

1. Tubular, asynchronous (non-synchronous) motors, with built-in reversible capacitor operating at 110v AC (60hz), single phase, temperature Class A, thermally protected, totally enclosed, maintenance free with line voltage power supply equipped with locking disconnect plug assembly furnished with each motor.
2. Conceal motors inside shade roller tube.
3. Maximum current draw for each shade motor of 2.3 amps.
4. Use motors rated at the same nominal speed for all shades in the same room.

- B. Total hanging weight of shade band shall not exceed 80 percent of the rated lifting capacity of the shade motor and tube assembly.

2.8 MOTOR CONTROL SYSTEMS

- A. IQ/MLC: Specifications and design of shade motors and motor control system are based on the IQ/MLC motor logic control system manufactured by MechoShade Systems, Inc. Other systems may be acceptable provide that all of the following performance capabilities are provided. Motor logic control systems not in complete compliance with these performance criteria shall not be accepted as equal systems.
1. Motor Control System:
 - a. Provide power to each shade motor via individual 3 conductor line voltage circuits connecting each motor to the relay based motor logic controllers (IQ/MLC).
 - b. Control system components shall provide appropriate (spike and brown out) over-current protection (+/- 10 percent of line voltage) for each of the four individual motor circuits and shall be rated by UL or ETL as a recognized component of this system and tested as an integrated system.
 - c. Motor control system shall allow each group of four shade motors in any combination to be controlled by each of four local switch ports, with up to fourteen possible "sub-group" combinations via local 3 button wall switches and all at once via a master 3 button switch. System shall allow for overlapping switch combinations from two or more local switches.
 - d. Multiple "sub-groups" from different IQ/MLC control components shall be capable of being combined to form "groups" operated by a single 3 button wall switch, from either the master port or in series from a local switch port.
 - e. Each shade motor shall be accessible (for control purposes) from up to four local switches and one master switch.
 - f. Control system shall allow for automatic alignment of shade hem bars in stopped position at 25 percent, 50 percent, and 75 percent of opening heights, and up to three user-defined intermediate stopping positions in addition to all up / all down, regardless of shade height, for a total of five positions. Control system shall allow shades to be stopped at any point in the opening height noting that shades may not be in alignment at these non-defined positions).
 - g. Control system shall have two standard operating modes: Normal mode allowing the shades to be stopped anywhere in the window's opening height and uniform mode, allowing the shades to only be stopped at the predefined intermediate stop positions. Both modes shall allow for all up / all down positioning.
 - h. Control system components shall allow for interface with both audiovisual system components and building fire and life safety system via a dry contact terminal block.
 - i. Control system components shall allow for interface with external analog input control devices such as solar activated controllers, 24 hour timers, and similar items; via a dry contact terminal block.
 - j. Reconfiguration of switch groups shall not require rewiring of the hardwired line voltage motor power supply wiring, or the low voltage control wiring. Reconfiguration of switch groups shall be accomplished within the motor control device (IQ/MLC).
 2. Wall Switches:
 - a. Three-button architectural flush mounted switches with metal cover plate and no exposed fasteners.
 - b. Connect local wall switches to control system components via low voltage (12V DC) 4-conductor modular cable equipped with RJ-11 type connectors supplied, installed and certified under Division 16 - Electrical.
 - c. Connect master wall switches to control system components via low voltage (12V DC) 6-conductor modular cable equipped with RJ-12 type connectors supplied, installed and certified under Division 16 - Electrical.

2.9 ACCESSORIES

- A. Roller Roller Shade Pocket for recessed mounting in acoustical tile, or drywall ceilings as indicated on the Drawings (for Shade Type 01).
 - 1. Provide either extruded aluminum and or formed steel shade pocket, sized to accommodate roller shades, with exposed extruded aluminum closure mount, tile support and removable closure panel to provide access to shades.
 - a. Provide "MagnaShade" components and housing.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Do not begin installation until substrates have been properly prepared.
- B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.2 PREPARATION

- A. Clean surfaces thoroughly prior to installation.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.3 INSTALLATION

- A. Install roller shades level, plumb, square, and true according to manufacturer's written instructions, and located so shade band is not closer than 2 inches (50 mm) to interior face of glass. Allow proper clearances for window operation hardware.
- B. Turn-Key Single-Source Responsibility for Motorized Interior Roller Shades: To control the responsibility for performance of motorized roller shade systems, assign the design, engineering, and installation of motorized roller shade systems, motors, controls, and low voltage electrical control wiring specified in this Section to a single manufacturer and their authorized installer/dealer. The Architect will not produce a set of electrical drawings for the installation of control wiring for the motors, or motor controllers of the motorized roller shades. Power wiring (line voltage), shall be provided by the roller shade installer/dealer, in accordance with the requirements provided by the manufacturer. Coordinate the following with the roller shade installer/dealer:
 - 1. Main Contractor shall provide power panels and circuits of sufficient size to accommodate roller shade manufacturer's requirements, as indicated on the mechanical and electrical drawings.
 - 2. Main Contractor shall coordinate with requirements of roller shade installer/dealer, before inaccessible areas are constructed.
 - 3. Roller shade installer/dealer shall run line voltage as dedicated home runs (of sufficient quantity, in sufficient capacity as required) terminating in junction boxes in locations designated by roller shade dealer.
 - 4. Roller shade installer/dealer shall provide and run all line voltage (from the terminating points) to the motor controllers, wire all roller shade motors to the motor controllers, and provide and run low voltage control wiring from motor controllers to switch/ control locations designated by the

Architect. All above-ceiling and concealed wiring shall be plenum-rated, or installed in conduit, as required by the electrical code having jurisdiction.

5. Main Contractor shall provide conduit with pull wire in all areas, which might not be accessible to roller shade contractor due to building design, equipment location or schedule.
- C. Adjust and balance roller shades to operate smoothly, easily, safely, and free from binding or malfunction throughout entire operational range.
- D. Clean roller shade surfaces after installation, according to manufacturer's written instructions.
- E. Engage Installer to train Owner's maintenance personnel to adjust, operate and maintain roller shade systems.

3.4 PROTECTION

- A. Protect installed products until completion of project.
- B. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION 122413

SECTION 142400HYDRAULIC ELEVATORS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes hydraulic passenger elevators.

1.2 ACTION SUBMITTALS

- A. Product Data: Include capacities, sizes, performances, operations, safety features, finishes, and similar information.
- B. Shop Drawings:
 - 1. Include plans, elevations, sections, and large-scale details indicating service at each landing, machine room layout, coordination with building structure, relationships with other construction, and locations of equipment.
 - 2. Indicate maximum dynamic and static loads imposed on building structure at points of support, and maximum and average power demands.
- C. Samples: For exposed finishes.

1.3 INFORMATIONAL SUBMITTALS

- A. Manufacturer Certificates: Signed by elevator manufacturer certifying that hoistway, pit, and machine room layout and dimensions, as shown on Drawings, and electrical service, as shown and specified, are adequate for elevator system being provided.

1.4 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For elevators to include in emergency, operation, and maintenance manuals.
- B. Inspection and Acceptance Certificates and Operating Permits: As required by authorities having jurisdiction for normal, unrestricted elevator use.
- C. Continuing Maintenance Proposal: Submit a continuing maintenance proposal from Installer to Owner, in the form of a standard two-year maintenance agreement, starting on date initial maintenance service is concluded. State services, obligations, conditions, and terms for agreement period and for future renewal options.

1.5 WARRANTY

- A. Manufacturer's Special Warranty: Manufacturer agrees to repair, restore, or replace elevator work that fails in materials or workmanship within specified warranty period.
 - 1. Warranty Period: One year(s) from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Basis-of-Design Product: Subject to compliance with requirements, provide Schindler Elevator Corp. or comparable product by one of the following:
1. KONE Inc.
 2. Minnesota Elevator, Inc.
 3. Otis Elevator Co.
 4. ThyssenKrupp Elevator.

2.2 PERFORMANCE REQUIREMENTS

- A. Regulatory Requirements: Comply with ASME A17.1/CSA B44.
- B. Accessibility Requirements: Comply with Section 407 in the U.S. Architectural & Transportation Barriers Compliance Board's ADA-ABA Accessibility Guidelines and with ICC A117.1.

2.3 ELEVATORS

- A. Elevator System, General: Manufacturer's standard elevator systems. Unless otherwise indicated, manufacturers' standard components shall be used, as included in standard elevator systems and as required for complete system.
- B. Elevator Description: Schindler 330A Holeless Hydraulic Elevator
1. Elevator Number(s): as shown on Drawings.
 2. Type: dual piston, holeless.
 3. Rated Load: 3500 lb.
 4. Rated Speed: 125 fpm.
 5. Operation System: Single automatic.
 6. Auxiliary Operations:
 - a. Standby power operation.
 7. Security Feature: Card-reader operation.
 8. Car Enclosures:
 - a. Inside Width: 85 inches platform.
 - b. Inside Depth: 64 inches platform.
 - c. Inside Height: 96 inches to underside of ceiling.
 - d. Front Walls (Return Panels): Satin stainless steel, No. 4 finish with integral car door frames.
 - e. Car Fixtures: Satin stainless steel, No. 4 finish.
 - f. Side and Rear Wall Panels: Satin stainless steel, No. 4 finish.
 - g. Reveals: Satin stainless steel, No. 4 finish.
 - h. Door Faces (Interior): Satin stainless steel, No. 4 finish.
 - i. Ceiling: Luminous ceiling.
 - j. Handrails: 1/2 by 2 inches rectangular satin stainless steel, No. 4 finish, at sides and rear of car.
 - k. Floor prepared to receive ceramic tile (specified in Section 09680 "Carpet").
 9. Hoistway Entrances:
 - a. Width: 42 inches.
 - b. Height: 84 inches.

- c. Type: Single-speed side sliding.
- d. Frames at First Floor and second floor Satin stainless steel, No. 4 finish.
- 10. Hall Fixtures at each floor: Satin stainless steel, No. 4 finish.
- 11. Additional Requirements:
 - a. Provide inspection certificate in each car, mounted under acrylic cover with frame made from satin stainless steel, No. 4 finish.
 - b. Provide hooks for protective pads two complete set(s) of full-height protective pads.

2.4 SYSTEMS AND COMPONENTS

- A. Pump Units: Positive-displacement type with a maximum of 10 percent variation between no load and full load and with minimum pulsations.
 - 1. Pump shall be suspended inside oil tank from vibration isolation mounts or shall be tank-top-mounted type with fan-cooled, squirrel-cage induction motor, and shall be mounted on oil tank with vibration isolation mounts and enclosed in prime-painted steel enclosure lined with 1-inch-thick, glass-fiber insulation board.
 - 2. Motor shall have **solid-state** starting.
- B. Hydraulic Silencers: System shall have hydraulic silencer containing pulsation-absorbing material in blowout-proof housing at pump unit.
- C. Hydraulic Fluid: Nontoxic, biodegradable, fire-resistant fluid made from vegetable oil with antioxidant, anticorrosive, antifoaming, and metal-passivating additives and approved by elevator manufacturer for use with elevator equipment.
 - 1. Product: Subject to compliance with requirements, provide "Hydro Safe" by Hydro Safe Oil Division, Inc.
- D. Guides: Roller guides; polymer-coated, nonlubricated sliding guides; or sliding guides with guide-rail lubricators. Provide guides at top and bottom of car and counterweight frames.

2.5 OPERATION SYSTEMS

- A. General: Provide manufacturer's standard microprocessor operation system as required to provide type of operation indicated.
- B. Auxiliary Operations: In addition to primary operation system features, provide the following operational features for elevators where indicated:
 - 1. Single-Car Standby Power Operation: On activation of standby power, car is returned to a designated floor and parked with doors open. Car can be manually put in service on standby power, either for return operation or for regular operation, by switches in control panel located at control room. Manual operation causes automatic operation to cease.
 - 2. Single-Car Battery-Powered Lowering: When power fails, car is lowered to the lowest floor, opens its doors, and shuts down. System includes rechargeable battery and automatic recharging system.
 - 3. Group Battery-Powered Lowering: When power fails, cars are lowered to the lowest floor, open their doors, and shut down. System includes rechargeable battery and automatic recharging system.
- C. Security Feature: Security feature shall not affect emergency firefighters' service.
 - 1. Card-Reader Operation: System uses card readers at car-control stations to authorize calls. Security system determines which landings and at what times calls require authorization by card reader. Allow space as indicated for card reader in car. Provide stripe-swipe card reader integral with each car-control station.
 - a. Security access system equipment is specified in Section 13730 "Security Access." not in the Contract.

2.6 DOOR REOPENING DEVICES

- A. Infrared Array: Provide door reopening device with uniform array of 36 or more microprocessor-controlled, infrared light beams projecting across car entrance. Interruption of one or more light beams shall cause doors to stop and reopen.

2.7 CAR ENCLOSURES

- A. General: Provide steel-framed car enclosures with nonremovable wall panels, with car roof, access doors, power door operators, and ventilation.
- B. Materials and Finishes: Manufacturer's standards, but not less than the following:
 - 1. Stainless-Steel Wall Panels: Flush, hollow-metal construction; fabricated from stainless-steel sheet.
 - 2. Stainless-Steel Doors: Flush, hollow-metal construction; fabricated from stainless-steel sheet.
 - 3. Sight Guards: Provide sight guards on car doors.
 - 4. Sills: Extruded aluminum, with grooved surface, 1/4 inch thick.
 - 5. Luminous Ceiling: Fluorescent light fixtures and ceiling panels of translucent acrylic or other permanent rigid plastic.
 - 6. Handrails: Manufacturer's standard handrails, of shape, metal, and finish indicated.

2.8 HOISTWAY ENTRANCES

- A. Hoistway Entrance Assemblies: Manufacturer's standard horizontal-sliding, door-and-frame hoistway entrances complete with track systems, hardware, sills, and accessories. Frame size and profile shall accommodate hoistway wall construction.
- B. Fire-Rated Hoistway Entrance Assemblies: Door and frame assemblies shall comply with NFPA 80 and be listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction based on testing at as close-to-neutral pressure as possible according to NFPA 252.
 - 1. Fire-Protection Rating: 1 hour with 30-minute temperature rise of 450 deg F.
- C. Materials and Fabrication: Manufacturer's standards, but not less than the following:
 - 1. Stainless-Steel Frames: Formed from stainless-steel sheet.
 - 2. Stainless-Steel Doors: Flush, hollow-metal construction; fabricated from stainless-steel sheet.
 - 3. Sight Guards: Provide sight guards on doors matching door edges.
 - 4. Sills: Extruded aluminum, with grooved surface, 1/4 inch thick.
 - 5. Nonshrink, Nonmetallic Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C 1107/C 1107M.

2.9 SIGNAL EQUIPMENT

- A. General: Provide hall-call and car-call buttons that light when activated and remain lit until call has been fulfilled. Fabricate lighted elements with long-life lamps and acrylic or other permanent, non-yellowing translucent plastic diffusers or LEDs.
- B. Car-Control Stations: Provide manufacturer's standard recessed or semirecessed car-control stations. Mount in return panel adjacent to car door unless otherwise indicated.
 - 1. Provide "No Smoking" sign matching car-control station, with text and graphics as required by authorities having jurisdiction.
- C. Emergency Communication System: Two-way voice communication system, with visible signal, which dials preprogrammed number of monitoring station and does not require handset use. System is contained in flush-mounted cabinet, with identification, instructions for use, and battery backup power supply.
- D. Firefighters' Two-Way Telephone Communication Service: Provide flush-mounted cabinet telephone jack in each car and required conductors in traveling cable for firefighters' two-way telephone

communication service specified in Section 13852 "Digital, Addressable Fire-Alarm System"
Section 13853 "Zoned (DC Loop) Fire-Alarm System."

- E. Car Position Indicator: Provide illuminated, digital-type car position indicator, located above car door or above car-control station. Also, provide audible signal to indicate to passengers that car is either stopping at or passing each of the floors served. Include travel direction arrows if not provided in car-control station.
- F. Hall Push-Button Stations: Provide hall push-button station at each landing as indicated.
- G. Hall Lanterns: Units with illuminated arrows; but provide single arrow at terminal landings. Provide one of the following:
 - 1. Manufacturer's standard wall-mounted units, for mounting above entrance frames.
- H. Hall Annunciator: With each hall lantern, provide audible signals indicating car arrival and direction of travel. Signals sound once for up and twice for down.
- I. Standby Power Elevator Selector Switches: Provide switches, as required by ASME A17.1/CSA B44, where indicated. Adjacent to switches, provide illuminated signal that indicates when normal power supply has failed
- J. Fire-Command-Center Annunciator Panel: Provide panel containing illuminated position indicators for each elevator, clearly labeled with elevator designation; include illuminated signal that indicates when elevator is operational and when it is at the designated emergency return level with doors open. Provide standby power elevator selector switch(es), as required by ASME A17.1/CSA B44, adjacent to position indicators. Provide illuminated signal that indicates when normal power supply has failed.

2.10 FINISH MATERIALS

- A. Cold-Rolled Steel Sheet: ASTM A 1008/A 1008M, commercial steel, Type B, exposed, matte finish.
- B. Hot-Rolled Steel Sheet: ASTM A 1011/A 1011M, commercial steel, Type B, pickled.
- C. Stainless-Steel Sheet: ASTM A 240/A 240M, Type 304.
- D. Stainless-Steel Bars: ASTM A 276, Type 304.
- E. Stainless-Steel Tubing: ASTM A 554, Grade MT 304.
- F. Aluminum Extrusions: ASTM B 221, Alloy 6063.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install cylinder plumb and accurately centered for elevator car position and travel. Anchor securely in place, supported at pit floor and braced at intervals as needed to maintain alignment. Anchor cylinder guides at spacing needed to maintain alignment and avoid overstressing guides.
- B. Sound Isolation: Mount rotating and vibrating equipment on vibration-isolating mounts to minimize vibration transmission to structure and structure-borne noise due to elevator system.
- C. Lubricate operating parts of systems as recommended by manufacturers.
- D. Leveling Tolerance: 1/4 inch, up or down, regardless of load and travel direction.
- E. Set sills flush with finished floor surface at landing. Fill space under sill solidly with nonshrink, nonmetallic grout.
- F. Locate hall signal equipment for elevators as follows, unless otherwise indicated:
 - 1. Place hall lanterns either above or beside each hoistway entrance.
 - 2. Mount hall lanterns at a minimum of 72 inches above finished floor.

3.2 FIELD QUALITY CONTROL

- A. Acceptance Testing: On completion of elevator installation and before permitting elevator use (either temporary or permanent), perform acceptance tests as required and recommended by ASME A17.1/CSA B44 and by governing regulations and agencies.

3.3 PROTECTION

- A. Temporary Use: Comply with the following requirements for elevator used for construction purposes:
 1. Provide car with temporary enclosure, either within finished car or in place of finished car, to protect finishes from damage.
 2. Provide other protective coverings, barriers, devices, signs, and procedures as needed to protect elevator and elevator equipment.
 3. Engage elevator Installer to provide full maintenance service.
 4. Engage elevator Installer to restore damaged work, if any, so no evidence remains of correction. Return items that cannot be refinished in the field to the shop, make required repairs and refinish entire unit, or provide new units as required.

3.4 DEMONSTRATION

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to operate, adjust and maintain elevator(s).

3.5 MAINTENANCE

- A. Initial Maintenance Service: Beginning at Substantial Completion, maintenance service shall include twenty four months' full maintenance by skilled employees of elevator Installer. Include monthly preventive maintenance, repair or replacement of worn or defective components, lubrication, cleaning, and adjusting as required for proper elevator operation. Parts and supplies shall be manufacturer's authorized replacement parts and supplies.

END OF SECTION 142400

SECTION 121313

WET-PIPE SPRINKLER SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

- A. Includes But Not Limited To:
 - 1. Furnish and install complete wet-pipe fire sprinkler system as specified in Contract Documents.
 - 2. Furnish and install Firestop Penetration Systems for fire sprinkler system penetrations as described in Contract Documents.
 - 3. Install sealant at all dry sprinkler penetrations.
- B. Related Requirements:
 - 1. Section 07 8400: Quality of Penetration Firestop Systems to be used on Project and submittal requirements.
 - 2. Section 28 3101: Fire Detection and Alarm Annunciation Panels including connection of tamper switches and flow detectors to alarm system and furnishing and installing of low temperature switch.
 - 3. Section 33 1119: Fire Suppression Utility Water Distribution Piping.

1.2 REFERENCES

- A. Association Publications:
 - 1. Underwriters Laboratories, Inc.:
 - a. UL Directory B, 'Fire Protection Equipment Directory' (2011).
- B. Definitions:
 - 1. Glycerin: Permitted by NFPA 13 for use as antifreeze solutions with water in sprinkler systems supplied by either potable or nonpotable water connections.
- C. Reference Standards:
 - 1. American National Standards Institute / American Society of Mechanical Engineers:
 - a. ANSI/ASME B1.20.1-1983(R2006), 'Pipe Threads, General Purpose (Inch)'.
 - b. ANSI/ASME B16.1-2010, 'Cast Iron Pipe Flanges and Flanged Fittings'.
 - c. ANSI/ASME B16.3-2011, 'Malleable Iron Threaded Fittings: Classes 150 and 300'.
 - d. ANSI/ASME B16.4-2011, 'Gray Iron Threaded Fittings, Classes 125 and 250'.
 - e. ANSI/ASME B16.5-2009, 'Pipe Flanges and Flanged Fittings'.
 - 2. American National Standards Institute / American Water Works Association:
 - a. ANSI/AWWA C606-11, 'Grooved and Shouldered Joints'.
 - 3. American National Standards Institute / American Welding Society:
 - a. ANSI/AWA B2.1/B2.1M-2009, 'Specification for Welding Procedure and Performance Qualification'.
 - 4. ASTM International:
 - a. ASTM A53/A53M-12, 'Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless'.
 - b. ASTM A135/A135M-09, 'Standard Specification for Electric-Resistance-Welded Steel Pipe'.
 - c. ASTM A234/A234M-11a, 'Standard Specification for Piping Fittings of Wrought Carbon Steel and Alloy Steel for Moderate and High Temperature Service'.
 - d. ASTM A395/A395M-99(2009), 'Standard Specification for Ferritic Ductile Iron Pressure-Retaining Castings for Use at Elevated Temperatures'.
 - e. ASTM A536-84(2009), 'Standard Specification for Ductile Iron Castings'.
 - f. ASTM A795/A795M-08, 'Standard Specification for Black and Hot-Dipped Zinc-Coated (Galvanized) Welded and Seamless Steel Pipe for Fire Protection Use'.
 - 5. National Fire Protection Association / American National Standards Institute:

- a. NFPA 13: 'Standard for the Installation of Sprinkler Systems', (2010 Edition).
- b. NFPA 24: 'Installation of Private Fire Service Mains and their Appurtenances', (2010 Edition).
- c. NFPA 25: 'Standard for the Inspection, Testing, and Maintenance of Water-Based Fire Protection Systems', (2011 Edition).
- d. NFPA 101: 'Life Safety Code', (2012 Edition).

1.3 SUBMITTALS

A. Action Submittals:

1. Shop Drawings:
 - a. Size sprinkler system by one of following methods:
 - 1) Hydraulic calculation design method based on water supply evaluation performed at building site.
 - b. On submittals, refer to sprinkler heads by sprinkler identification or model number published in appropriate agency listing or approval. Trade names and other abbreviated designations are not acceptable.
 - c. Submittal Procedure:
 - 1) After award of Contract and before purchase of equipment, submit one PDF of shop drawings with specifications and hydraulic calculations to Architect/Engineer and three hard copy sets to local jurisdiction having authority for fire prevention for review.
 - 2) After integrating Architect's and AHJ's comments into drawings, licensed certified fire protection engineer of record who designed fire protection system shall stamp, sign, and date each sheet of shop drawings and first page of specifications and calculations.
 - 3) Submit stamped documents to Owner and to AHJ for fire prevention for final approval.
 - 4) After final approval, submit four copies of approved stamped documents to Architect.
 - 5) Failure of system to meet requirements of authority having jurisdiction and/or approved stamped construction documents shall be corrected at no additional cost to Owner.

B. Informational Submittals:

1. Qualification Statement:
 - a. Licensed fire protection engineer or fire protection system designer:
 - 1) Licensed for area of Project.
 - 2) Certified by NICET to level three minimum.
 - 3) Provide Qualification documentation if requested by Architect or Owner.
 - b. Installer:
 - 1) Provide Qualification documentation if requested by Architect or Owner.

C. Closeout Submittals:

1. Include following in Operations And Maintenance Manual specified in Section 01 7800:
 - a. Operations and Maintenance Data:
 - 1) Maintenance and instructions.
 - a) List of system components used indicating name and model of each item.
 - b) Manufacturer's maintenance instructions for each component installed in Project.
 - c) Instructions shall include installation instructions, parts numbers and lists, operation instructions of equipment, and maintenance and lubrication instructions.
 - b. Warranty Documentation:
 - 1) Include copies of required warranties.
 - c. Record Documentation:
 - 1) Include copies of approved shop drawings.
 - 2) Provide master index showing items included.
 - 3) Provide name, address, and phone number of Architect, Architect's Fire Sprinkler Consultant, General Contractor, and Fire Protection subcontractor.
 - 4) Provide operating instructions to include:
 - a) General description of fire protection system.
 - b) Step by step procedure to follow for shutting down system or putting system into operation.

- 5) Provide copy of system's above ground and below ground hydrostatic tests. Provide separate copies for Architect and Owner.
 - 6) Provide copy of 'Contractor's Material and Testing Certificate for Above Ground Piping' NFPA 13, Figure 24.1 (2010 edition).
2. Inspection:
- a. Provide Owner with latest version of NFPA 25.

D. Maintenance Material Submittals;

1. Extra Stock Materials:
 - a. Spare sprinkler heads in the quantity recommended by NFPA 13 selected in representative proportion to quantity used in Project and in accordance with NFPA 13 (Six (6) spare sprinkler heads minimum). Do not include dry barrel Pendent and dry barrel Sidewall sprinkler heads.
 - b. Provide spare heads in cabinet with sprinkler head wrench for each type of head used. After approval of cabinet and contents, mount cabinet in convenient location in Riser Room.

1.4 QUALITY ASSURANCE

A. Requirements of Regulatory Agencies:

1. Unless noted otherwise, system shall conform to:
 - a. NFPA 13, 'Light & Ordinary Hazard Occupancies'.
 - b. NFPA 24, 'Service Mains and Their Appurtenances, Private'.
 - c. NFPA 25, 'Inspection, Testing, and Maintenance'.
 - d. NFPA 101, 'Life Safety Code'.
 - e. Requirements of local water department and local authority having jurisdiction for fire protection.
 - f. Underwriters Laboratories Publication, UL Directory B, 'Fire Protection Equipment Directory', current edition at time of Pre-Bid Meeting.
 - g. Comply with backflow prevention requirements and, if required, include device in hydraulic calculations.
 - h. Applicable rules, regulations, laws, and ordinances.

B. Qualifications:

1. Licensed fire protection engineer or fire protection system designer certified by NICET to level three minimum and engaged in design of fire protection systems. Engineer / designer shall:
 - a. Licensed for area of Project.
 - b. Minimum five (5) years experience in fire protection system installations.
 - c. Minimum five (5) satisfactorily completed installations in past three (3) years of projects similar in size, scope, and complexity required for this project before bidding.
 - d. Be responsible for overseeing preparation of shop drawings, hydraulic calculations where applicable, and system installation.
 - e. Make complete inspection of installation.
 - f. Provide corrected record drawings to Owner with letter of acceptance.
 - g. Certify that installation is in accordance with Contract Documents.
 - h. Upon request, submit documentation.
2. Installer:
 - a. Licensed for area of Project.
 - b. Minimum five (5) years experience in fire protection system installations.
 - c. Minimum five (5) satisfactorily completed installations in past three (3) years of projects similar in size, scope, and complexity required for this project before bidding.
 - d. Upon request, submit documentation.

PART 2 - PRODUCTS

2.1 SYSTEM

A. Manufacturers:

1. Manufacturer Contact List:
 - a. Croker Corp, Elmsford, NY www.croker.com.
 - b. Gruvlock by Anvil International, Portsmouth, NH www.anvilintl.com.
 - c. HO Trerice Company, Oak Park, MI www.hotco.com.
 - d. Kennedy Valve, Elmira, NY www.kennedyvalve.com.
 - e. Milwaukee Valve Co, New Berlin, WI www.milwaukeevalve.com.
 - f. Mueller Company, Decatur, IL www.muellerflo.com.
 - g. Nibco Inc, Elkhart, IN www.nibco.com.

B. Description:

1. Automatic wet-pipe fire sprinkler system starting at flange in Fire Riser Room and extending throughout heated portions of building.
2. Sprinklers not required in areas with fire-retardant treated wood.
3. Dry sprinkler heads preferred over and into Vestibules.

C. Performance:

1. Design Criteria:
 - a. Area of Application and Corresponding Design Density:
 - 1) Serving Area and Mechanical, Electrical, and Janitorial Areas:
 - a) Ordinary Hazard Group 1.
 - b) Design density = 0.15 gpm per sq ft over 1,500 sq ft (140 sq m).
 - 2) Storage Areas:
 - a) Ordinary Hazard Group 2.
 - b) Design density = 0.20 gpm per sq ft over 1,500 sq ft (140 sq m).
 - 3) All Other Areas:
 - a) Light Hazard.
 - b) Design density = 0.10 gpm per sq ft over 1,500 sq ft (140 sq m).
 - 4) Increase remote areas by 30 percent where ceiling / roof is sloped more than 2 inches (50 mm) per ft.
 - 5) Remote areas may be reduced within parameters indicated in NFPA 13 for use of quick response sprinklers throughout.
 - b. Maximum Coverage per Sprinkler Head:
 - 1) Ordinary Hazard Areas: 130 sq ft (12.1 sq meters).
 - 2) Attic Areas: 120 sq ft (11.2 sq meters).
 - 3) Light Hazard Areas: 225 sq ft (20.1 sq meters).
 - c. Design Area shall be hydraulically most remote area in accordance with NFPA 13.
 - 1) Provide a 10% safety allowance under adjusted water flow supply curve.
 - d. Maximum velocity of water flow within piping: 20 feet (6.1 m) per sec.

D. Components:

1. General: Use only domestically manufactured cast iron pipe fittings, valves, sprinkler heads, and other components.
 - a. Pipe of foreign manufacture that meets ASTM Standards is acceptable.
 - b. Ductile iron fittings of foreign manufacture are acceptable.
2. Pipe:
 - a. Schedule 40 Welded Steel:
 - 1) Exterior, Above Ground: Schedule 40 hot-dip galvanized welded steel meeting requirements of ASTM A53/A53M, ASTM A135/A135M or ASTM A795/A795M.
 - 2) Interior, Above Ground: Schedule 40 black welded steel meeting requirements of ASTM A53/A53M, ASTM A135/A135M or ASTM A795/A795M.
 - 3) Connections:

- a) 2 inches (50 mm) And Smaller: Screwed, flanged, or roll grooved coupling system.
- b) 2-1/2 inches (64 mm) And Larger: Flanged or roll grooved coupling system.
3. Fittings:
- a. Usage:
- 1) 2 inches (50 mm) And Smaller: Welded, screwed, flanged, or roll grooved coupling system. For use with schedule 40 carbon steel pipe.
- 2) 2-1/2 inches (64 mm) And Larger: Welded, flanged, or roll grooved coupling system.
- b. Types And Quality:
- 1) Screwed:
- a) Cast iron meeting requirements of ANSI B16.4 or ductile iron meeting requirements of ANSI B16.3 and ASTM A536, Grade 65-45-12.
- b) Threaded fittings and pipe shall have threads cut to ANSI B1.20.1.
- c) Do not extend pipe into fittings to reduce waterway.
- d) Ream pipe after cutting to remove burrs and fins.
- 2) Flanged: Steel meeting requirements of ANSI B16.5.
- 3) Welded:
- a) Carbon steel meeting requirements of ASTM A234/A234M.
- b) Weld pipe using methods complying with AWS B2.1, level AR-3. Welding procedures and performance of welders shall comply with AWS B2.1, level AR3.
- 4) Roll Grooved Pipe Coupling System:
- a) Ductile iron meeting requirements of ASTM A395/A395M and ASTM A536, and UL listed.
- b) Grooved products used on Project shall be from same manufacturer. Grooving tools shall be as recommended by manufacturer of grooved products.
- c) Category Four Approved Products: See Section 01 6200 for definition of Categories:

	Gruvlok	Tyco (Grinnell)	Victaulic
Rigid Couplings	7401	772	Style 005
Flexible Couplings ¹	7000	705	Style 75
Flange Adaptors ²	7012	71	Style 744
Grooved Coupling Gaskets ³	'E' EPDM	Grade 'E' EPDM	'E' EPDM ⁴

¹ Use in locations where vibration attenuation, stress relief, thermal expansion, or seismic design is required / needed.

² Class 125 or 150.

³ Temperature rated 30 to 150 deg F (minus one to plus 65 deg C). NSF-61 certified.

⁴ Grade 'A'.

- c. Use of saddle or hole cut type mechanical tees is NOT APPROVED.
4. Valves:
- a. Butterfly Valves:
- 1) Design Criteria:
- a) UL / CASA approved.
- b) Indicating type.
- 2) Category Four Approved Products: See Section 01 6200 for definitions of Categories:
- a) Milwaukee:
- (1) Model BB-SCS02 threaded ends with tamper switch one inch (25 mm) to 2 inches (50 mm).
- (2) Model BBVSCS02 Grooved ends with tamper switch 2 inches (50 mm) to 2-1/2 inch (64 mm).
- b) Nibco:
- (1) Model WD3510-8 Wafer type with valve tamper switch.
- (2) Model GD4765-8N Grooved type with valve tamper switch, 2-1/2 inches (64 mm) to 8 inches (200 mm).
- c) Tyco (Grinnell):
- (1) Model BFV-N wafer.
- (2) Model BFV-N grooved.

- d) Victaulic: Series 705W Grooved end type with internal supy. switches.
- e) Kennedy:
 - (1) Model 01W wafer.
 - (2) Model G300 grooved.
- b. Gate Valves:
 - 1) Design Criteria:
 - a) UL / CASA approved.
 - b) Outside Screw and Yoke Type (O.S.&Y).
 - c) Class 150 psi.
 - 2) Category Four Approved Products: See Section 01 6200 for definitions of Categories:
 - a) Nibco:
 - (1) T-104-0 with Threaded Ends **1/2 inch (12.7 mm) to 2 inches (50 mm)**.
 - (2) F-637-31 Flanged Ends.
 - b) Mueller: R-2360-6 Flanged Ends.
 - c) Victaulic: Series 771 Grooved Ends
- c. Ball Valves:
 - 1) Design Criteria:
 - a) UL / CASA approved.
 - b) Valve tamper switch.
 - 2) Category Four Approved Products: See Section 01 6200 for definitions of Categories:
 - a) Milwaukee: BB-SCS02 with threaded ends.
 - b) Nibco: KT-505 with threaded ends.
 - c) Nibco: KG-505 with grooved ends.
 - d) Victaulic: Series 728 with grooved or threaded ends.
- d. Swing Check Valves:
 - 1) **1/2 to 3 inch (13 to 75 mm)** horizontal check.
 - a) Design Criteria:
 - (1) Regrinding type.
 - (2) Renewable disk.
 - (3) Bronze Class 125 with threaded ends.
 - b) Category Four Approved Products: See Section 01 6200 for definitions of Categories:
 - (1) Nibco: KT-403-W.
 - (2) Victaulic: Series 712.
 - (3) Viking: G-1 Grooved ends.
 - 2) **2 to 4 inch (50 to 100 mm)** Horizontal check:
 - a) Design Criteria:
 - (1) Grooved ends.
 - (2) Ductile iron body.
 - (3) Rated **300 psi (2.07 MPa)**.
 - b) Category Four Approved Products: See Section 01 6200 for definitions of Categories:
 - (1) Tyco (Grinnell): CV-1F Grooved ends.
 - (2) Victaulic: Series 712.
 - (3) Viking: G-1 Grooved ends.
 - 3) **3 to 12 inch (76 to 300 mm)** Horizontal check:
 - a) Design Criteria:
 - (1) Bolted bonnet.
 - (2) Raised face flanges.
 - (3) Bronze mounted with ductile iron body.
 - (4) **125 lb (56.7 kg)** Class A.
 - b) Category Four Approved Products: See Section 01 6200 for definitions of Categories:
 - (1) Nibco: F-938-31.
 - (2) Mueller: A-2120-6.
 - (3) Viking: F-1 grooved and flanged.
- e. Wafer Type Check Valves:
 - 1) Design Criteria:
 - a) **4 to 8 inch (100 to 300 mm)** cast iron body.
 - b) **175 psi (1.21 MPa)** minimum working pressure.

- c) Rubber Seat.
 - 2) Category Four Approved Products: See Section 01 6200 for definitions of Categories:
 - a) Nibco: KW-900-W.
 - b) Mueller: A-2102.
 - c) Kennedy: Fig.706.
 - f. Grooved-End Check Valves:
 - 1) Design Criteria:
 - a) UL / CASA listed and approved to **250 psi (1.72 MPa)** maximum operating pressure.
 - b) **2-1/2 to 12 inch (64 to 300 mm)** ductile iron body.
 - c) Disc And Seat:
 - (1) **2-1/2 And 3 Inch (64 to 75 mm)**: Aluminum bronze disc with mounted elastomer seal and PPS (polyphenylene sulfide) coated seat.
 - (2) **4 Inch (100 mm) And Larger**: Elastomer encapsulated ductile iron disc with welded in nickel seat.
 - (3) Viking: Model VK462.
 - 2) Category Four Approved Products. See Section 01 6200 for definitions of Categories:
 - a) Nibco: KG-900-W grooved ends.
 - b) Victaulic: Series 717.
 - c) Kennedy: Fig.426.
 - g. Alarm Check Valves:
 - 1) Category Four Approved Products: See Section 01 6200 for definitions of Categories:
 - a) Reliable: E with gauges and drain.
 - b) Tyco (Grinnell): Model AV-1-300.
 - c) Victaulic: Series 751 with gauges and drain.
 - d) Viking: J-1 with gauges and drain.
 - h. Backflow Preventer: Make and model shown on Drawings or as required by local codes.
 - i. Inspector's Test Valve:
 - 1) Design Criteria:
 - a) Bronze body with threaded or grooved ends.
 - b) Combination sight glass / orifice.
 - 2) Category Four Approved Products. See Section 01 6200 for definitions of Categories:
 - a) Tyco (Grinnell): Model F350.
 - b) Victaulic: Testmaster Alarm Test Module Style 720.
5. Sprinkler Heads:
- a. Concealed Pendant and Institutional(see plans):
 - 1) Design Criteria:
 - a) Adjustable cover.
 - b) UL / CASA listed and approved.
 - c) Coordinate concealed cover finish with Architect.
 - b. Horizontal Sidewall Sprinkler:
 - 1) Design Criteria:
 - a) UL / CASA listed and approved.
 - b) Recess adjustable.
 - c) Where guards are required, use chrome plated sprinkler guards that are listed, that are approved by Sprinkler Manufacturer for use with head, and that are supplied
 - c. Upright Sprinklers:
 - 1) Design Criteria:
 - a) UL Listed and approved.
6. Water Flow Alarm:
- a. Electric Flow Alarm:
 - 1) Design Criteria:
 - a) UL listed and approved.
 - 2) Category Four Approved Products: See Section 01 6200 for definitions of Categories:
 - a) Potter Electric: Bell, PBA-AC, **6 inch (150 mm)** diameter, 120VAC.
 - b) System Sensor: Bell, SSV-120, 120VAC.
 - c) Potter Electric: Horn Strobe, SASH-120, 120VAC.
 - d) System Sensor: Horn Strobe, P2RHK-120, 120 VAC.

- b. Mechanical Flow Alarm: Water Gong.
 - 1) Design Criteria:
 - a) UL / CASA listed and approved.
 - 2) Category Four Approved Products: See Section 01 6200 for definitions of Categories:
 - a) Reliable: C.
 - b) System Sensor: SSV 120 or SSM 24 Series.
 - c) Tyco: WMA-1.
 - d) Victaulic: Series 760.
 - e) Viking: F-2.
7. Pressure Gauges:
 - a. Mechanical Water Pressure Gauges:
 - 1) Design Criteria:
 - a) UL / CASA listed and approved.
 - b) 3-1/2 inch (89 mm) diameter dial.
 - c) 0 to 300 psi (0 to 2.07 MPa) in 5 psi (34.5 kPa) increments.
 - 2) Category Four Approved Products: See Section 01 6200 for definitions of Categories:
 - a) Reliable: UA.
 - b) HO Terrice: 500.
 - c) Viking: 01124A.
8. Waterflow Detectors:
 - a. Electrical Water Flow Switch:
 - 1) Design Criteria:
 - a) UL / CASA listed.
 - b) Switch activates with flow of 10 gpm (37.85 lpm) or more.
 - c) Two single pole double throw switches.
 - d) Automatic reset.
 - 2) Category Four Approved Products: See Section 01 6200 for definitions of Categories:
 - a) Potter-Roemer: Model 6201 thru 6208.
 - b) System Sensor: WFD20 thru WFD80.
 - c) Viking: VSR-F.
9. Tamper Switch
 - a. Weather and Tamper Resistant Switch.
 - 1) Design Criteria:
 - a) UL / CASA listed.
 - b) Mount to monitor valve and not interfere with operation.
 - c) Shall operate in horizontal and vertical position.
 - 2) Category Four Approved Products. See Section 01 6200 for definitions of Categories:
 - a) Control Valves, Butterfly Valves, Post Indicator Valves:
 - (1) Potter Electric: Model PCVS.
 - (2) Notifier: Model PIBV2.
 - (3) System Sensor: Model PIBV2.
 - b) O.S. & Y Valves:
 - (1) Potter Electric: Model OSYSU.
 - (2) System sensor: Model OSY2.
10. Automatic Drain Device:
 - a. Design Criteria:
 - 1) Straight Design, 3/4 inch: (19 mm).
 - b. Category Four Approved Products: See Section 01 6200 for definitions of Categories:
 - 1) Nibco: Ball-Drip.
 - 2) Potter-Roemer: Figure 5982.
 - 3) Viking: B-1.
11. Fire Department Connection:
 - a. Provide Siamese with knox caps and/or as required fire local fire department.
12. Indicating Post Valve:
 - a. Design Criteria:
 - 1) As specified in Section 33 1119: 'Fire Suppression Water Distribution Piping'.
 - 2) Prefer exposed parts non-brass, for theft protection.

- 3) Supervisory switch.
- b. Category Four Approved Products: See Section 01 6200 for definitions of Categories:
 - 1) As required by Authority Having Jurisdiction (AHJ).
13. Riser Manifold Assembly:
 - a. Design Criteria:
 - 1) Groove x Groove Manifold Body.
 - 2) Water Flow Alarm Switch, VSC with Vane, UL / CASA listed and approved.
 - 3) 300 psi (2.07 MPa) Water Pressure Gauge.
 - 4) Test and Drain Valve with Manifold Drain Trim and 1/2 inch (12.7 mm) diameter test Orifice.
 - 5) Pressure Relief Valve, 175 psi (1.21 MPa), non adjustable, pipe discharge to test Drain Valve.
 - b. Category Four Approved Products: See Section 01 6200 for definitions of Categories:
 - 1) Tyco: Model 513.
 - 2) Victaulic: Style 747P.

2.2 ACCESSORIES

- A. Manufacturers:
 1. Manufacturer Contact List:
 - a. Anvil International, Portsmouth, NH www.anvilintl.com.
 - b. Cooper B-Line, Highland, IL www.b-line.com.
 - B. Hangers, Rods, And Clamps:
 1. Design Criteria:
 - a. Galvanized, unless specified otherwise, and UL / CASA approved for service intended.
 2. Class One Quality Standard:
 - a. Hangers and accessories shall be Anvil numbers specified or equals by Cooper B-Line.
 - b. Pipe Ring Hangers: Equal to Anvil Fig 69.
 - c. Riser Clamps: Equal to Anvil Fig. 261.
 - C. Posted System Diagram:
 1. Provide single, color-coded floor plan diagram showing total system. Color antifreeze pipe system elements BLUE and wet pipe system elements RED. Indicate locations of antifreeze system drains and sample test station.
 2. Include following information on diagram sheet:
 - a. Explanation of how to test an antifreeze system.
 - b. Step by step shut down procedure.
 - c. Step by step system drainage procedure.
 - d. Step by step start-up procedure.
 - e. Step by step procedure for protection of system from freezing.
 3. Laminate diagram with plastic and mat or frame suitable for hanging near riser.

PART 3 - EXECUTION

3.1 INSTALLERS

- A. Acceptable Installers. See Section 01 4301:
 1. Meet Quality Assurance Installer Qualifications as specified in Part 1 of this specification.

3.2 EXAMINATION

- A. Drawings:

1. Fire Protection Drawings show general arrangement of piping. Follow as closely as actual building construction and work of other trades will permit. Install system so it drains.
2. Consider Architectural and Structural Drawings part of this work insofar as these drawings furnish information relating to design and construction of building. These Drawings take precedence over Fire Protection Drawings.
3. Because of small scale of Drawings, it is not possible to indicate all offsets, fittings, and accessories that may be required. Investigate structural and finish conditions affecting this work and arrange work accordingly, providing such fittings, valves, and accessories required to meet conditions and to enable system to drain.

3.3 INSTALLATION

- A. Connect system to flange provided under Section 33 1119. After installation of riser, fill annular space between pipe and slab with flexible mastic.
- B. Install sprinkler systems in accordance with requirements of latest editions of NFPA 13 and as specified below:
 1. Provide maintenance access to equipment
 2. Conceal sprinkler lines installed in occupied areas. In Mezzanine areas, route pipe to side or underneath Mezzanine walkway. Do not impede egress from Attic.
 3. Install to enable drainage of system.
 - a. Install main drain from riser according to NFPA 13, paragraph 8.17.4.
 4. Install piping system, except for dry heads, so it will not be exposed to freezing temperatures.
 5. Do not use dropped, damaged, or used sprinkler heads.
 6. Install tamper switches and flow detectors where located by Architect.
 7. Except for Siamese connection, install automatic ball drip device in lowest point of piping to fire department connection and drain to floor drain or to exterior of building.
 8. Brace and support system to meet seismic zone requirements for building site.
- C. Flush system at full design flow rate for minimum five minutes. Route water to outside of building. Protect landscaping and other exterior elements from damage during flow tests.

3.4 FIELD QUALITY CONTROL

- A. Field Tests:
 1. Pressure Test:
 - a. Hydrostatically test system to 200 psi (1.38 MPa) minimum for 2 hours as required by 'Contractor's Material And Testing certificate for Above Ground Piping' NFPA-13, Figure Figure 24.1 (2010) Edition).
 - b. If system or part of system is to have a glycol solution, hydrostatic test is to be performed using approved glycol solution. Do not hydrostatically test any section of system that is to be filled with a glycol solution with plain water.
 2. Water Flow Test:
 - a. Test to determine static and residual pressures and corresponding flow rate at point of connection to utility water main.
 - b. Adjust water flow test data for seasonal fluctuations and future growth as recommended by Water Utility and AHJ.
 - c. At point of connection to utility water main, combine inside and outside hose stream allowances.
 3. Check piping in relation to insulation envelope to be certain piping and auxiliary drains are properly enclosed inside building insulation envelope. Report unsatisfactory conditions to Architect.
 4. Tests shall be witnessed by Architect and representative of local jurisdiction over fire prevention.

3.5 CLEANING

- A. Pipe:
 - a. All piping must be clean before hanging in building.

3.6 CLOSE-OUT ACTIVITIES

- A. Instruction of Owner:
 - 1. Instruction Sessions:
 - a. Instruct Owner's personnel in operation and maintenance of system utilizing 'Operation And Maintenance Manual' when so doing. Minimum instruction period shall be four (4) hours.
 - 1) Include antifreeze system requirement to be tested at least once a year.
 - b. Instruction sessions shall occur after Substantial Completion inspection when system is properly working and before final payment is made.
 - c. Provide Owner with latest version of NFPA 25.
- B. Training:
 - 1. Installer required to provide FM Training from latest version of NFPA 25 with checklist and brief explanation of following inspections:
 - a. Weekly Inspection.
 - b. Monthly Inspection.
 - c. Quarterly Inspection.
 - d. Semi-Annual Inspection.
 - e. Annual Inspection.

END OF SECTION 12113

SECTION 220100SUMMARY OF PLUMBING WORK

PART 1 - GENERAL

1.1 WORK COVERED BY CONTRACT DOCUMENTS

- A. The following Summary of Work is intended as an aid to achieve an understanding of the various elements of work included in the project, as is not intended to be all-inclusive. Detailed descriptions of work and requirements are given in drawings and specifications.
- B. Plumbing Contract Documents were prepared for the Project by:
- Trinity MEP Engineering, LLC
3533 Moreland Dr. Ste. A
Weslaco, Texas 78596
Phone Number: (956) 973-0500
Contact Person: Leonardo Munoz, P.E.
- C. General Scope of Work:
1. Install systems and equipment as shown on the contract documents. Refer to drawings for schedule of equipment that will be installed. After installing equipment, connect all water, sewer, and/or power to fixtures.
 2. Provide all materials and labor associated with a complete operational installation of new systems including, but not limited to:
 - Fixtures for facility
 - Piping for Sanitary Sewer and Vent Systems
 - Piping for Domestic water and Hot Water Systems.

1.2 COORDINATION

- A. All plumbing work shall be done under sub-contract to a General Contractor. Plumbing Contractor shall coordinate all work through General Contractor, even in areas where only plumbing work is to take place.
- B. Coordination between all trades shall take place on a regular basis to avoid conflicts between disciplines and equipment clearances.
- C. Work shall take place with minimal disruption to Owner's operations in areas surrounding the new building.
- D. Cooperate fully with other contractors so that work under those contracts may be carried out smoothly, without interfering with or delaying work under this Contract.
- E. Fully coordinate with electrical contractor for providing power to plumbing equipment.

1.3 UTILITIES

1. Coordinate with power, water, telephone, cable and gas utilities to locate all utilities prior to digging in any area.
2. Obtain any approvals required from utilities to relocate utilities.
3. Cost of relocating or bypassing utilities indicated on drawings shall be included in Base Bid.

1.4 CONTRACTOR USE OF PREMISES

- A. Use of the Site: Limit use of the premises to work in areas indicated. Confine operations to areas within contract limits indicated. Do not disturb portions of the site beyond the areas in which the Work is indicated.
1. Owner Occupancy: Allow for Owner occupancy and use by the public.

2. Driveways and Entrances: Keep driveways and entrances serving the premises, clear and available to the Owner, the Owner's employees, and emergency vehicles at all time. Do not use these areas for parking or storage of materials. Schedule deliveries to minimize space and time requirements for storage of materials and equipment on-site.
- B. Site Safety: Take every precaution to ensure the site does not present a threat to the safety of occupants and/or workers. Minimal safety requirements include, but are not limited to the following:
1. Temporary fencing around construction areas.
 2. Yellow caution tape and construction barricades along open trenches during the day. Trenches shall be covered at night and warning lights provided on construction barricades.
 3. Temporary fencing around equipment while site work is in progress.

1.5 SUBMITTALS

1. All equipment and fixtures shall be provided with a submittal.
2. To expedite the submittal process more efficiently, DO NOT piece-meal the submittals. Submit entire plumbing or in a bound enclosure. This will eliminate delays in the submittal process.

END OF SECTION 220100

SECTION 220100

COMMON PLUMBING REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

- A. Includes But Not Limited To:
 - 1. Common requirements and procedures for plumbing systems.
 - 2. Responsibility for proper operation of electrically powered equipment furnished under this Division.
 - 3. Furnish and install sealants relating to installation of systems installed under this Division.
 - 4. Furnish and install Firestop Penetration Systems for plumbing systems penetrations as described in Contract Documents.
- B. Products Furnished But Not Installed Under This Section:
 - 1. Sleeves, inserts, supports, and equipment for plumbing systems installed under other Sections.

1.2 SUBMITTALS

- A. Action Submittals:
 - 1. Product Data:
 - a. Manufacturer's catalog data for each manufactured item.
 - 1) Provide section in submittal for each type of item of equipment. Include Manufacturer's catalog data of each manufactured item and enough information to show compliance with Contract Document requirements. Literature shall show capacities and size of equipment used and be marked indicating each specific item with applicable data underlined.
 - 2) Include name, address, and phone number of each supplier.
- B. Informational Submittals:
 - 1. Qualification Statement:
 - a. Plumbing Subcontractor:
 - 1)
 - 2) Provide Qualification documentation if requested by Architect or Owner.
 - b. Installer:
 - 1) Provide Qualification documentation if requested by Architect or Owner.
- C. Closeout Submittals:
 - 1. Include following in Operations And Maintenance Manual specified in Section 01 7800:
 - a. Operations and Maintenance Data (Modify and add to requirements of Section 01 7800):
 - 1) At beginning of PLUMBING section of Operations And Maintenance Manual, provide master index showing items included:
 - a) Provide name, address, and phone number of Architect, Architect's Mechanical Engineer, General Contractor, and Plumbing subcontractor.
 - b) Identify maintenance instructions by using same equipment identification used in Contract Drawings. Maintenance instructions shall include:
 - (1) List of plumbing equipment used indicating name, model, serial number, and nameplate data of each item together with number and name associated with each system item.
 - (2) Manufacturer's maintenance instructions for each piece of plumbing equipment installed in Project. Instructions shall include name of vendor, installation instructions, parts numbers and lists, operation instructions of equipment, and maintenance instructions.
 - c) Provide operating instructions to include:
 - (1) General description of fire protection system.

- (2) Step by step procedure to follow for shutting down system or putting system into operation.
- b. Warranty Documentation:
 - 1) Include copies of warranties required in individual Sections of Division 22.

1.3 QUALITY ASSURANCE

- A. Regulatory Agency Sustainability Approvals:
 1. Perform work in accordance with applicable provisions of Plumbing Codes applicable to Project. Provide materials and labor necessary to comply with rules, regulations, and ordinances.
 2. In case of differences between building codes, laws, local ordinances, utility company regulations, and Contract Documents, the most stringent shall govern. Notify Architect in writing of such differences before performing work affected by such differences.
 3. Identification:
 - a. Motor and equipment name plates as well as applicable UL / ULC and AGA / CGA labels shall be in place when Project is turned over to Owner.
- B. Qualifications.
 1. Plumbing Subcontractor:
 - a. Company specializing in performing work of this section.
 - 1) Minimum five (5) years experience in plumbing installations.
 - 2) Minimum five (5) satisfactorily completed installations in past three (3) years of projects similar in size, scope, and complexity required for this project before bidding.
 - b. Upon request, submit documentation.
 2. Installer:
 - a. Licensed for area of Project.
 - b. Designate one (1) individual as project foremen who shall be on site at all times during installation and experienced with installation procedures required for this project.
 - c. Upon request, submit documentation.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Delivery And Acceptance Requirements:
 1. Accept valves on site in shipping containers with labeling in place.
 2. Provide temporary protective coating on cast iron and steel valves.
 3. Provide temporary end caps and closures on piping and fittings. Maintain in place until installation.
- B. Storage And Handling Requirements:
 1. In addition to requirements specified within, stored material shall be readily accessible for inspection by Architect/engineer until installed.
 2. Store items subject to moisture damage in dry, heated spaces.

1.5 WARRANTY

- A. Manufacturer Warranty:
 1. Provide certificates of warranty for each piece of equipment made out in favor of Owner.
- B. Special Warranty:
 1. Guarantee plumbing systems to be free from noise in operation that may develop from failure to construct system in accordance with Contract Documents.
 2. If plumbing sub-contractor with offices located more than 150 miles (240 km) from Project site is used, provide service / warranty work agreement for warranty period with local plumbing sub-contractor approved by Architect. Include copy of service / warranty agreement in warranty section of Operation And Maintenance Manual.

PART 2 - PRODUCTS

2.1 COMPONENTS

- A. Components shall bear Manufacturer's name and trade name. Equipment and materials of same general type shall be of same make throughout work to provide uniform appearance, operation, and maintenance.
- B. Pipe And Pipe Fittings:
 - 1. Weld-O-Let and Screw-O-Let fittings are acceptable.
 - 2. Use domestic made pipe and pipe fittings on Project, except non-domestic made cast iron pipe and fittings by MATCO-NORCA are acceptable.
- C. Sleeves:
 - 1. General:
 - a. Two sizes larger than bare pipe or insulation on insulated pipe.
 - 2. In Concrete And Masonry:
 - a. Sleeves through outside walls, interior shear walls, and footings shall be schedule 80 black steel pipe with welded plate.
 - 3. In Framing And Suspended Floor Slabs:
 - a. Standard weight galvanized iron pipe, Schedule 40 PVC, or 14 ga (2 mm) galvanized sheet metal.
- D. Valves:
 - 1. Valves of same type shall be of same manufacturer.

PART 3 - EXECUTION

3.1 INSTALLERS

- A. Acceptable Installers:
 - 1. Meet Quality Assurance Installer Qualifications as specified in Part 1 of this specification.

3.2 EXAMINATION

- A. Drawings:
 - 1. Plumbing Drawings show general arrangement of piping, equipment, etc. Follow as closely as actual building construction and work of other trades will permit.
 - 2. Consider Architectural and Structural Drawings part of this work insofar as these drawings furnish information relating to design and construction of building. These drawings take precedence over Plumbing Drawings.
 - 3. Because of small scale of Drawings, it is not possible to indicate all offsets, fittings, and accessories that may be required. Investigate structural and finish conditions affecting this work and arrange work accordingly, providing such fittings, valves, and accessories required to meet conditions.
- B. Verification Of Conditions:
 - 1. Examine premises to understand conditions that may affect performance of work of this Division before submitting proposals for this work. Examine adjoining work on which plumbing work is dependent for efficiency and report work that requires correction.
 - 2. Ensure that items to be furnished fit space available. Make necessary field measurements to ascertain space requirements including those for connections and furnish and install equipment of size and shape so final installation shall suit true intent and meaning of Contract Documents. If approval is received by Addendum or Change Order to use other than originally specified items, be responsible for specified capacities and for ensuring that items to be furnished will fit space available.

3. Check that slots and openings provided under other Divisions through floors, walls, ceilings, and roofs are properly located. Perform cutting and patching caused by neglecting to coordinate with Divisions providing slots and openings at no additional cost to Owner.
4. No subsequent allowance for time or money will be considered for any consequence related to failure to examine site conditions.

3.3 PREPARATION

A. Demolition Requirements:

- 1.

B. Changes Due To Equipment Selection:

1. Where equipment specified or otherwise approved requires different arrangement or connections from that shown in Contract Documents, submit drawings showing proposed installations.
2. If proposed changes are approved, install equipment to operate properly and in harmony with intent of Contract Documents. Make incidental changes in piping, ductwork, supports, installation, wiring, heaters, panelboards, and as otherwise necessary.
3. Provide additional motors, valves, controllers, fittings, and other equipment required for proper operation of systems resulting from selection of equipment.
4. Be responsible for proper location of rough-in and connections provided under other Divisions.

3.4 INSTALLATION

A. Interface With Other Work:

1. Furnish exact location of electrical connections and complete information on motor controls to installer of electrical system.
2. Furnish sleeves, inserts, supports, and equipment that are to be installed by others in sufficient time to be incorporated into construction as work proceeds. Locate these items and confirm that they are properly installed.
3. Furnish inserts for attaching hangers that are to be cast in concrete floor construction at time floors are poured.

B. Cut carefully to minimize necessity for repairs to previously installed or existing work. Do not cut beams, columns, or trusses.

C. Locating Equipment:

1. Arrange pipes and equipment to permit ready access to valves, cocks, unions, traps, and to clear openings of doors and access panels.
2. Adjust locations of pipes, equipment, and fixtures to accommodate work to interferences anticipated and encountered.
3. Install plumbing work to permit removal of equipment and parts of equipment requiring periodic replacement or maintenance without damage to or interference with other parts of equipment or structure.
4. Determine exact route and location of each pipe before fabrication.
 - a. Right-Of-Way:
 - 1) Lines that pitch shall have right-of-way over those that do not pitch. For example, plumbing drains shall normally have right-of-way.
 - 2) Lines whose elevations cannot be changed shall have right-of-way over lines whose elevations can be changed.
 - b. Offsets, Transitions, and Changes in Direction:
 - 1) Make offsets, transitions, and changes in direction in pipes as required to maintain proper head room and pitch of sloping lines whether or not indicated on Drawings.
 - 2) Furnish and install all traps, air vents, sanitary vents, and devices as required to effect these offsets, transitions, and changes in direction.

D. Penetration Firestops:

1. Install Penetration Firestop System appropriate for penetration at plumbing systems penetrations through walls, ceilings, roofs, and top plates of walls.

E. Sealants:

1. Seal openings through building exterior caused by penetrations of elements of plumbing systems.
2. Furnish and install acoustical sealant to seal penetrations through acoustically insulated walls and ceilings.

F. Furnish and install complete system of piping, valved as indicated or as necessary to completely control entire apparatus:

1. Pipe drawings are diagrammatic and indicate general location and connections. Piping may have to be offset, lowered, or raised as required or directed at site. This does not relieve this Division from responsibility for proper installation of plumbing systems.
2. Arrange piping to not interfere with removal of other equipment, ducts, or devices, or block access to doors, windows, or access openings:
 - a. Arrange so as to facilitate removal of tube bundles.
 - b. Provide accessible flanges or ground joint unions, as applicable for type of piping specified, at connections to equipment and on bypasses.
 - 1) Make connections of dissimilar metals with di-electric unions.
 - 2) Install valves and unions ahead of traps and strainers. Provide unions on both sides of traps.
 - c. Do not use reducing bushings, bull head tees, close nipples, or running couplings. Street elbows are allowed only on potable water pipe **3/4 inch (19 mm)** in diameter and smaller.
 - d. Install piping systems so they may be easily drained
 - e. Install piping to insure noiseless circulation.
 - f. Place valves and specialties to permit easy operation and access. Valves shall be regulated, packed, and glands adjusted at completion of work before final acceptance.
3. Do not install piping in shear walls.
4. Cut piping accurately to measurements established at site. Remove burr and cutting slag from pipes.
5. Work piping into place without springing or forcing. Make piping connections to pumps and other equipment without strain at piping connection. Remove bolts in flanged connections or disconnect piping to demonstrate that piping has been so connected, if requested.
6. Make changes in direction with proper fittings.
7. Expansion of Thermoplastic Pipe:
 - a. Provide for expansion in every **30 feet** of straight run.
 - b. Provide **12 inch** offset below roof line in each vent line penetrating roof.
8. Expansion of PEX Pipe: Allow for expansion and contraction of PEX pipe as recommended by Pipe Manufacturer.

G. Sleeves:

1. Do not place sleeves around soil, waste, vent, or roof drain lines passing through concrete slabs on grade (unless noted on plans).
2. Provide sleeves around pipes passing through concrete or masonry floors, walls, partitions, or structural members. Seal sleeves with specified sealants. Follow Pipe Manufacturer's recommendations for PEX pipe (if used) penetrations through studs and floor slabs.
3. Sleeves through floors shall extend **1/4 inch** above floor finish in mechanical equipment rooms above basement floor. In other rooms, sleeves shall be flush with floor.
4. Sleeves through floors and foundation walls shall be watertight.

H. Escutcheons:

1. Provide spring clamp plates where pipes run through walls, floors, or ceilings and are exposed in finished locations of building. Plates shall be chrome plated heavy brass of plain pattern and shall be set tight on pipe and to building surface.

3.5 REPAIR / RESTORATION

- A. Each Section of this Division shall bear expense of cutting, patching, repairing, and replacing of work of other Sections required because of its fault, error, tardiness, or because of damage done by it:

1. Patch and repair walls, floors, ceilings, and roofs with materials of same quality and appearance as adjacent surfaces unless otherwise shown.
2. Surface finishes shall exactly match existing finishes of same materials.

3.6 FIELD QUALITY CONTROL

A. Field Tests:

1. Perform tests on plumbing piping systems. Furnish devices required for testing purposes.

B. Non-Conforming Work:

1. Replace material or workmanship proven defective with sound material at no additional cost to Owner.
2. Repeat tests on new material, if requested.

3.7 CLEANING

A. Remove dirt, grease, and other foreign matter from each length of piping before installation:

1. After each section of piping used for movement of water or steam is installed, flush with clean water, except where specified otherwise.
2. Arrange temporary flushing connections for each section of piping and arrange for flushing total piping system.
3. Provide temporary cross connections and water supply for flushing and drainage and remove after completion of work.

B. Clean exposed piping, equipment, and fixtures. Remove stickers from fixtures and adjust flush valves.

3.8 CLOSEOUT ACTIVITIES

A. Instruction of Owner:

1. Instruct building maintenance personnel in operation and maintenance of plumbing systems utilizing Operation And Maintenance Manual when so doing.
2. Conduct instruction period after Substantial Completion inspection when systems are properly working and before final payment is made.

3.9 PROTECTION

- #### A. Protect piping systems from entry of foreign materials by temporary covers, completing sections of the work, and isolating parts of completed system. Cap or plug open ends of pipes and equipment to keep dirt and other foreign materials out of system. Do not use plugs of rags, wool, cotton waste, or similar materials.

END OF SECTION 220501

SECTION 220529HANGERS AND SUPPORTS FOR PLUMBING PIPING AND EQUIPMENT

PART 1 - GENERAL

1.1 SUMMARY

- A. Includes But Not Limited To:
 - 1. Common hanger and support
 - 2. requirements and procedures for plumbing systems.
- B. Products Installed But Not Furnished Under This Section:
 - 1. Paint identification for gas piping used in HVAC equipment.

1.2 SUBMITTALS

- A. Action Submittals:
 - 1. Product Data:
 - a. Manufacturer's catalog data for each manufactured item.

PART 2 - PRODUCTS

2.1 ASSEMBLIES

- A. Manufacturers:
 - 1. Manufacturer Contact List:
 - a. Anvil International,
 - b. Cooper B-Line,
 - c. Unistrut, Wayne,
- B. Materials:
 - 1. Hangers, Rods, And Inserts
 - a. Galvanized and UL approved for service intended.
 - b. Support horizontal piping from hangers or on roller assemblies with channel supports, except where trapeze type hangers are explicitly shown on Drawings. Hangers shall have double nuts.
 - 1) Support insulated pipes **2 inches** in diameter and smaller with adjustable swivel ring hanger with insulation protection shield. Gauge and length of shield shall be in accordance with Anvil design data.
 - a) Type Two Acceptable Products:
 - (1) Swivel Ring Hanger: Anvil Fig. 69.
 - (2) Insulation Protection Shield: Anvil Fig. 167.
 - (3) Equals by Cooper B-Line.
 - 2) Support insulated pipes **2-1/2 inches** in diameter and larger with clevis hanger or roller assembly with an insulation protection shield. Gauge and length of shield shall be according to Anvil design data.
 - a) Type Two Acceptable Products:
 - (1) Clevis Hanger: Anvil Fig. 260.
 - (2) Roller Assembly: Anvil Fig. 171.
 - (3) Insulation Protection Shield: Anvil Fig. 167.
 - (4) Equals by Cooper B-Line.
 - 3) Support uninsulated copper pipe **2 inches** in diameter and smaller from swivel ring hanger, copper plated and otherwise fully suitable for use with copper tubing. Support non-copper uninsulated pipes from swivel ring hanger.
 - a) Type Two Acceptable Products:
 - (1) Swivel Ring Hanger For Copper Pipe: Anvil Fig. CT-69.
 - (2) Swivel Ring Hanger For Other Pipe: Anvil Fig. 69.
 - (3) Equals by Cooper B-Line.
 - 4) Support uninsulated copper pipe **2-1/2 inches** in diameter and larger from clevis hanger, copper plated hangers and otherwise fully suitable for use with copper tubing. Support non-copper uninsulated pipes from clevis hanger.
 - a) Type Two Acceptable Products:
 - (1) Clevis Hanger For Copper Pipe: Anvil Fig. CT-65.
 - (2) Clevis Hanger For Other Pipe: Anvil Fig. 260.
 - (3) Equals by Cooper B-Line.
 - c. Support rods for single pipe shall be in accordance with following table:

Rod Diameter		Pipe Size						
3/8 inch		2 inches and smaller						
#	Rods	1/2 inch	3/4 inch	1 inch	1 1/4 inch	1 1/2 inch	2 inch	2 1/2 inch
2	3/8"	0	0	0	0	0	0	0
2	1/2"	3	2	0	0	0	0	0
2	5/8"	4	3	2	0	0	0	0
2	5/8"	9	7	5	3	2	2	0
2	5/8"	12	9	7	5	3	2	2

d. Support rods for multiple pipe supported on steel angle trapeze hangers shall be in accordance with following table:

1) Size trapeze angles so bending stress is less than 10,000 psi

e. Riser Clamps For Vertical Piping:

1) Type Two Acceptable Products:

a) Anvil Fig. 261.

b) Equals by Cooper B-Line.

f. Concrete Inserts:

1) Individual Inserts:

a) Suitable for special nuts size 3/8 inch through 7/8 inch with yoke to receive concrete reinforcing rods, and with malleable iron lugs for attaching to forms.

b) Type Two Acceptable Products:

(1) Anvil Fig. 282.

(2) Equals by Cooper B-Line.

2) Continuous Inserts:

a) Class Two Quality Standard: Equal to Unistrut P-3200 series.

g. Steel Deck Bracket:

1) Class Two Quality Standard: Equal to Unistrut P1000 with clamp nut, minimum 6 inch length.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Interface with Other Work: If project contains concrete structural system.

1. Furnish inserts for attaching hangers that are to be cast in concrete floor construction at time floors are poured.

B. Piping:

1. Properly support piping and make adequate provisions for expansion, contraction, slope, and anchorage.

a. Except for underground pipe, suspend piping from roof trusses or clamp to vertical walls using Unistrut and clamps. Do not hang pipe from other pipe, equipment, or ductwork. Laying of piping on any building element is not allowed.

b. Supports For Horizontal Piping:

1) Support metal piping at 96 inches on center maximum for pipe 1-1/4 inches or larger and 72 inches on center maximum for pipe 1-1/8 inch or less.

2) Support thermoplastic pipe at 48 inches on center maximum.

3) Support PEX pipe at 32 inches minimum on center.

4) Provide support at each elbow. Install additional support as required.

c. Supports for Vertical Piping:

1) Place riser clamps at each floor or ceiling level.

2) Securely support clamps by structural members, which in turn are supported directly from building structure.

3) Provide clamps as necessary to brace pipe to wall.

d. If Structural concrete systems are used: Install supports from inserts cast into concrete floor system, including concrete joists and floor slabs. Where inserts cannot be used, provide expansion shields and support hangers from angles held in place by expansion bolts, never directly from expansion bolt itself. Provide calculations necessary to determine number of expansion bolts required to equal capacity of cast-in-place insert.

e. Attach Unistrut to structural steel roof supporting structure. Spacing and support as described above.

f. Insulate hangers for copper pipe from piping by means of at least two layers of Scotch 33 plastic tape.

2. Gas piping Identification:

a. Apply paint identification for gas piping used with HVAC equipment as specified in Section 23 0553.

END OF SECTION 220529

SECTION 220529

HANGERS AND SUPPORTS FOR PLUMBING PIPING AND EQUIPMENT

PART 1 - GENERAL

1.1 SUMMARY

- A. Includes But Not Limited To:
 - 1. Common hanger and support
 - 2. requirements and procedures for plumbing systems.
- B. Products Installed But Not Furnished Under This Section:
 - 1. Paint identification for gas piping used in HVAC equipment.

1.2 SUBMITTALS

- A. Action Submittals:
 - 1. Product Data:
 - a. Manufacturer's catalog data for each manufactured item.

PART 2 - PRODUCTS

2.1 ASSEMBLIES

- A. Manufacturers:
 - 1. Manufacturer Contact List:
 - a. Anvil International,
 - b. Cooper B-Line,
 - c. Unistrut, Wayne,
- B. Materials:
 - 1. Hangers, Rods, And Inserts
 - a. Galvanized and UL approved for service intended.
 - b. Support horizontal piping from hangers or on roller assemblies with channel supports, except where trapeze type hangers are explicitly shown on Drawings. Hangers shall have double nuts.
 - 1) Support insulated pipes **2 inches** in diameter and smaller with adjustable swivel ring hanger with insulation protection shield. Gauge and length of shield shall be in accordance with Anvil design data.
 - a) Type Two Acceptable Products:
 - (1) Swivel Ring Hanger: Anvil Fig. 69.
 - (2) Insulation Protection Shield: Anvil Fig. 167.
 - (3) Equals by Cooper B-Line.
 - 2) Support insulated pipes **2-1/2 inches** in diameter and larger with clevis hanger or roller assembly with an insulation protection shield. Gauge and length of shield shall be according to Anvil design data.
 - a) Type Two Acceptable Products:
 - (1) Clevis Hanger: Anvil Fig. 260.
 - (2) Roller Assembly: Anvil Fig. 171.
 - (3) Insulation Protection Shield: Anvil Fig. 167.
 - (4) Equals by Cooper B-Line.
 - 3) Support uninsulated copper pipe **2 inches** in diameter and smaller from swivel ring hanger, copper plated and otherwise fully suitable for use with copper tubing. Support non-copper uninsulated pipes from swivel ring hanger.
 - a) Type Two Acceptable Products:
 - (1) Swivel Ring Hanger For Copper Pipe: Anvil Fig. CT-69.
 - (2) Swivel Ring Hanger For Other Pipe: Anvil Fig. 69.
 - (3) Equals by Cooper B-Line.
 - 4) Support uninsulated copper pipe **2-1/2 inches** in diameter and larger from clevis hanger, copper plated hangers and otherwise fully suitable for use with copper tubing. Support non-copper uninsulated pipes from clevis hanger.
 - a) Type Two Acceptable Products:
 - (1) Clevis Hanger For Copper Pipe: Anvil Fig. CT-65.
 - (2) Clevis Hanger For Other Pipe: Anvil Fig. 260.
 - (3) Equals by Cooper B-Line.
 - c. Support rods for single pipe shall be in accordance with following table:

Rod Diameter		Pipe Size						
3/8 inch		2 inches and smaller						
#	Dia.	2"	2.5"	3"	4"	5"	6"	8"
2	3/8"	0	0	0	0	0	0	0
2	1/2"	3	2	0	0	0	0	0
2	5/8"	4	3	2	0	0	0	0
2	5/8"	9	7	5	3	2	2	0
2	5/8"	12	9	7	5	3	2	2

d. Support rods for multiple pipe supported on steel angle trapeze hangers shall be in accordance with following table:

1) Size trapeze angles so bending stress is less than 10,000 psi

e. Riser Clamps For Vertical Piping:

1) Type Two Acceptable Products:

a) Anvil Fig. 261.

b) Equals by Cooper B-Line.

f. Concrete Inserts:

1) Individual Inserts:

a) Suitable for special nuts size 3/8 inch through 7/8 inch with yoke to receive concrete reinforcing rods, and with malleable iron lugs for attaching to forms.

b) Type Two Acceptable Products:

(1) Anvil Fig. 282.

(2) Equals by Cooper B-Line.

2) Continuous Inserts:

a) Class Two Quality Standard: Equal to Unistrut P-3200 series.

g. Steel Deck Bracket:

1) Class Two Quality Standard: Equal to Unistrut P1000 with clamp nut, minimum 6 inch length.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Interface with Other Work: If project contains concrete structural system.

1. Furnish inserts for attaching hangers that are to be cast in concrete floor construction at time floors are poured.

B. Piping:

1. Properly support piping and make adequate provisions for expansion, contraction, slope, and anchorage.

a. Except for underground pipe, suspend piping from roof trusses or clamp to vertical walls using Unistrut and clamps. Do not hang pipe from other pipe, equipment, or ductwork. Laying of piping on any building element is not allowed.

b. Supports For Horizontal Piping:

1) Support metal piping at 96 inches on center maximum for pipe 1-1/4 inches or larger and 72 inches on center maximum for pipe 1-1/8 inch or less.

2) Support thermoplastic pipe at 48 inches on center maximum.

3) Support PEX pipe at 32 inches minimum on center.

4) Provide support at each elbow. Install additional support as required.

c. Supports for Vertical Piping:

1) Place riser clamps at each floor or ceiling level.

2) Securely support clamps by structural members, which in turn are supported directly from building structure.

3) Provide clamps as necessary to brace pipe to wall.

d. If Structural concrete systems are used: Install supports from inserts cast into concrete floor system, including concrete joists and floor slabs. Where inserts cannot be used, provide expansion shields and support hangers from angles held in place by expansion bolts, never directly from expansion bolt itself. Provide calculations necessary to determine number of expansion bolts required to equal capacity of cast-in-place insert.

e. Attach Unistrut to structural steel roof supporting structure. Spacing and support as described above.

f. Insulate hangers for copper pipe from piping by means of at least two layers of Scotch 33 plastic tape.

2. Gas piping Identification:

a. Apply paint identification for gas piping used with HVAC equipment as specified in Section 23 0553.

END OF SECTION

SECTION 220553

IDENTIFICATION FOR PLUMBING PIPES AND EQUIPMENT

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:

1. Furnish and install identification of plumbing piping and equipment as described in Contract Documents.

PART 2 - PRODUCTS

2.1 SYSTEM

A. Materials:

1. Labels:

a. Equipment Identification:

- 1) Black formica, with white reveal when engraved.
- 2) Lettering to be 3/16 inch high minimum.

2. Paint:

a. One Coat Primer:

- 1) 6-2 Quick Drying Latex Primer Sealer over fabric covers.
- 2) 6-205 Metal Primer under dark color paint.
- 3) 6-6 Metal Primer under light color paint.

b. Finish Coats: Two coats 53 Line Acrylic Enamel.

c. Type Two Acceptable Products.

- 1) Paint of equal quality from following Manufacturers may be submitted for Architect's approval before use. Maintain specified colors, shades, and contrasts.
 - a) Benjamin Moore,
 - b) ICI Dulux,
 - c) Sherwin Williams,

PART 3 - EXECUTION

3.1 APPLICATION

A. Labels:

1. Identify following items with specified labels fastened to equipment with screws (unless noted otherwise):
 - a. Water Heaters.
2. Engrave following data from Equipment Schedules on Drawings onto labels:
 - a. Equipment mark.
 - b. Room(s) served.
 - c. Panel and breaker from which unit is powered.

B. Painting:

1. Only painted legends, directional arrows, and color bands are acceptable.
2. Locate identifying legends, directional arrows, and color bands at following points on exposed piping of each piping system:
 - a. Adjacent to each item of equipment.
 - b. At point of entry and exit where piping goes through wall.
 - c. On each riser and junction.
 - d. Every 25 feet on long continuous lines.
 - e. Stenciled symbols shall be one inch high and black.

3.2 ATTACHMENTS

A. Schedules:

1. Pipe Identification Schedule:

- a. Apply stenciled symbols as follows:

Pipe Use	Abbreviation
Domestic Cold Water	CW
Domestic Hot Water	HW

END OF SECTION

SECTION 220719

PLUMBING PIPING INSULATION

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:

1. Furnish and install insulation on hot and cold water lines, fittings, valves, and accessories as described in Contract Documents.
2. Furnish and install insulation on roof drain piping as described in Contract Documents.

B. Related Requirements:

1. Section 22 1116: 'Domestic Water Piping'.
2. Section 22 1400: 'Facility Storm Drainage'.(if provided on plans)

1.2 SUBMITTALS

A. Informational Submittals:

1. Identify thermal conductivity, thickness, and jackets (both factory and field applied, if any), for each type of product indicated.

1.3 QUALITY ASSURANCE

A. Fire-Test-Response Characteristics: As determined by testing materials identical to those specified in this Section according to ASTM E 84, by a testing and inspecting agency acceptable to authorities having jurisdiction. Factory label insulation and jacket materials and sealer and cement material containers with appropriate markings of applicable testing and inspecting agency.

1. Insulation Installed Indoors: Flame-spread rating of 25 or less, and smoke-developed rating of 50 or less.
2. Insulation Installed Outdoors: Flame-spread rating of 75 or less, and smoke-developed rating of 150 or less.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Packaging: Ship insulation materials in containers marked by manufacturer with appropriate ASTM specification designation, type and grade, and maximum use temperature.

1.5 COORDINATION

A. Coordinate size and location of supports, hangers, and insulation shields specified Section "Hangers and Supports."

B. Coordinate clearance requirements with piping Installer for insulation application.

C. Coordinate installation and testing of steam or electric heat tracing.

1.6 SCHEDULING

- A. Schedule insulation application after testing piping systems and, where required, after installing and testing heat-trace tape. Insulation application may begin on segments of piping that have satisfactory test results.

PART 2 - PRODUCTS

2.1 COMPONENTS

A. Manufacturers:

- 1. Manufacturer Contact List:
 - a. Armacell, Mebane, NC www.armacell.com.
 - b. Childers Products Co, Eastlake, OH www.fosterproducts.com.
 - c. IMCOA, Youngsville, NC www.nomacokflex.com.
 - d. Johns-Manville, Denver, CO www.jm.com.
 - e. Knauf, Shelbyville, IN www.knauffiberglass.com.
 - f. Manson, Brossard, PQ, Canada www.isolationmanson.com.
 - g. Nomaco Inc, Yopungsville, NC www.nomacokflex.com.
 - h. Owens-Corning, Toledo, OH www.owenscorning.com.
 - i. Speedline Corp, Solon, OH www.speedlinepvc.com.
 - j. CertainTeed Manson.
 - k. Knauf FiberGlass GmbH.
 - l. Owens-Corning Fiberglas Corp.
 - m. Schuller International, Inc.
 - n. RBX Corporation; Insul-Sheet 1800 and Insul-Tube 180.
 - o. Armstrong World Industries, Inc.
 - p. Rubatex Corp.

B. Materials:

- 1. Above Grade Metal Piping:
 - a. Insulation For Piping:
 - 1) Snap-on glass fiber or melamine foam pipe insulation, or heavy density pipe insulation with factory vapor jacket.
 - 2) Insulation Thickness:

Service Water Temperature	Pipe Sizes		
	Up to 1-1/4 In	1-1/2 to 2 In	Over 2 In
170 - 180 Deg F	One In	1-1/2 In	2 In
140 - 160 Deg F	1/2 In	One In	1-1/2 In
45 - 130 Deg F	1/2 In	1/2 In	One In

- 3) Performance Standards: Fiberglas ASJ by Owens-Corning.
- 4) Type One Acceptable Manufacturers:
 - a) Childers Products.
 - b) Knauf.
 - c) Manson.
 - d) Owens-Corning.
 - e) Johns-Manville.
 - f) Equal as approved by Architect before bidding. See Section Project Requirements 01 60 00.
- b. Fitting, Valve, And Accessory Covers:
 - 1) PVC.
 - 2) Performance Standard: Zeston by Johns-Manville.
 - 3) Type One Acceptable Manufacturers:
 - a) Knauf.

- b) Speedline.
 - c) Johns-Manville.
 - d) Equal as approved by Architect before bidding. See Section Project Requirements 01 60 00.
2. Below Grade Metal Piping:
- a. Insulation:
 - 1) **1/2 inch (13 mm)** thick.
 - 2) Category Four Acceptable Products. See Section Project Requirements 01 60 00 for definition of Categories:
 - a) SS Tubolit by Armacell.
 - b) ImcoLock by Imcoa.
 - c) Nomalock or Therma-Cel by Nomaco.
 - b. Joint Sealant:
 - 1) Category Four Acceptable Products. See Section Project Requirements 01 60 00 for definition of Categories:
 - a) Armacell 520.
 - b) Nomaco K-Flex R-373.
3. Pex Piping, Above And Below Grade:
- a. Insulation:
 - 1) **1/2 inch (13 mm)** thick.
 - 2) Category Four Acceptable Products. See Section Project Requirements 01 60 00 for definition of Categories:
 - a) SS Tubolit
 - b) by Armacell.
 - c) ImcoLock by Imcoa.
 - d) Nomalock or Therma-Cel by Nomaco.
 - b. Joint Sealant:
 - 1) Category Four Acceptable Products. See Section Project Requirements 01 60 00 for definition of Categories:
 - a) Armacell 520.
 - b) Nomaco K-Flex R-373.
 - c)
4. PP-R Piping, Above And Below Grade:
- a. Insulation:
 - 1) **1/2 inch (13 mm)** thick.
 - 2) Category Four Acceptable Products. See Section Project Requirements 01 60 00 for definition of Categories:
 - a) SS Tubolit by Armacell.
 - b) ImcoLock by Imcoa.
 - c) Nomalock or Therma-Cel by Nomaco.
 - b. Joint Sealant:
 - 1) Category Four Acceptable Products. See Section Project Requirements 01 60 00 for definition of Categories:
 - a) Armacell 520.
 - b) Nomaco K-Flex R-373.
5. PVC or ABS Piping, Above And Below Grade - Facility Storm Drain:
- a. Insulation:
 - 1) **1/2 inch (13 mm)** thick.
 - 2) Category Four Acceptable Products. See Section Project Requirements 01 60 00 for definition of Categories:
 - a) SS Tubolit by Armacell.
 - b) ImcoLock by Imcoa.
 - c) Nomalock or Therma-Cel by Nomaco.
 - b. Joint Sealant:
 - 1) Category Four Acceptable Products. See Section Project Requirements 01 60 00 for definition of Categories:
 - a) Armacell 520.
 - b) Nomaco K-Flex R-373.

PART 3 - EXECUTION

3.1 APPLICATION

A. Above Grade Piping:

1. Apply insulation to clean, dry piping with joints tightly butted.
2. Install insulation in manner to facilitate removal for repairs. Place sections or blocks so least possible damage to insulation will result from inspection or repairs of piping or equipment.
3. Piping up to **1-1/4 inch** Diameter:
 - a. Adhere 'factory applied vapor barrier jacket lap' smoothly and securely at longitudinal laps with white vapor barrier adhesive.
 - b. Adhere **3 inch** wide self-sealing butt joint strips over end joints.
4. Piping **1-1/2 inches** Diameter And Larger:
 - a. Use broken-joint construction in application of two-layer covering.
 - b. Fill cracks and depressions with insulating cement mixed to thick plastic paste.
 - 1) Apply by hand in several layers to make up total specified thickness.
 - 2) Final layer shall have smooth uniform finish before application of covering.
5. Fittings, Valves, And Accessories:
 - a. Do not apply insulation over flanged joints or victaulic couplings until piping has been brought up to operating temperature and flange bolts have been fully tightened. Insulate valves so wheel, stem, and packing nut are exposed.
 - b. Insulate with same type and thickness of insulation as pipe, with ends of insulation tucked snugly into throat of fitting and edges adjacent to pipe insulation tufted and tucked in.
 - c. Piping Up To **1-1/4 Inch** Diameter:
 - 1) Cover insulation with one piece fitting cover secured by stapling or taping ends to adjacent pipe covering.
 - 2) Alternate Method:
 - a) Insulate fittings, valves, and accessories with one inch of insulating cement and vapor seal with two **1/8 inch** wet coats of vapor barrier mastic reinforced with glass fabric extending **2 inches** onto adjacent insulation.
 - d. Piping **1-1/2 inches** To **2 Inches** :
 - 1) Insulate with hydraulic setting insulating cement or equal, to thickness equal to adjoining pipe insulation.
 - 2) Apply final coat of fitting mastic over insulating cement.
 - e. Piping **2-1/2 inch** And Larger:
 - 1) Insulate with segments of molded insulation securely wired in place and coated with skim coat of insulating cement.
 - 2) Apply fitting mastic, fitting tape and finish with final coat of fitting mastic.
6. Pipe Hangers:
 - a. Do not allow pipes to come in contact with hangers.
 - b. Pipe Shield:
 - 1) Provide schedule 40 PVC by **6 inch** long at each clevis and/or unistrut type hanger.
 - 2) Provide **16 ga** by **6 inch** long galvanized shields at each pipe hanger to protect pipe insulation from crushing by clevis hanger.
 - 3) Provide **22 ga** by **6 inch** long galvanized shield at each pipe hanger to protect insulation from crushing by Unistrut type hanger.
 - c. At Pipe Hangers:
 - 1) Provide rigid calcium silicate insulation (**100 psi** compressive strength) at least **2 inches** beyond shield.
7. Protect insulation wherever leak from valve stem or other source might drip on insulated surface, with aluminum cover or shield rolled up at edges and sufficiently large in area and of shape that dripping will not splash on surrounding insulation.

B. Below Grade Piping:

1. Slip underground pipe insulation onto pipe and seal butt joints.
2. Where slip-on technique is not possible, slit insulation, apply to pipe, and seal seams and joints.

3.2 EXAMINATION

- A. Examine substrates and conditions for compliance with requirements for installation and other conditions affecting performance of insulation application.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.3 PREPARATION

- A. Surface Preparation: Clean and dry pipe and fitting surfaces. Remove materials that will adversely affect insulation application.

3.4 GENERAL APPLICATION REQUIREMENTS

- A. Apply insulation materials, accessories, and finishes according to the manufacturer's written instructions; with smooth, straight, and even surfaces; free of voids throughout the length of piping, including fittings, valves, and specialties.
- B. Refer to schedules at the end of this Section for materials, forms, jackets, and thicknesses required for each piping system.
- C. Use accessories compatible with insulation materials and suitable for the service. Use accessories that do not corrode, soften, or otherwise attack insulation or jacket in either wet or dry state.
- D. Apply insulation with longitudinal seams at top and bottom of horizontal pipe runs.
- E. Do not weld brackets, clips, or other attachment devices to piping, fittings, and specialties.
- F. Seal joints and seams with vapor-retarder mastic on insulation indicated to receive a vapor retarder.
- G. Keep insulation materials dry during application and finishing.
- H. Apply insulation with tight longitudinal seams and end joints. Bond seams and joints with adhesive recommended by the insulation material manufacturer.
- I. Apply insulation with the least number of joints practical.
- J. Apply insulation over fittings, valves, and specialties, with continuous thermal and vapor-retarder integrity, unless otherwise indicated. Refer to special instructions for applying insulation over fittings, valves, and specialties.
- K. Hangers and Anchors: Where vapor retarder is indicated, seal penetrations in insulation at hangers, supports, anchors, and other projections with vapor-retarder mastic.
 - 1. Apply insulation continuously through hangers and around anchor attachments. Insulation around hanger or pipe clamp will not be acceptable.
 - 2. For insulation application where vapor retarders are indicated, extend insulation on anchor legs at least 12 inches (300 mm) from point of attachment to pipe and taper insulation ends. Seal tapered ends with a compound recommended by the insulation material manufacturer to maintain vapor retarder.
 - 3. Install insert materials and apply insulation to tightly join the insert. Seal insulation to insulation inserts with adhesive or sealing compound recommended by the insulation material manufacturer.
 - 4. Cover inserts with jacket material matching adjacent pipe insulation. Install shields over jacket, arranged to protect the jacket from tear or puncture by the hanger, support, and shield.

- L. Insulation Terminations: For insulation application where vapor retarders are indicated, taper insulation ends. Seal tapered ends with a compound recommended by the insulation material manufacturer to maintain vapor retarder.
- M. Apply adhesives and mastics at the manufacturer's recommended coverage rate.
- N. Apply insulation with integral jackets as follows:
1. Pull jacket tight and smooth.
 2. Circumferential Joints: Cover with 3-inch- (75-mm-) wide strips, of same material as insulation jacket. Secure strips with adhesive and outward clinching staples along both edges of strip and spaced 4 inches (100 mm) o.c.
 3. Longitudinal Seams: Overlap jacket seams at least 1-1/2 inches (40 mm). Apply insulation with longitudinal seams at bottom of pipe. Clean and dry surface to receive self-sealing lap. Staple laps with outward clinching staples along edge at 4 inches (100 mm) o.c.
 - a. Exception: Do not staple longitudinal laps on insulation having a vapor retarder.
 4. Vapor-Retarder Mastics: Where vapor retarders are indicated, apply mastic on seams and joints and at ends adjacent to flanges, unions, valves, and fittings.
 5. At penetrations in jackets for thermometers and pressure gages, fill and seal voids with vapor-retarder mastic.
- O. Roof Penetrations: Apply insulation for interior applications to a point even with top of roof flashing.
1. Seal penetrations with vapor-retarder mastic.
 2. Apply insulation for exterior applications tightly joined to interior insulation ends.
 3. Extend metal jacket of exterior insulation outside roof flashing at least 2 inches (50 mm) below top of roof flashing.
 4. Seal metal jacket to roof flashing with vapor-retarder mastic.
- P. Exterior Wall Penetrations: For penetrations of below-grade exterior walls, terminate insulation flush with mechanical sleeve seal. Seal terminations with vapor-retarder mastic.
- Q. Interior Wall and Partition Penetrations: Apply insulation continuously through walls and floors.
- R. Fire-Rated Wall and Partition Penetrations: Apply insulation continuously through penetrations of fire-rated walls and partitions.
1. Firestopping and fire-resistive joint sealers are specified in Section "Firestopping."

3.5 MINERAL-FIBER INSULATION APPLICATION

- A. Apply insulation to straight pipes and tubes as follows:
1. Secure each layer of preformed pipe insulation to pipe with wire, tape, or bands without deforming insulation materials.
 2. Where vapor retarders are indicated, seal longitudinal seams and end joints with vapor-retarder mastic. Apply vapor retarder to ends of insulation at intervals of 15 to 20 feet (4.5 to 6 m) to form a vapor retarder between pipe insulation segments.
 3. For insulation with factory-applied jackets, secure laps with outward clinched staples at 6 inches (150 mm) o.c.
 4. For insulation with factory-applied jackets with vapor retarders, do not staple longitudinal tabs but secure tabs with additional adhesive as recommended by the insulation material manufacturer and seal with vapor-retarder mastic.

B. Apply insulation to flanges as follows:

1. Apply preformed pipe insulation to outer diameter of pipe flange.
2. Make width of insulation segment the same as overall width of the flange and bolts, plus twice the thickness of the pipe insulation.
3. Fill voids between inner circumference of flange insulation and outer circumference of adjacent straight pipe segments with mineral-fiber blanket insulation.
4. Apply canvas jacket material with manufacturer's recommended adhesive, overlapping seams at least 1 inch (25 mm), and seal joints with vapor-retarder mastic.

C. Apply insulation to fittings and elbows as follows:

1. Apply premolded insulation sections of the same material as straight segments of pipe insulation when available. Secure according to manufacturer's written instructions.
2. When premolded insulation elbows and fittings are not available, apply mitered sections of pipe insulation, or glass-fiber blanket insulation, to a thickness equal to adjoining pipe insulation. Secure insulation materials with wire, tape, or bands.
3. Cover fittings with standard PVC fitting covers.

D. Apply insulation to valves and specialties as follows:

1. Apply premolded segments of cellular-glass insulation or glass-fiber blanket insulation to valve body. Arrange insulation to permit access to packing and to allow valve operation without disturbing insulation. For check valves, arrange insulation for access to strainer basket without disturbing insulation.
2. Apply insulation to flanges as specified for flange insulation application.
3. Use preformed standard PVC fitting covers for valve sizes where available. Secure fitting covers with manufacturer's attachments and accessories. Seal seams with tape and vapor-retarder mastic.
4. For larger sizes where PVC fitting covers are not available, seal insulation with canvas jacket and sealing compound recommended by the insulation material manufacturer.

3.6 CLOSED-CELL PHENOLIC-FOAM INSUALTION APPLICATION

A. Apply insulation to straight pipes and tubes as follows:

1. Secure each layer of insulation to pipe with wire, tape, or bands without deforming insulation materials.
2. Where vapor retarders are indicated, seal longitudinal seams and end joints with vapor-retarder mastic.
3. For insulation with factory-applied jackets, secure laps with outward clinched staples at 6 inches o.c.
4. For insulation with factory-applied jackets with vapor retarders, do not staple longitudinal tabs but secure with additional adhesive as recommended by the insulation material manufacturer and seal with vapor-retarder mastic.

B. Apply insulation to flanges as follows:

1. Apply preformed pipe insulation to outer diameter of pipe flange.
2. Make width of insulation segment the same as overall width of the flange and bolts, plus twice the thickness of the pipe insulation.
3. Fill voids between inner circumference of flange insulation and outer circumference of adjacent straight pipe segments with cut sections of block insulation of the same thickness as pipe insulation.
4. Apply canvas jacket material with manufacturer's recommended adhesive, overlapping seams at least 1 inch (25 mm), and seal joints with vapor-retarder mastic.

C. Apply insulation to fittings and elbows as follows:

1. Apply premolded insulation sections of the same material as straight segments of pipe insulation when available. Secure according to manufacturers written instructions.

2. When premolded sections of insulation are not available, apply mitered sections of phenolic-foam insulation. Secure insulation materials with wire, tape, or bands.
3. Cover fittings with heavy PVC fitting covers. Overlap PVC covers on pipe insulation jackets at least 1 inch (25 mm) at each end. Secure fitting covers with manufacturer's attachments and accessories. Seal seams with tape and vapor-retarder mastic.

D. Apply insulation to valves and specialties as follows:

1. Apply premolded insulation sections of the same material as straight segments of pipe insulation when available. Secure according to manufacturer's written instructions.
2. When premolded sections of insulation are not available, apply mitered sections of phenolic-foam insulation to valve body. Arrange insulation to permit access to packing and to allow valve operation without disturbing insulation. For check valves, arrange insulation for access to stainer basket without distributing insulation.
3. Apply insulation to flanges as specified for flange insulation application.
4. Use preformed heavy PVC fitting covers for valve sizes where available. Secure fitting covers with manufacturer's attachments and accessories. Seal seams with tape and vapor-retarder mastic.
5. For larger sizes where PVC fitting covers are not available, seal insulation with canvas jacket and sealing compound recommended by the insulation material manufacturer.

3.7 FLEXIBLE ELASTOMERIC THERMAL INSULATION APPLICATION

A. Apply insulation to straight pipes and tubes as follows:

1. Follow manufacturer's written instructions for applying insulation.
2. Seal longitudinal seams and end joints with manufacturer's recommended adhesive. Cement to avoid openings in insulation that will allow passage of air to the pipe surface.

B. Apply insulation to flanges as follows:

1. Apply pipe insulation to outer diameter of pipe flange.
2. Make width of insulation segment the same as overall width of the flange and bolts, plus twice the thickness of the pipe insulation.
3. Fill voids between inner circumference of flange insulation and outer circumference of adjacent straight pipe segments with cut sections of sheet insulation of the same thickness as pipe insulation.
4. Secure insulation to flanges and seal seams with manufacturer's recommended adhesive. Cement to avoid openings in insulation that will allow passage of air to the pipe surface.

C. Apply insulation to fittings and elbows as follows:

1. Apply mitered sections of pipe insulation.
2. Secure insulation materials and seal seams with manufacturer's recommended adhesive. Cement to avoid openings in insulation that will allow passage of air to the pipe surface.

D. Apply insulation to valves and specialties as follows:

1. Apply preformed valve covers manufactured of the same material as pipe insulation and attached according to the manufacturer's written instructions.
2. Apply cut segments of pipe and sheet insulation to valve body. Arrange insulation to permit access to packing and to allow valve operation without disturbing insulation. For check valves, fabricate removable sections of insulation arranged to allow access to stainer basket.
3. Apply insulation to flanges as specified for flange insulation application.
4. Secure insulation to valves and specialties and seal seams with manufacturer's recommended adhesive. Cement to avoid openings in insulation that will allow passage of air to the pipe surface.

3.8 FIELD-APPLIED JACKET APPLICATION

- A. Apply glass-cloth jacket, where indicated, directly over bare insulation or insulation with factory-applied jackets.
 - 1. Apply jacket smooth and tight to surface with 2-inch (50-mm) overlap at seams and joints.
 - 2. Embed glass cloth between two 0.062-inch- (1.6-mm-) thick coats of jacket manufacturer's recommended adhesive.
 - 3. Completely encapsulate insulation with jacket, leaving no exposed raw insulation.
- B. Foil and Paper Jackets: Apply foil and paper jackets where indicated.
 - 1. Draw jacket material smooth and tight.
 - 2. Apply lap or joint strips with the same material as jacket.
 - 3. Secure jacket to insulation with manufacturer's recommended adhesive.
 - 4. Apply jackets with 1-1/2-inch (40-mm) laps at longitudinal seams and 3-inch- (75-mm-) wide joint strips at end joints.
 - 5. Seal openings, punctures, and breaks in vapor-retarder jackets and exposed insulation with vapor-retarder mastic.
- C. Apply metal jacket where indicated, with 2-inch (50-mm) overlap at longitudinal seams and end joints. Overlap longitudinal seams arranged to shed water. Seal end joints with weatherproof sealant recommended by insulation manufacturer. Secure jacket with stainless-steel bands 12 inches (300 mm) o.c. and at end joints.

3.9 PIPING SYSTEM APPLICATIONS

- A. Insulation materials and thicknesses are specified in schedules at the end of this Section.
- B. Items Not Insulated: Unless otherwise indicated, do not apply insulation to the following systems, materials, and equipment:
 - 1. Flexible connectors.
 - 2. Fire-suppression piping.
 - 3. Drainage piping located in crawl spaces, unless otherwise indicated.
 - 4. Below-grade piping, unless otherwise indicated.
 - 5. Chrome-plated pipes and fittings, unless potential for personnel injury.
 - 6. Air chambers, unions, strainers, check valves, plug valves, and flow regulators.

3.10 INTERIOR INSULATION APPLICATION SCHEDULE

- A. Service: Domestic water piping.
 - 1. Operating Temperature: 60 to 80 deg F
 - 2. Insulation Material: Mineral Fiber
 - 3. Insulation Thickness: 1" thick.
 - 4. Field-Applied Jacket: Foil and Paper(ASJ)
 - 5. Vapor Retarder Required: Yes.
 - 6. Finish: None.
- B. Service: Domestic hot and recirculated hot water.
 - 1. Operating Temperature: 60 to 140 deg F (15 to 60 deg C).
 - 2. Insulation Material: Mineral fiber
 - 3. Insulation Thickness: 1" thick
 - 4. Field-Applied Jacket: Foil and Paper(ASJ)
 - 5. Vapor Retarder Required: No

6. Finish: None.

C. Service: Condensate and equipment drain piping.

1. Operating Temperature: 40 to 60 deg F
2. Insulation Material: Flexible elastomeric, only on first ten feet of pipe from trap.
3. Insulation Thickness: 3/4"
4. Field-Applied Jacket: None.
5. Vapor Retarder Required: No.
6. Finish: Two coats of the insulation manufacturer's recommended protective coating.

D. Service: Refrigerant suction and hot-gas piping.

1. Operating Temperature: 35 to 50 deg F
2. Insulation Material: Flexible elastomeric.
3. Insulation Thickness: 1" thick.
4. Field-Applied Jacket: Aluminum Jacket on building exterior application only.
5. Vapor Retarder Required: Yes.
6. Finish: None.

E. Service: For obtaining fire/smoke rating in return air plenum (calbes, PE, PB, PP, ABS, PVC, CPVC, etc).

1. Operating Temperature: 35 to 90 deg F
2. Insulation Material: 3M Fire Barrier Plenum Wrap 5 A or equal.
3. Insulation Thickness: larger of 1" or mfr's recommendations.
4. Field-Applied Jacket: scrim reinforced foil
5. Vapor Retarder Required: None.
6. Finish: None.

3.11 EXTERIOR INSULATION APPLICATION SCHEDULE

A. Service: Domestic water.

1. Operating Temperature: 60 to 140 deg F (15 to 60 deg C).
2. Insulation Material: Mineral fiber.
3. Insulation Thickness: Apply the following insulation thicknesses: 1"
4. Field-Applied Jacket: Aluminum.
5. Vapor Retarder Required: Yes.
6. Finish: None.

B. Service: Refrigerant suction.

1. Operating Temperature: 35 to 50 deg F (2 to 10 deg C).
2. Insulation Material: Flexible elastomeric.
3. Insulation Thickness: Apply the following insulation thicknesses: 1/2"
4. Field-Applied Jacket: Aluminum
5. Vapor Retarder Required: Yes.
6. Finish: None.

END OF SECTION

SECTION 221116

DOMESTIC WATER PIPING

PART 1 - GENERAL

1.1 SUMMARY

- A. Includes But Not Limited To:
1. Perform excavating and backfilling required by work of this Section.
 2. Furnish and install potable water piping complete with necessary valves, connections, and accessories inside building and connect with outside utility lines **5 feet** from building perimeter as described in Contract Documents.

1.2 PERFORMANCE REQUIREMENTS

- A. Provide components and installation capable of producing domestic water piping systems with the following minimum working-pressure ratings, unless otherwise indicated:
1. Domestic Water Distribution Piping: 125 psig..

1.3 SUBMITTALS

- A. Action Submittals:
1. Product Data: For pipe, tube, fittings, and couplings.
 2. Field Test Reports: Indicate and interpret test results for compliance with performance requirements.
- B. Informational Submittals:
1. Test And Evaluation Reports:
 - a. Written report of sterilization test.
- C. Shop Drawings:
- a. Piping Layout:
 - 1) Provide as-built drawings at end of project.

1.4 QUALITY ASSURANCE

- A. Regulatory Agency Sustainability Approvals:
1. Meet NSF International Standards for materials or products that come into contact with drinking water, drinking water treatment chemicals, or both for chemical contaminants and impurities that are indirectly imparted to drinking water from products, components, and materials used in drinking water systems.
 2. California only: California Assembly Bill 1953 (AB1953) Compliant for Lead Free.
- B. Piping materials shall bear label, stamp, or other markings of specified testing agency.
- C. Comply with NSF 14, "Plastics Piping Components and Related Materials," for plastic, potable domestic water piping and components.
- D. Comply with NSF 61, "Drinking Water System Components-Health Effects; Sections 1 through 9," for potable domestic water piping and components.

PART 2 - PRODUCTS

2.1 SYSTEMS

A. Manufacturers:

1. Manufacturer Contact List:
 - a. Aquatherm, Inc.,
 - b. Cash Acme,
 - c. Cla-Val Company,
 - d. Conbraco Industries Inc,
 - e. Hammond Valve,
 - f. Handy & Harmon Products Div,
 - g. Honeywell Inc,
 - h. Leonard Valve Co,
 - i. Milwaukee Valve Co,
 - j. Nibco Inc,
 - k. Rehau,
 - l. Sloan Valve Co,
 - m. Spence Engineering Co,
 - n. Symmons Industries, Braintree,
 - o. Uponor Inc,
 - p. Viega ProPress, Wic
 - q. Watts Regulator Co,
 - r. Wilkins (Zurn Wilkins),
 - s. Zurn PEX, Inc.

B. Materials:

1. Design Criteria:
 - a. All drinking water products, components, and materials above and below grade used in drinking water systems must meet NSF International Standards for Lead Free.
 - b. No CPVC allowed.
2. Pipe:
 - a. Copper:
 - 1) Above-Grade:
 - a) Meet requirements of ASTM B88, Type K & L.
 - b. Hard Copper Tube: ASTM B 88, Types K and L, water tube, drawn tempered.
 - c. Copper Pressure Fittings: ASME B16.18, cast-copper-alloy or ASME B16.22, wrought-copper, solder-joint fittings. Furnish wrought-copper fittings if indicated.
 - d. Bronze Flanges: ASME B16.24, Class 150, with solder-joint end. Furnish Class 300 flanges if required to match piping.
 - e. Copper Unions: MSS SP-123, cast-copper-alloy, hexagonal-stock body, with ball-and-socket, metal-to-metal seating surfaces and solder-joint or threaded ends.
 - f. Copper, Grooved-End Fittings: ASTM B 75 (ASTM B 75M) copper tube or ASTM B 584 bronze castings.
 - a) Copper-Tubing, Keyed Couplings: Copper-tube dimensions and design similar to AWWA C606. Include ferrous housing sections, gasket suitable for hot water, and bolts and nuts.
 - 2) Below-Grade:
 - a) Meet requirements of ASTM B88, Type K. **3/4 inch** minimum under slabs.
 - b) **2 inches** And Smaller: Annealed soft drawn.
 - c) **2-1/2 inches** And Larger: Hard Drawn.
 - 3) Fittings:
 - a) For Copper Pipe: Wrought copper.
3. Connections For Copper Pipe:
 - a. Above-Grade:
 - 1) Sweat copper type with 95/5 or 96/4 Tin-Antimony solder, Bridgit solder, or Silvabrite 100 solder. Use only lead-free solder.

- 2) Viega ProPress System
- b. Below Grade:
 - 1) Brazed using following type rods:
 - a) Copper to Copper Connections:
 - (1) AWS Classification BCuP-4 Copper Phosphorus (6 percent silver).
 - (2) AWS Classification BCuP-5 Copper Phosphorus (15 percent silver).
 - 2) Copper to Brass or Copper to Steel Connections: AWS Classification BAg-5 Silver (45 percent silver).
 - 3) Do not use rods containing Cadmium.
 - 4) Brazing Flux:
 - a) Approved Products:
 - (1) Stay-Silv white brazing flux by Harris Product Group.
 - (2) High quality silver solder flux by Handy & Harmon.
 - 5) Joints under slabs acceptable only if allowed by local codes.
 4. Ball Valves:
 - a. Use ball valves exclusively unless otherwise specified. Ball valves shall be by single manufacturer from approved list below.
 - b. Valves shall be two-piece, full port for **150 psi** SWP.
 - 1) Operate with flow in either direction, suitable for throttling and tight shut-off.
 - 2) Body: Bronze, **150 psig** wsp at **350 deg F** and **400 psig** wog.
 - 3) Seat: Bubble tight at **100 psig** under water.
 - c. Class One Quality Standard: Nibco T585 or S585.
 - 1) Equal by Conbraco 'Apollo,' Hammond, Milwaukee, or Watts.
 5. Combination Pressure Reducing Valve / Strainer:
 - a. Integral stainless steel strainer, or separate 'Y' strainer installed upstream of pressure reducing valve.
 - b. Built-in thermal expansion bypass check valve.
 - c. Class One Quality Standard: Watts LFU5B:
 - 1) Equal by Cash Acme, Cla-Val Hi Capacity, Conbraco 36C, Honeywell-Braukmann, Spence Hi Capacity, Watts, or Wilkins. See Section 01 6200.
 - d. .

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Below Grade:
 1. Install piping under slabs without joints where possible.
 2. Insulate water piping buried within building perimeter.
 3. Bury water piping **6 inches** minimum below bottom of slab and encase in **2 inches** minimum of sand.
- B. Locate cold water lines a minimum of **6 inches** from hot water line.

3.2 FIELD QUALITY CONTROL

- A. Field Tests:
 1. Before pipes are covered, test systems in presence of Architect/Engineer at **125 psig** hydrostatic pressure for four (4) hours and show no leaks.
 2. Disconnect equipment not suitable for **125 psig** pressure from piping system during test period.

3.3 ADJUSTING

- A. Adjust balancing valves in hot-water-circulation return piping to provide adequate flow.
 1. Manually adjust ball-type balancing valves in hot-water-circulation return piping to provide flow of hot water in each branch.

2. Adjust calibrated balancing valves to flows indicated.

3.4 CLEANING

- A. Clean and disinfect potable domestic water piping as follows:
 1. Purge new piping and parts of existing domestic water piping that have been altered, extended, or repaired before using.
 2. Use purging and disinfecting procedures prescribed by authorities having jurisdiction or, if methods are not prescribed, procedures described in either AWWA C651 or AWWA C652 or as described below:
 - a. Flush piping system with clean, potable water until dirty water does not appear at outlets.
 - b. Fill and isolate system according to either of the following:
 - 1) Fill system or part thereof with water/chlorine solution with at least 50 ppm (50 mg/L) of chlorine. Isolate with valves and allow to stand for 24 hours.
 - 2) Fill system or part thereof with water/chlorine solution with at least 200 ppm (200 mg/L) of chlorine. Isolate and allow to stand for three hours.
 - c. Flush system with clean, potable water until no chlorine is in water coming from system after the standing time.
 - d. Submit water samples in sterile bottles to authorities having jurisdiction. Repeat procedures if biological examination shows contamination.
- B. Prepare and submit reports of purging and disinfecting activities.
- C. Clean interior of domestic water piping system. Remove dirt and debris as work progresses.
- D. Water system will not be accepted until negative bacteriological test is made on water taken from system. Repeat dosing as necessary until such negative test is accomplished.

END OF SECTION

SECTION 221119

DOMESTIC WATER PIPING SPECIALTIES

PART 1 - GENERAL

1.1 SUMMARY

- A. Includes But Not Limited To:
1. Balancing valves.
 2. Washer-supply outlets.
 3. Key-operation hydrants.
 4. Trap seal primer valves.
 5. Drain valves.
 6. Miscellaneous piping specialties.
 7. Sleeve penetration systems.
 8. Flashing materials.

1.2 QUALITY ASSURANCE

- A. Regulatory Agency Sustainability Approvals:
1. Meet NSF International Standards for materials or products that come into contact with drinking water, drinking water treatment chemicals, or both for chemical contaminants and impurities that are indirectly imparted to drinking water from products, components, and materials used in drinking water systems.

PART 2 - PRODUCTS

2.1 BALANCING VALVES

- A. Calibrated Balancing Valves: Adjustable, with two readout ports and memory setting indicator. Include manufacturer's standard hoses, fittings, valves, differential pressure meter, and carrying case.
1. Manufacturers:
 1. Armstrong Pumps, Inc.
 2. Flow Design, Inc.
 3. ITT Industries; Bell & Gossett Div.
 4. Taco, Inc.
 5. Watts Industries, Inc.; Water Products Div.
 2. 2" and Smaller: Bronze body with brass ball, adjustment knob, calibrated nameplate, and threaded or solder-joint ends.
 3. 2" and Smaller: Bronze, Y-pattern body with adjustment knob and threaded ends.
 4. 2.5" and Larger: Cast-iron, Y-pattern body with bronze disc and flanged or grooved ends.
- B. Memory-Stop Balancing Valves, NPS 2 (DN 50) and smaller: MSS SP-110, ball valve, rated for 400-psig (2760-kPa) minimum CWP. Include two-piece, copper-alloy body with full-port, chrome-plated brass ball, replaceable seats and seals, threaded or solder-joint ends, and vinyl-covered steel handle with memory-stop device.
1. Manufacturers:
 1. Conbraco Industries, Inc.

2. Crane Co., Crane Valve Group; Crane Valves.
3. Grinnell Corporation.
4. NIBCO INC.
5. Red-White Valve Corp.

2.2 STRAINERS

- A. Strainers: Y-pattern, unless otherwise indicated, and full size of connecting piping. Include ASTM A 666, Type 304, stainless-steel screens with 3/64-inch (1.2-mm) round perforations, unless otherwise indicated.
1. Pressure Rating: 125-psig (860-kPa) minimum steam working pressure, unless otherwise indicated.
 2. NPS 2 (DN 50) and Smaller: Bronze body, with female threaded ends.
 3. NPS 2-1/2 (DN 65) and Larger: Cast-iron body, with interior AWWA C550 or FDA-approved, epoxy coating and flanged ends.

2.3 OUTLET BOXES

- A. Manufacturers:
1. Acorn Engineering Company.
 2. Gray, Guy Manufacturing Co., Inc.
 3. Symmons Industries, Inc.
- B. General: Recessed-mounting outlet boxes with supply fittings complying with ASME A112.18.1M. Include box with faceplate, services indicated for equipment connections, and wood-blocking reinforcement.
- C. Clothes Washer Outlet Boxes: With hot- and cold-water hose connections, drain, and the following:
1. Box and Faceplate: [Stainless steel] [Enameled or epoxy-painted steel].
 2. Shutoff Fitting: Two hose bibbs.
 3. Supply Fittings: Two NPS 1/2 (DN 15) gate, globe, or ball valves and NPS 1/2 (DN 15) copper, water tubing.
 4. Drain: NPS 2 (DN 50) standpipe, P-trap, and direct waste connection to drainage piping.
 5. Inlet Hoses: Two ASTM D 3571, 60-inch- (1500-mm-) long, rubber household clothes washer inlet hoses with female hose-thread couplings.
 6. Drain Hose: One 48-inch- (1200-mm-) long, rubber household clothes washer drain hose with hooked end.
- D. Icemaker Outlet Boxes: With hose connection and the following:
1. Box and Faceplate: Stainless steel.
 2. Shutoff Fitting: Hose bibb.
 3. Supply Fitting: NPS 1/2 (DN 15) gate, globe, or ball valve and NPS 1/2 (DN 15) copper, water tubing.

2.4 KEY-OPERATION HYDRANTS

- A. Manufacturers:
1. Josam Co.
 2. Smith, Jay R. Mfg. Co.
 3. Woodford Manufacturing Co.
- B. General: ASME A112.21.3M, key-operation hydrant with pressure rating of 125 psig.
1. Inlet: 3/4 " or NPS 1" threaded or solder joint.

2. Outlet: ASME B1.20.7, garden-hose threads.
3. Operating Keys: One with each key-operation hydrant.

C. Moderate-Climate, Concealed-Outlet Wall Hydrants: ASSE 1019, self-drainable with flush-mounting box with cover, integral nonremovable hose-connection vacuum breaker, and concealed outlet.

1. Classification: Type A, for automatic draining with hose removed or Type B, for automatic draining with hose removed or with hose attached and nozzle closed.

D. Hot and Cold, Nonfreeze Concealed-Outlet Wall Hydrants: With deep flush-mounting box with cover; hot- and cold-water casings and operating rods to match wall thickness; concealed outlet; wall clamps; and factory- or field-installed, nonremovable and manual drain-type, hose-connection vacuum breaker complying with ASSE 1011.

2.5 ROOF HYDRANTS

1. Design Criteria:
 - 1) Provide dual check backflow preventer.
 - 2) Non-freeze.
 - 3) Drain port - connect to drain

2.6 TRAP SEAL PRIMER VALVES

A. Supply-Type Trap Seal Primer Valves: ASSE 1018, water-supply-fed type, with the following characteristics:

1. Manufacturers:
 1. Josam Co.
 2. MIFAB Manufacturing, Inc.
 3. Precision Plumbing Products, Inc.
 4. Smith, Jay R. Mfg. Co.
2. 125-psig (860-kPa) minimum working pressure.
3. Bronze body with atmospheric-vented drain chamber.
4. Inlet and Outlet Connections: NPS 1/2 (DN 15) threaded, union, or solder joint.
5. Gravity Drain Outlet Connection: NPS 1/2 (DN 15) threaded or solder joint.
6. Finish: Chrome plated, or rough bronze for units used with pipe or tube that is not chrome finished.

2.7 MISCELLANEOUS PIPING SPECIALTIES

A. Water Hammer Arresters: ASSE 1010 or PDI-WH 201, metal-bellows type with pressurized metal cushioning chamber. Sizes indicated are based on ASSE 1010 or PDI-WH 201, Sizes A through F.

1. Manufacturers:
 1. Josam Co.
 2. Smith, Jay R. Mfg. Co.
 3. Tyler Pipe; Wade Div.
 4. Zurn Industries, Inc.; Specification Drainage Operation.

B. Hose Bibbs: Bronze body with replaceable seat disc complying with ASME A112.18.1M for compression-type faucets. Include NPS 1/2 or NPS 3/4 (DN 15 or DN 20) threaded or solder-joint inlet, of design suitable for pressure of at least 125 psig (860 kPa); integral [or field-installed,] nonremovable, drainable hose-connection vacuum breaker; and garden-hose threads complying with ASME B1.20.7 on outlet.

C. Roof Flashing Assemblies: Manufactured assembly made of [4-lb/sq. ft. (20-kg/sq. m), 0.0625-inch- (1.6-mm-)] [6-lb/sq. ft. (30-kg/sq. m), 0.0938-inch- (2.4-mm-)] thick, lead flashing collar and skirt extending at least [6 inches

(150 mm)] [8 inches (200 mm)] [10 inches (250 mm)] from pipe with galvanized steel boot reinforcement, and counterflashing fitting.

- D. Floor-Drain Inlet Fittings: Cast iron, with threaded inlet and threaded or spigot outlet, and trap seal primer valve connection.
- E. Fixed Air-Gap Fittings: Manufactured cast-iron or bronze drainage fitting with semiopen top with threads or device to secure drainage inlet piping in top and bottom spigot or threaded outlet larger than top inlet. Include design complying with ASME A112.1.2 that will provide fixed air gap between installed inlet and outlet piping.
- F. Stack Flashing Fittings: Counterflashing-type, cast-iron fitting, with bottom recess for terminating roof membrane, and with threaded or hub top for extending vent pipe.
- G. Vent Caps: Cast-iron body with threaded or hub inlet and vandal-proof design. Include vented hood and set-screws to secure to vent pipe.
- H. Vent Terminals: Commercially manufactured, shop- or field-fabricated, frost-proof assembly constructed of galvanized steel, copper, or lead-coated copper. Size to provide 1-inch (25-mm) enclosed air space between outside of pipe and inside of flashing collar extension, with counterflashing.
- I. Expansion Joints: ASME A112.21.2M, assembly with cast-iron body with bronze sleeve, packing gland, and packing; of size and end types corresponding to connected piping.

2.8 SLEEVE PENETRATION SYSTEMS

A. Manufacturers:

1. ProSet Systems, Inc.

B. Description: UL 1479, through-penetration firestop assembly consisting of sleeve and stack fitting with firestopping plug.

1. Sleeve: Molded PVC plastic, of length to match slab thickness and with integral nailing flange on one end for installation in cast-in-place concrete slabs.
2. Stack Fitting: ASTM A 48 (ASTM A 48M), gray-iron, hubless-pattern, wye-branch stack fitting with neoprene O-ring at base and gray-iron plug in thermal-release harness in branch. Include PVC protective cap for plug.
 1. Special Coating: Include corrosion-resistant interior coating on fittings for plastic chemical waste and vent stacks.

2.9 FLASHING MATERIALS

A. Lead Sheet: ASTM B 749, Type L51121, copper bearing, with the following minimum weights and thicknesses, unless otherwise indicated:

1. General Use: 4-lb/sq. ft. (20-kg/sq. m), 0.0625-inch (1.6-mm) thickness.
2. Vent Pipe Flashing: 3-lb/sq. ft. (15-kg/sq. m), 0.0469-inch (1.2-mm) thickness.
3. Burning: 6-lb/sq. ft. (30-kg/sq. m), 0.0938-inch (2.4-mm) thickness.

B. Elastic Membrane Sheet: ASTM D 4068, flexible, chlorinated polyethylene, 40-mil (1.01-mm) minimum thickness.

C. Fasteners: Metal compatible with material and substrate being fastened.

- D. Metal Accessories: Sheet metal strips, clamps, anchoring devices, and similar accessory units required for installation; matching or compatible with material being installed.
- E. Solder: ASTM B 32, lead-free alloy.
- F. Bituminous Coating: SSPC-Paint 12, solvent-type, bituminous mastic.
 - 1) Not required to meet NSF International Standards for Lead Free.
 - 2. Category Four Approved Products. See Section Project Requirements 01 60 00 for definitions of Categories:
 - 1) Jay R. Smith: 5907.
 - 2) Prier: P-RH2.
 - 3) Woodford: RHY2-MS.
 - 2. Water Hammer Arrestors:
 - 1. Design Criteria:
 - 1) Meet NSF International Standards for Lead Free.
 - 2) Nesting type, air pre-charged bellows with casing.
 - 3) Bellows constructed of stabilized 18-8 stainless steel.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install pressure regulators with inlet and outlet shutoff valves and balance valve bypass. Install pressure gages on inlet and outlet.
- B. Install strainers on supply side of each control valve, pressure regulator, and solenoid valve.
- C. Install trap seal primer valves with outlet piping pitched down toward drain trap a minimum of 1 percent and connect to floor-drain body, trap, or inlet fitting. Adjust valve for proper flow.
- D. Install backwater valves in building drain piping. For interior installation, provide cleanout deck plate flush with floor and centered over backwater valve cover, and of adequate size to remove valve cover for servicing.
- E. Install expansion joints on vertical risers, stacks, and conductors if indicated.

3.2 CONNECTIONS

- A. Install piping adjacent to equipment to allow service and maintenance.
- B. Ground equipment.
- C. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A and UL 486B.
- D. Connect plumbing specialties and devices that require power.

3.3 FLASHING INSTALLATION

- A. Fabricate flashing from single piece unless large pans, sumps, or other drainage shapes are required. Join flashing according to the following if required:
 - 1. Lead Sheets: Burn joints of lead sheets 6-lb/sq. ft. (30-kg/sq. m), 0.0938-inch (2.4-mm) thickness or thicker. Solder joints of lead sheets 4-lb/sq. ft. (20-kg/sq. m), 0.0625-inch (1.6-mm) thickness or thinner.

- B. Install sheet flashing on pipes, sleeves, and specialties passing through or embedded in floors and roofs with waterproof membrane.
 - 1. Pipe Flashing: Sleeve type, matching pipe size, with minimum length of 10 inches (250 mm), and skirt or flange extending at least 8 inches (200 mm) around pipe.
 - 2. Sleeve Flashing: Flat sheet, with skirt or flange extending at least 8 inches (200 mm) around sleeve.
 - 3. Embedded Specialty Flashing: Flat sheet, with skirt or flange extending at least 8 inches (200 mm) around specialty.
- C. Set flashing on floors and roofs in solid coating of bituminous cement.
- D. Secure flashing into sleeve and specialty clamping ring or device.
- E. Install flashing for piping passing through roofs with counterflashing or commercially made flashing fittings, according to "Sheet Metal Flashing and Trim."
- F. Extend flashing up vent pipe passing through roofs and turn down into pipe, or secure flashing into cast-iron sleeve having calking recess.

3.4 FIELD QUALITY CONTROL

- A. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect field-assembled trap seal primer systems and their installation, including piping and electrical connections. Report results in writing.
 - 1. Leak Test: After installation, charge system and test for leaks. Repair leaks and retest until no leaks exist.
 - 2. Operational Test: After electrical circuitry has been energized, start units to confirm proper motor rotation and unit operation. Remove malfunctioning units, replace with new units, and retest.
 - 3. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

END OF SECTION

SECTION 221313

FACILITY SANITARY SEWERS

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:

1. Furnish and install soil, waste, and vent piping systems within building and connect with outside utility lines **5 feet** out from building where applicable.
2. Perform excavation and backfill required by work of this Section.

1.2 ADMINISTRATIVE REQUIREMENTS

A. Pre-Cover Observation.

1. Contact Architect/Engineer prior to covering any section of pipe.
2. All piping all be under pressure during observation

1.3 REFERENCES

A. Reference Standards:

1. International Code Council:
 - a. ICC IPC-2012, 'International Plumbing Code'.

1.4 PERFORMANCE REQUIREMENTS

A. Provide components and installation capable of producing piping systems with the following minimum working-pressure ratings, unless otherwise indicated:

1. Soil, Waste, and Vent Piping: 10-foot head of water (30 kPa).

1.5 SUBMITTALS

- A. Product Data: For pipe, tube, fittings, and couplings.
- B. Shop Drawings: For solvent drainage system, include plans, elevations, sections, and details.
- C. Field Test Reports: Indicate and interpret test results for compliance with performance requirements.

1.6 QUALITY ASSURANCE

- A. Piping materials shall bear label, stamp, or other markings of specified testing agency.

PART 2 - PRODUCTS

2.1 PVC PIPING

A. PVC Pipe: ASTM D 2665, solid-wall drain, waste, and vent.

1. PVC Socket Fittings: ASTM D 2665, socket type, made to ASTM D 3311, drain, waste, and vent patterns.

B. PVC Special Fittings: ASTM F 409, drainage-pattern tube and tubular fittings with ends as required for application.

C. Plenum Vent Lines: In areas of building with a return air plenum.

a. Approved Types:

- 1) Service weight, single-hub or no-hub type cast iron soil pipe meeting requirements of ASTM A74.
- 2) Vent lines **2-1/2 inches** or smaller may be Schedule 40 galvanized steel.

b. Joint Material:

- 1) Single-Hub: Rubber gaskets meeting requirements of ASTM C564.
- 2) No-Hub Pipe: Neoprene gaskets with stainless steel cinch bands.

c. Fittings:

- d. Cast Iron Pipe: Hub and spigot, except fittings for no-hub pipe shall be no-hub, and meet requirements of ASTM A74.
 - 1) Joint Material: Rubber gaskets meeting requirements of ASTM C564.
 - 2) Galvanized Pipe: Screwed Durham tarred drainage type.

PART 3 - EXECUTION

3.1 PIPING INSTALLATION

- A. Install cleanouts at grade and extend to where building sanitary drains connect to building sanitary sewers.
- B. Install cast-iron sleeve with water stop and mechanical sleeve seal at each service pipe penetration through foundation wall. Select number of interlocking rubber links required to make installation watertight.
- C. Make changes in direction for soil and waste drainage and vent piping using appropriate branches, bends, and long-sweep bends. Sanitary tees and short-sweep ¼ bends may be used on vertical stacks if change in direction of flow is from horizontal to vertical. Use long-turn, double Y-branch and 1/8- bend fittings if 2 fixture are installed back to back or side by side with common drain pipe. Straight tees, elbows, and crosses may be used on vent lines. Do not change direction of flow more than 90 degrees. Use proper size of standard increasers and reducers if pipes of different sizes are connected. Reducing size of drainage piping in direction of flow is prohibited.
- D. Lay buried building drainage piping beginning at low point of each system. Install true to grades and alignment indicated, with unbroken continuity of invert. Place hub ends of piping upstream. Install required gaskets according to manufacturer's written instructions for use of lubricants, cements, and other installation requirements. Maintain swab in piping and pull past each joint as completed.
- E. Re-verify building drainage piping slope before covering pipe in trench if left uncovered over a 24 hour period of subjected to exterior water. If slope of piping has changed, provide new shoring material to maintain original slope after trench has been covered.
- F. Install soil and waste drainage and vent piping at the code required minimum slopes, unless otherwise indicated:
- G. Install engineered soil and waste drainage and vent piping systems in locations indicated and as follows:
 1. Combination Waste and Vent: Comply with standards of authorities having jurisdiction.
 2. Cast-Iron, Sovent, Single Stack: Comply with ASSE 1043 and sovent fitting manufacturer's written installation instructions.
 3. Reduced-Size Venting: Comply with standards of authorities having jurisdiction.
- H. Sleeves are not required for cast-iron soil piping passing through concrete slabs-on-grade if slab is without membrane waterproofing.
- I. Install PVC soil and waste drainage and vent piping according to ASTM D 2665.
- J. Install underground PVC soil and waste drainage piping according to ASTM D 2321.
- K. Do not enclose, cover, or put piping into operation until it is inspected and approved by authorities having jurisdiction.

3.2 CONNECTIONS

- A. Drawings indicate general arrangement of piping, fittings, and specialties.
- B. Connect soil and waste piping to exterior sanitary sewerage piping. Use transition fitting to join dissimilar piping materials.
- C. Connect drainage and vent piping to the following:
 1. Plumbing Fixtures: Connect drainage piping in sizes indicated, but not smaller than required by plumbing code. Refer to Section "Plumbing Fixtures."
 2. Plumbing Fixtures and Equipment: Connect atmospheric vent piping in sizes indicated, but not smaller than required by authorities having jurisdiction.
 3. Plumbing Specialties: Connect drainage and vent piping in sizes indicated, but not smaller than required by plumbing code.

- 3.3 Equipment: Connect drainage piping as indicated. Provide shutoff valve, if indicated, and union for each connection. Use flanges instead of unions for connections NPS 2-1/2 (DN 65) and larger

3.4 FIELD QUALITY CONTROL

- A. Field Tests:
 1. Conduct tests for leaks and defective work. Notify Architect before testing.
 2. Thermoplastic Pipe System:

- a. Before backfilling and compacting of trenches, Fill waste and vent system with water to roof level or **10 feet** minimum, and show no leaks for two hours. Correct leaks and defective work.
 - b. After backfilling and compacting of trenches is complete but before placing floor slab, re-test as specified above. Uncover pipe and correct leaks and defective work. Re-backfill and compact and re-test.
- B. During installation, notify authorities having jurisdiction at least 24 hours before inspection must be made. Perform tests specified below in presence of authorities having jurisdiction.
1. Roughing-in Inspection: Arrange for inspection of piping before concealing or closing-in after roughing-in and before setting fixtures.
 2. Final Inspection: Arrange for final inspection by authorities having jurisdiction to observe tests specified below and to ensure compliance with requirements.
- C. Reinspection: If authorities having jurisdiction find that piping will not pass test or inspection, make required corrections and arrange for reinspection.
- D. Reports: Prepare inspection reports and have them signed by authorities having jurisdiction.
- E. Test sanitary drainage and vent piping according to procedures of authorities having jurisdiction or, in absence of published procedures, as follows:
1. Test for leaks and defects in new piping and parts of existing piping that have been altered, extended, or repaired. If testing is performed in segments, submit separate report for each test, complete with diagram of portion of piping tested.
 2. Leave uncovered and unconcealed new, altered, extended, or replaced drainage and vent piping until it has been tested and approved. Expose work that was covered or concealed before it was tested.
 3. Roughing-in Plumbing Test Procedure: Test drainage and vent piping, except outside leaders, on completion of roughing-in. Close openings in piping system and fill with water to point of overflow, but not less than 10-foot head of water (30 kPa). From 15 minutes before inspection starts to completion of inspection, water level must not drop. Inspect joints for leaks.
 4. Finished Plumbing Test Procedure: After plumbing fixtures have been set and traps filled with water, test connections and prove they are gastight and watertight. Plug vent-stack openings on roof and building drains where they leave building. Introduce air into piping system equal to pressure of 1-inch wg (250 Pa). Use U-tube or manometer inserted in trap of water closet to measure this pressure. Air pressure must remain constant without introducing additional air throughout period of inspection. Inspect plumbing fixture connections for gas and water leaks.
 5. Repair leaks and defects with new materials and retest piping, or portion thereof, until satisfactory results are obtained.
 6. Prepare reports for tests and required corrective action.

3.5 CLEANING

- A. Clean interior of piping. Remove dirt and debris as work progresses.
- B. Protect drains during remainder of construction period to avoid clogging with dirt and debris and to prevent damage from traffic and construction work.
- C. Place plugs in ends of uncompleted piping at end of day and when work stops.

END OF SECTION

SECTION 221319

FACILITY SANITARY SEWER SPECIALTIES

PART 1 - GENERAL

1.1 SUMMARY

- A. Products Furnished But Not Installed Under this Section as described in Contract Documents.
1. Cleanouts.
 2. Floor drains.

1.2 PERFORMANCE REQUIREMENTS

- A. Provide components and installation capable of producing piping systems with following minimum working-pressure ratings, unless otherwise indicated:
1. Sanitary Waste and Vent Piping: 10-foot head of water.
 2. Storm Drainage Piping: 10-foot head of water.

1.3 SUBMITTALS

- A. Product Data: Include rated capacities and shipping, installed, and operating weights. Indicate materials, finishes, dimensions, required clearances, and methods of assembly of components; and piping and wiring connections for the following:
1. Cleanouts, floor drains, and roof drains.
 2. Roof flashing assemblies.
 3. Grease interceptors(if applicable)
 4. Sleeve penetration systems.

PART 2 - PRODUCTS

2.1 SLEEVE PENETRATION SYSTEMS

- A. Manufacturers:
1. ProSet Systems, Inc.
- B. Description: UL 1479, through-penetration firestop assembly consisting of sleeve and stack fitting with firestopping plug.
1. Sleeve: Molded PVC plastic, of length to match slab thickness and with integral nailing flange on one end for installation in cast-in-place concrete slabs.
 2. Stack Fitting: ASTM A 48 (ASTM A 48M), gray-iron, hubless-pattern, wye-branch stack fitting with neoprene O-ring at base and gray-iron plug in thermal-release harness in branch. Include PVC protective cap for plug.
 - a. Special Coating: Include corrosion-resistant interior coating on fittings for plastic chemical waste and vent stacks.

2.2 FLASHING MATERIALS

- A. Lead Sheet: ASTM B 749, Type L51121, copper bearing, with the following minimum weights and thicknesses, unless otherwise indicated:
 - 1. General Use: 4-lb/sq. ft. (20-kg/sq. m), 0.0625-inch (1.6-mm) thickness.
 - 2. Vent Pipe Flashing: 3-lb/sq. ft. (15-kg/sq. m), 0.0469-inch (1.2-mm) thickness.
 - 3. Burning: 6-lb/sq. ft. (30-kg/sq. m), 0.0938-inch (2.4-mm) thickness.
- B. Elastic Membrane Sheet: ASTM D 4068, flexible, chlorinated polyethylene, 40-mil (1.01-mm) minimum thickness.
- C. Fasteners: Metal compatible with material and substrate being fastened.
- D. Metal Accessories: Sheet metal strips, clamps, anchoring devices, and similar accessory units required for installation; matching or compatible with material being installed.
- E. Solder: ASTM B 32, lead-free alloy.
- F. Bituminous Coating: SSPC-Paint 12, solvent-type, bituminous mastic.

2.3 CLEANOUTS

- A. Cleanouts: Comply with [ASME A112.36.2M] [ASME A112.3.1] <Insert other>.
 - 1. Application: [Floor cleanout] [Wall cleanout] [For installation in exposed piping].
 - 2. Products:
 - a. Josam Co.
 - b. Mifab
 - c. Smith, Jay R. Mfg. Co.
 - d. Tyler Pipe, Wade Div.
 - e. Zurn Industries, Inc., Specification Drainage Operation.

2.4 FLOOR DRAINS

- A. Floor Drains.
 - 1. Products:
 - a. Josam Co.
 - b. Mifab
 - c. Smith, Jay R. Mfg. Co.
 - d. Tyler Pipe, Wade Div.
 - e. Zurn Industries, Inc.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install trap seal primer valves with outlet piping pitched down toward drain trap a minimum of 1 percent and connect to floor-drain body, trap, or inlet fitting. Adjust valve for proper flow.
- B. Install backwater valves in building drain piping. For interior installation, provide cleanout deck plate flush with floor and centered over backwater valve cover, and of adequate size to remove valve cover for servicing.

- C. Install expansion joints on vertical risers, stacks, and conductors if indicated.
- D. Install cleanouts in aboveground piping and building drain piping according to the following, unless otherwise indicated:
 - 1. Size same as drainage piping up to NPS 4 (DN 100). Use NPS 4 (DN 100) for larger drainage piping unless larger cleanout is indicated.
 - 2. Locate at each change in direction of piping greater than 45 degrees.
 - 3. Locate at minimum intervals of 50 feet (15 m) for piping NPS 4 (DN 100) and smaller and 100 feet (30 m) for larger piping.
 - 4. Locate at base of each vertical soil and waste stack.
- E. Install cleanout deck plates with top flush with finished floor, for floor cleanouts for piping below floors.
- F. Install cleanout wall access covers, of types indicated, with frame and cover flush with finished wall, for cleanouts located in concealed piping.
- G. Install flashing flange and clamping device with each stack and cleanout passing through floors with waterproof membrane.
- H. Install vent flashing sleeves on stacks passing through roof. Secure over stack flashing according to manufacturer's written instructions.
- I. Install frost-proof vent caps on each vent pipe passing through roof. Maintain 1-inch (25-mm) clearance between vent pipe and roof substrate.
- J. Install floor drains at low points of surface areas to be drained. Set grates of drains flush with finished floor, unless otherwise indicated.
 - 1. Position floor drains for easy access and maintenance.
 - 2. Set floor drains below elevation of surrounding finished floor to allow floor drainage. Set with grates depressed according to the following drainage area radii:
 - a. Radius, 30 Inches (750 mm) or Less: Equivalent to 1 percent slope, but not less than 1/4-inch (6.35-mm) total depression.
 - b. Radius, 30 to 60 Inches (750 to 1500 mm): Equivalent to 1 percent slope.
 - c. Radius, 60 Inches (1500 mm) or Larger: Equivalent to 1 percent slope, but not greater than 1-inch (25-mm) total depression.
 - 3. Install floor-drain flashing collar or flange so no leakage occurs between drain and adjoining flooring. Maintain integrity of waterproof membranes where penetrated.
 - 4. Install individual traps for floor drains connected to sanitary building drain, unless otherwise indicated.
- K. Install roof drains at low points of roof areas according to roof membrane manufacturer's written installation instructions.
 - 1. Install roof-drain flashing collar or flange so no leakage occurs between drain and adjoining roofing. Maintain integrity of waterproof membranes where penetrated.
 - 2. Position roof drains for easy access and maintenance.
- L. Install interceptors, including trapping, venting, and flow-control fitting, according to authorities having jurisdiction and with clear space for servicing.
 - 1. Flush with In-Ground Installation: Set unit and extension, if required, with cover flush with finished grade.
 - 2. Install cleanout immediately downstream from interceptors not having integral cleanout on outlet.

- M. Fasten wall-hanging plumbing specialties securely to supports attached to building substrate if supports are specified and to building wall construction if no support is indicated.
- N. Fasten recessed-type plumbing specialties to reinforcement built into walls.
- O. Install wood-blocking reinforcement for wall-mounting and recessed-type plumbing specialties.
- P. Install escutcheons at wall, floor, and ceiling penetrations in exposed finished locations and within cabinets and millwork. Use deep-pattern escutcheons if required to conceal protruding pipe fittings.

3.2 CONNECTIONS

- A. Install piping adjacent to equipment to allow service and maintenance.
- B. Ground equipment.
- C. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A and UL 486B.
- D. Connect plumbing specialties and devices that require power according to Division Sections.
- E. Interceptor Connections: Connect piping, flow-control fittings, and accessories.
 - 1. Grease Interceptors: Connect inlet and outlet to unit, and flow-control fitting and vent to unit inlet piping.

3.3 FLASHING INSTALLATION

- A. Fabricate flashing from single piece unless large pans, sumps, or other drainage shapes are required. Join flashing according to the following if required:
 - 1. Lead Sheets: Burn joints of lead sheets 6-lb/sq. ft. (30-kg/sq. m), 0.0938-inch (2.4-mm) thickness or thicker. Solder joints of lead sheets 4-lb/sq. ft. (20-kg/sq. m), 0.0625-inch (1.6-mm) thickness or thinner.
- B. Install sheet flashing on pipes, sleeves, and specialties passing through or embedded in floors and roofs with waterproof membrane.
 - 1. Pipe Flashing: Sleeve type, matching pipe size, with minimum length of 10 inches (250 mm), and skirt or flange extending at least 8 inches (200 mm) around pipe.
 - 2. Sleeve Flashing: Flat sheet, with skirt or flange extending at least 8 inches (200 mm) around sleeve.
 - 3. Embedded Specialty Flashing: Flat sheet, with skirt or flange extending at least 8 inches (200 mm) around specialty.
- C. Set flashing on floors and roofs in solid coating of bituminous cement.
- D. Secure flashing into sleeve and specialty clamping ring or device.
- E. Install flashing for piping passing through roofs with counterflashing or commercially made flashing fittings.
- F. Extend flashing up vent pipe passing through roofs and turn down into pipe, or secure flashing into cast-iron sleeve having calking recess.

3.4 FIELD QUALITY CONTROL

- A. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect field-assembled trap seal primer systems and their installation, including piping and electrical connections. Report results in writing.
 - 1. Leak Test: After installation, charge system and test for leaks. Repair leaks and retest until no leaks exist.
 - 2. Operational Test: After electrical circuitry has been energized, start units to confirm proper motor rotation and unit operation. Remove malfunctioning units, replace with new units, and retest.
 - 3. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

3.5 PROTECTION

- A. Protect drains during remainder of construction period to avoid clogging with dirt and debris and to prevent damage from traffic and construction work.
- B. Place plugs in ends of uncompleted piping at end of each day or when work stops.

END OF SECTION

SECTION 223305

ELECTRIC DOMESTIC WATER HEATERS

PART 1 - GENERAL

1.1 SUMMARY

- A. Includes But Not Limited To:
 - 1. Furnish and install electric water heater as specified in Contract Documents.
- B. Related Requirements:
 - 1. Section 22 0501: 'Common Plumbing Requirements'.
 - 2. Section 22 1116: 'Domestic Water Piping'.

1.2 REFERENCES

- A. Reference Standard:
 - 1. NSF International Standard / American National Standards Institute:
 - a. NSF/ANSI 61-2012, 'Drinking Water System Components - Health Effects'.
 - b. NSF/ANSI 372-2011, 'Drinking Water System Components - Lead Content'.

1.3 SUBMITTALS

- A. Closeout Submittals:
 - 1. Include following in Operations And Maintenance Manual specified in Section 01 7800:
 - a. Operations and Maintenance Data:
 - 1) Maintenance and operational instructions.
 - b. Warranty Documentation:
 - 1) Final, executed copy of Warranty.
 - c. Record Documentation:
 - 1) Manufacturers documentation:
 - a) Manufacturer's literature or cut sheet.

1.4 QUALITY ASSURANCE

- A. Regulatory Agency Sustainability Approvals:
 - 1. Meet NSF International Standards for materials or products that come into contact with drinking water, drinking water treatment chemicals, or both for chemical contaminants and impurities that are indirectly imparted to drinking water from products, components, and materials used in drinking water systems.
 - 2. California only: California Assembly Bill 1953 (AB1953) Compliant for Lead Free.

1.5 WARRANTY

- A. Special Warranty:
 - 1. Three-year non-prorated warranty on water heaters of 20 gallon capacity and larger.

PART 2 - PRODUCTS

2.1 ASSEMBLIES

A. Manufacturers:

1. Manufacturer Contact List:
 - a. A O Smith Water Products Co,
 - b. Bradford-White Corp, Ambler,.
 - c. Rheem / Ruud Water Heater Div
 - d. Ruud Manufacturing Co.,
 - e. State Industries Inc,

B. Materials:

1. Design Criteria:
 - a. All (wetted) drinking water products, components, and materials used in drinking water systems must meet NSF International Standards for Lead Free.
 - b. All water heaters require 'Tempered Water Temperature Control' (mixing valves) as specified in Section 22 1116.
2. 30 Gallon to 50 Gallon Regular Height:
 - a. Glass lined storage tank pressure tested and rated for **125 psi (862 kPa)** working pressure.
 - b. Water heaters shall each have ASME rated temperature-pressure relief valve rated at MBH input of heater minimum set to relieve at **120 psi (827 kPa)**.
 - c. 9 Kw.
 - d. **3 inches (75 mm)** minimum glass fiber or polyurethane foam insulation.
 - e. Complete with two stage thermostat, magnesium anode, electric sheath rod type heating element, and high limit control.
 - f. Heater shall be pre-wired and entire unit bear UL label.
 - g. Manufactures
 - 1) American:
 - 2) A O Smith:
 - 3) Bradford White:
 - 4) Rheem
 - 5) State Industries: SB6-40.

2.2 ACCESSORIES

A. Anchoring Components:

1. **One inch (25 mm)** by **18 ga (1.2 mm)** galvanized steel straps.
2. No. 10 by **2-1/2 inch (64 mm)** screws.

B. Thermal Expansion Absorbers:

1. Bladder type for use with potable water systems.
2. Type One Acceptable Products.
 - a. Therm-X-Trol ST-12-C by Amtrol Inc, West Warwick, RI www.amtrol.com.
 - b. Equal as approved by Architect before bidding.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install temperature-pressure relief valve on hot water heater and pipe discharge to directly above funnel of floor drain.

3.2 ADJUSTING

- A. Set discharge water temperature at 140 deg F (60 deg C). Final hot water temperature shall be 110 deg F (43 deg C) after mixing valve. If no mixing valve set discharge temperature at 110 deg F (43 deg C).

END OF SECTION

SECTION 224200

PLUMBING FIXTURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes plumbing fixtures and related components.

1.3 DEFINITIONS

- A. Accessible Fixture: Plumbing fixture that can be approached, entered, and used by people with disabilities.
- B. Fitting: Device that controls flow of water into or out of plumbing fixture. Fittings specified in this Section include supplies and stops, faucets and spouts, shower heads and tub spouts, drains and tailpieces, and traps and waste pipes. Piping and general-duty valves are included where indicated.

1.4 SUBMITTALS

- A. Product Data: Include selected fixture and trim, fittings, accessories, appliances, appurtenances, equipment, and supports and indicate materials and finishes, dimensions, construction details, and flow-control rates for each type of fixture indicated.

1.5 QUALITY ASSURANCE

- A. Source Limitations: Obtain plumbing fixtures, faucets, and other components of each category through one source from a single manufacturer.
 - 1. Exception: If fixtures, faucets, or other components are not available from a single manufacturer, obtain similar products from other manufacturers specified for that category.
- B. Regulatory Requirements: Comply with requirements in U.S. Architectural & Transportation Barriers Compliance Board's "Uniform Federal Accessibility Standards (UFAS), 1985-494-187" about plumbing fixtures for people with disabilities.
- C. Regulatory Requirements: Comply with requirements in Public Law 102-486, "Energy Policy Act," about water flow and consumption rates for plumbing fixtures.
- D. NSF Standard: Comply with NSF 61, "Drinking Water System Components--Health Effects," for fixture materials that will be in contact with potable water.

- E. TAS: Texas Accessibility Standards.

1.6 COORDINATION

- A. Coordinate roughing-in and final plumbing fixture locations, and verify that fixtures can be installed to comply with original design and referenced standards.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. For fixture descriptions in other Part 2 articles where the subparagraph titles "Products," and "Manufacturers" introduce a list of manufacturers and their products or manufacturers only, the following requirements apply for product selection:
 - 1. Products: Subject to compliance with requirements, provide one of the products specified in other Part 2 articles.

2.2 LAVATORY FAUCETS

- A. Lavatory Faucet: Include hot- and cold-water indicators; coordinate faucet inlets with supplies and fixture holes and outlet with spout and fixture receptor.
 - 1. Products:
 - a. American Standard.
 - b. Eljer.
 - c. Kohler.

2.3 SINK FAUCETS

- A. Sink Faucet: Include hot- and cold-water indicators; coordinate faucet inlets with supplies and fixture holes and outlet with spout and fixture receptor.
 - 1. Manufacturers:
 - a. American Standard.
 - b. Eljer
 - c. Kohler

2.4 TOILET SEATS

- A. Toilet Seat: Solid plastic.
 - 1. Manufacturers:
 - a. Bemis.
 - b. Beneke.
 - c. Centoco.
 - d. Church.

2.5 PROTECTIVE SHIELDING GUARDS

- A. Protective Shielding Guard, Manufactured, plastic enclosure for covering for hot- and cold-water supplies and trap and drain piping and complying with ADA requirements.
 - 1. Manufacturers:
 - a. Engineered Brass Co.
 - b. Plumerex
 - c. Truebro.

2.6 FIXTURE SUPPORTS

- A. Water-Closet Support: Water-closet combination carrier designed for accessible and standard mounting heights. Include single or double, vertical or horizontal, hub-and-spigot or hubless waste fitting as required for piping arrangement; faceplates; couplings with gaskets; feet; and fixture bolts and hardware matching fixture. Include additional extension coupling, faceplate, and feet for installation in wide pipe space.
 - 1. Manufacturers:
 - a. Mifab
 - b. Josam.
 - c. Wade.
 - d. Zurn
- B. Urinal Support: Not required
- C. Lavatory Support: Not required
- D. Sink Support: Type II, sink carrier with hanger plate, bearing studs, and tie rod. Include steel uprights with feet.
 - 1. Manufacturers:
 - a. Josam.
 - b. J.R. Smith
 - c. Zurn.

2.7 WATER CLOSETS

- A. Water Closets: Accessible, wall-hanging, back-outlet, vitreous-china fixture designed for flushometer valve operation.
 - 1. Products:
 - a. American Standard, Inc.
 - b. Kohler Co.
 - c. TOTO USA, Inc.
- B. Water Closets: Institutional Combination Lavatory/Toilet
 - 1. Products:
 - a. ACORN

- b. All others shall be submitted for pre-approval prior to bid date.

2.8 LAVATORIES, SINKS

- A. Lavatories,: Accessible, counter top, vitreous-china fixture.
 - 1. Products:
 - a. American Standard, Inc.
 - b. Kohler Co.
 - c. Toto
 - d. CRANE

2.9 SINKS

- A. Sinks: Commercial, counter-mounting, stainless-steel fixture.
 - 1. Products:
 - a. Elkay Manufacturing Co.
 - b. Just Manufacturing Co.

2.10 SERVICE SINKS

- A. Service/Mop Sinks: Floor-mounting, enameled, sink with front apron, raised back, and coated, wire rim guard.
 - 1. Products:
 - a. Commercial Enameling Co.
 - b. Kohler Co.
 - c. Fiat

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine roughing-in for water soil and for waste piping systems and supports to verify actual locations and sizes of piping connections and that locations and types of supports match those indicated, before plumbing fixture installation. Use manufacturer's roughing-in data if roughing-in data are not indicated.
- B. Examine walls, floors, and cabinets for suitable conditions where fixtures are to be installed.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 FIXTURE INSTALLATION

- A. Assemble fixtures, trim, fittings, and other components according to manufacturers' written instructions.
- B. For wall-hanging fixtures, install off-floor supports affixed to building substrate.

1. Use carrier supports with waste fitting and seal for back-outlet fixtures.
 2. Use chair-type carrier supports with rectangular steel uprights for accessible fixtures.
- C. Install back-outlet, wall-hanging fixtures onto waste fitting seals and attach to supports.
- D. Install floor-mounting fixtures on closet flanges or other attachments to piping or building substrate.
- E. Install wall-hanging fixtures with tubular waste piping attached to supports.
- F. Install floor-mounting, back-outlet water closets attached to building floor substrate and wall bracket and onto waste fitting seals.
- G. Install counter-mounting fixtures in and attached to casework.
- H. Install fixtures level and plumb according to manufacturers' written instructions and roughing-in drawings.
- I. Install water-supply piping with stop on each supply to each fixture to be connected to water distribution piping. Attach supplies to supports or substrate within pipe spaces behind fixtures. Install stops in locations where they can be easily reached for operation.
1. Exception: Use ball, gate, or globe valve if stops are not specified with fixture. Refer to Division 15 Section "Valves" for general-duty valves.
- J. Install trap and tubular waste piping on drain outlet of each fixture to be directly connected to sanitary drainage system.
- K. Install tubular waste piping on drain outlet of each fixture to be indirectly connected to drainage system.
- L. Install flushometer valves for accessible water closets and urinals with handle mounted on wide side of compartment. Install other actuators in locations that are easy for people with disabilities to reach.
- M. Install toilet seats on water closets.
- N. Install faucet-spout fittings with specified flow rates and patterns in faucet spouts if faucets are not available with required rates and patterns. Include adapters if required.
- O. Install water-supply, flow-control fittings with specified flow rates in fixture supplies at stop valves.
- P. Install faucet, flow-control fittings with specified flow rates and patterns in faucet spouts if faucets are not available with required rates and patterns. Include adapters if required.
- Q. Install traps on fixture outlets.
- R. Install escutcheons at piping wall ceiling penetrations in exposed, finished locations and within cabinets and millwork. Use deep-pattern escutcheons if required to conceal protruding fittings. Refer to Division 15 Section "Basic Mechanical Materials and Methods" for escutcheons.
- S. Seal joints between fixtures and walls, floors, and counters using sanitary-type, one-part, mildew-resistant, silicone sealant. Match sealant color to fixture color. Refer to Division 7 Section "Joint Sealants" for sealant and installation requirements.

3.3 CONNECTIONS

- A. Piping installation requirements are specified in other Division 15 Sections. Drawings indicate general arrangement of piping, fittings, and specialties.
- B. Connect water supplies from water distribution piping to fixtures.
- C. Connect drain piping from fixtures to drainage piping.
- D. Supply and Waste Connections to Plumbing Fixtures: Connect fixtures with water supplies, stops, risers, traps, and waste piping. Use size fittings required to match fixtures. Connect to plumbing piping.
- E. Supply and Waste Connections to Fixtures and Equipment Specified in Other Sections: Connect fixtures and equipment with water supplies, stops, risers, traps, and waste piping specified. Use size fittings required to match fixtures and equipment. Connect to plumbing piping.
- F. Ground equipment.
 - 1. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A and UL 486B.

3.4 FIELD QUALITY CONTROL

- A. Verify that installed fixtures are categories and types specified for locations where installed.
- B. Check that fixtures are complete with trim, faucets, fittings, and other specified components.
- C. Inspect installed fixtures for damage. Replace damaged fixtures and components.
- D. Test installed fixtures after water systems are pressurized for proper operation. Replace malfunctioning fixtures and components, then retest. Repeat procedure until units operate properly.

3.5 ADJUSTING

- A. Operate and adjust faucets and controls. Replace damaged and malfunctioning fixtures, fittings, and controls.
- B. Adjust water pressure at faucets, shower valves, and flushometer valves to produce proper flow and stream.
- C. Replace washers and seals of leaking and dripping faucets and stops.

3.6 CLEANING

- A. Clean fixtures, faucets, and other fittings with manufacturers' recommended cleaning methods and materials. Do the following:
 - 1. Remove faucet spouts and strainers, remove sediment and debris, and reinstall strainers and spouts.
 - 2. Remove sediment and debris from drains.

3.7 PROTECTION

- A. Provide protective covering for installed fixtures and fittings.
- B. Do not allow use of fixtures for temporary facilities unless approved in writing by Owner.

END OF SECTION

SECTION 224713

ELECTRIC DRINKING FOUNTAINS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Drinking fountains.
 - 2. Self-contained water coolers.
 - 3. Fixture supports.

1.3 DEFINITIONS

- A. Accessible Drinking Fountain and Water Cooler: Fixture that can be approached and used by people with disabilities.
- B. Drinking Fountain: Fixture with nozzle for delivering stream of water for drinking.
- C. Fitting: Device that controls flow of water into or out of fixture.
- D. Fixture: Drinking fountain or water cooler, unless one is specifically indicated.
- E. Water Cooler: Electrically powered fixture for generating and delivering cooled drinking water.

1.4 SUBMITTALS

- A. Product Data: Include rated capacities; shipping, installed, and operating weights; furnished specialties; and accessories for each type of fixture indicated.
- B. Shop Drawings: Diagram power, signal, and control wiring and differentiate between manufacturer-installed and field-installed wiring.
- C. Maintenance Data: For fixtures to include in maintenance manuals specified in Division.

1.5 QUALITY ASSURANCE

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

- B. Regulatory Requirements: Comply with requirements in ICC A117.1, "Accessible and Usable Buildings and Facilities" about fixtures for people with disabilities.
- C. NSF Standard: Comply with NSF 61, "Drinking Water System Components--Health Effects," for fixture materials that will be in contact with potable water.
- D. ARI Standard: Comply with ARI 1010, "Self-Contained, Mechanically Refrigerated Drinking-Water Coolers," for water coolers and with ARI's "Directory of Certified Drinking Water Coolers" for type and style classifications.
- E. TAS: Texas Accessibility Standards.

1.6 COORDINATION

- A. Coordinate roughing-in and final fixture locations, and verify that fixtures can be installed to comply with original design and referenced standards.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by the manufacturers specified below.
 - 1. Elkay.
 - 2. Halsey Taylor.
 - 3. Haws Corporation.

2.2 DRINKING FOUNTAINS

- A. Drinking Fountains,: Accessible, Style W, wall-hanging fixture made of stainless steel.
 - 1. Receptor Shape: Rectangular.
 - 2. Back Panel: Stainless-steel wall plate behind drinking fountain.
 - 3. Bubblers: Two, with automatic stream regulator, located on deck.
 - 4. Control: Push button.
 - 5. Supply: NPS 3/8 (DN 10) with ball, gate, or globe valve.
 - 6. Drain: Grid with NPS 1-1/4 (DN 32) minimum horizontal waste and trap complying with ASME Standards.
 - 7. Support: Type I, water-cooler carrier. Refer to "Fixture Supports" Article.

2.3 SELF-CONTAINED WATER COOLERS

- A. Water Coolers: Accessible, ARI 1010, Type PB, pressure with bubbler, Style W, wall-hanging fixture.
 - 1. Cabinet: Bilevel with two attached cabinets, enameled steel with stainless-steel top.
 - 2. Bubbler: One, with automatic stream regulator, located on each cabinet deck.
 - 3. Control: Push button.
 - 4. Supply: NPS 3/8 (DN 10) with ball, gate, or globe valve and filter.

5. Drain: Grid with NPS 1-1/4 (DN 32) minimum horizontal waste and trap complying with ASME Standards.
6. Cooling System: Electric, with hermetically sealed compressor, cooling coil, air-cooled condensing unit, corrosion-resistant tubing, refrigerant, corrosion-resistant-metal storage tank, and adjustable thermostat.
 - a. Capacity: 8 gph (0.0084 L/s) of 50 deg F (10 deg C) cooled water from 80 deg F (27 deg C) inlet water and 90 deg F (32 deg C) ambient air temperature.
 - b. Electrical Characteristics: 1/5 hp; 120-V ac; single phase; 60 Hz.
7. Support: Type II, water-cooler carrier. Refer to "Fixture Supports" Article.

2.4 FIXTURE SUPPORTS

- A. Off-Floor, Plumbing Fixture Supports: ASME A112.6.1M, water-cooler carriers. Include vertical, steel uprights with feet and tie rods and bearing plates with mounting studs matching fixture to be supported.
 1. Available Manufacturers:
 2. Manufacturers:
 - a. Josam Co.
 - b. Smith, Jay R. Mfg. Co.
 - c. Tyler Pipe; Wade Div.
 - d. Zurn Specifications Drainage Operation.
 3. Type I: Hanger-type carrier with two vertical uprights.
 4. Type II: Bilevel, hanger-type carrier with three vertical uprights.
 5. Supports for Accessible Fixtures: Include rectangular, vertical, steel uprights instead of steel pipe uprights.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine roughing-in for water and waste piping systems to verify actual locations of piping connections before fixture installation. Verify that sizes and locations of piping and types of supports match those indicated.
- B. Examine walls and floors for suitable conditions where fixtures are to be installed.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 APPLICATIONS

- A. Use carrier off-floor supports for wall-hanging fixtures, unless otherwise indicated.
- B. Use chrome-plated brass or copper tube, fittings, and valves in locations exposed to view. Plain copper tube, fittings, and valves may be used in concealed locations.

3.3 INSTALLATION

- A. Install off-floor supports affixed to building substrate and attach wall-hanging fixtures, unless otherwise indicated.
- B. Install mounting frames affixed to building construction and attach recessed water coolers to mounting frames, unless otherwise indicated.
- C. Install fixtures level and plumb.
- D. Install water-supply piping with shutoff valve on supply to each fixture to be connected to water distribution piping. Use ball, gate, or globe valve. Install valves in locations where they can be easily reached for operation. Refer to Division Section "Valves" for general-duty valves.
- E. Install trap and waste piping on drain outlet of each fixture to be connected to sanitary drainage system.
- F. Install pipe escutcheons at wall penetrations in exposed, finished locations. Use deep-pattern escutcheons where required to conceal protruding pipe fittings. Refer to Division Section "Basic Mechanical Materials and Methods" for escutcheons.
- G. Seal joints between fixtures and walls and floors using sanitary-type, one-part, mildew-resistant, silicone sealant. Match sealant color to fixture color. Refer to Division for sealant and installation requirements.

3.4 CONNECTIONS

- A. Piping installation requirements are specified in other Division Sections. Drawings indicate general arrangement of piping, fittings, and specialties.
- B. Connect water supplies from water distribution piping to fixtures.
- C. Connect drain piping from fixtures to drainage piping.
- D. Ground equipment.
 - 1. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A and UL 486B.

END OF SECTION

SECTION 230100

SUMMARY OF MECHANICAL WORK

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions

1.2 WORK COVERED BY CONTRACT DOCUMENTS

- A. The following Summary of Work is intended as an aid to achieve an understanding of the various elements of work included in the project, as is not intended to be all-inclusive. Detailed descriptions of work and requirements are given in drawings and specifications.

- B. Mechanical Contract Documents were prepared for the Project by:

Trinity MEP Engineering, LLC
3533 Moreland Dr. Ste. A
Weslaco, Texas 78596
Phone Number: (956) 973-0500
Contact Person: Leonardo Munoz, P.E.

- C. General Scope of Work:

1. Install AC equipment and ductwork as shown on the contract documents. Refer to drawings for schedule of equipment that will be installed. After installing equipment, connect power to unit.
2. HVAC: Provide all materials and labor associated with a complete operational installation of new HVAC systems including, but not limited to:
 - DX Split System A/C Units
 - Exhaust fans
 - Sheet metal, Ductwork
 - Diffusers and Grilles
 - Duct accessories, including grilles, and louvers
 - Air Test and Balance

1.3 COORDINATION

- A. All mechanical work shall be done under sub-contract to a General Contractor. Mechanical Contractor shall coordinate all work through General Contractor, even in areas where only mechanical work is to take place.
- B. Coordination between all trades shall take place on a regular basis to avoid conflicts between disciplines and equipment clearances.
- C. Work shall take place with minimal disruption to Owner's operations in areas surrounding the new building.
- D. Cooperate fully with other contractors so that work under those contracts may be carried out smoothly, without interfering with or delaying work under this Contract.
- E. Fully coordinate with electrical contractor for providing power to mechanical equipment.
- F. Mechanical Contractor is responsible for all control wiring including thermostat(s). This includes all conduit, wire, and accessories both low voltage and source voltage for the controls' system. Mechanical

Contractor will provide all the necessary actuators, relays, software, hardware, and all necessary accessories required for a fully functional controls' system.

1.4 UTILITIES

1. Coordinate with power, water, telephone, cable and gas utilities to locate all utilities prior to digging in any area.
2. Obtain any approvals required from utilities to relocate utilities.
3. Cost of relocating or bypassing utilities indicated on drawings shall be included in Base Bid.

1.5 CONTRACTOR USE OF PREMISES

- A. Use of the Site: Limit use of the premises to work in areas indicated. Confine operations to areas within contract limits indicated. Do not disturb portions of the site beyond the areas in which the Work is indicated.
1. Owner Occupancy: Allow for Owner occupancy and use by the public.
 2. Driveways and Entrances: Keep driveways and entrances serving the premises, clear and available to the Owner, the Owner's employees, and emergency vehicles at all time. Do not use these areas for parking or storage of materials. Schedule deliveries to minimize space and time requirements for storage of materials and equipment on-site.
- B. Site Safety: Take every precaution to ensure the site does not present a threat to the safety of occupants and/or workers. Minimal safety requirements include, but are not limited to the following:
1. Temporary fencing around construction areas.
 2. Yellow caution tape and construction barricades along open trenches during the day. Trenches shall be covered at night and warning lights provided on construction barricades.
 3. Temporary fencing around equipment while site work is in progress.

1.6 SUBMITTALS

1. To expedite the submittal process more efficiently, DO NOT piece-meal the submittals. Submit entire mechanical or plumbing in a bound enclosure. This will eliminate delays in the submittal process.

END OF SECTION

SECTION 230510

BASIC MECHANICAL MATERIALS AND METHODS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

1.2 SUMMARY

- A. This Section includes the following basic mechanical materials and methods to complement other Sections.

1. Piping materials and installation instructions common to most piping systems.
2. Concrete base construction requirements.
3. Escutcheons.
4. Dielectric fittings.
5. Flexible connectors.
6. Mechanical sleeve seals.
7. Equipment nameplate data requirements.
8. Nonshrink grout for equipment installations.
9. Field-fabricated metal and wood equipment supports.
10. Installation requirements common to equipment specification sections.
11. Cutting and patching.
12. Touchup painting and finishing.

1.3 DEFINITIONS

- A. Finished Spaces: Spaces other than mechanical and electrical equipment rooms, furred spaces, pipe and duct shafts, unheated spaces immediately below roof, spaces above ceilings, unexcavated spaces, crawl spaces, and tunnels.
- B. Exposed, Interior Installations: Exposed to view indoors. Examples include finished occupied spaces and mechanical equipment rooms.
- C. Exposed, Exterior Installations: Exposed to view outdoors, or subject to outdoor ambient temperatures and weather conditions. Examples include rooftop locations.
- D. Concealed, Interior Installations: Concealed from view and protected from physical contact by building occupants. Examples include above ceilings and in duct shafts.
- E. Concealed, Exterior Installations: Concealed from view and protected from weather conditions and physical contact by building occupants, but subject to outdoor ambient temperatures. Examples include installations within unheated shelters.
- F. The following are industry abbreviations for plastic materials:
1. PVC: Polyvinyl chloride plastic.
- G. The following are industry abbreviations for rubber materials:
1. EPDM: Ethylene propylene diene terpolymer rubber.

1.4 SUBMITTALS

- A. Product Data: For dielectric fittings, flexible connectors, mechanical sleeve seals, and identification materials and devices.
- B. Coordination Drawings: Detail major elements, components, and systems of mechanical equipment and materials in relationship with other systems, installations, and building components. Show space requirements for installation and access. Indicate if sequence and coordination of installations are important to efficient flow of the Work. Include the following:
 - 1. Planned piping layout, including valve and specialty locations and valve-stem movement.
 - 2. Clearances for servicing and maintaining equipment, accessories, and specialties, including space for disassembly required for periodic maintenance.
 - 3. Sizes and location of required concrete pads and bases.
 - 4. Floor plans, elevations, and details to indicate penetrations in floors, walls, and ceilings and their relationship to other penetrations and installations.
 - 5. Reflected ceiling plans to coordinate and integrate installation of air outlets and inlets, light fixtures, communication system components, sprinklers, and other ceiling-mounted items.

1.5 QUALITY ASSURANCE

- A. Comply with ASME A13.1 for lettering size, length of color field, colors, and viewing angles of identification devices.
- B. Equipment Selection: Equipment of higher electrical characteristics, physical dimensions, capacities, and ratings may be furnished provided such proposed equipment is approved in writing and connecting mechanical and electrical services, circuit breakers, conduit, motors, bases, and equipment spaces are increased. Additional costs shall be approved in advance by appropriate Contract Modification for these increases. If minimum energy ratings or efficiencies of equipment are specified, equipment must meet design and commissioning requirements.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver pipes and tubes with factory-applied end caps. Maintain end caps through shipping, storage, and handling to prevent pipe end damage and prevent entrance of dirt, debris, and moisture.
- B. Protect stored pipes, ductwork, equipment, and tubes from moisture and dirt. Elevate above grade. Do not exceed structural capacity of floor, if stored inside.
- C. Protect flanges, fittings, and piping specialties from moisture and dirt.
- D. Store plastic pipes protected from direct sunlight. Support to prevent sagging and bending.

1.7 SEQUENCING AND SCHEDULING

- A. Coordinate mechanical equipment installation with other building components.
- B. Arrange for pipe spaces, chases, slots, and openings in building structure during progress of construction to allow for mechanical installations.
- C. Coordinate installation of required supporting devices and set sleeves in poured-in-place concrete and other structural components, as they are constructed.

- D. Sequence, coordinate, and integrate installations of mechanical materials and equipment for efficient flow of the Work. Coordinate installation of large equipment requiring positioning before closing in building.
- E. Coordinate connection of mechanical systems with exterior underground and overhead utilities and services. Comply with requirements of governing regulations, franchised service companies, and controlling agencies.
- F. Coordinate requirements for access panels and doors if mechanical items requiring access are concealed behind finished surfaces. Access panels and doors are specified in architectural section.
- G. Coordinate installation of identifying devices after completing covering and painting, if devices are applied to surfaces. Install identifying devices before installing acoustical ceilings and similar concealment.

1.8 OPERATION PRIOR TO ACCEPTANCE

- A. When any equipment is operable, and it is to the advantage of the Contractor to operate the equipment, he may do so provided that he properly supervises the operation, and retains full responsibility for the equipment operated.
- B. Regardless of whether or not the equipment has or has not been operated, the Contractor shall clean the equipment properly, make required adjustments, and complete punch list items before final acceptance by the Owner.
- C. The date of acceptance by the Engineer, for beneficial use by the Owner, shall be the beginning date of the warranty period.

1.9 SPACE AND EQUIPMENT ARRANGEMENT

- A. The size of each item of mechanical equipment shown on the Drawings is based on the dimensions of a particular manufacturer as indicated. While other manufacturers may be acceptable, it shall be the responsibility of the Contractor to determine whether or not the equipment he proposes to furnish will fit into the space. Shop drawings shall be prepared when required by the engineer to indicate a suitable arrangement.
- B. Install equipment in a manner to permit access to all surfaces. Install valves, motors, drives, lubricating devices, filters, and other accessory items in a position to allow removal for service without requiring the disassembly of another part.
- C. Provide access panels acceptable to the Engineer for equipment that is concealed above ceiling space.
- D. Large equipment assemblies or components which will be installed in the building, and which are too large to permit access through doorways, stairways or shafts, shall be brought to the site and placed in the appropriate spaces before the enclosing structure is completed. Provisions shall be implemented by the Contractor to insure that the equipment will not be damaged in any way during the associated construction procedures.

1.10 START-UP OF EQUIPMENT AND SYSTEMS

- A. Whenever the manufacturer of a particular item of equipment or a particular system makes available a start-up service after completion of the installation, such manufacturer's start-up service (rendered by the manufacturer or his authorized representative) shall be provided.
- B. Witnessing and explanations of start-up services shall be included as part of the "Instruction of Owner's Personnel" as specified below.

1.11 INSTRUCTION OF OWNER'S PERSONNEL

- A. Provide the services of competent engineers or technicians acceptable to the Engineer to instruct representatives of the Owner in complete and detailed operation and maintenance of each item of equipment, and each system. These instructions shall be provided for whatever periods may be necessary to accomplish the desired results. Upon completion of these instructions, the Contractor shall obtain a letter of release, acknowledged by the Owner or his authorized representative, stating the dates on which the various kinds of instruction were given, and the personnel to whom the instructions were given.
- B. The Contractor shall be fully responsible for proper maintenance of equipment and systems until the instructions have been given to the Owner's personnel and the letter of release acknowledged.
- C. In providing the instructions to the Owner's personnel, the written operating and maintenance manuals shall be followed in all instances, and the Owner's personnel shall be familiarized with such manuals. Operating and maintenance manuals used for instructions shall include piping diagrams, valve identification charts, control and interlocking wiring diagrams, manufacturers' operation and maintenance manuals, parts lists (with sources identified), and other data as appropriate for each system, and as required elsewhere in the Specifications to be furnished to the Owner prior to final acceptance of the project.
- D. Provide the Owner with three (3) complete sets of all maintenance manuals, pamphlets, brochures or instructions. This material shall be catalogued, indexed and bound into books.

1.12 ACCEPTABLE MANUFACTURERS

- A. Provide equipment and materials from listed manufacturers listed within this specification. Deviations from this specification will not be acceptable. When one manufacturer is listed, alternate materials and equipment may be provided "equal to" the listed. When more than one manufacturer is listed, equipment and material must be provided by one of the listed manufacturers.

PART 2 - PRODUCTS

2.1 STANDARD PRODUCTS

- A. Each item of equipment furnished under this Division of the Specifications shall be essentially the standard product of the manufacturer. Where two or more units of the same kind or class of equipment are required, these shall be the products of a single manufacturer; however, the component parts of the equipment need not be the products of one manufacturer.
- B. Materials and equipment shall be of the base quality normally used in good commercial practice, and shall be the products of reputable domestic manufacturers unless otherwise specified. Each major component shall bear a nameplate giving the name and address of the manufacturer, and the catalog number or designation of the component.

2.2 QUALITY AND CLASSIFICATION OF MATERIALS

- A. Materials and equipment shall be new and of the quality specified, and shall be free from defects at the time of installation. Materials or equipment damaged in shipment or otherwise damaged prior to installation shall not be repaired at the job site, but shall be replaced with new materials or equipment identical with those damaged.

- B. Wherever a UL standard has been established for a particular type of material or equipment, each such material or equipment provided on this project shall meet the requirements of the UL standard in every way and shall be UL listed and labeled.

2.3 LOCAL PARTS AND SERVICE

- A. Each item of equipment furnished on this project shall have local representation, factory-authorized service, and an adequate stock of repair parts. "Local" shall be defined, for this purpose, as "within 50 miles of the project site."

2.4 FLAME SPREAD PROPERTIES OF MATERIALS

- A. Materials used for insulation, acoustical linings, adhesives, jackets and coatings, and combinations of these materials, shall each have a flame spread rating of 25 or less, and a smoke developed rating of 50 or less, as determined by an independent testing laboratory in accordance with NFPA-255.

2.5 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Dielectric Unions:
 - a. Watts Industries, Inc.; Water Products Div.
 - b. Zurn Industries, Inc.; Wilkins Div.
 - 2. Mechanical Sleeve Seals:
 - a. Calpico, Inc.
 - b. Metraflex Co.
 - c. Thunderline/Link-Seal.

2.6 MECHANICAL SLEEVE SEALS

- A. Description: Modular design, with interlocking rubber links shaped to continuously fill annular space between pipe and sleeve. Include connecting bolts and pressure plates.

2.7 PIPING SPECIALTIES

- A. Sleeves: The following materials are for wall, floor, slab, and roof penetrations:
 - 1. Steel Sheet Metal: 0.0239-inch minimum thickness, galvanized, round tube closed with welded longitudinal joint.
 - 2. Steel Pipe: ASTM A 53, Type E, Grade A, Schedule 40, galvanized, plain ends.
 - 3. Cast Iron: Cast or fabricated "wall pipe" equivalent to ductile-iron pressure pipe, with plain ends and integral waterstop, unless otherwise indicated.
 - 4. Stack Sleeve Fittings: Manufactured, cast-iron sleeve with integral clamping flange. Include clamping ring and bolts and nuts for membrane flashing.
 - a. Underdeck Clamp: Clamping ring with set screws.

- B. Escutcheons: Manufactured wall, ceiling, and floor plates; deep-pattern type if required to conceal protruding fittings and sleeves.
 - 1. ID: Closely fit around pipe, tube, and insulation of insulated piping.
 - 2. OD: Completely cover opening.
 - 3. Cast Brass: One piece, with set screw.
 - a. Finish: Rough brass.
 - b. Finish: Polished chrome-plate.
 - 4. Cast-Iron Floor Plate: One-piece casting.

2.8 GROUT

- A. Nonshrink, Nonmetallic Grout: ASTM C 1107, Grade B.
 - 1. Characteristics: Post-hardening, volume-adjusting, dry, hydraulic-cement grout, nonstaining, noncorrosive, nongaseous, and recommended for interior and exterior applications.
 - 2. Design Mix: 5000-psi, 28-day compressive strength.
 - 3. Packaging: Premixed and factory packaged.

PART 3 - EXECUTION

3.1 PIPING SYSTEMS - COMMON REQUIREMENTS

- A. General: Install piping as described below, unless piping Sections specify otherwise. Individual Sections specify unique piping installation requirements.
- B. General Locations and Arrangements: Drawing plans, schematics, and diagrams indicate general location and arrangement of piping systems. Indicated locations and arrangements were used to size pipe and calculate friction loss, expansion, pump sizing, and other design considerations. Install piping as indicated, unless deviations to layout are approved on Coordination Drawings.
- C. Install piping at indicated slope.
- D. Install components with pressure rating equal to or greater than system operating pressure.
- E. Install piping in concealed interior and exterior locations, except in equipment rooms and service areas.
- F. Install piping free of sags and bends.
- G. Install exposed interior and exterior piping at right angles or parallel to building walls. Diagonal runs are prohibited, unless otherwise indicated.
- H. Install piping tight to slabs, beams, joists, columns, walls, and other building elements. Allow sufficient space above removable ceiling panels to allow for ceiling panel removal.
- I. Install piping to allow application of insulation plus 1-inch clearance around insulation.
- J. Locate groups of pipes parallel to each other, spaced to permit valve servicing.
- K. Install fittings for changes in direction and branch connections.

- L. Install couplings according to manufacturer's written instructions.
- M. Install pipe escutcheons for pipe penetrations of concrete and masonry walls, wall board partitions, and suspended ceilings according to the following:
1. Chrome-Plated Piping: Cast brass, one piece, with set screw, and polished chrome-plated finish.
 2. Uninsulated Piping Wall Escutcheons: Cast brass or stamped steel, with set screw.
 3. Uninsulated Piping Floor Plates in Utility Areas: Cast-iron floor plates.
 4. Insulated Piping: Cast brass or stamped steel; with concealed hinge, spring clips, and chrome-plated finish.
 5. Piping in Utility Areas: Cast brass or stamped steel, with set-screw or spring clips.
- N. Sleeves are not required for core drilled holes.
- O. Install sleeves for pipes passing through concrete and masonry walls, and concrete floor and roof slabs.
- P. Install sleeves for pipes passing through concrete and masonry walls, gypsum-board partitions, and concrete floor and roof slabs.
1. Cut sleeves to length for mounting flush with both surfaces.
 - a. Exception: Extend sleeves installed in floors of mechanical equipment areas or other wet areas 2 inches above finished floor level. Extend cast-iron sleeve fittings below floor slab as required to secure clamping ring if ring is specified.
 2. Build sleeves into new walls and slabs as work progresses.
 3. Install sleeves large enough to provide 1/4-inch annular clear space between sleeve and pipe or pipe insulation. Use the following sleeve materials: Steel Pipe Sleeves: For pipes smaller than 6-inch NPS.
 - b. Steel, Sheet-Metal Sleeves: For pipes 6-inch NPS and larger, penetrating gypsum-board partitions.
 4. Except for underground wall penetrations, seal annular space between sleeve and pipe or pipe insulation, using elastomeric joint sealants.
 5. Use Type S, Grade NS, Class 25, Use O, neutral-curing silicone sealant, unless otherwise indicated.
- Q. Aboveground, Exterior-Wall, Pipe Penetrations: Seal penetrations using sleeves and mechanical sleeve seals. Size sleeve for 1-inch annular clear space between pipe or pipe insulation and sleeve for installing mechanical sleeve seals.
1. Install steel pipe for sleeves smaller than 6 inches in diameter.
 2. Install cast-iron "wall pipes" for sleeves 6 inches in diameter and larger.
 3. Assemble and install mechanical sleeve seals according to manufacturer's written instructions. Tighten bolts that cause rubber sealing elements to expand and make watertight seal.
- R. Underground, Exterior-Wall, Pipe Penetrations: Install cast-iron "wall pipes" for sleeves. Seal pipe penetrations using mechanical sleeve seals. Size sleeve for 1-inch annular clear space between pipe and sleeve for installing mechanical sleeve seals.
1. Assemble and install mechanical sleeve seals according to manufacturer's written instructions. Tighten bolts that cause rubber sealing elements to expand and make watertight seal.
- S. Fire-Barrier Penetrations: Maintain indicated fire rating of walls, partitions, ceilings, and floors at pipe penetrations. Seal pipe penetrations with firestopping materials.

- T. Verify final equipment locations for roughing-in.
- U. Refer to equipment specifications in other Sections of these Specifications for roughing-in requirements.
- V. Piping Joint Construction: Join pipe and fittings as follows and as specifically required in individual piping specification Sections:
1. Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.
 2. Remove scale, slag, dirt, and debris from inside and outside of pipe and fittings before assembly.
 3. Soldered Joints: Construct joints according to AWS's "Soldering Manual," Chapter "The Soldering of Pipe and Tube"; or CDA's "Copper Tube Handbook."
 4. Brazed Joints: Construct joints according to AWS's "Brazing Handbook," Chapter "Pipe and Tube."
 5. Threaded Joints: Thread pipe with tapered pipe threads according to ASME B1.20.1. Cut threads full and clean using sharp dies. Ream threaded pipe ends to remove burrs and restore full ID. Join pipe fittings and valves as follows:
 - a. Note internal length of threads in fittings or valve ends, and proximity of internal seat or wall, to determine how far pipe should be threaded into joint.
 - b. Apply appropriate tape or thread compound to external pipe threads, unless dry seal threading is specified.
 - c. Align threads at point of assembly.
 - d. Tighten joint with wrench. Apply wrench to valve end into which pipe is being threaded.
 - e. Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged. Do not use pipe sections that have cracked or open welds.
 6. Welded Joints: Construct joints according to AWS D10.12, "Recommended Practices and Procedures for Welding Low Carbon Steel Pipe," using qualified processes and welding operators according to "Quality Assurance" Article.
 7. Flanged Joints: Align flange surfaces parallel. Select appropriate gasket material, size, type, and thickness for service application. Install gasket concentrically positioned. Assemble joints by sequencing bolt tightening to make initial contact of flanges and gaskets as flat and parallel as possible. Use suitable lubricants on bolt threads. Tighten bolts gradually and uniformly using torque wrench.
 8. Plastic Piping Solvent-Cement Joints: Clean and dry joining surfaces by wiping with clean cloth or paper towels. Join pipe and fittings according to the following:
 - a. Comply with ASTM F 402 for safe-handling practice of cleaners, primers, and solvent cements.
 - b. PVC Nonpressure Piping: ASTM D 2855.
 - c. PVC to ABS Nonpressure Transition Fittings: Procedure and solvent cement according to ASTM D 3138.
 9. Plastic Piping Heat-Fusion Joints: Clean and dry joining surfaces by wiping with clean cloth or paper towels. Join according to ASTM D 2657 procedures and manufacturer's written instructions.
 - a. Plain-End Pipe and Fittings: Use butt fusion.
 - b. Plain-End Pipe and Socket Fittings: Use socket fusion.
- W. Piping Connections: Make connections according to the following, unless otherwise indicated:
1. Install unions, in piping 2-inch NPS and smaller, adjacent to each valve and at final connection to each piece of equipment with 2-inch NPS or smaller threaded pipe connection.

2. Install flanges, in piping 2-1/2-inch NPS and larger, adjacent to flanged valves and at final connection to each piece of equipment with flanged pipe connection.
3. Dry Piping Systems: Install dielectric unions and flanges to connect piping materials of dissimilar metals.
4. Wet Piping Systems: Install dielectric coupling and nipple fittings to connect piping materials of dissimilar metals.

3.2 EQUIPMENT AND MATERIAL INSTALLATION - COMMON REQUIREMENTS

- A. Install equipment and material to provide maximum possible headroom, if mounting heights are not indicated.
- B. Install equipment according to approved submittal data. Portions of the Work are shown only in diagrammatic form. Refer conflicts to Architect.
- C. Install equipment level and plumb, parallel and perpendicular to other building systems and components in exposed interior spaces, unless otherwise indicated.
- D. Install mechanical equipment to facilitate service, maintenance, and repair or replacement of components. Connect equipment for ease of disconnecting, with minimum interference to other installations. Extend grease fittings to accessible locations.
- E. Install equipment and ductwork giving right of way to piping installed at required slope.
- F. Install flexible connectors on equipment side of shutoff valves, horizontally and parallel to equipment shafts if possible.

3.3 PAINTING AND FINISHING

- A. Refer to paint materials, surface preparation, and application of paint.
- B. Do not paint piping specialties with factory-applied finish.
- C. Damage and Touchup: Repair marred and damaged factory-painted finishes with materials and procedures to match original factory finish.

3.4 CONCRETE BASES

- A. Construct concrete bases of dimensions indicated, but not less than 4 inches larger in both directions than supported unit. Follow supported equipment manufacturer's setting templates for anchor bolt and tie locations. Use 3000-psi, 28-day compressive-strength concrete and reinforcement or as specified.

3.5 ERECTION OF METAL SUPPORTS AND ANCHORAGE

- A. Cut, fit, and place miscellaneous metal supports accurately in location, alignment, and elevation to support and anchor mechanical materials and equipment.
- B. Field Welding: Comply with AWS D1.1, "Structural Welding Code--Steel."

3.6 CUTTING AND PATCHING

- A. Cut, channel, chase, and drill floors, walls, partitions, ceilings, and other surfaces necessary for mechanical installations. Perform cutting by skilled mechanics of trades involved.
- B. Repair cut surfaces to match adjacent surfaces.

3.7 GROUTING

- A. Install nonmetallic, nonshrink, grout for mechanical equipment base bearing surfaces, pump and other equipment base plates, and anchors. Mix grout according to manufacturer's written instructions.
- B. Clean surfaces that will come into contact with grout.
- C. Provide forms as required for placement of grout.
- D. Avoid air entrapment during placing of grout.
- E. Place grout, completely filling equipment bases.
- F. Place grout on concrete bases to provide smooth bearing surface for equipment.
- G. Place grout around anchors.
- H. Cure placed grout according to manufacturer's written instructions.

END OF SECTION

SECTION 220529HANGERS AND SUPPORTS

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes hangers and supports for mechanical system piping and equipment.

1.2 DEFINITIONS

- A. MSS: Manufacturers Standardization Society for the Valve and Fittings Industry.
- B. Terminology: As defined in MSS SP-90, "Guidelines on Terminology for Pipe Hangers and Supports."

1.3 PERFORMANCE REQUIREMENTS

- A. Design channel support systems for piping to support multiple pipes capable of supporting combined weight of supported systems, system contents, and test water.
- B. Design heavy-duty steel trapezes for piping to support multiple pipes capable of supporting combined weight of supported systems, system contents, and test water.

1.4 SUBMITTALS

- A. Product Data: For each type of pipe hanger, channel support system component, and thermal-hanger shield insert indicated.
- B. Shop Drawings: Signed and sealed by a qualified professional engineer for multiple piping supports and trapeze hangers. Include design calculations and indicate size and characteristics of components and fabrication details.

1.5 QUALITY ASSURANCE

- A. Engineering Responsibility: Design and preparation of Shop Drawings and calculations for each multiple pipe support and trapeze by a qualified professional engineer.
 - 1. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of hangers and supports that are similar to those indicated for this Project in material, design, and extent.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Pipe Hangers:
 - a. Globe Pipe Hanger Products, Inc.
 - b. Grinnell Corp.
 - c. Michigan Hanger Co., Inc.

2.2 MANUFACTURED UNITS

A. Pipe Hangers, Supports, and Components: MSS SP-58, factory-fabricated components. Refer to "Hanger and Support Applications" Article in Part 3 for where to use specific hanger and support types.

1. Galvanized, Metallic Coatings: For piping and equipment that will not have field-applied finish.
2. Nonmetallic Coatings: On attachments for electrolytic protection where attachments are in direct contact with copper tubing.

B. Channel Support Systems: MFMA-2, factory-fabricated components for field assembly.

1. Coatings: Manufacturer's standard finish, unless bare metal surfaces are indicated.
Nonmetallic Coatings: On attachments for electrolytic protection where attachments are in direct contact with copper tubing.

2.3 MISCELLANEOUS MATERIALS

A. Mechanical-Anchor Fasteners: Insert-type attachments with pull-out and shear capacities appropriate for supported loads and building materials where used.

B. Structural Steel: ASTM A 36/A 36M, steel plates, shapes, and bars, black and galvanized.

PART 3 - EXECUTION

3.1 HANGER AND SUPPORT APPLICATIONS

A. Specific hanger requirements are specified in Sections specifying equipment and systems.

B. Comply with MSS SP-69 for pipe hanger selections and applications that are not specified in piping system Specification Sections.

C. Horizontal-Piping Hangers and Supports: Unless otherwise indicated and except as specified in piping system Specification Sections, install the following types:

1. Adjustable Steel Clevis Hangers (MSS Type 1): For suspension of noninsulated or insulated stationary pipes, NPS 1/2 to NPS 30.
2. Adjustable Swivel-Ring Band Hangers (MSS Type 10): For suspension of noninsulated stationary pipes, NPS 1/2 to NPS 2.
3. Extension Hinged Clamps (MSS Type 12): For suspension of noninsulated stationary pipes, NPS 3/8 to NPS 3.

- D. Vertical-Piping Clamps: Unless otherwise indicated and except as specified in piping system Specification Sections, install the following types:
1. Extension Pipe or Riser Clamps (MSS Type 8): For support of pipe risers, NPS 3/4 to NPS 20.
- E. Hanger-Rod Attachments: Unless otherwise indicated and except as specified in piping system Specification Sections, install the following types:
1. Steel Turnbuckles (MSS Type 13): For adjustment up to 6 inches for heavy loads.
 2. Swivel Turnbuckles (MSS Type 15): For use with MSS Type 11, split pipe rings.
 3. Malleable-Iron Sockets (MSS Type 16): For attaching hanger rods to various types of building attachments.
 4. Steel Weldless Eye Nuts (MSS Type 17): For 120 to 450 deg F piping installations.
- F. Building Attachments: Unless otherwise indicated and except as specified in piping system Specification Sections, install the following types:
1. Top-Beam C-Clamps (MSS Type 19): For use under roof installations with bar-joint construction to attach to top flange of structural shape.
 2. Side-Beam or Channel Clamps (MSS Type 20): For attaching to bottom flange of beams, channels, or angles.
 3. Center-Beam Clamps (MSS Type 21): For attaching to center of bottom flange of beams.
 4. C-Clamps (MSS Type 23): For structural shapes.
 5. Top-Beam Clamps (MSS Type 25): For top of beams if hanger rod is required tangent to flange edge.
 6. Steel-Beam Clamps with Eye Nuts (MSS Type 28): For attaching to bottom of steel I-beams for heavy loads.
 7. Linked-Steel Clamps with Eye Nuts (MSS Type 29): For attaching to bottom of steel I-beams for heavy loads, with link extensions.
 8. Malleable Beam Clamps with Extension Pieces (MSS Type 30): For attaching to structural steel.
- G. Saddles and Shields: Unless otherwise indicated and except as specified in piping system Specification Sections, install the following types:
1. Steel Pipe-Covering Protection Saddles (MSS Type 39): To fill interior voids with insulation that matches adjoining insulation.
 2. Protection Shields (MSS Type 40): Of length recommended by manufacturer to prevent crushing insulation.
- H. Spring Hangers and Supports: Unless otherwise indicated and except as specified in piping system Specification sections, install the following types:
1. Restraint-Control Devices (MSS Type 47): Where indicated to control piping movement.
 2. Spring Cushions (MSS Type 48): For light loads if vertical movement does not exceed 1-1/4 inches (32 mm).

3.2 HANGER AND SUPPORT INSTALLATION

- A. Pipe Hanger and Support Installation: Comply with MSS SP-69 and MSS SP-89. Install hangers, supports, clamps, and attachments as required to properly support piping from building structure.
- B. Channel Support System Installation: Arrange for grouping of parallel runs of piping and support together on field-assembled channel systems.

1. Field assemble and install according to manufacturer's written instructions.
- C. Heavy-Duty Steel Trapeze Installation: Arrange for grouping of parallel runs of horizontal piping and support together on field-fabricated, heavy-duty trapezes.
1. Pipes of Various Sizes: Support together and space trapezes for smallest pipe size or install intermediate supports for smaller diameter pipes as specified above for individual pipe hangers.
 2. Field fabricate from ASTM A 36/A 36M, steel shapes selected for loads being supported. Weld steel according to AWS D-1.1.
- D. Install building attachments within concrete slabs or attach to structural steel. Space attachments within maximum piping span length indicated in MSS SP-69. Install additional attachments at concentrated loads, including valves, flanges, guides, strainers, and expansion joints, and at changes in direction of piping. Install concrete inserts before concrete is placed; fasten inserts to forms and install reinforcing bars through openings at top of inserts.
- E. Install hangers and supports complete with necessary inserts, bolts, rods, nuts, washers, and other accessories.
- F. Install hangers and supports to allow controlled thermal and seismic movement of piping systems, to permit freedom of movement between pipe anchors, and to facilitate action of expansion joints, expansion loops, expansion bends, and similar units.
- G. Load Distribution: Install hangers and supports so that piping live and dead loads and stresses from movement will not be transmitted to connected equipment.
- H. Pipe Slopes: Install hangers and supports to provide indicated pipe slopes and so maximum pipe deflections allowed by ASME B31.9, "Building Services Piping," is not exceeded.
- I. Insulated Piping: Comply with the following:
1. Attach clamps and spacers to piping.
 - a. Piping Operating above Ambient Air Temperature: Clamp may project through insulation.
 - b. Piping Operating below Ambient Air Temperature: Use thermal-hanger shield insert with clamp sized to match OD of insert.
 - c. Do not exceed pipe stress limits according to ASME B31.9.
 2. Shield Dimensions for Pipe: Not less than the following:
 - a. NPS 1/4 to NPS 3-1/2: 12 inches long and 0.048 inch thick.
 - b. NPS 4: 12 inches long and 0.06 inch thick.
 - c. NPS 5 and NPS 6: 18 inches long and 0.06 inch thick.
 - d. NPS 8 to NPS 14: 24 inches long and 0.075 inch thick.
 - e. NPS 16 to NPS 24: 24 inches long and 0.105 inch thick.
 5. Pipes NPS 8 and Larger: Include wood inserts.
 6. Insert Material: Length at least as long as protective shield.

3.3 EQUIPMENT SUPPORTS

- A. Fabricate structural-steel stands to suspend equipment from structure above or to support equipment above floor.
- B. Grouting: Place grout under supports for equipment and make smooth bearing surface.

3.4 ADJUSTING

- A. Hanger Adjustment: Adjust hangers to distribute loads equally on attachments and to achieve indicated slope of pipe.

END OF SECTION

SECTION 230530

SUPPORTS AND ANCHORS

PART 1 - GENERAL

1.01 WORK INCLUDED

- A. Pipe, and equipment hangers, supports and associated anchors.
- B. Sleeves and seals.
- C. Flashing and sealing equipment and pipe stacks.

1.02 SUBMITTALS

- A. Submit shop drawings and product data under provisions of specification.
- B. Indicate hanger and support framing and attachment methods.

PART 2 - PRODUCTS

2.01 PIPE HANGERS AND SUPPORTS

- A. Hangers for Pipe Sizes 1/2 to 1-1/2 Inch Malleable iron, adjustable swivel, split ring.
- B. Hangers for Pipe Sizes 2 to 4 Inches Carbon steel, adjustable, clevis.
- C. Hangers for Pipe Sizes 6 Inches and Over: Adjustable steel yoke, cast iron roll, double hanger.
- D. Multiple or Trapeze Hangers: Steel channels with welded spacers and hanger rods; cast iron roll and stand for pipe sizes 6 inches and over.
- E. Wall Support for Pipe Sizes to 3 Inches: Cast iron hook.
- F. Wall Support for Pipe Sizes 4 Inches and over: adjustable steel yoke and cast iron roll.
- G. Vertical Support: Steel riser clamp.
- H. Floor Support for Pipe Sizes to 4 Inches: Cast iron adjustable pipe saddle, locknut nipple, floor flange, and concrete pier or steel support.
- I. Floor Support for Pipe Sizes 6 Inches and Over: Adjustable cast iron roll and stand, steel screws, and concrete pier or steel support.
- J. Roof Pipe Supports and Hangers: Galvanized Steel Channel System as manufactured by Portable Pipe Hangers, Inc. or approved equal.
 - For pipes 2-1/2" and smaller – Type PP10 with roller
 - For pipes 3" through 8" – Type PS
 - For multiple pipes – Type PSE - Custom
- K. Copper Pipe Support and Hangers: Electro-galvanized with thermoplastic elastomer cushions; Unistrut "Cush-A-Clamp" or equal. Hangers: Plastic coated; Unistrut or equal.
- L. For installation of protective shields refer to specification section 15140-3.03.
- M. Shields for Vertical Copper Pipe Risers: Sheet lead.
- N. Pipe Rough-In Supports in Walls/Chases: Provide preformed plastic pipe supports, Sioux Chief "Pipe Titan", Holdrite or equal.

2.02 HANGER RODS

- A. Galvanized Hanger Rods: Threaded both ends, threaded one end, or continuous threaded.

2.03 INSERTS

- A. Inserts: Malleable iron case of galvanized steel shell and expander plug for threaded connection with lateral adjustment, top slot for reinforcing rods, lugs for attaching to forms; size inserts to suit

threaded hanger rods.

2.04 FLASHING

- A. Metal Flashing: 20 gage galvanized steel.
- B. Lead Flashing: 4 lb. /sq. ft. sheet lead for waterproofing; 1 lb. /sq. ft. sheet lead for soundproofing.
- C. Caps: Steel, 20 gage minimum; 16 gage at fire resistant elements.

- D. Coordinate with roofing contractor/architect for type of flashing on metal roofs.

2.05 EQUIPMENT CURBS

- A. Fabricate curbs of hot dipped galvanized steel.

2.06 SLEEVES

- A. Sleeves for Pipes through Non-fire Rated Floors: Form with 18 gage galvanized steel, tack welded to form a uniform sleeve.
- B. Sleeves for Pipes through Non-fire Rated Beams, Walls, Footings, and Potentially Wet Floors: Form with steel pipe, schedule 40.
- C. Sleeves for Pipes through Fire Rated and Fire Resistive Floors and Walls, and Fireproofing: Prefabricated fire rated steel sleeves including seals, UL listed.
- D. Sleeves for Round Ductwork: Form with galvanized steel.
- E. Sleeves for Rectangular Ductwork: Form with galvanized steel.
- F. Fire Stopping Insulation: Glass fiber type, non-combustible, U.L. listed.
- G. Caulk: Paintable 25-year acrylic sealant.
- H. Pipe Alignment Guides: Factory fabricated, of cast semi-steel or heavy fabricated steel, consisting of bolted, two-section outer cylinder and base with two-section guiding spider that bolts tightly to pipe. Length of guides shall be as recommended by manufacturer to allow indicated travel.

2.07 FABRICATION

- A. Size sleeves large enough to allow for movement due to expansion and contraction. Provide for continuous insulation wrapping.
- B. Design hangers without disengagement of supported pipe.
- C. Design roof supports without roof penetrations, flashing or damage to the roofing material.

2.08 FINISH

- A. Prime coat exposed steel hangers and supports. Hangers and supports located in crawl spaces, pipe shafts, and suspended ceiling spaces are not considered exposed.

PART 3 - EXECUTION

3.01 INSERTS

- A. Provide inserts for suspending hangers from reinforced concrete slabs and sides of reinforced concrete beams. Coordinate with structural engineer for placement of inserts.
- B. Provide hooked rod to concrete reinforcement section for inserts carrying pipe over 4 inches.
- C. Where concrete slabs form finished ceiling, provide inserts to be flush with slab surface.
- D. Where inserts are omitted, drill through concrete slab from below and provide thru-bolt with recessed square steel plate and nut recessed into and grouted flush with slab. Verify with structural engineer prior to start of work.

3.02 PIPE HANGERS AND SUPPORTS

A. Support horizontal piping as follows:

<u>PIPE SIZE</u>	<u>MAX. HANGER SPACING</u>	<u>HANGER DIAMETER</u>
(Steel Pipe)		
1/2 to 1-1/4 inch	7'-0"	3/8"
1-1/2 to 3 inch	10'-0"	3/8"
4 to 6 inch	10'-0"	1/2"
8 to 10 inch	10'-0"	5/8"
12 to 14 inch	10'-0"	3/4"
15 inch and over	10'-0"	7/8"
(Copper Pipe)		
1/2 to 1-1/4 inch	5'-0"	3/8"
1-1/2 to 2-1/2 inch	8'-0"	3/8"
3 to 4 inch	10'-0"	3/8"
6 to 8 inch	10'-0"	1/2"
(Cast Iron)		
2 to 3 inch	5'-0"	3/8"
4 to 6 inch	10'-0"	1/2"
8 to 10 inch	10'-0"	5/8"
12 to 14 inch	10'-0"	3/4"
15 inch and over	10'-0"	7/8"
(PVC Pipe)		
1-1/2 to 4 inch	4'-0"	3/8"
6 to 8 inch	4'-0"	1/2"
10 and over	4'-0"	5/8"

- B. Install hangers to provide minimum 1/2 inch space between finished covering and adjacent work.
- C. Place a hanger within 12 inches of each horizontal elbow and at the vertical horizontal transition.
- D. Use hangers with 1-1/2 inch minimum vertical adjustment.
- E. Support horizontal cast iron pipe adjacent to each hub, with 5 feet maximum spacing between hangers.
- F. Support vertical piping at every floor. Support vertical cast iron pipe at each floor at hub.
- G. Where several pipes can be installed in parallel and at same elevation, provide multiple or trapeze hangers.
- H. Support riser piping independently of connected horizontal piping.
- I. Install hangers with nut at base and above hanger; tighten upper nut to hanger after final installation adjustments.
- J. Portable pipe hanger systems shall be installed per manufacturers' instructions.
- K. Distances between supports are maximum distance. Supports shall be provided to carry the pipe/equipment load.

3.03 Insulated Piping: Comply with the following installation requirements.

- A. Clamps: Attach galvanized clamps, including spacers (if any), to piping with clamps projecting through insulation; do not exceed pipe stresses allowed by ASME B31.9.
- B. Saddles: Install galvanized protection saddles MSS Type 39 where insulation without vapor barrier is indicated. Fill interior voids with segments of insulation that match adjoining pipe insulation.

- C. Shields: Install protective shields MSS Type 40 on cold and chilled water piping that has vapor barrier. Shields shall span an arc of 180 degrees and shall have dimensions in inches not less than the following:

- D. Piping 2" and larger provide galvanized sheet metal shields with calcium silicate at hangers/supports.
- E. Insert material shall be at least as long as the protective shield.
- F. Thermal Hanger Shields: Install where indicated, with insulation of same thickness as piping.

<u>NPS</u>	<u>LENGTH</u>	<u>THICKNESS</u>
1/4 THROUGH 3-1/2	12	0.048
4	12	0.060
5 & 6	18	0.060
8 THROUGH 14	24	0.075
16 THROUGH 24	24	0.105

3.04 EQUIPMENT BASES AND SUPPORTS

- A. Provide equipment bases of concrete.
- B. Provide templates, anchor bolts, and accessories for mounting and anchoring equipment.
- C. Construct support of steel members. Brace and fasten with flanges bolted to structure.
- D. Provide rigid anchors for pipes after vibration isolation components are installed.

3.05 FLASHING

- A. Provide flexible flashing and metal counter flashing where piping and ductwork penetrate weather or waterproofed walls, floors, and roofs.
- B. Flash vent and soil pipes projecting 8 inches minimum above finished roof surface with lead worked one inch minimum into hub, 8 inches minimum clear on sides with 24 x 24 inches sheet size. For pipes through outside walls, turn flanges back into wall and caulk, metal counter flash and seal.
- C. Flash floor drains in floors with topping over finished areas with lead, 10 inches clear on sides with minimum 36 x 36 inch sheet size. Fasten flashing to drain clamp device.
- D. Seal floor shower mop sink and all other drains watertight to adjacent materials.
- E. Provide curbs for mechanical roof installations 8 inches minimum high above roofing surface. Contact architect for all flashing details and roof construction. Seal penetrations watertight.

3.06 SLEEVES

- A. Set sleeves in position in formwork. Provide reinforcing around sleeves.
- B. Extend sleeves through floors minimum one inch above finished floor level. Caulk sleeves full depth with fire rated thermfiber and 3M caulking and provide floor plate.
- C. Where piping or ductwork penetrates floor, ceiling, or wall, close off space between pipe or duct and adjacent work with U.L. listed fire stopping insulation and caulk seal air tight. Provide close

- D. fitting metal collar or escutcheon covers at both sides of penetration.
Fire protection sleeves may be flush with floor of stairways.

END OF SECTION

SECTION 230593TESTING, ADJUSTING, AND BALANCING

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes testing, adjusting, and balancing HVAC systems to produce design objectives, including the following:
1. Balancing airflow within distribution systems, including submains, branches, and terminals, to indicated quantities according to specified tolerances.
 2. Adjusting total HVAC systems to provide indicated quantities.
 3. Measuring electrical performance of HVAC equipment.
 4. Setting quantitative performance of HVAC equipment.
 5. Verifying that automatic control devices are functioning properly.
 6. Reporting results of the activities and procedures specified in this Section.
- B. Related Sections include the following:
1. Testing and adjusting requirements unique to particular systems and equipment are included in the Sections that specify those systems and equipment.
 2. Field quality-control testing to verify that workmanship quality for system and equipment installation is specified in system and equipment Sections.

1.2 DEFINITIONS

- A. Adjust: To regulate fluid flow rate and air patterns at the terminal equipment, such as to reduce fan speed or adjust a damper.
- B. Balance: To proportion flows within the distribution system, including submains, branches, and terminals, according to design quantities.
- C. Draft: A current of air, when referring to localized effect caused by one or more factors of high air velocity, low ambient temperature, or direction of airflow, whereby more heat is withdrawn from a person's skin than is normally dissipated.
- D. Procedure: An approach to and execution of a sequence of work operations to yield repeatable results.
- E. Report Forms: Test data sheets for recording test data in logical order.
- F. Static Head: The pressure due to the weight of the fluid above the point of measurement. In a closed system, static head is equal on both sides of the pump.
- G. Suction Head: The height of fluid surface above the centerline of the pump on the suction side.
- H. System Effect: A phenomenon that can create undesired or unpredicted conditions that cause reduced capacities in all or part of a system.

- I. System Effect Factors: Allowances used to calculate a reduction of the performance ratings of a fan when installed under conditions different from those presented when the fan was performance tested.
- J. Terminal: A point where the controlled medium, such as fluid or energy, enters or leaves the distribution system.
- K. Test: A procedure to determine quantitative performance of a system or equipment.
- L. Testing, Adjusting, and Balancing Agent: The entity responsible for performing and reporting the testing, adjusting, and balancing procedures.
- M. AABC: Associated Air Balance Council.
- N. CTI: Cooling Tower Institute.
- O. NEBB: National Environmental Balancing Bureau.
- P. SMACNA: Sheet Metal and Air Conditioning Contractors' National Association.

1.3 SUBMITTALS

- A. Quality-Assurance Submittals: Within 30 days from the Contractor's Notice to Proceed, submit 2 copies of evidence that the testing, adjusting, and balancing Agent and this Project's testing, adjusting, and balancing team members meet the qualifications specified in the "Quality Assurance" Article below.
- B. Certified Testing, Adjusting, and Balancing Reports: Submit 2 copies of reports prepared, as specified in this Section, on approved forms certified by the testing, adjusting, and balancing Agent.
- C. Warranty: Submit 2 copies of special warranty specified in the "Warranty" Article below.

1.4 QUALITY ASSURANCE

- A. Agent Qualifications for larger projects: Engage a testing, adjusting, and balancing agent certified by AABC.
- B. Agent Qualifications for smaller projects: Engage a testing, adjusting, and balancing agent certified by NEBB.
- C. Certification of Testing, Adjusting, and Balancing Reports: Certify the testing, adjusting, and balancing field data reports. This certification includes the following:
 - 1. Review field data reports to validate accuracy of data and to prepare certified testing, adjusting, and balancing reports.
 - 2. Certify that the testing, adjusting, and balancing team complied with the approved testing, adjusting, and balancing plan and the procedures specified and referenced in this Specification.
- D. Testing, Adjusting, and Balancing Reports: Use standard forms from AABC's "National Standards for Testing, Adjusting, and Balancing."
- E. Testing, Adjusting, and Balancing Reports: Use standard forms from NEBB's "Procedural Standards for Testing, Adjusting, and Balancing of Environmental Systems."

- F. Instrumentation Type, Quantity, and Accuracy: As described in AABC national standards.
- G. Instrumentation Type, Quantity, and Accuracy: As described in NEBB's "Procedural Standards for Testing, Adjusting, and Balancing of Environmental Systems," Section II, "Required Instrumentation for NEBB Certification."
- H. Instrumentation Calibration: Calibrate instruments at least every 6 months or more frequently if required by the instrument manufacturer.

1.5 PROJECT CONDITIONS

- A. Partial Owner Occupancy: The Owner may occupy completed areas of the building before Substantial Completion. Cooperate with the Owner during testing, adjusting, and balancing operations to minimize conflicts with the Owner's operations.

1.6 COORDINATION

- A. Coordinate the efforts of factory-authorized service representatives for systems and equipment, HVAC controls installers, and other mechanics to operate HVAC systems and equipment to support and assist testing, adjusting, and balancing activities.
- B. Notice: Provide 7 days' advance notice for each test. Include scheduled test dates and times.
- C. Perform testing, adjusting, and balancing after leakage and pressure tests on air and water distribution systems have been satisfactorily completed.

1.7 WARRANTY

- A. General Warranty: The national project performance guarantee specified in this Article shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by the Contractor under requirements of the Contract Documents.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine Contract Documents to become familiar with project requirements and to discover conditions in systems' designs that may preclude proper testing, adjusting, and balancing of systems and equipment.
 - 1. Contract Documents are defined in the General and Supplementary Conditions of the Contract.
 - 2. Verify that balancing devices, such as test ports, gage cocks, thermometer wells, flow-control devices, balancing valves and fittings, and manual volume dampers, are required by the Contract Documents. Verify that quantities and locations of these balancing devices are accessible and appropriate for effective balancing and for efficient system and equipment operation.

- B. Examine approved submittal data of HVAC systems and equipment.
- C. Examine project record documents described in specifications.
- D. Examine Architect's and Engineer's design data, including HVAC system descriptions, statements of design assumptions for environmental conditions and systems' output, and statements of philosophies and assumptions about HVAC system and equipment controls.
- E. Examine equipment performance data, including fan and pump curves. Relate performance data to project conditions and requirements, including system effects that can create undesired or unpredicted conditions that cause reduced capacities in all or part of a system. Calculate system effect factors to reduce the performance ratings of HVAC equipment when installed under conditions different from those presented when the equipment was performance tested at the factory. To calculate system effects for air systems, use tables and charts found in AMCA 201, "Fans and Systems," Sections 7 through 10; or in SMACNA's "HVAC Systems--Duct Design," Sections 5 and 6. Compare this data with the design data and installed conditions.
- F. Examine system and equipment installations to verify that they are complete and that testing, cleaning, adjusting, and commissioning specified in individual Specification Sections have been performed.
- G. Examine system and equipment test reports.
- H. Examine HVAC system and equipment installations to verify that indicated balancing devices, such as test ports, gage cocks, thermometer wells, flow-control devices, balancing valves and fittings, and manual volume dampers, are properly installed, and their locations are accessible and appropriate for effective balancing and for efficient system and equipment operation.
- I. Examine systems for functional deficiencies that cannot be corrected by adjusting and balancing.
- J. Examine air-handling equipment to ensure clean filters have been installed, bearings are greased, belts are aligned and tight, and equipment with functioning controls is ready for operation.
- K. Examine terminal units, such as variable-air-volume boxes and mixing boxes, to verify that they are accessible and their controls are connected and functioning.
- L. Examine equipment for installation and for properly operating safety interlocks and controls.
- M. Examine automatic temperature system components to verify the following:
 - 1. Dampers, valves, and other controlled devices operate by the intended controller.
 - 2. Dampers and valves are in the position indicated by the controller.
 - 3. Integrity of valves and dampers for free and full operation and for tightness of fully closed and fully open positions. This includes dampers in multizone units, mixing boxes, and variable-air-volume terminals.
 - 4. Thermostats and humidistats are located to avoid adverse effects of sunlight, drafts, and cold walls.
 - 5. Sensors are located to sense only the intended conditions.
 - 6. Sequence of operation for control modes is according to the Contract Documents.
 - 7. Controller set points are set at design values. Observe and record system reactions to changes in conditions. Record default set points if different from design values.
 - 8. Interlocked systems are operating.
 - 9. Changeover from heating to cooling mode occurs according to design values.

- N. Report deficiencies discovered before and during performance of testing, adjusting, and balancing procedures.

3.2 PREPARATION

- A. Complete system readiness checks and prepare system readiness reports. Verify the following:
 1. Permanent electrical power wiring is complete.
 2. Automatic temperature-control systems are operational.
 3. Equipment and duct access doors are securely closed.
 4. Balance, fire dampers are open.
 5. Ceilings are installed in critical areas where air-pattern adjustments are required and access to balancing devices is provided.
 6. Windows and doors can be closed so design conditions for system operations can be met.

3.3 GENERAL TESTING AND BALANCING PROCEDURES

- A. Perform testing and balancing procedures on each system according to the procedures contained in AABC national standards and this Section.
- B. Perform testing and balancing procedures on each system according to the procedures contained in NEBB's "Procedural Standards for Testing, Adjusting, and Balancing of Environmental Systems" and this Section.
- C. Cut insulation, ducts, pipes, and equipment cabinets for installation of test probes to the minimum extent necessary to allow adequate performance of procedures. After testing and balancing, close probe holes and patch insulation with new materials identical to those removed. Restore vapor barrier and finish according to the insulation Specifications for this Project.
- D. Mark equipment settings with paint or other suitable, permanent identification material, including damper-control positions, valve indicators, fan-speed-control levers, and similar controls and devices, to show final settings.

3.4 FUNDAMENTAL AIR SYSTEMS' BALANCING PROCEDURES

- A. Prepare test reports for both fans and outlets. Obtain manufacturer's outlet factors and recommended testing procedures. Crosscheck the summation of required outlet volumes with required fan volumes.
- B. Prepare schematic diagrams of systems' "as-built" duct layouts.
- C. For variable-air-volume systems, develop a plan to simulate diversity.
- D. Check the airflow patterns from the outside-air louvers and dampers and the return- and exhaust-air dampers, through the supply-fan discharge and mixing dampers.
- E. Locate start-stop and disconnect switches, electrical interlocks, and motor starters.
- F. Verify that motor starters are equipped with properly sized thermal protection.
- G. Check dampers for proper position to achieve desired airflow path.

- H. Check for airflow blockages.
- I. Check condensate drains for proper connections and functioning.
- J. Check for proper sealing of air-handling unit components.

3.5 CONSTANT-VOLUME AIR SYSTEMS' BALANCING PROCEDURES

- A. The procedures in this Article apply to constant-volume supply-, return-, and exhaust-air systems.
- B. Adjust fans to deliver total design airflows within the maximum allowable rpm listed by the fan manufacturer.
 - 1. Measure fan static pressures to determine actual static pressure as follows:
 - a. Measure outlet static pressure as far downstream from the fan as practicable and upstream from restrictions in ducts such as elbows and transitions.
 - b. Measure static pressure directly at the fan outlet or through the flexible connection.
 - c. Measure inlet static pressure of single-inlet fans in the inlet duct as near the fan as possible, upstream from flexible connection and downstream from duct restrictions.
 - 2. Measure static pressure across each air-handling unit component.
 - a. Simulate dirty filter operation and record the point at which maintenance personnel must change filters.
 - 3. Compare design data with installed conditions to determine variations in design static pressures versus actual static pressures. Compare actual system effect factors with calculated system effect factors to identify where variations occur. Recommend corrective action to align design and actual conditions.
 - 4. Adjust fan speed higher or lower than design with the approval of the Architect. Make required adjustments to pulley sizes, motor sizes, and electrical connections to accommodate fan-speed changes.
 - 5. Do not make fan-speed adjustments that result in motor overload. Consult equipment manufacturers about fan-speed safety factors. Modulate dampers and measure fan-motor amperage to ensure no overload will occur. Measure amperage in full cooling, full heating, and economizer modes to determine the maximum required brake horsepower.
- C. Adjust volume dampers for main duct, submain ducts, and major branch ducts to design airflows within specified tolerances.
 - 1. Measure static pressure at a point downstream from the balancing damper and adjust volume dampers until the proper static pressure is achieved.
 - a. Where sufficient space in submains and branch ducts is unavailable for Pitot-tube traverse measurements, measure airflow at terminal outlets and inlets and calculate the total airflow for that zone.
 - 2. Remeasure each submain and branch duct after all have been adjusted. Continue to adjust submains and branch ducts to design airflows within specified tolerances.
- D. Measure terminal outlets and inlets without making adjustments.

1. Measure terminal outlets using a direct-reading hood or the outlet manufacturer's written instructions and calculating factors.
- E. Adjust terminal outlets and inlets for each space to design airflows within specified tolerances of design values. Make adjustments using volume dampers rather than extractors and the dampers at the air terminals.
1. Adjust each outlet in the same room or space to within specified tolerances of design quantities without generating noise levels above the limitations prescribed by the Contract Documents.
 2. Adjust patterns of adjustable outlets for proper distribution without drafts.

3.6 MOTORS

- A. Motors, 1/2 HP and Larger: Test at final balanced conditions and record the following data:
1. Manufacturer, model, and serial numbers.
 2. Motor horsepower rating.
 3. Motor rpm.
 4. Efficiency rating if high-efficiency motor.
 5. Nameplate and measured voltage, each phase.
 6. Nameplate and measured amperage, each phase.
 7. Starter thermal-protection-element rating.
- B. Motors Driven by Variable-Frequency Controllers: Test for proper operation at speeds varying from minimum to maximum. Test the manual bypass for the controller to prove proper operation. Record observations, including controller manufacturer, model and serial numbers, and nameplate data.

3.7 CONDENSING UNITS

- A. Verify proper rotation of fans and measure entering- and leaving-air temperatures. Record compressor data.

3.8 HEAT-TRANSFER COILS

- A. Electric-Heating Coils: Measure the following data for each coil:
1. Nameplate data.
 2. Airflow.
 3. Entering- and leaving-air temperatures at full load.
 4. Voltage and amperage input of each phase at full load and at each incremental stage.
 5. Calculated kW at full load.
 6. Fuse or circuit-breaker rating for overload protection.

3.9 TEMPERATURE TESTING

- A. During testing, adjusting, and balancing, report need for adjustment in temperature regulation within the automatic temperature-control system.
- B. Measure outside-air, wet- and dry-bulb temperatures.

3.10 TEMPERATURE-CONTROL VERIFICATION

- A. Verify that controllers are calibrated and commissioned.
- B. Check transmitter and controller locations and note conditions that would adversely affect control functions.
- C. Record controller settings and note variances between set points and actual measurements.
- D. Verify operation of limiting controllers (i.e., high- and low-temperature controllers).
- E. Verify free travel and proper operation of control devices such as damper and valve operators.
- F. Verify sequence of operation of control devices. Note air pressures and device positions and correlate with airflow and water-flow measurements. Note the speed of response to input changes.
- G. Confirm interaction of electrically operated switch transducers.
- H. Confirm interaction of interlock and lockout systems.
- I. Verify main control supply-air pressure and observe compressor and dryer operations.
- J. Record voltages of power supply and controller output. Determine if the system operates on a grounded or nongrounded power supply.
- K. Note operation of electric actuators using spring return for proper fail-safe operations.

3.11 TOLERANCES

- A. Set HVAC system airflow and water flow rates within the following tolerances:
 - 1. Supply and Exhaust Fans: Plus 5 to plus 10 percent.
 - 2. Air Outlets and Inlets: 0 to minus 10 percent.
 - 3. Cooling-Water Flow Rate: 0 to minus 5 percent.

3.12 FINAL REPORT

- A. General: Typewritten, or computer printout in letter-quality font, on standard bond paper, in 3-ring binder, tabulated and divided into sections by tested and balanced systems.
- B. Include a certification sheet in front of binder signed and sealed by the certified testing and balancing engineer.
 - 1. Include a list of the instruments used for procedures, along with proof of calibration.
- C. Final Report Contents: In addition to the certified field report data, include the following:
 - 1. Fan curves.
 - 2. Manufacturers' test data.
 - 3. Field test reports prepared by system and equipment installers.
 - 4. Other information relative to equipment performance, but do not include approved Shop Drawings and Product Data.

- D. General Report Data: In addition to the form titles and entries, include the following data in the final report, as applicable:
1. Title page.
 2. Name and address of testing, adjusting, and balancing Agent.
 3. Project name.
 4. Project location.
 5. Architect's name and address.
 6. Engineer's name and address.
 7. Contractor's name and address.
 8. Report date.
 9. Signature of testing, adjusting, and balancing Agent who certifies the report.
 10. Summary of contents, including the following:
 - a. Design versus final performance.
 - b. Notable characteristics of systems.
 - c. Description of system operation sequence if it varies from the Contract Documents.
 11. Nomenclature sheets for each item of equipment.
 12. Data for terminal units, including manufacturer, type size, and fittings.
 13. Notes to explain why certain final data in the body of reports vary from design values.
 14. Test conditions for fans and pump performance forms, including the following:
 - a. Settings for outside-, return-, and exhaust-air dampers.
 - b. Conditions of filters.
 - c. Cooling coil, wet- and dry-bulb conditions.
 - d. Face and bypass damper settings at coils.
 - e. Fan drive settings, including settings and percentage of maximum pitch diameter.
 - f. Settings for supply-air, static-pressure controller.
 - g. Other system operating conditions that affect performance.
- E. System Diagrams: Include schematic layouts of air and hydronic distribution systems. Present with single-line diagrams and include the following:
1. Quantities of outside, supply, return, and exhaust airflows.
 2. Water and steam flow rates.
 3. Duct, outlet, and inlet sizes.
 4. Pipe and valve sizes and locations.
 5. Terminal units.
 6. Balancing stations.
- F. Roof Top Unit Test Reports: For air-handling units with coils, include the following:
1. Unit Data: Include the following:
 - a. Unit identification.
 - b. Location.
 - c. Make and type.
 - d. Model number and unit size.
 - e. Manufacturer's serial number.
 - f. Unit arrangement and class.
 - g. Discharge arrangement.
 - h. Sheave make, size in inches (mm), and bore.
 - i. Number of belts, make, and size.
 - j. Number of filters, type, and size.

2. Motor Data: Include the following:
 - a. Make and frame type and size.
 - b. Horsepower and rpm.
 - c. Volts, phase, and hertz.
 - d. Full-load amperage and service factor.

3. Test Data: Include design and actual values for the following:
 - a. Total airflow rate in cfm (L/s).
 - b. Total system static pressure in inches wg (Pa).
 - c. Fan rpm.
 - d. Discharge static pressure in inches wg (Pa).
 - e. Preheat coil static-pressure differential in inches wg (Pa).
 - f. Cooling coil static-pressure differential in inches wg (Pa).
 - g. Heating coil static-pressure differential in inches wg (Pa).
 - h. Outside airflow in cfm (L/s).
 - i. Return airflow in cfm (L/s).
 - j. Outside-air damper position.
 - k. Return-air damper position.
 - l. Discharge air temperature

- G. Electric-Coil Test Reports: For electric duct coils, and electric coils installed in central-station air-handling units, include the following:
 1. Unit Data: Include the following:
 - a. System identification.
 - b. Location.
 - c. Coil identification.
 - d. Capacity in Btuh (kW).
 - e. Number of stages.
 - f. Connected volts, phase, and hertz.
 - g. Rated amperage.
 - h. Discharge air temperature

 2. Test Data: Include design and actual values for the following:
 - a. Heat output in Btuh (kW).
 - b. Airflow rate in cfm (L/s).
 - c. Air velocity in fpm (m/s).
 - d. Entering-air temperature in deg F (deg C).
 - e. Leaving-air temperature in deg F (deg C).
 - f. Voltage at each connection.
 - g. Amperage for each phase.

- H. Fan Test Reports: For exhaust fans, include the following:
 1. Fan Data: Include the following:
 - a. System identification.
 - b. Location.
 - c. Make and type.
 - d. Model number and size.

- e. Manufacturer's serial number.
 - f. Arrangement and class.
2. Motor Data: Include the following:
- a. Make and frame type and size.
 - b. Horsepower and rpm.
 - c. Volts, phase, and hertz.
 - d. Full-load amperage and service factor.
 - e. Number of belts, make, and size.
3. Test Data: Include design and actual values for the following:
- a. Total airflow rate in cfm (L/s).
 - b. Total system static pressure in inches wg (Pa).
 - c. Fan rpm.
 - d. Discharge static pressure in inches wg (Pa).
 - e. Suction static pressure in inches wg (Pa).
- I. Condenser Reports: For refrigerant side of unitary systems, stand-alone refrigerant compressors, air-cooled condensing units, include the following:
1. Unit Data: Include the following:
- a. Unit identification.
 - b. Location.
 - c. Unit make and model number.
 - d. Manufacturer's compressor serial numbers.
 - e. Compressor make.
 - f. Compressor model and serial numbers.
 - g. Refrigerant weight in lb (kg).
2. Test Data: Include design and actual values for the following:
- a. Entering-air, dry-bulb temperature in deg F (deg C).
 - b. Leaving-air, dry-bulb temperature in deg F (deg C).
 - c. Control settings.
 - d. Unloader set points.
 - e. Low-pressure-cutout set point in psig (kPa).
 - f. High-pressure-cutout set point in psig (kPa).
 - g. Suction pressure in psig (kPa).
 - h. Suction temperature in deg F (deg C).
 - i. Condenser refrigerant pressure in psig (kPa).
 - j. Condenser refrigerant temperature in deg F (deg C).
 - k. Oil pressure in psig (kPa).
 - l. Oil temperature in deg F (deg C).
 - m. Voltage at each connection.
 - n. Amperage for each phase.
 - o. The kW input.
 - p. Number of fans.

3.13 ADDITIONAL TESTS

- A. Within 90 days of completing testing, adjusting, and balancing, perform additional testing and balancing to verify that balanced conditions are being maintained throughout and to correct unusual conditions.

END OF SECTION

SECTION 230601

MECHANICAL IDENTIFICATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions.

1.2 SUMMARY

- A. This Section includes the following mechanical identification materials and their installation:
 - 1. Equipment nameplates.
 - 2. Equipment markers.
 - 3. Access panel and door markers.
 - 4. Pipe markers.
 - 5. Duct markers.
 - 6. Valve tags.

1.3 SUBMITTALS

- A. Product Data: For each type of product indicated.

1.4 COORDINATION

- A. Coordinate installation of identifying devices with completion of covering and painting of surfaces where devices are to be applied.
- B. Coordinate installation of identifying devices with location of access panels and doors.
- C. Install identifying devices before installing acoustical ceilings and similar concealment.

PART 2 - PRODUCTS

2.1 EQUIPMENT IDENTIFICATION DEVICES

- A. Equipment Nameplates: Metal, with data engraved or stamped, for permanent attachment on equipment.
 - 1. Data:
 - a. Manufacturer, product name, model number, and serial number.
 - b. Capacity, operating and power characteristics, and essential data.
 - c. Labels of tested compliances.

2. Location: Accessible and visible.
 3. Fasteners: As required to mount on equipment.
- B. Equipment Markers: Engraved, color-coded laminated plastic. Include contact-type, permanent adhesive.
1. Terminology: Match schedules as closely as possible.
 2. Data:
 - a. Name and plan number.
 - b. Equipment service.
 - c. Design capacity.
 - d. Other design parameters such as pressure drop, entering and leaving conditions, and speed.
 3. Size: 2-1/2 by 4 inches (64 by 100 mm) for control devices, dampers, and valves; 4-1/2 by 6 inches (115 by 150 mm) for equipment.
 4. Fasteners: Self-tapping, stainless-steel screws or contact-type, permanent adhesive.

2.2 PIPING IDENTIFICATION DEVICES

- A. Manufactured Pipe Markers, General: Preprinted, color-coded, with lettering indicating service, and showing direction of flow.
1. Colors: Comply with ASME A13.1, unless otherwise indicated.
 2. Lettering: Use piping system terms indicated and abbreviate only as necessary for each application length.
 3. Pipes with OD, Including Insulation, Less Than 6 Inches (150 mm): Full-band pipe markers extending 360 degrees around pipe at each location.
 4. Pipes with OD, Including Insulation, 6 Inches (150 mm) and Larger: Either full-band or strip-type pipe markers at least three times letter height and of length required for label.
 5. Arrows: Integral with piping system service lettering to accommodate both directions; or as separate unit on each pipe marker to indicate direction of flow.
- B. Pretensioned Pipe Markers: Precoiled semirigid plastic formed to cover full circumference of pipe and to attach to pipe without adhesive.
- C. Shaped Pipe Markers: Preformed semirigid plastic formed to partially cover circumference of pipe and to attach to pipe with mechanical fasteners that do not penetrate insulation vapor barrier.
- D. Self-Adhesive Pipe Markers: Plastic with pressure-sensitive, permanent-type, self-adhesive back.
- E. Plastic Tape: Continuously printed, vinyl tape at least 3 mils (0.08 mm) thick with pressure-sensitive, permanent-type, self-adhesive back.
1. Width for Markers on Pipes with OD, Including Insulation, Less Than 6 Inches (150 mm): 3/4 inch (19 mm) minimum.
 2. Width for Markers on Pipes with OD, Including Insulation, 6 Inches (150 mm) or Larger: 1-1/2 inches (38 mm) minimum.

2.3 DUCT IDENTIFICATION DEVICES

- A. Duct Markers: Engraved, color-coded laminated plastic. Include direction and quantity of airflow and duct service (such as supply, return, and exhaust). Include contact-type, permanent adhesive.

2.4 VALVE TAGS

- A. Valve Tags: Stamped or engraved with **1/4-inch (6.4-mm)** letters for piping system abbreviation and **1/2-inch (13-mm)** numbers, with numbering scheme [approved by Architect] <Insert other>. Provide **5/32-inch (4-mm)** hole for fastener.
 - 1. Material: **3/32-inch- (2.4-mm-)** thick laminated plastic with 2 black surfaces and white inner layer.
 - 2. Valve-Tag Fasteners: Brass wire-link or beaded chain; or S-hook.

PART 3 - EXECUTION

3.1 APPLICATIONS, GENERAL

- A. Products specified are for applications referenced in other Divisions. If more than single-type material, device, or label is specified for listed applications, selection is Installer's option.

3.2 EQUIPMENT IDENTIFICATION

- A. Install and permanently fasten equipment nameplates on each major item of mechanical equipment that does not have nameplate or has nameplate that is damaged or located where not easily visible. Locate nameplates where accessible and visible. Include nameplates for the following general categories of equipment:
 - 1. Pumps, compressors, chillers, condensers, and similar motor-driven units.
 - 2. Heat exchangers, coils, evaporators, and similar equipment.
 - 3. Fans, blowers, primary balancing dampers, and mixing boxes.
 - 4. Packaged HVAC central-station and zone-type units.
- B. Install equipment markers with permanent adhesive on or near each major item of mechanical equipment. Data required for markers may be included on signs, and markers may be omitted if both are indicated.
 - 1. Letter Size: Minimum **1/4 inch (6.4 mm)** for name of units if viewing distance is less than **24 inches (600 mm)**, **1/2 inch (13 mm)** for viewing distances up to **72 inches (1830 mm)**, and proportionately larger lettering for greater viewing distances. Include secondary lettering two-thirds to three-fourths the size of principal lettering.
 - 2. Data: Distinguish among multiple units, indicate operational requirements, indicate safety and emergency precautions, warn of hazards and improper operations, and identify units.
 - 3. Locate markers where accessible and visible. Include markers for the following general categories of equipment:
 - a. Main control and operating valves, including safety devices and hazardous units such as gas outlets.
 - b. Fire department hose valves and hose stations.
 - c. Meters, gages, thermometers, and similar units.
 - d. Pumps, compressors, chillers, condensers, and similar motor-driven units.
 - e. Heat exchangers, coils, evaporators, and similar equipment.
 - f. Fans, blowers, primary balancing dampers, and mixing boxes.

- g. Packaged HVAC central-station and zone-type units.
 - h. Strainers, filters, humidifiers, water-treatment systems, and similar equipment.
- C. Install equipment signs with screws or permanent adhesive on or near each major item of mechanical equipment. Locate signs where accessible and visible.
 - 1. Identify mechanical equipment with equipment markers in the following color codes:
 - a. Green: For cooling equipment and components.
 - b. Yellow: For heating equipment and components.
 - c. Orange: For combination cooling and heating equipment and components.
 - 2. Letter Size: Minimum **1/4 inch (6.4 mm)** for name of units if viewing distance is less than **24 inches (600 mm)**, **1/2 inch (13 mm)** for viewing distances up to **72 inches (1830 mm)**, and proportionately larger lettering for greater viewing distances. Include secondary lettering two-thirds to three-fourths the size of principal lettering.
 - 3. Data: Distinguish among multiple units, indicate operational requirements, indicate safety and emergency precautions, warn of hazards and improper operations, and identify units.
 - 4. Include signs for the following general categories of equipment:
 - a. Main control and operating valves, including safety devices.
 - b. Pumps, compressors, chillers, condensers, and similar motor-driven units.
 - c. Heat exchangers, coils, evaporators, and similar equipment.
 - d. Fans, blowers, primary balancing dampers, and mixing boxes.
 - e. Packaged HVAC central-station and zone-type units.
 - f. Tanks and pressure vessels.
 - g. Strainers, filters, humidifiers, water-treatment systems, and similar equipment.
- D. Install access panel markers with screws on equipment access panels.

3.3 PIPING IDENTIFICATION

- A. Install manufactured pipe markers indicating service on each piping system. Install with flow indication arrows showing direction of flow.
 - 1. Pipes with OD, Including Insulation, Less Than **6 Inches (150 mm)**: Pretensioned pipe markers. Use size to ensure a tight fit.
 - 2. Pipes with OD, Including Insulation, **6 Inches (150 mm)** and Larger: Self-adhesive pipe markers. Use color-coded, self-adhesive plastic tape, at least **1-1/2 inches (38 mm)** wide, lapped at least **3 inches (75 mm)** at both ends of pipe marker, and covering full circumference of pipe.
- B. Locate pipe markers and color bands where piping is exposed in finished spaces; machine rooms; accessible maintenance spaces such as shafts, tunnels, and plenums; and exterior nonconcealed locations as follows:
 - 1. Near each valve and control device.
 - 2. Near each branch connection, excluding short takeoffs for fixtures and terminal units. Where flow pattern is not obvious, mark each pipe at branch.
 - 3. Near penetrations through walls, floors, ceilings, and nonaccessible enclosures.
 - 4. At access doors, manholes, and similar access points that permit view of concealed piping.
 - 5. Near major equipment items and other points of origination and termination.
 - 6. Spaced at maximum intervals of **50 feet (15 m)** along each run. Reduce intervals to **25 feet (7.6 m)** in areas of congested piping and equipment.

7. On piping above removable acoustical ceilings. Omit intermediately spaced markers.

3.4 DUCT IDENTIFICATION

- A. Install duct markers with permanent adhesive on air ducts in the following color codes:
 1. Green: For cold-air supply ducts.
 2. Blue: For exhaust-, outside-, relief-, return-, and mixed-air ducts.
 3. ASME A13.1 Colors and Designs: For hazardous material exhaust.
 4. Letter Size: Minimum **1/4 inch (6.4 mm)** for name of units if viewing distance is less than **24 inches (600 mm)**, **1/2 inch (13 mm)** for viewing distances up to **72 inches (1830 mm)**, and proportionately larger lettering for greater viewing distances. Include secondary lettering two-thirds to three-fourths the size of principal lettering.
- B. Locate markers near points where ducts enter into concealed spaces and at maximum intervals of **50 feet (15 m)** in each space where ducts are exposed or concealed by removable ceiling system.

3.5 VALVE-TAG INSTALLATION

- A. Install tags on valves and control devices in piping systems, except check valves; valves within factory-fabricated equipment units; plumbing fixture supply stops; shutoff valves; faucets; convenience and lawn-watering hose connections; and HVAC terminal devices and similar roughing-in connections of end-use fixtures and units. List tagged valves in a valve schedule.
- B. Valve-Tag Application Schedule: Tag valves according to size, shape, and color scheme and with captions similar to those indicated in the following:
 1. Valve-Tag Size and Shape:
 - a. Cold Water: **1-1/2 inches (38 mm)**, round.
 - b. Hot Water: **1-1/2 inches (38 mm)**, round.
 - c. Fire Protection: **2 inches (50 mm)**, round.
 2. Valve-Tag Color:
 - a. Cold Water: Green.
 - b. Hot Water: Yellow.
 - c. Fire Protection: Red.
 3. Letter Color:
 - a. Cold Water: White.
 - b. Hot Water: White.
 - c. Fire Protection: White.

3.6 VALVE-SCHEDULE INSTALLATION

- A. Mount valve schedule on wall in accessible location in each major equipment room.

3.7 ADJUSTING

- A. Relocate mechanical identification materials and devices that have become visually blocked by other work.

CLEANING

- B. Clean faces of mechanical identification devices and glass frames of valve schedules.

END OF SECTION

SECTION 230713

DUCT INSULATION

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes semirigid and flexible duct, plenum, and breeching insulation; insulating cements; field-applied jackets; accessories and attachments; and sealing compounds.

1.2 SUBMITTALS

- A. Product Data: Identify thermal conductivity, thickness, and jackets (both factory and field applied, if any), for each type of product indicated.

1.3 QUALITY ASSURANCE

- A. Fire-Test-Response Characteristics: As determined by testing materials identical to those specified in this Section according to ASTM E 84, by a testing and inspecting agency acceptable to authorities having jurisdiction. Factory label insulation and jacket materials and sealer and cement material containers with appropriate markings of applicable testing and inspecting agency.
 - 1. Insulation Installed Indoors: Flame-spread rating of 25 or less, and smoke-developed rating of 50 or less.
 - 2. Insulation Installed Outdoors: Flame-spread rating of 75 or less, and smoke-developed rating of 150 or less.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Packaging: Ship insulation materials in containers marked by manufacturer with appropriate ASTM specification designation, type and grade, and maximum use temperature.
- B. Deliver and store all insulation with protective material until installation. Any material left exposed to moisture and/or particulates shall be removed and replaced.
- C. Any installed insulation left temporarily incomplete shall be covered with protective material until final connections can be installed.

1.5 COORDINATION

- A. Coordinate clearance requirements with duct Installer for insulation application.

1.6 SCHEDULING

- A. Schedule insulation application after testing duct systems. Insulation application may begin on segments of ducts that have satisfactory test results.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Mineral-Fiber Insulation:
 - a. CertainTeed Manson.
 - b. Knauf FiberGlass GmbH.
 - c. Owens-Corning Fiberglas Corp.
 - d. Schuller International, Inc.

2.2 INSULATION MATERIALS

A. Mineral-Fiber Blanket Thermal Insulation: Glass fibers bonded with a thermosetting resin. Comply with ASTM C 553, Type II, with all-service jacket manufactured from kraft paper, reinforcing scrim, aluminum foil, and vinyl film

2.3 Field Applied Jacket

A. Foil and paper Jacket: Laminated, glass-fiber-reinforced, flame-retardant kraft paper and aluminum foil.

2.4 ACCESSORIES AND ATTACHMENTS

A. Glass Cloth and Tape: Comply with MIL-C-20079H, Type I for cloth and Type II for tape. Woven glass-fiber fabrics, plain weave, presized a minimum of 8 oz./sq. yd. (270 g/sq. m).

1. Tape Width: 4 inches (100 mm).

B. Adhesive-Attached Anchor Pins and Speed Washers: Galvanized steel plate, pin, and washer manufactured for attachment to duct and plenum with adhesive. Pin length sufficient for insulation thickness indicated.

1. Adhesive: Recommended by the anchor pin manufacturer as appropriate for surface temperatures of ducts, plenums, and breechings; and to achieve a holding capacity of 100 lb (45 kg) for direct pull perpendicular to the adhered surface.

2.5 VAPOR RETARDERS

A. Mastics: Materials recommended by insulation material manufacturer that are compatible with insulation materials, jackets, and substrates.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions for compliance with requirements for installation and other conditions affecting performance of insulation application.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Surface Preparation: Clean and dry surfaces to receive insulation. Remove materials that will adversely affect insulation application.

3.3 GENERAL APPLICATION REQUIREMENTS

- A. Apply insulation materials, accessories, and finishes according to the manufacturer's written instructions; with smooth, straight, and even surfaces; and free of voids throughout the length of ducts and fittings.
- B. Refer to schedules at the end of this Section for materials, forms, jackets, and thicknesses required for each duct system.
- C. Use accessories compatible with insulation materials and suitable for the service. Use accessories that do not corrode, soften, or otherwise attack insulation or jacket in either wet or dry state.
- D. Apply multiple layers of insulation with longitudinal and end seams staggered.
- E. Seal joints and seams with vapor-retarder mastic on insulation indicated to receive a vapor retarder.
- F. Keep insulation materials dry during application and finishing.
- G. Apply insulation with tight longitudinal seams and end joints. Bond seams and joints with adhesive recommended by the insulation material manufacturer.
- H. Apply insulation with the least number of joints practical.
- I. Apply insulation over fittings and specialties, with continuous thermal and vapor-retarder integrity, unless otherwise indicated.
- J. Hangers and Anchors: Where vapor retarder is indicated, seal penetrations in insulation at hangers, supports, anchors, and other projections with vapor-retarder mastic. Apply insulation continuously through hangers and around anchor attachments.
- K. Insulation Terminations: For insulation application where vapor retarders are indicated, seal ends with a compound recommended by the insulation material manufacturer to maintain vapor retarder.
- L. Apply insulation with integral jackets as follows:
 - 1. Pull jacket tight and smooth.
 - 2. Joints and Seams: Cover with tape and vapor retarder as recommended by insulation material manufacturer to maintain vapor seal.
 - 3. Vapor-Retarder Mastics: Where vapor retarders are indicated, apply mastic on seams and joints and at ends adjacent to duct flanges and fittings.
- M. Cut insulation according to manufacturer's written instructions to prevent compressing insulation to less than 75 percent of its nominal thickness.

- N. Install vapor-retarder mastic on ducts and plenums scheduled to receive vapor retarders.
1. Ducts with Vapor Retarders: Overlap insulation facing at seams and seal with vapor-retarder mastic and pressure-sensitive tape having same facing as insulation. Repair punctures, tears, and penetrations with tape or mastic to maintain vapor-retarder seal.
 2. Ducts without Vapor Retarders: Overlap insulation facing at seams and secure with outward clinching staples and pressure-sensitive tape having same facing as insulation.
- O. Roof Penetrations: Apply insulation for interior applications to a point even with top of roof flashing.
1. Seal penetrations with vapor-retarder mastic.
 2. Apply insulation for exterior applications tightly joined to interior insulation ends.
 3. Seal insulation to roof flashing with vapor-retarder mastic.
- P. Interior Wall and Partition Penetrations: Apply insulation continuously through walls and partitions, except fire-rated walls and partitions.
- Q. Fire-Rated Wall and Partition Penetrations: Terminate insulation at fire/smoke damper sleeves for fire-rated wall and partition penetrations.
- R. Floor Penetrations: Terminate insulation at underside of floor assembly and at floor support at top of floor.
1. For insulation indicated to have vapor retarders, taper termination and seal insulation ends with vapor-retarder mastic.

3.4 MINERAL-FIBER INSULATION APPLICATION

- A. Blanket Applications for Ducts and Plenums: Secure blanket insulation with adhesive and anchor pins and speed washers.
1. Apply adhesives according to manufacturer's recommended coverage rates per square foot, for 100 percent coverage of duct and plenum surfaces.
 2. Install anchor pins and speed washers on sides and bottom of horizontal ducts and all sides of vertical ducts as follows:
 - a. On duct sides with dimensions 18 inches (450 mm) and smaller, along longitudinal centerline of duct. Space 3 inches (75 mm) maximum from insulation end joints, and 16 inches (400 mm) o.c.
 - b. On duct sides with dimensions larger than 18 inches (450 mm). Space 16 inches (400 mm) o.c. each way, and 3 inches (75 mm) maximum from insulation joints. Apply additional pins and clips to hold insulation tightly against surface at cross bracing.
 - c. Anchor pins may be omitted from top surface of horizontal, rectangular ducts and plenums.
 - d. Do not overcompress insulation during installation.
 3. Impale insulation over anchors and attach speed washers.
 4. Cut excess portion of pins extending beyond speed washers or bend parallel with insulation surface. Cover exposed pins and washers with tape matching insulation facing.
 5. Create a facing lap for longitudinal seams and end joints with insulation by removing 2 inches (50 mm) from one edge and one end of insulation segment. Secure laps to adjacent insulation segment with 1/2-inch (13-mm) staples, 1 inch (25 mm) o.c., and cover with pressure-sensitive tape having same facing as insulation.

6. Overlap unfaced blankets a minimum of 2 inches (50 mm) on longitudinal seams and end joints. Secure with steel band at end joints and spaced a maximum of 18 inches (450 mm) o.c.
7. Apply insulation on rectangular duct elbows and transitions with a full insulation segment for each surface. Apply insulation on round duct elbows with individually mitered gores cut to fit the elbow.
8. Insulate duct stiffeners, hangers, and flanges that protrude beyond the insulation surface with 6-inch- (150-mm-) wide strips of the same material used to insulate duct. Secure on alternating sides of stiffener, hanger, and flange with anchor pins spaced 6 inches (150 mm) o.c.
9. Apply vapor-retarder mastic to open joints, breaks, and punctures for insulation indicated to receive vapor retarder.

3.5 DUCT SYSTEM APPLICATIONS

- A. Insulation materials and thicknesses are specified in schedules at the end of this Section.
- B. Materials and thicknesses for systems listed below are specified in schedules at the end of this Section.
- C. Insulate the following plenums and duct systems:
 1. Indoor concealed supply-, return-, and outside-air ductwork.
 2. Indoor exposed supply-, return-, and outside-air ductwork.
 3. Indoor concealed range-hood exhaust ductwork.
 4. Indoor concealed dishwasher ductwork.
- D. Items Not Insulated: Unless otherwise indicated, do not apply insulation to the following systems, materials, and equipment:
 1. Factory-insulated flexible ducts.
 2. Factory-insulated plenums, casings, terminal boxes, and filter boxes and sections.
 3. Flexible connectors.
 4. Vibration-control devices.
 5. Testing agency labels and stamps.
 6. Nameplates and data plates.
 7. Access panels and doors in air-distribution systems.

3.6 INDOOR DUCT AND PLENUM APPLICATION SCHEDULE

- A. Service: Round and rectangular, supply-air ducts, concealed.
 1. Material: Mineral-fiber blanket.
 2. Thickness: 3 inches (R-8 or greater)
 3. Number of Layers: One.
 4. Field-Applied Jacket: Foil and paper.
 5. Vapor Retarder Required: Yes.
- B. Service: Round and rectangular, return-air ducts, outside air duct, concealed or exposed.
 1. Material: Mineral-fiber blanket.
 2. Thickness: 2 inches (50 mm).
 3. Number of Layers: One.
 4. Field-Applied Jacket: Foil and Paper
 5. Vapor Retarder Required: Yes.

- C. Service: Round and rectangular, supply and return-air ducts, exposed and in mechanical rooms.
1. Material: 2" liner insulation
 2. Thickness: 2 inches (50 mm).
 3. Number of Layers: One.
 4. Field-Applied Jacket: None.
 5. Vapor Retarder Required: No
- D. Service: Round and rectangular, exhaust air ducts, concealed & exposed and in mechanical rooms.
1. Material: 1" Interior liner
 2. Thickness: 1 inches
 3. Number of Layers: One.
 4. Field-Applied Jacket: None.
 5. Vapor Retarder Required: No

END OF SECTION

SECTION 232300

REFRIGERANT PIPING

PART 1 - GENERAL

1.1 SUMMARY

- A. Includes But Not Limited To:
 - 1. Furnish and install piping and specialties for refrigeration systems as described in Contract Documents.
- B. Products Installed But Not Furnished Under This Section:

1.2 REFERENCES

- A. Association Publications:
 - 1. Federal Emergency Management Agency (FEMA) / Vibration Isolation and Seismic Control Manufacturers Association (VISCMA) / American Society of Civil Engineers (ASCE):
 - a. FEMA 412, 'Installing Seismic Restraints For Mechanical Equipment' (December 2002).
 - 2. Vibration Isolation and Seismic Control Manufacturers Association (VISCMA):
 - a. VISCMA 101-12, 'Seismic Restraint Specification Guidelines for Mechanical, Electrical, and Plumbing Systems'.
 - b. VISCMA 102-12, 'Vibration Isolation Specification Guidelines for Mechanical, Electrical, and Plumbing Systems'.
- B. Definitions:
 - 1. Refrigerant: Absorbs heat by a change of state (evaporation) from liquid to a gas, and releases heat by a change of state (condenses) from gas back to a liquid.
 - 2. Vibration Isolation: Vibration reduction in which an isolation system is placed between the source of unwanted vibration and an item which needs to be shielded from the vibration.
- C. Reference Standards:
 - 1. American National Standards Institute (ANSI) / American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE):
 - a. ANSI/ASHRAE Standard 15-2010, 'Safety Standard for Refrigeration Systems'.
 - b. ANSI/ASHRAE Standard 34-2010, 'Designation and Classification of Refrigerants'.
 - 2. American National Standards Institute / American Welding Society:
 - a. ANSI/AWS A5.8M/A5.8-2011, 'Specification for Filler Metals for Brazing and Braze Welding'.
 - 3. American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE):
 - a. '2011 ASHRAE Handbook - HVAC Applications'.
 - 1) Chapter 48, 'Noise and Vibration Control'.
 - 4. ASTM International:
 - a. ASTM A36/A36M-08, 'Standard Specification for Carbon Structural Steel'.
 - b. ASTM B280-08, 'Standard Specification for Seamless Copper Tube for Air Conditioning and Refrigeration Field Service'.
 - 5. National Fire Protection Association / American National Standards Institute:
 - a. NFPA 90A-2012, 'Installation of Air Conditioning and Ventilating Systems'.
 - 6. Underwriters Laboratories:
 - a. UL 2182, 'Refrigerants' (2nd Edition).

1.3 SUBMITTALS

- A. Action Submittals:
 - 1. Shop Drawings: Show each individual equipment and piping support.

- B. Informational Submittals:
 - 1. Qualification Statements: Technician certificate for use of HFC and HCFC refrigerants.

1.4 QUALITY ASSURANCE

- A. Regulatory Agency Sustainability Approvals:
 - 1. Refrigerants:
 - a. Underwriters Laboratories / Underwriters Laboratories of Canada:
 - 1) Comply with requirements of UL 2182.
- B. Qualifications. Section 01 4301 applies, but is not limited to the following:
 - 1. Installer: Refrigerant piping shall be installed by refrigeration contractor licensed by State and by technicians certified in use of HFC and HCFC refrigerants.

PART 2 - PRODUCTS

2.1 COMPONENTS

- A. Manufacturers:
 - 1. Manufacturer Contact List:
 - a. Airtec,
 - b. Cush-A-Clamp by ZSI Manufacturing,
 - c. Elkhart Products Corp.,
 - d. Emerson Climate Technologies,
 - e. Handy & Harman Products
 - f. Harris Products Group,
 - g. Henry Valve Co,
 - h. Hilti Inc,
 - i. Hydra-Zorb Co,
 - j. JB Industries,
 - k. Mueller Steam Specialty,
 - l. Nibco Inc,
 - m. Packless Industries, Parker Corp,
 - n. Sporlan Valve Co.
 - o. Sherwood Valves,.
 - p. Thomas & Betts,
 - q. Unistrut, Div of Atkore International, Inc.
 - r. Universal Metal Hose.
 - s. Vibration Mountings & Controls,
 - t. Virginia KMP Corp,
- B. Materials:
 - 1. Refrigerant Piping:
 - a. Meet requirements of ASTM B280, hard drawn straight lengths. Soft copper tubing not permitted.
 - b. Do not use pre-charged refrigerant lines.
 - 2. Refrigerant Fittings:
 - a. Wrought copper with long radius elbows.
 - b. Category Four Approved Manufacturers. See Section Project Requirements 01 60 00 for definitions of Categories:
 - 1) Mueller Streamline.
 - 2) Nibco Inc.
 - 3) Elkhart.
 - 3. Suction Line Traps:
 - a. Manufactured standard one-piece traps.

- b. Category Four Approved Manufacturers. See Section Project Requirements 01 60 00 for definitions of Categories:
 - 1) Mueller Streamline.
 - 2) Nibco Inc.
 - 3) Elkhart.
4. Tee Access:
 - a. Brass:
 - 1) Category Four Approved Manufacturers. See Section Project Requirements 01 60 00 for definitions of Categories:
 - a) JB Industries: Part #A3 Series with Factory Cap and Valve Core.
5. Connection Material:
 - a. Brazing Rods in accordance with ANSI/AWS A5.8M/A5.8:
 - 1) Copper to Copper Connections:
 - a) Classification BCuP-4 Copper Phosphorus (6 percent silver).
 - b) Classification BCuP-5 Copper Phosphorus (15 percent silver).
 - 2) Copper to Brass or Copper to Steel Connections: Classification BAg-5 Silver (45 percent silver).
 - 3) Do not use rods containing Cadmium.
 - b. Flux:
 - 1) Type Two Acceptable Products:
 - a) Stay-Silv White Brazing Flux by Harris Products Group.
 - b) High quality silver solder flux by Handy & Harmon.
 - c) Equal as approved by Architect before use. See Section Project Requirements 01 60 00.
6. Valves:
 - a. Expansion Valves:
 - 1) For pressure type distributors, externally equalized with stainless steel diaphragm, and same refrigerant in thermostatic elements as in system.
 - 2) Size valves to provide full rated capacity of cooling coil served. Coordinate selection with evaporator coil and condensing unit.
 - 3) Category Four Approved Manufacturers. See Section Project Requirements 01 60 00 for definitions of Categories:
 - a) Emerson Climate Technologies.
 - b) Henry.
 - c) Mueller.
 - d) Parker.
 - e) Sporlan.
 - b. Manual Refrigerant Shut-Off Valves:
 - 1) Ball valves designed for refrigeration service and full line size.
 - 2) Valve shall have cap seals.
 - 3) Valves with hand wheels are not acceptable.
 - 4) Provide service valve on each liquid and suction line at compressor.
 - 5) If service valves come as integral part of condensing unit, additional service valves shall not be required.
 - 6) Category Four Approved Manufacturers. See Section Project Requirements 01 60 00 for definitions of Categories:
 - a) Henry.
 - b) Mueller.
 - c) Sherwood.
 - d) Virginia.
7. Filter-Drier:
 - a. On lines **3/4 inch (19 mm)** outside diameter and larger, filter-drier shall be replaceable core type with Schraeder type valve.
 - b. On lines smaller than **3/4 inch (19 mm)** outside diameter, filter-drier shall be sealed type with brazed end connections.
 - c. Size shall be full line size.
 - d. Category Four Approved Manufacturers. See Section Project Requirements 01 60 00 for definitions of Categories:
 - 1) Emerson Climate Technologies.

- 2) Mueller.
 - 3) Parker.
 - 4) Sporlan.
 - 5) Virginia.
8. Sight Glass:
- a. Combination moisture and liquid indicator with protection cap.
 - b. Sight glass shall be full line size.
 - c. Sight glass connections and sight glass body shall be solid copper or brass, no copper-coated steel sight glasses allowed.
 - d. Category Four Approved Product. See Section Project Requirements 01 60 00 for definitions of Categories:
 - 1) HMI by Emerson Climate Technologies.
9. Flexible Connectors:
- a. Designed for refrigerant service with bronze seamless corrugated hose and bronze braiding.
 - b. Category Four Approved Products. See Section Project Requirements 01 60 00 for definitions of Categories:
 - 1) Vibration Absorber Model VAF by Packless Industries.
 - 2) Vibration Absorbers by Virginia KMP Corp.
 - 3) Anaconda 'Vibration Eliminators' by Universal Metal Hose.
 - 4) Style 'BF' Spring-flex freon connectors by Vibration Mountings.
10. Refrigerant Piping Supports:
- a. Base, Angles, And Uprights: Steel meeting requirements of ASTM A36.
 - b. Securing Channels:
 - 1) At Free-Standing Pipe Support:
 - a) Class One Quality Standard: P-1000 channels by Unistrut.
 - b) Acceptable Manufacturers: Hilti, Thomas & Betts.
 - c) Equal as approved by Architect before installation. See Section Project Requirements 01 60 00.
 - 2) At Wall Support:
 - a) Class One Quality Standard: P-3300 channels by Unistrut.
 - b) Acceptable Manufacturers: Hilti, Thomas & Betts.
 - c) Equal as approved by Architect before installation. See Section Project Requirements 01 60 00.
 - 3) At Suspended Support:
 - a) Class One Quality Standard: P-1001 channels by Unistrut.
 - b) Acceptable Manufacturers: Hilti, Thomas & Betts.
 - c) Equal as approved by Architect before installation. See Section Project Requirements 01 60 00.
 - 4) Angle Fittings:
 - a) Class One Quality Standard: P-2626 90 degree angle by Unistrut.
 - b) Acceptable Manufacturers: Hilti, Thomas & Betts.
 - c) Equal as approved by Architect before installation. See Section Project Requirements 01 60 00.
 - c. Pipe Clamps:
 - 1) Type Two Acceptable Manufacturers:
 - a) Hydra-Zorb.
 - b) ZSI Cush-A-Clamp.
 - c) Hilti Cush-A-Clamp.
 - d) Equal as approved by Architect before installation. See Section Project Requirements 01 60 00.
 - d. Protective Cover: 18 ga (1.2 mm) steel, hot-dipped galvanized.
11. Locking Refrigerant Cap:
- a. Provide and install on charging valves:
 - 1) Class One Quality Standard: 'No Vent' locking refrigerant cap.
 - 2) Acceptable Manufacturers: Airtec.
 - 3) Equal as approved by Architect before installation. See Section Project Requirements 01 60 00.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Refrigerant Lines:

1. Install as high in upper mechanical areas as possible. Do not install underground or in tunnels.
2. Slope suction lines down toward compressor **one inch/10 feet (25 mm in 3 meters)**. Locate traps at vertical rises against flow in suction lines.

B. Connections:

1. Refrigeration system connections shall be copper-to-copper, copper-to-brass, or copper-to-steel type properly cleaned and brazed with specified rods. Use flux only where necessary. No soft solder (tin, lead, antimony) connections will be allowed in system.
2. Braze manual refrigerant shut-off valve, sight glass, and flexible connections.
3. Circulate dry nitrogen through tubes being brazed to eliminate formation of copper oxide during brazing operation.

C. Specialties:

1. Install valves and specialties in accessible locations. Install refrigeration distributors and suction outlet at same end of coil.
2. Install thermostatic bulb as close to cooling coil as possible. Do not install on vertical lines.
3. Install equalizing line in straight section of suction line, downstream of and reasonably close to thermostatic bulb. Do not install on vertical lines.
4. Provide flexible connectors in each liquid line and suction line at both condensing unit and evaporator on systems larger than five tons. Anchor pipe near each flexible connector.

D. Refrigerant Supports:

1. Support Spacing:
 - a. Piping **1-1/4 inch (32 mm)** And Larger: **8 feet (2.450 m)** on center maximum.
 - b. Piping **1-1/8 inch (28.5 mm)** And Smaller: **6 feet (1.80 m)** on center maximum.
 - c. Support each elbow.
2. Isolate pipe from supports and clamps with Hydrozorb or Cush-A-Clamp systems.
3. Run protective cover continuous from condensing units to risers or penetrations at building wall.

3.2 FIELD QUALITY CONTROL

A. Field Tests:

1. Make evacuation and leak tests in presence of Architect's Engineer after completing refrigeration piping systems. Positive pressure test will not suffice for procedure outlined below.
 - a. Draw vacuum on each entire system with two stage vacuum pump. Draw vacuum to 300 microns using micron vacuum gauge capable of reading from atmosphere to 10 microns. Do not use cooling compressor to evacuate system nor operate it while system is under high vacuum.
 - b. Break vacuum with nitrogen and re-establish vacuum test. Vacuum shall hold for 30 minutes at 300 microns without vacuum pump running.
 - c. Conduct tests at **70 deg F (21 deg C)** ambient temperature minimum.
 - d. Do not run systems until above tests have been made and systems started up as specified. Inform Owner's Representative of status of systems at time of final inspection and schedule start-up and testing if prevented by outdoor conditions before this time.
 - e. After testing, fully charge system with refrigerant and conduct test with Halide Leak Detector.
 - f. Recover all refrigerant in accordance with applicable codes. Do not allow any refrigerant to escape to atmosphere.

B. Non-Conforming Work:

1. If it is observed that refrigerant lines are being or have been brazed without proper circulation of nitrogen through lines, all refrigerant lines installed up to that point in time shall be removed and replaced at no additional cost to Owner.

END OF SECTION

SECTION 232600

CONDENSATE DRAIN PIPING

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:

1. Coordinate installation of condensate drain piping with Section 22 0501 as described in Contract Documents.

1.2 REFERENCES

A. Reference Standards:

1. ASTM International:
 - a. ASTM B88-09, 'Standard Specification for Seamless Copper Water Tube'.
 - b. ASTM D1785-12, 'Standard Specification for Poly (Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 120'.

PART 2 - PRODUCTS

2.1 SYSTEMS

A. Materials:

1. Condensate Drains:
 - a. Exterior And Interior Lines: Type M copper meeting requirements of ASTM B88.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Condensate Drains:

1. Support piping and protect from damage.

END OF SECTION

SECTION 23310DUCT ACCESSORIES

PART 1 - GENERAL

1.1 SUMMA

1.2 R

1.3 Y

A. This Section includes the following:

1. Backdraft dampers.
2. Manual-volume dampers.
3. Fire dampers.
4. Turning vanes.
5. Duct-mounted access doors and panels.
6. Flexible ducts.
7. Flexible connectors.
8. Duct accessory hardware.

1.4 SUBMITTALS

A. Product Data: For the following:

1. Backdraft dampers.
2. Manual-volume dampers.
3. Fire dampers.
4. Duct-mounted access doors and panels.
5. Flexible ducts.

B. Shop Drawings: Detail equipment assemblies and indicate dimensions, weights, loadings, required clearances, method of field assembly, components, location, and size of each field connection. Detail the following:

1. Special fittings and manual- and automatic-volume-damper installations.
2. Fire-damper installations, including sleeves and duct-mounted access doors and panels.

C. Product Certificates: Submit certified test data on dynamic insertion loss; self-noise power levels; and airflow performance data, static-pressure loss, dimensions, and weights.

1.5 QUALITY ASSURANCE

A. NFPA Compliance: Comply with the following NFPA standards:

1. NFPA 90A, "Installation of Air Conditioning and Ventilating Systems."
2. NFPA 90B, "Installation of Warm Air Heating and Air Conditioning Systems."

1.6 EXTRA MATERIALS

- A. Furnish extra materials described below that match products installed, are packaged with protective covering for storage, and are identified with labels describing contents.
 - 1. Fusible Links: Furnish quantity equal to 10 percent of amount installed.

PART 2 - PRODUCTS

2.1 SHEET METAL MATERIALS

- A. Galvanized, Sheet Steel: Lock-forming quality; ASTM A 653/A 653M, G90 (Z275) coating designation; mill-phosphatized finish for surfaces of ducts exposed to view.
- B. Carbon-Steel Sheets: ASTM A 366/A 366M, cold-rolled sheets, commercial quality, with oiled, exposed matte finish.
- C. Reinforcement Shapes and Plates: Galvanized steel reinforcement where installed on galvanized, sheet metal ducts; compatible materials for aluminum and stainless-steel ducts.
- D. Tie Rods: Galvanized steel, 1/4-inch (6-mm) minimum diameter for 36-inch (900-mm) length or less; 3/8-inch (10-mm) minimum diameter for lengths longer than 36 inches (900 mm).

2.2 BACKDRAFT DAMPERS

- A. Description: Suitable for horizontal or vertical installations.
- B. Frame: 0.052-inch- (1.3-mm-) thick, galvanized, sheet steel, with welded corners and mounting flange.
- C. Blades: 0.025-inch- (0.6-mm-) thick, roll-formed aluminum.
- D. Blade Seals: Vinyl.
- E. Blade Axles: Galvanized steel.
- F. Tie Bars and Brackets: Galvanized steel.
- G. Return Spring: Adjustable tension.

2.3 MANUAL-VOLUME DAMPERS

- A. General: Factory fabricated with required hardware and accessories. Stiffen damper blades for stability. Include locking device to hold single-blade dampers in a fixed position without vibration. Close duct penetrations for damper components to seal duct consistent with pressure class.
- B. Standard Volume Dampers: Multiple- or single-blade, parallel- or opposed-blade design as indicated, standard leakage rating, with linkage outside airstream, and suitable for horizontal or vertical applications.
 - 1. Steel Frames: Hat-shaped, galvanized, sheet steel channels, minimum of 0.064 inch (1.62 mm) thick, with mitered and welded corners; frames with flanges where indicated for attaching to walls; and flangeless frames where indicated for installing in ducts.

2. Roll-Formed Steel Blades: 0.064-inch- (1.62-mm-) thick, galvanized, sheet steel.
 3. Blade Axles: Galvanized steel.
 4. Tie Bars and Brackets: Galvanized steel.
- C. Jackshaft: 1-inch- (25-mm-) diameter, galvanized steel pipe rotating within a pipe-bearing assembly mounted on supports at each mullion and at each end of multiple-damper assemblies.
1. Length and Number of Mountings: Appropriate to connect linkage of each damper of a multiple-damper assembly.
- D. Damper Hardware: Zinc-plated, die-cast core with dial and handle made of 3/32-inch- (2.4-mm-) thick zinc-plated steel, and a 3/4-inch (19-mm) hexagon locking nut. Include center hole to suit damper operating-rod size. Include elevated platform for insulated duct mounting.

2.4 FIRE DAMPERS

- A. General: Labeled to UL 555.
- B. Fire Rating: One and one-half hours.
- C. Fire Rating: One and one-half hours.
- D. Frame: SMACNA Type B with blades out of airstream; fabricated with roll-formed, 0.034-inch- (0.85-mm-) thick galvanized steel; with mitered and interlocking corners.
- E. Mounting Sleeve: Factory- or field-installed galvanized, sheet steel.
1. Minimum Thickness: 0.052 inch (1.3 mm) or 0.138 inch (3.5 mm) thick as indicated, and length to suit application.
 2. Exceptions: Omit sleeve where damper frame width permits direct attachment of perimeter mounting angles on each side of wall or floor, and thickness of damper frame complies with sleeve requirements.
- F. Mounting Orientation: Vertical or horizontal as indicated.
- G. Blades: Roll-formed, interlocking, 0.034-inch- (0.85-mm-) thick, galvanized, sheet steel. In place of interlocking blades, use full-length, 0.034-inch- (0.85-mm-) thick, galvanized steel blade connectors.
- H. Horizontal Dampers: Include a blade lock and stainless-steel negator closure spring.
- I. Fusible Link: Replaceable, 165 deg F (74 deg C) rated as indicated.

2.5 TURNING VANES

- A. Fabricate to comply with SMACNA's "HVAC Duct Construction Standards--Metal and Flexible."
- B. Acoustic Turning Vanes: Fabricate of airfoil-shaped aluminum extrusions with perforated faces and fibrous-glass fill.

2.6 DUCT-MOUNTED ACCESS DOORS AND PANELS

- A. General: Fabricate doors and panels airtight and suitable for duct pressure class.
- B. Frame: Galvanized, sheet steel, with bend-over tabs and foam gaskets.
- C. Door: Double-wall, galvanized, sheet metal construction with insulation fill and thickness, and number of hinges and locks as indicated for duct pressure class. Include vision panel where indicated. Include 1-by-1-inch (25-by-25-mm) butt or piano hinge and cam latches.
- D. Seal around frame attachment to duct and door to frame with neoprene or foam rubber.
- E. Insulation: 1-inch- (25-mm-) thick, fibrous-glass or polystyrene-foam board.

2.7 FLEXIBLE CONNECTORS

- A. General: Flame-retarded or noncombustible fabrics, coatings, and adhesives complying with UL 181, Class 1.
- B. Standard Metal-Edged Connectors: Factory fabricated with a strip of fabric 3-1/2 inches (89 mm) wide attached to two strips of 2-3/4-inch- (70-mm-) wide, 0.028-inch- (0.7-mm-) thick, galvanized, sheet steel or 0.032-inch (0.8-mm) aluminum sheets. Select metal compatible with connected ducts.
- C. Extra-Wide Metal-Edged Connectors: Factory fabricated with a strip of fabric 5-3/4 inches (146 mm) wide attached to two strips of 2-3/4-inch- (70-mm-) wide, 0.028-inch- (0.7-mm-) thick, galvanized, sheet steel or 0.032-inch (0.8-mm) aluminum sheets. Select metal compatible with connected ducts.
- D. Transverse Metal-Edged Connectors: Factory fabricated with a strip of fabric 3-1/2 inches (89 mm) wide attached to two strips of 4-3/8-inch- (111-mm-) wide, 0.028-inch- (0.7-mm-) thick, galvanized, sheet steel or 0.032-inch (0.8-mm) aluminum sheets. Select metal compatible with connected ducts.
- E. Conventional, Indoor System Flexible Connector Fabric: Glass fabric double coated with polychloroprene.
 - 1. Minimum Weight: 26 oz./sq. yd. (880 g/sq. m).
 - 2. Tensile Strength: 480 lbf/inch (84 N/mm) in the warp, and 360 lbf/inch (63 N/mm) in the filling.
- F. Conventional, Outdoor System Flexible Connector Fabric: Glass fabric double coated with a synthetic-rubber, weatherproof coating resistant to the sun's ultraviolet rays and ozone environment.
 - 1. Minimum Weight: 26 oz./sq. yd. (880 g/sq. m).
 - 2. Tensile Strength: 530 lbf/inch (93 N/mm) in the warp, and 440 lbf/inch (77 N/mm) in the filling.

2.8 FLEXIBLE DUCTS

- A. General: Comply with UL 181, Class 1.
- B. Flexible Ducts, Insulated: Factory-fabricated, insulated, round duct, with an outer jacket enclosing 1-1/2-inch- (38-mm-) thick, glass-fiber insulation around a continuous inner liner.
 - 1. Reinforcement: Steel-wire helix encapsulated in inner liner.
 - 2. Outer Jacket: Polyethylene film.
 - 3. Inner Liner: Polyethylene film.

- C. Pressure Rating: 6-inch wg (1500 Pa) positive, 1/2-inch wg (125 Pa) negative.

2.9 ACCESSORY HARDWARE

- A. Instrument Test Holes: Cast iron or cast aluminum to suit duct material, including screw cap and gasket. Size to allow insertion of pitot tube and other testing instruments, and length to suit duct insulation thickness.
- B. Splitter Damper Accessories: Zinc-plated damper blade bracket; 1/4-inch (6-mm), zinc-plated operating rod; and a duct-mounted, ball-joint bracket with flat rubber gasket and square-head set screw.
- C. Flexible Duct Clamps: Stainless-steel band with cadmium-plated hex screw to tighten band with a worm-gear action, in sizes 3 to 18 inches (75 to 450 mm) to suit duct size.
- D. Adhesives: High strength, quick setting, neoprene based, waterproof, and resistant to gasoline and grease.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install duct accessories according to applicable details shown in SMACNA's "HVAC Duct Construction Standards--Metal and Flexible" for metal ducts and NAIMA's "Fibrous Glass Duct Construction Standards" for fibrous-glass ducts.
- B. Install volume dampers in lined duct; avoid damage to and erosion of duct liner.
- C. Provide test holes at fan inlet and outlet and elsewhere as indicated.
- D. Install fire and smoke dampers according to manufacturer's UL-approved written instructions.
 - 1. Install fusible links in fire dampers.
- E. Install duct access panels for access to both sides of duct coils. Install duct access panels downstream from volume dampers, fire dampers, turning vanes, and equipment.
 - 1. Install duct access panels to allow access to interior of ducts for cleaning, inspecting, adjusting, and maintaining accessories and terminal units.
 - 2. Install access panels on side of duct where adequate clearance is available.
- F. Label access doors according to Division "Mechanical Identification."

3.2 ADJUSTING

- A. Adjust duct accessories for proper settings.
- B. Adjust fire dampers for proper action.
- C. Final positioning of manual-volume dampers is specified in Section "Testing, Adjusting, and Balancing."

END OF SECTION

SECTION 23113

METAL DUCTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions.

1.2 SUMMARY

- A. This Section includes rectangular, round, and flat-oval metal ducts and plenums for heating, ventilating, and air-conditioning systems in pressure classes from minus 2- to plus 10-inch wg

1.3 DEFINITIONS

- A. Thermal Conductivity and Apparent Thermal Conductivity (k-Value): As defined in ASTM C 168. In this Section, these values are the result of the formula $Btu \times in./h \times sq. \text{ ft.} \times deg \text{ F}$ or $W/m \times K$ at the temperature differences specified. Values are expressed as Btu or W.

1.4 SYSTEM DESCRIPTION

- A. Duct system design, as indicated, has been used to select and size air-moving and -distribution equipment and other components of air system. Changes to layout or configuration of duct system must be specifically approved in writing by Architect.

1.5 SUBMITTALS

- A. Product Data: For duct liner and sealing materials.
- B. Shop Drawings: Show details of the following:
 - 1. Duct layout indicating pressure classifications and sizes on plans.
 - 2. Fittings.
 - 3. Penetrations through fire-rated and other partitions.
 - 4. Coordination with other trades and including but not limited to: structural members, electrical lights and conduits, plumbing lines, & fire sprinkler lines.
- C. Coordination Drawings: Reflected ceiling plans drawn to scale and coordinating penetrations and ceiling-mounted items. Show the following:
 - 1. Ceiling- and wall-mounted access doors and panels required to provide access to dampers and other operating devices.
 - 2. Coordination with ceiling-mounted items, including lighting fixtures, diffusers, grilles, speakers, sprinkler heads, access panels, and special moldings.
- D. Duct Construction Standards: Provide a copy of the duct construction standards to be used for each pressure classification in this project. Duct Construction Standards must comply with the latest edition of SMACNA "HVAC Duct Construction Standards – Metal and Flexible."
- E. Field Test Reports: Indicate and interpret test results for compliance with performance requirements.
- F. Record Drawings: Indicate actual routing, fitting details, reinforcement, support, and installed accessories and devices.

1.6 QUALITY ASSURANCE

- A. Welding Standards: Qualify welding procedures and welding personnel to perform welding processes for this Project according to AWS D1.1, "Structural Welding Code--Steel," for hangers and supports;

AWS D1.2, "Structural Welding Code--Aluminum," for aluminum supporting members; and AWS D9.1, "Sheet Metal Welding Code," for duct joint and seam welding.

- B. Comply with NFPA 90A, "Installation of Air Conditioning and Ventilating Systems," unless otherwise indicated.
- C. Comply with NFPA 90B, "Installation of Warm Air Heating and Air Conditioning Systems," unless otherwise indicated.
- D. Comply with NFPA 96, "Ventilation Control and Fire Protection of Commercial Cooking Operations," Chapter 3, "Duct System," for range hood ducts, unless otherwise indicated.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver sealant and firestopping materials to site in original unopened containers or bundles with labels indicating manufacturer, product name and designation, color, expiration period for use, pot life, curing time, and mixing instructions for multicomponent materials.
- B. Store and handle sealant and firestopping materials according to manufacturer's written recommendations.
- C. Deliver and store stainless-steel sheets with mill-applied adhesive protective paper maintained through fabrication and installation
- D. Deliver and store all ductwork with protective material until installation. Any material left exposed to moisture and/or particulates shall be removed and replaced.
- E. Any installed ductwork or piping system left temporarily incomplete shall be covered with protective material until final connections can be installed.
- F. All ductwork and/or liner insulation to be wrapped with protective material until installation. Any ductwork or insulation left exposed to the environment or contaminating particulate matter shall be replaced at the contractor's expense.

PART 2 - PRODUCTS

2.1 SHEET METAL MATERIALS

- A. Galvanized, Sheet Steel: Lock-forming quality; ASTM A 653/A 653M, G90 (Z275) coating designation; mill-phosphatized finish for surfaces of ducts exposed to view.
- B. Carbon-Steel Sheets: ASTM A 366/A 366M, cold-rolled sheets; commercial quality; with oiled, exposed matte finish.
- C. Stainless Steel: ASTM A 480/A 480M, Type 316, sheet form with No. 4 finish for surfaces of ducts exposed to view; and Type 304, sheet form with No. 1 finish for concealed ducts.
- D. Reinforcement Shapes and Plates: Galvanized steel reinforcement where installed on galvanized, sheet metal ducts; compatible materials for aluminum and stainless-steel ducts.
- E. Tie Rods: Galvanized steel, 1/4-inch (6-mm) minimum diameter for 36-inch (900-mm) length or less; 3/8-inch (10-mm) minimum diameter for lengths longer than 36 inches (900 mm).

2.2 SEALANT MATERIALS

- A. Joint and Seam Sealants, General: The term "sealant" is not limited to materials of adhesive or mastic nature but includes tapes and combinations of open-weave fabric strips and mastics.
 - 1. Joint and Seam Sealant: One-part, nonsag, solvent-release-curing, polymerized butyl sealant, formulated with a minimum of 75 percent solids.
 - 2. Flanged Joint Mastics: One-part, acid-curing, silicone, elastomeric joint sealants, complying with ASTM C 920, Type S, Grade NS, Class 25, Use O.

2.3 HANGERS AND SUPPORTS

- A. Hanger Materials: Galvanized, sheet steel or round, threaded steel rod.
 - 1. Hangers Installed in Corrosive Atmospheres: Electrogalvanized, all-thread rod or galvanized rods with threads painted after installation.
 - 2. Straps and Rod Sizes: Comply with latest edition of SMACNA's "HVAC Duct Construction Standards--Metal and Flexible" for sheet steel width and thickness and for steel rod diameters.
- B. Duct Attachments: Sheet metal screws, blind rivets, or self-tapping metal screws; compatible with duct materials.
- C. Trapeze and Riser Supports: Steel shapes complying with ASTM A 36/A 36M.
 - 1. Supports for Galvanized-Steel Ducts: Galvanized steel shapes and plates.
 - 2. Supports for Stainless-Steel Ducts: Stainless-steel support materials.
 - 3. Supports for Aluminum Ducts: Aluminum support materials, unless materials are electrolytically separated from ductwork.

2.4 RECTANGULAR DUCT FABRICATION

- A. General: Fabricate ducts, elbows, transitions, offsets, branch connections, and other construction with galvanized, sheet steel, according to the latest edition of SMACNA's "HVAC Duct Construction Standards--Metal and Flexible." Comply with requirements for metal thickness, reinforcing types and intervals, tie-rod applications, and joint types and intervals.
 - 1. Lengths: Fabricate rectangular ducts in lengths appropriate to reinforcement and rigidity class required for pressure classification.
 - 2. Materials: Free from visual imperfections such as pitting, seam marks, roller marks, stains, and discolorations.
- B. Fabricate range hood exhaust ducts with 0.0598-inch- thick, galvanized sheet for concealed ducts and 0.0500-inch- thick stainless steel for exposed ducts. Weld and flange seams and joints. Comply with NFPA 96.
- C. Fabricate dishwasher hood exhaust ducts with 0.0500-inch- thick stainless steel. Weld and flange seams and joints.
- D. Static-Pressure Classifications: Unless otherwise indicated, construct ducts to the following:
 - 1. Supply Ducts between AHU and Air Terminal Units: 3-inch wg.
 - 2. Supply Ducts after air terminal units and on constant volume supply equipment: 1-inch wg (250 Pa), positive pressure
 - 3. Return Ducts: 1-inch wg ,negative pressure.
 - 4. Exhaust Ducts: 1-inch wg negative pressure.
- E. Cross Breaking or Cross Beading: Cross break or cross bead duct sides 19 inches and larger and 0.0359 inch thick or less, with more than 10 sq. ft. of unbraced panel area, unless ducts are lined.

2.5 ROUND FABRICATION

- A. Round Ducts: Fabricate spiral seam supply and return ducts of galvanized steel according to SMACNA's "HVAC Duct Construction Standards--Metal and Flexible." Snap Lock Longitudinal seam ductwork will not be allowed. Adjustable elbows will not be allowed.
- B. Spiral seam round or oval duct may be substituted for rectangular duct at the contractors option. Spiral seam ductwork sizing must result in the same or less pressure drop than the rectangular duct indicated on the plans.

2.6 DUCT STORAGE

- A. All duct must have end capped with plastic covers on both ends from end of fabrication to duct installation. If this is not provided at the field, vacuum ducts before final acceptance to remove dust and debris.

PART 3 - EXECUTION

3.1 DUCT INSTALLATION, GENERAL

- A. Duct installation requirements are specified in other Division Sections. Drawings indicate general arrangement of ducts, fittings, and accessories.
- B. Construct and install each duct system for the specific duct pressure classification indicated.
- C. Install round ducts in lengths not less than 10 feet (3 m), unless interrupted by fittings.
- D. Install ducts with fewest possible joints.
- E. Install fabricated fittings for changes in directions, changes in size and shape, and connections.
- F. Install couplings tight to duct wall surface with a minimum of projections into duct.
- G. Install ducts, unless otherwise indicated, vertically and horizontally, parallel and perpendicular to building lines; avoid diagonal runs.
- H. Install ducts close to walls, overhead construction, columns, and other structural and permanent enclosure elements of building.
- I. Install ducts with a clearance of 1 inch (25 mm), plus allowance for insulation thickness.
- J. Conceal ducts from view in finished spaces. Do not encase horizontal runs in solid partitions, unless specifically indicated.
- K. Coordinate layout with suspended ceiling, fire- and smoke-control dampers, lighting layouts, and similar finished work.
- L. Electrical Equipment Spaces: Route ductwork to avoid passing through transformer vaults and electrical equipment spaces and enclosures.
- M. Non-Fire-Rated Partition Penetrations: Where ducts pass through interior partitions and exterior walls, and are exposed to view, conceal space between construction opening and duct or duct insulation with sheet metal flanges of same metal thickness as duct. Overlap opening on four sides by at least 1-1/2 inches (38 mm).
- N. Fire-Rated Partition Penetrations: Where ducts pass through interior partitions and exterior walls, install appropriately rated fire damper, sleeve, and firestopping sealant. Fire and smoke dampers are specified in Division Section "Duct Accessories." Firestopping materials and installation methods are specified in other Divisions

3.2 SEAM AND JOINT SEALING

- A. General: Seal duct seams and joints according to the duct pressure class indicated and as described in SMACNA's "HVAC Duct Construction Standards--Metal and Flexible." All duct to be sealed to SMACNA seal class A which requires sealing all transverse joints, longitudinal seams and duct wall penetrations regardless of pressure classification.
- B. Seal externally insulated ducts before insulation installation.
- C. All ducts shall be inspected after sealing is complete and prior to insulation installation. Provide the engineer with a minimum 7 days notice prior to beginning duct insulation.

3.3 RANGE HOOD EXHAUST DUCT INSTALLATIONS

- A. Install ducts to allow for thermal expansion of ductwork through 2000 deg F temperature range.

- B. Install ducts without dips or traps that may collect residues, unless traps have continuous or automatic residue removal.
- C. Install access openings at each change in direction and at 15-foot intervals; locate on sides of duct a minimum of 1-1/2 inches from bottom; and fit with grease-tight covers of same material as duct.
- D. Do not penetrate fire-rated assemblies.

3.4 DISHWASHER EXHAUST DUCT INSTALLATIONS

- A. Install dishwasher exhaust ducts according to SMACNA's "HVAC Duct Construction Standards--Metal and Flexible."
- B.

3.5 HANGING AND SUPPORTING

- A. Install rigid round and rectangular metal duct with support systems indicated in the latest edition of SMACNA's "HVAC Duct Construction Standards--Metal and Flexible."
- B. Support horizontal ducts within 24 inches of each elbow and within 48 inches of each branch intersection.
- C. Support vertical ducts at a maximum interval of 16 feet and at each floor.
- D. Install upper attachments to structures with an allowable load not exceeding one-fourth of failure (proof-test) load.

3.6 CONNECTIONS

- A. Connect equipment with flexible connectors according to Section "Duct Accessories."
- B. For branch, outlet and inlet, and terminal unit connections, comply with the latest edition of SMACNA's "HVAC Duct Construction Standards--Metal and Flexible."

3.7 DUCT APPLICATION

- A. Service: Round and rectangular, supply/return/outside -air ducts, concealed.
 - 1. Sheet-metal with wrap insulation
- B. Service: Round and rectangular, supply/return/outside -air ducts, exposed and in mechanical rooms.
 - 1. Sheet-metal double wall with lined insulation in-between.
 - 2. Inner sheet-metal duct shall be perforated in areas with acoustical requirements, ref. plans.
- C.

3.8 FIELD QUALITY CONTROL

- A. Disassemble, reassemble, and seal segments of systems as required to accommodate leakage testing and as required for compliance with test requirements.
- B. 25% of the duct installed after the air handling units and (prior to the air terminal units, when applicable) shall be tested in the presence of the Architect, at static pressures equal to maximum design pressure of system or section being tested. The sections of duct to be tested shall be chosen by the architect or engineer after installation of the duct. If pressure classifications are not indicated, test entire system at maximum system design pressure. Do not pressurize systems above maximum design operating pressure. Give seven days' advance notice for testing.
- C. Leakage Test: Perform tests according to SMACNA's "HVAC Air Duct Leakage Test Manual."
- D. Maximum Allowable Leakage: Comply with requirements for Leakage Classification 3 for round, Leakage Classification 12 for rectangular ducts in pressure classifications less than and equal to 2-inch

wg (both positive and negative pressures), and Leakage Classification 6 for pressure classifications from 2- to 10-inch wg.

E. Remake leaking joints and retest until leakage is less than maximum allowable.

3.9 CLEANING

A. After completing system installation, including outlet fittings and devices, inspect the system.

END OF SECTION

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:

1. Furnish and install supply air branch duct runouts to diffusers as described in Contract Documents.

1.2 REFERENCES

A. Reference Standards:

1. National Fire Protection Association / American National Standards Institute:
 - a. NFPA 90A: 'Standard for the Installation of Air-Conditioning and Ventilating Systems' (2012 Edition).
2. Underwriters Laboratories:
 - a. UL 181, 'Factory-Made Ducts and Air Connectors' (10th Edition).
 - b. UL 181B, 'Closure Systems for Use With Flexible Air Ducts and Air Connectors' (3rd Edition).

PART 2 - PRODUCTS

2.1 SYSTEM

A. Manufacturers:

1. Manufacturer Contact List:
 - a. Anco Products Inc,
 - b. Thermaflex by Flexible Technologies
 - c. Flexmaster USA Inc, Houston, TX

B. Materials:

1. Ducts:
 - a. Formable, flexible, circular duct which shall retain its cross-section, shape, rigidity, and shall not restrict airflow after bending.
 - b. Insulation:
 - 1) Nominal 1-1/2 inches (38 mm), 3/4 lb per cu ft (12 kg per cu m) density fiberglass insulation with air-tight, polyethylene or polyester core, sheathed in seamless vapor barrier jacket factory installed over flexible assembly.
 - c. Assembly, including insulation and vapor barrier, shall meet Class I requirement of NFPA 90A and be UL 181 rated, with flame spread of 25 or less and smoke developed rating of 50 or under.
 - d. Category Four Approved Products. See Section Project Requirements 01 60 00 for definitions of Categories:
 - 1) ANCO-FLEX 4625 by Anco Products.
 - 2) M-KC by Thermaflex by Flexible Technologies.
 - 3) Type 4m Insulated by Flexmaster.
2. Cinch Bands: Nylon, 3/8 inch removable and reusable type.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install duct in fully extended condition free of sags and kinks, using 60 inch maximum lengths.
- B. Make duct connections by coating exterior of duct collar for 3 inches with duct sealer and securing duct in place over sheet metal collar with specified cinch bands.

END OF SECTION

SECTION 233423CENTRIFUGAL FANS

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes centrifugal fans and vent sets.

1.2 PERFORMANCE REQUIREMENTS

- A. Project Altitude: Base air ratings on actual site elevations.
- B. Operating Limits: Classify according to AMCA standards.

1.3 SUBMITTALS

- A. Product Data: Include rated capacities, furnished specialties, and accessories for each unit scheduled and include the following:
 - 1. Certified fan performance curves with system operating conditions indicated.
 - 2. Certified fan sound-power ratings.
 - 3. Motor ratings and electrical characteristics, plus motor and electrical accessories.
 - 4. Material gages and finishes, including color charts.
 - 5. Dampers, including housings, linkages, and operators.
- B. Shop Drawings: Detail equipment assemblies and indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
 - 1. Wiring Diagrams: Power, signal, and control wiring. Differentiate between manufacturer-installed and field-installed wiring.
- C. Maintenance Data: For centrifugal fans to include in maintenance manuals specified in specifications.

1.4 QUALITY ASSURANCE

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- B. AMCA Compliance: Products shall comply with performance requirements and shall be licensed to use the AMCA-Certified Ratings Seal.
- C. NEMA Compliance: Motors and electrical accessories shall comply with NEMA standards.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver fans as factory-assembled units, to the extent allowable by shipping limitations, with protective crating and covering.

- B. Disassemble and reassemble units, as required for moving to the final location, according to manufacturer's written instructions.
- C. Lift and support units with manufacturer's designated lifting or supporting points.

1.6 COORDINATION

- A. Coordinate size and location of structural support members and/or shaft locations.
- B. Coordinate installation of roof curbs, equipment supports, and roof penetrations. These items are specified in these documents.

1.7 EXTRA MATERIALS

- A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Belts: One set for each belt-driven unit.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Cook, Loren Company.
 - 2. Greenheck.

2.2 HOUSINGS

- A. Roof Mounted Centrifugal Exhaust Fan.
 - 1. The fan shall be of bolted and welded construction utilizing corrosion resistant fasteners. The spun aluminum structural components shall be constructed of minimum 16 gauge marine alloy aluminum, bolted to a rigid aluminum support structure. The aluminum base shall have continuously welded curb cap corners for maximum leak protection. The discharge baffle shall have a rolled bead for added strength. An integral conduit chase shall be provided through the curb cap and into the motor compartment to facilitate wiring connections. Bearings and drives shall be mounted on a minimum 14 gauge steel power assembly, isolated from the unit structure with rubber vibration isolators. These components shall be enclosed in a weather-tight compartment, separated from the exhaust airstream. Unit shall bear an engraved aluminum nameplate and shall be shipped in ISTA certified transit tested packaging.

2.3 WHEELS

- A. Roof Mounted Centrifugal Exhaust Fan
 - 1. Wheel shall be centrifugal backward inclined, constructed of 100% aluminum, including a precision machined cast aluminum hub. Wheel inlet shall overlap an aerodynamic aluminum inlet cone to provide maximum performance and efficiency. Wheel shall be balanced in accordance with AMCA Standard 204-96, Balance Quality and Vibration Levels for Fans.

2.4 SHAFTS

- A. Statically and dynamically balanced and selected for continuous operation at maximum rated fan speed and motor horsepower, with final alignment and belt adjustment made after installation.
- B. Turned, ground, and polished hot-rolled steel with keyway. Ship with a protective coating of lubricating oil.
- C. Designed to operate at no more than 70 percent of first critical speed at top of fan's speed range.

2.5 BEARINGS

- A. Prelubricated and Sealed Shaft Bearings: Self-aligning, pillow-block-type ball bearings.
 - 1. Ball-Bearing Rating Life: ABMA 9, L₅₀ of 200,000 hours.
 - 2. Roller-Bearing Rating Life: ABMA 11, L₅₀ of 200,000 hours.

2.6 BELT DRIVES

- A. Description: Factory mounted, with final alignment and belt adjustment made after installation.
 - 1. Service Factor Based on Fan Motor: 1.5.
- B. Fan Pulleys: Cast iron or cast steel with split, tapered bushing; dynamically balanced at factory.
- C. Motor Pulleys: Adjustable pitch for use with motors through 5 hp; fixed pitch for use with motors larger than 5 hp. Select pulley so pitch adjustment is at the middle of adjustment range at fan design conditions.
- D. Belts: Oil resistant, nonsparking, and nonstatic; matched sets for multiple belt drives.
- E. Motor Mount: Adjustable for belt tensioning.

2.7 ACCESSORIES

- A. Scroll Access Doors: Shaped to conform to scroll, with quick-opening latches and gaskets.
- B. Companion Flanges: Galvanized steel, for duct connections.
- C. Scroll Drain Connection: NPS 1 (DN 25) steel pipe coupling welded to low point of fan scroll.
- D. Shaft Cooler: Metal disk between bearings and fan wheel, designed to dissipate heat from shaft.
- E. Spark-Resistant Construction: AMCA 99 (where required).
- F. Shaft Seals: Airtight seals installed around shaft on drive side of single-width fans.
- G. Weather Cover: Enameled-steel sheet with ventilation slots, bolted to housing.

2.8 MOTORS

- A. Refer to Section "Motors" for general requirements for factory-installed motors.
- B. Motor Construction: NEMA MG 1, general purpose, continuous duty, high efficiency, Design B.
- C. Enclosure Type: [Open dripproof] [Totally enclosed, fan cooled].

2.9 SOURCE QUALITY CONTROL

- A. Sound-Power Level Ratings: Comply with AMCA 301, "Methods for Calculating Fan Sound Ratings from Laboratory Test Data." Factory test fans according to AMCA 300, "Reverberant Room Method for Sound Testing of Fans." Label fans with the AMCA-Certified Ratings Seal.
- B. Fan Performance Ratings: Establish flow rate, pressure, power, air density, speed of rotation, and efficiency by factory tests and ratings according to AMCA 210, "Laboratory Methods of Testing Fans for Rating."

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install centrifugal fans level and plumb.
- B. Install units with clearances for service and maintenance.
- C. Label fans according to requirements specified in Section "Mechanical Identification."

3.2 CONNECTIONS

- A. Duct installation and connection requirements are specified in other Division 23 Sections. Drawings indicate general arrangement of ducts and duct accessories. Make final duct connections with flexible connectors. Flexible connectors are specified in Division 23 Section "Duct Accessories."
- B. Install ducts adjacent to fans to allow service and maintenance.
- C. Ground equipment.
- D. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A and UL 486B.

3.3 FIELD QUALITY CONTROL

- A. Equipment Startup Checks:
 - 1. Verify that shipping, blocking, and bracing are removed.
 - 2. Verify that unit is secure on mountings and supporting devices and that connections to ducts and electrical components are complete. Verify that proper thermal-overload protection is installed in motors, starters, and disconnect switches.
 - 3. Verify that cleaning and adjusting are complete.

4. Disconnect fan drive from motor, verify proper motor rotation direction, and verify fan wheel free rotation and smooth bearing operation. Reconnect fan drive system, align and adjust belts, and install belt guards.
5. Verify lubrication for bearings and other moving parts.

B. Starting Procedures:

1. Energize motor and adjust fan to indicated rpm.
2. Measure and record motor voltage and amperage.

C. Operational Test: After electrical circuitry has been energized, start units to confirm proper motor rotation and unit operation. Remove malfunctioning units, replace with new units, and retest.

D. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

E. Shut unit down and reconnect automatic temperature-control operators.

F. Refer to Section "Testing, Adjusting, and Balancing" for testing, adjusting, and balancing procedures.

G. Replace fan and motor pulleys as required to achieve design airflow.

H. Repair or replace malfunctioning units. Retest as specified above after repairs or replacements are made.

3.4 ADJUSTING

- A. Adjust damper linkages for proper damper operation.
- B. Adjust belt tension.
- C. Lubricate bearings.

3.5 CLEANING

- A. On completion of installation, internally clean fans according to manufacturer's written instructions. Remove foreign material and construction debris. Vacuum fan wheel and cabinet.
- B. After completing system installation, including outlet fitting and devices, inspect exposed finish. Remove burrs, dirt, and construction debris and repair damaged finishes.

3.6 DEMONSTRATION

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain centrifugal fans.
 1. Train Owner's maintenance personnel on procedures and schedules for starting and stopping, troubleshooting, servicing, and maintaining equipment and schedules.
 2. Review data in maintenance manuals. Refer to specifications Section "Closeout Procedures."
 3. Schedule training with Owner, through Architect, with at least seven days' advance notice.

END OF SECTION

SECTION 233713

DIFFUSERS, REGISTERS, AND GRILLES

PART 1 -

1.1 SUMMARY

- A. This Section includes ceiling- and wall-mounted diffusers, registers, and grilles.

1.2 DEFINITIONS

- A. Diffuser: Circular, square, or rectangular air distribution outlet, generally located in the ceiling and comprised of deflecting members discharging supply air in various directions and planes and arranged to promote mixing of primary air with secondary room air.
- B. Grille: A louvered or perforated covering for an opening in an air passage, which can be located in a sidewall, ceiling, or floor.
- C. Register: A combination grille and damper assembly over an air opening.

1.3 SUBMITTALS

- A. Product Data: For each model indicated, include the following:
1. Data Sheet: For each type of air outlet and inlet, and accessory furnished; indicate construction, finish, and mounting details.
 2. Performance Data: Include throw and drop, static-pressure drop, and noise ratings for each type of air outlet and inlet.
 3. Schedule of diffusers, registers, and grilles indicating drawing designation, room location, quantity, model number, size, and accessories furnished.
 4. Assembly Drawing: For each type of air outlet and inlet; indicate materials and methods of assembly of components.
- B. Coordination Drawings: Reflected ceiling plans and wall elevations drawn to scale to show locations and coordination of diffusers, registers, and grilles with other items installed in ceilings and walls.

1.4 QUALITY ASSURANCE

- A. NFPA Compliance: Install diffusers, registers, and grilles according to NFPA 90A, "Standard for the Installation of Air-Conditioning and Ventilating Systems."

PART 2 - PRODUCTS

2.1 MANUFACTURED UNITS

- A. Diffusers, registers, and grilles are scheduled on Drawings.

B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Titus.
2. Price

2.2 SOURCE QUALITY CONTROL

A. Testing: Test performance according to ASHRAE 70, "Method of Testing for Rating the Performance of Air Outlets and Inlets."

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas where diffusers, registers, and grilles are to be installed for compliance with requirements for installation tolerances and other conditions affecting performance of equipment. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Install diffusers, registers, and grilles level and plumb, according to manufacturer's written instructions, Coordination Drawings, original design, and referenced standards.

B. Ceiling-Mounted Outlets and Inlets: Drawings indicate general arrangement of ducts, fittings, and accessories. Air outlet and inlet locations have been indicated to achieve design requirements for air volume, noise criteria, airflow pattern, throw, and pressure drop. Make final locations where indicated, as much as practicable. . Coordinate device locations with ceiling grid, sprinklers, and lights. Where architectural features or other items conflict with installation, notify Architect for a determination of final location.

C. Install diffusers, registers, and grilles with airtight connection to ducts and to allow service and maintenance of dampers, air extractors, and fire dampers.

3.3 ADJUSTING

A. After installation, adjust diffusers, registers, and grilles to air patterns indicated, or as directed, before starting air balancing.

3.4 CLEANING

A. After installation of diffusers, registers, and grilles, inspect exposed finish. Clean exposed surfaces to remove burrs, dirt, and smudges. Replace diffusers, registers, and grilles that have damaged finishes.

END OF SECTION

SECTION 233714

LOUVERS AND VENTS

PART 1 - GENERAL

1.1 SUMMARY

- A. Includes But Not Limited To:
1. Furnish and install louvers connected to ductwork as described in Contract Documents.

1.2 SUBMITTALS

- A. Informational Submittals:
1. Provide all performance data, drawings, sizes, material, color, and warranty.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturer Contact List:
1. Carnes Co
 2. Ruskin Manufacturing
 3. United Enertech
 4. Greenheck

2.2 MANUFACTURED UNITS

- A. Louvers:
1. General:
 - a. Extruded aluminum, with blades welded or screwed into frames.
 - b. Frames shall have mitered corners.
 - c. Louvers shall be recessed, flanged, stationary, or removable as noted on Contract Documents.
 - d. Finish:
 - 1) Polyvinylidene Fluoride (PVF₂) Resin-base finish (Kynar 500 or Hylar 5000) containing 70 percent minimum PVF₂ in resin portion of formula. Thermo-cured two coat system consisting of corrosion inhibiting epoxy primer and top coat factory applied over properly pre-treated metal.
 - 2) Color as selected by Architect from Manufacturer's standard colors.
 2. Louvers Connected To Ductwork:
 - a. 1/2 inch (13 mm) mesh 16 ga (1.59 mm) aluminum bird screen.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Anchor securely into openings.

- B. Where louvers touch masonry or dissimilar metals, protect with heavy coat of asphaltum paint.

END OF SECTION

PART 1 GENERAL

1.01 Section Includes

- A. Packaged air handling units.
- B. Refrigeration components

1.02 RELATED SECTIONS

- A. Section - Vibration Isolation.
- B. Section - Ductwork Insulation.
- C. Section - Ductwork.
- D. Section - Ductwork Accessories: Flexible duct connections.
- E. Section - Controls and Instrumentation
- F. Section - Equipment wiring systems.

1.03 REFERENCES

- A. ANSI/ASHRAE 15 - Safety Code for Mechanical Refrigeration.
- B. ANSI/ASHRAE/IES 90 A - Energy Conservation in New Building Design Standard.
- C. AHRI 210/240 - Unitary Air-Conditioning Equipment and Air-Source Heat Pump Equipment, (less than 135,000 Btuh).
- D. AHRI 360 - Commercial and Industrial Unitary Air Conditioning Equipment testing and rating standard, (equipment greater than 135,000 Btuh).
- E. AHRI 340 - Commercial and Industrial Unitary Heat pump Equipment, (heat pumps above 135,000 Btuh).
- F. ANSI Z21.47/UL1995 - Unitary Air Conditioning Standard for safety requirements.

1.04 QUALITY ASSURANCE

- A. Air Handling Units: Product of manufacturer regularly engaged in production of components who issues complete catalog data on total product.

1.05 SUBMITTALS

- A. Submit unit performance data including: capacity, nominal and operating performance.

- B. Submit Mechanical Specifications for unit and accessories describing construction, components and options.
- C. Submit shop drawings indicating overall dimensions as well as installation, operation and service clearances. Indicate lift points and recommendations and center of gravity. Indicate unit shipping, installation and operating weights including dimensions.
- D. Submit data on electrical requirements and connection points. Include recommended wire and fuse sizes or MCA, sequence of operation, safety and start-up instructions.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Comply with manufacturer's installation instructions for rigging, unloading, and transporting units.
- B. Store in clean dry place and protect from weather and construction traffic. Handle carefully to avoid damage to components, enclosures, and finish.

1.07 ENVIRONMENTAL REQUIREMENTS

- A. Do not operate units for any purpose, temporary or permanent, until ductwork is clean, filters are in place, bearings lubricated, and fan has been test run under observation.

1.08 WARRANTY

- A. Provide one year parts warranty.

2.02 GENERAL

PART 2 PRODUCTS

2.01 SUMMARY

- A. The contractor shall furnish and install air handling unit(s) as shown as scheduled on the contract documents. The unit(s) shall be installed in accordance with this specification and perform at the specified conditions as scheduled.

- A. Provide indoor-mounted, draw-thru, packaged air handling unit(s). Unit(s) shall be factory-assembled including direct-expansion evaporator coil, expansion valve(s), check valves, condensate drain pan, centrifugal fan assembly with fan motor(s) and mounting bracket sheaves, drives and belts, filters, and electrical controls. Units shall be suitable for either horizontal or vertical airflow configuration and be used with or without ductwork.

B. APPROVED MANUFACTURERS

1. Trane

2.03 CASING

2. Substitutions: Prior approval required as indicated under the general and/or supplemental conditions of these specifications.

- A. Unit casing shall be constructed of zinc-coated, heavy gauge, galvanized steel. Exterior surfaces shall be cleaned, phosphatized and finished with a baked enamel finish.

- B. Unit casing shall be completely insulated with fire-retardant, permanent, foil-faced, odorless glass fiber material.

2.04 FANS

- A. Provide fan section with forward curved, double width, double inlet, centrifugal type fan.
- B. Provide self-aligning, grease lubricated, ball or roller bearings with permanent lubrication fittings.
- C. Factory mount motor on slide rails. Provide access to motor, drive, and bearings through removable casing panels.
- D. Provide shafts constructed of solid hot rolled steel, ground and polished, with key-way, and protectively coated with lubricating oil.
- E. Provide cast iron or steel variable and adjustable pitched sheaves, dynamically balanced, bored to fit shafts and keyed.

2.05 COILS

- A. Provide configured aluminum fin surface mechanically bonded to copper tubing coil. Enclose coils with headers and return bends fully contained within casing. Coil shall have factory installed expansion valves and factory pressure and leak tested at 375 psig.
- B. Provide double sloped condensate drain pan constructed of PVC with external connections on either side of unit. The drain pan shall be removable for cleaning.

2.06 FILTERS

- A. 3 TO 20 Ton AHUS.

- 1. Provide EZ Base Manufacturer filter frames with 2" filters.

2.07 CONTROLS

- A. Provide factory installed and wired controls including fan contactor, low voltage terminal strip and single point power entry.
- B. Provide factory installed evaporator defrost control to prevent coil freezing at low evaporator temperatures.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Install unit on vibration isolators.

END OF SECTION

SECTION 238127

MINI SPLIT SYSTEM AIR CONDITIONERS

PART 1 - GENERAL

1.1 SUMMARY

- A. Includes But Not Limited To:
 - 1. Furnish and install mini split heat pumps as described in Contract Documents.

1.2 SUBMITTALS

- A. Informational Submittals:
 - 1. Manufacturer Reports:
- B. Equipment Data sheets. Closeout Submittals:
 - 1. Include following in Operations And Maintenance Manual .
 - a. Record Documentation:
 - 1) Manufacturers Documentation:
 - b. Equipment data sheets: Complete and sign all items for each unit

1.3 QUALITY ASSURANCE

- A. Regulatory Agency Sustainability Approvals:
 - 1. Each unit shall be UL / ULC or ETL labeled.

1.4 WARRANTY

- A. Special Warranty:
 - 1. Provide five-year warranty on compressors beginning from date of start-up.
 - 2. Record start-up date on warranty certificate for each unit.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturer Contact List:
 - 1. Mitsubishi Electric & Electronics
 - 2. Sanyo Air Conditioning Products,
 - 3. LG

2.2 MANUFACTURED UNITS

- A. Heat Pumps:
 - 1. Indoor Units:
 - a. Compact wall mounted units.
 - b. Supplementary electric heater, size as scheduled.

- c. Cabinet finish as selected by Architect.
- d. Isolate moving parts from cabinets to reduce noise.
- 2. Outdoor Units:
 - a. Compressor shall be of rotary or scroll design.
 - b. Fans shall be direct driven and discharge horizontally.
 - c. Casing shall be fully weatherproof for outdoor installations.
 - d. Microprocessor Controls shall be factory wired with field installed remote pendant station.
 - e. Refrigerant shall be R-410a.
 - f. Isolate moving parts from cabinets to reduce noise.
 - g. Use dry-charged tubing for connection of unit's refrigerant system.

PART 3 - EXECUTION

3.1 FIELD QUALITY CONTROL

- A. Manufacturer's Field Service:
 - 1. Units shall be started up, checked out, and adjusted by Unit Manufacturer's authorized factory trained service mechanic.
 - 2. Use equipment check-out sheet provided by Manufacturer. Complete and sign all items on sheet.

END OF SECTION

SECTION 238128AIR COOLED CONDENSING**PART 1 GENERAL****1.01 SECTION INCLUDES**

- A. Condensing unit package.
- B. Charge of refrigerant and oil.
- C. Controls and control connections.
- D. Refrigerant piping connections.
- E. Motor starters.
- F. Electrical power connections.

1.02 RELATED SECTIONS

- A. Section - Cast-in-Place Concrete: Equipment bases.
- B. Section - Refrigeration Piping and Specialties.
- C. Section - Air Handling Units with Coils.
- D. Section - Controls and Instrumentation.
- E. Section - Vibration Isolation - Placement of Vibration Isolators

1.03 REFERENCES

- A. ANSI/ASHRAE 15 - Safety Code for Mechanical Refrigeration.
- B. ANSI/ASHRAE/IES 90 A - Energy Conservation in New Building Design Standard.
- C. AHRI 210/240 - Unitary Air-Conditioning Equipment and Air-Source Heat Pump Equipment, (units less than 135,000 Btuh).
- D. AHRI 360 - Commercial and Industrial Unitary Air Conditioning Equipment testing and rating standard (condensing units greater than 135,000 Btuh).
- E. ANSI Z21.47/UL1995 - Unitary Air Conditioning Standard for safety requirements.
- F. California Energy Commission Administrative Code - Title 20/24 - Establishes the minimum efficiency requirements for HVAC equipment installed in new buildings in the State of California.
- G. AHRI 270 - Sound Rating of Outdoor Unitary Equipment, (units less than 135,00 Btuh).
- H. AHRI 370 - Sound Rating of Large Outdoor Refrigerating and Air Conditioning Equipment (equipment above 135,000 Btuh).

1.04 SUBMITTALS

- A. Submit unit performance data including: capacity, nominal and operating performance.
- B. Submit Mechanical Specifications for unit and accessories describing construction, components and options.
- C. Submit shop drawings indicating overall dimensions as well as installation, operation and service clearances. Indicate lift points and recommendations and center of gravity. Indicate unit shipping, installation and operating weights including dimensions.
- D. Submit data on electrical requirements and connection points. Include recommended wire and fuse sizes or MCA, sequence of operation, safety and start-up instructions.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Comply with manufacturer's installation instructions for rigging, unloading, and transporting units.
- B. Protect units on site from physical damage. Protect coils.

1.06 WARRANTY

- A. Provide parts warranty for one year from start-up or 18 months from shipment, whichever occurs first.

PART 2 PRODUCTS**2.01 SUMMARY**

- A. The contractor shall furnish and install air-cooled condensing units as shown as scheduled on the contract documents. The unit(s) shall be installed in accordance with this specification and perform at the specified conditions as scheduled.

B. APPROVED MANUFACTURERS

- 1. Trane:
- 2. Carrier

2.02 GENERAL UNIT DESCRIPTION

- A. Provide self-contained, packaged, factory-assembled and pre-wired units suitable for outdoor use

- consisting of cabinet, compressor(s), condensing coil and fan(s), integral subcooling circuit(s), filter drier(s), and controls. Provide expansion valve(s) and check valves for split system heat pump unit(s).
- B. Performance Ratings: Energy Efficiency Rating (EER) [and Coefficient of Performance (COP)] not less than prescribed by ANSI/ASHRAE 90A.
- 2.03** CASING(2-20 TON)
- A. House components in 18 gauge zinc-coated galvanized steel frame and panels with weather resistant, baked enamel finish. Units surface shall be tested 500 hours in salt spray test.
- B. Mount controls in weatherproof panel provided with removable panels and/or access doors with quick opening fasteners.
- 2.04** CASING(20-30 TON)
- A. Cabinet: Galvanized steel, phosphatized, and finished with an air-dry paint coating durable enough to withstand 672 consecutive-hour salt spray application in accordance with standard ASTM B 117. Structural members shall be 14 gauge with access doors and removable panels of minimum 18 gauge steel.
- 2.05** CONDENSER COILS (2-20 TONS)
- 2.06** Coils: Aluminum fins mechanically bonded to seamless copper tubing. Provide subcooling circuit(s). Factory leak test under water to 450 psig, and vacuum dehydrate. Seal with holding charge of nitrogen.
- 2.07** CONDENSER SECTION (20-30 TON)
- A. Condenser coils shall have all Aluminum Microchannel coils. All coils shall be leak tested at the factory to ensure pressure integrity. The condenser coil is pressure tested to 650 psig.
- 2.08** REFRIGERANT CIRCUIT(S)
- A. Refer to plans.
- 2.09** FANS AND MOTORS
- A. Vertical discharge direct driven propeller type condenser fans with fan guard on discharge. Fans shall be statically and dynamically balanced.
- B. Weatherproof motors suitable for outdoor use, with permanently lubricated totally enclosed or open construction motors shall be provided and shall have built in current and thermal overload protection. Motors shall be either sleeve or ball bearing type.
- 2.10** COMPRESSORS (3-20 TON)
- A. Compressor(s): Provide direct-drive hermetic, reciprocating type compressor(s) with centrifugal oil pump providing positive lubrication to moving parts and automotive type pistons, rings to prevent gas leakage, internal suction and discharge valves and crankcase heater. Motor shall be suction gas-cooled with internal temperature and current sensitive motor overloads. Internally isolated motors on springs. External high and low pressure cutout devices shall be provided.
- 2.11** COMPRESSORS (21-30 TON)
- A. Compressors shall be industrial grade, energy-efficient direct-drive 3600 RPM maximum speed reciprocating, scroll type. The motor shall be of a suction gas cooled hermetic design. Compressor shall have centrifugal oil pump with dirt separator, oil sight glass, and oil charging valve. A solid state temperature sensor shall be embedded in the motor windings to protect against excessive winding temperatures.
1. If semi-hermetic reciprocating industrial grade compressors are utilized provide single piece crankshafts, connecting rods, aluminum pistons, rings to prevent gas leakage, high strength non-flexing ring type suction and discharge valves, spring loaded heads, replaceable cylinder liners, and sealing surface immersed in oil. Provide removable discharge heads and hand hole covers, and discharge service valves.
 2. Provide compressor with automatic capacity reduction equipment consisting of suction valve unloaders. Use electric solenoid actuated lifting. Provide for unloaded compressor start.
- B. Motor shall be designed for across-the-line starting and suitable for a voltage utilization range of +/- 10 percent from nameplate voltage.
- C. Supply initial charge of refrigerant and oil for each refrigerant circuit.
- 2.12** CONTROLS (3-20 TON)

- A. Provide factory-wired condensing units with 24 volt control circuit with internal fusing and control transformers, contactor pressure lugs and/or terminal block for power wiring. Contractor to provide field installed unit mounted disconnect switch. Units shall have single point power connections.
- B. Provide factory-wired units with 24-volt electro-mechanical control circuit with control transformers, contactors pressure lugs or terminal block for power wiring. Contractor to provide [DISCONNECT DEVICE]. Units shall have single point power connection as standard. Field wiring of zone controls to be NEC Class II.
 - 1. Provide factory installed evaporator defrost control to prevent compressor slugging by interrupting compressor operation when low evaporator coil temperatures are encountered.

- B. Provide microprocessor unit-mounted DDC control which when used with an electronic zone sensor provides proportional integral room control. This UCM shall perform all unit functions by making all heating, cooling, and ventilating decisions through resident software logic.

- 1. Provide factory-installed indoor evaporator defrost control to prevent compressor slugging by interrupting compressor operation.
- 2. Provide an anti-cycle timing and minimum on/off between stages timing in the microprocessor.

2.13 SYSTEM CONTROLS (21-30 TON)

- A. No System Control: Provide compressors wired to a terminal strip inside the control panel. Include guaranteed fixed-on and -off timers for compressor protection. Temperature controls not included in unit.
- B. Unit Control: Provide 115 volt control circuit with fusing and control power transformer. Unit wired with contactors for compressor and condenser motors, compressor overload protection, high/low cutouts, differential oil pressure control, reset relay, and anti-cycle compressor timer

2.14 BUILDING MANAGEMENT SYSTEM

- A. Interface control module to Energy Management System to be furnished and mounted by unit manufacturer. Through this interface module, all Energy Management functions (specified in Energy Management Section) shall be performed. See Building Automation and Automatic Temperature Control System Specifications. The interface module with necessary controls and sensors shall all be factory mounted (not field mounted). If not furnished by unit manufacturer, this shall be furnished by Energy Management System Contractor for factory mounting by rooftop unit manufacturer in rooftop unit and rated for service up to 140 F. The only field connection to Energy Management System shall be a single communication link.
- B. Control Functions: Include unit scheduling, occupied/unoccupied mode, start-up and coast-down modes, demand limiting, night setback, timed override and alarm shutdown.
- C. Diagnostic Functions: Include supply fan status, , and a field supplied and installed sensor, to provide a dirty filter alarm.
- D. Provide capabilities for Boolean Processing and trend logs as well as "templated" reports and logs.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Provide for connection to electrical service.
- C. Install units on vibration isolation neoprene pads.

- D. Install units on concrete housekeeping base as indicated.
- E. Provide connection to refrigeration piping system and evaporators.

END OF SECTION

SECTION 26 00 00**BASIC ELECTRICAL MATERIALS AND METHODS****PART 1 - GENERAL****1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Raceways.
 - 2. Building wire and connectors.
 - 3. Supporting devices for electrical components.
 - 4. Electrical identification.
 - 5. Electricity-metering components.
 - 6. Concrete equipment bases.
 - 7. Electrical demolition.
 - 8. Cutting and patching for electrical construction.
 - 9. Touchup painting.

1.3 DEFINITIONS

- A. EMT: Electrical metallic tubing.
- B. FMC: Flexible metal conduit.
- C. IMC: Intermediate metal conduit.
- D. LFMC: Liquidtight flexible metal conduit.
- E. RNC: Rigid nonmetallic conduit.

1.4 SUBMITTALS

- A. Product Data: For electricity-metering equipment.
- B. Shop Drawings: Dimensioned plans and sections or elevation layouts of electricity-metering equipment.
- C. Field Test Reports: Indicate and interpret test results for compliance with performance requirements.

1.5 QUALITY ASSURANCE

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- B. Comply with NFPA 70.

1.6 COORDINATION

- A. Coordinate chases, slots, inserts, sleeves, and openings with general construction work and arrange in building structure during progress of construction to facilitate the electrical installations that follow.
 - 1. Set inserts and sleeves in poured-in-place concrete, masonry work, and other structural components as they are constructed.
- B. Sequence, coordinate, and integrate installing electrical materials and equipment for efficient flow of the Work. Coordinate installing large equipment requiring positioning before closing in the building.
- C. Coordinate electrical service connections to components furnished by utility companies.
 - 1. Coordinate installation and connection of exterior underground and overhead utilities and services, including provision for electricity-metering components.
 - 2. Comply with requirements of authorities having jurisdiction and of utility company providing electrical power and other services.
- D. Coordinate location of access panels and doors for electrical items that are concealed by finished surfaces. Access doors and panels are specified in Division 8 Section "Access Doors."
- E. Where electrical identification devices are applied to field-finished surfaces, coordinate installation of identification devices with completion of finished surface.
- F. Where electrical identification markings and devices will be concealed by acoustical ceilings and similar finishes, coordinate installation of these items before ceiling installation.

PART 2 - PRODUCTS**2.1 EQUIPMENT FOR UTILITY COMPANY'S ELECTRICITY METERING**

- A. Current-Transformer Cabinets: Comply with requirements of electrical power utility company.
- B. Meter Sockets: Comply with requirements of electrical power utility company.

- C. Modular Meter Centers: Factory-coordinated assembly of a main meter center circuit-breaker unit with wireways, tenant meter socket modules, and tenant branch circuit breakers arranged in adjacent vertical sections, complete with interconnecting buses.
 - 1. Housing: NEMA 250, Type 3R enclosure.
 - 2. Tenant Branch Circuit Breakers: Series combination rated to protect circuit breakers in downstream panelboards that have 10,000-A interrupting capacity, minimum.
- 2.2 CONCRETE BASES
 - A. Concrete Forms and Reinforcement Materials: As specified in Division 3 Section "Cast-in-Place Concrete."
 - B. Concrete: 3000-psi (20.7-MPa), 28-day compressive strength as specified in Division 3 Section "Cast-in-Place Concrete."
- 2.3 TOUCHUP PAINT
 - A. For Equipment: Equipment manufacturer's paint selected to match installed equipment finish.
 - B. Galvanized Surfaces: Zinc-rich paint recommended by item manufacturer.
- PART 3 - EXECUTION
- 3.1 ELECTRICAL EQUIPMENT INSTALLATION
 - A. Headroom Maintenance: If mounting heights or other location criteria are not indicated, arrange and install components and equipment to provide the maximum possible headroom.
 - B. Materials and Components: Install level, plumb, and parallel and perpendicular to other building systems and components, unless otherwise indicated.
 - C. Equipment: Install to facilitate service, maintenance, and repair or replacement of components. Connect for ease of disconnecting, with minimum interference with other installations.
 - D. Right of Way: Give to raceways and piping systems installed at a required slope.
- 3.2 RACEWAY AND CABLE INSTALLATION
 - A. Conceal raceways and cables, unless otherwise indicated, within finished walls, ceilings, and floors.
 - B. Install raceways and cables at least 6 inches (150 mm) away from parallel runs of flues and steam or hot-water pipes. Locate horizontal raceway runs above water and steam piping.
 - C. Use temporary raceway caps to prevent foreign matter from entering.
 - D. Make conduit bends and offsets so ID is not reduced. Keep legs of bends in the same plane and straight legs of offsets parallel, unless otherwise indicated.
 - E. Use raceway and cable fittings compatible with raceways and cables and suitable for use and location.
 - F. Install raceways embedded in slabs in middle third of slab thickness where practical, and leave at least 1-inch (25-mm) concrete cover.
 - 1. Secure raceways to reinforcing rods to prevent sagging or shifting during concrete placement.
 - 2. Space raceways laterally to prevent voids in concrete.
 - 3. Install conduit larger than 1-inch trade size (DN27) parallel to or at right angles to main reinforcement. Where conduit is at right angles to reinforcement, place conduit close to slab support.
 - 4. Transition from nonmetallic tubing to Schedule 80 nonmetallic conduit, rigid steel conduit, or IMC before rising above floor.
 - 5. Make bends in exposed parallel or banked runs from same centerline to make bends parallel. Use factory elbows only where elbows can be installed parallel; otherwise, provide field bends for exposed parallel raceways.
 - G. Install pull wires in empty raceways. Use No. 14 AWG zinc-coated steel or monofilament plastic line with not less than 200-lb (90-kg) tensile strength. Leave at least 12 inches (300 mm) of slack at each end of the pull wire.
 - H. Install telephone and signal system raceways, 2-inch trade size (DN53) and smaller, in maximum lengths of 150 feet (45 m) and with a maximum of two 90-degree bends or equivalent. Separate lengths with pull or junction boxes where necessary to comply with these requirements, in addition to requirements above.
 - I. Connect motors and equipment subject to vibration, noise transmission, or movement with a maximum of 72-inch (1830-mm) flexible conduit. Install LFMC in wet or damp locations. Install separate ground conductor across flexible connections.
 - J. Set floor boxes level and trim after installation to fit flush to finished floor surface.
- 3.3 ELECTRICAL SUPPORTING DEVICE APPLICATION

- A. Damp Locations and Outdoors: Hot-dip galvanized materials or nonmetallic, U-channel system components.
- B. Dry Locations: Steel materials.
- C. Support Clamps for PVC Raceways: Click-type clamp system.
- D. Selection of Supports: Comply with manufacturer's written instructions.
- E. Strength of Supports: Adequate to carry present and future loads, times a safety factor of at least four; minimum of 200-lb (90-kg) design load.

3.4 SUPPORT INSTALLATION

- A. Install support devices to securely and permanently fasten and support electrical components.
- B. Install individual and multiple raceway hangers and riser clamps to support raceways. Provide U-bolts, clamps, attachments, and other hardware necessary for hanger assemblies and for securing hanger rods and conduits.
- C. Support parallel runs of horizontal raceways together on trapeze- or bracket-type hangers.
- D. Size supports for multiple raceway installations so capacity can be increased by a 25 percent minimum in the future.
- E. Support individual horizontal raceways with separate, malleable-iron pipe hangers or clamps.
- F. Install 1/4-inch- (6-mm-) diameter or larger threaded steel hanger rods, unless otherwise indicated.
- G. Spring-steel fasteners specifically designed for supporting single conduits or tubing may be used instead of malleable-iron hangers for 1-1/2-inch (38-mm) and smaller raceways serving lighting and receptacle branch circuits above suspended ceilings and for fastening raceways to slotted channel and angle supports.
- H. Arrange supports in vertical runs so the weight of raceways and enclosed conductors is carried entirely by raceway supports, with no weight load on raceway terminals.
- I. Simultaneously install vertical conductor supports with conductors.
- J. Separately support cast boxes that are threaded to raceways and used for fixture support. Support sheet-metal boxes directly from the building structure or by bar hangers. If bar hangers are used, attach bar to raceways on opposite sides of the box and support the raceway with an approved fastener not more than 24 inches (610 mm) from the box.
- K. Install metal channel racks for mounting cabinets, panelboards, disconnect switches, control enclosures, pull and junction boxes, transformers, and other devices unless components are mounted directly to structural elements of adequate strength.
- L. Install sleeves for cable and raceway penetrations of concrete slabs and walls unless core-drilled holes are used. Install sleeves for cable and raceway penetrations of masonry and fire-rated gypsum walls and of all other fire-rated floor and wall assemblies. Install sleeves during erection of concrete and masonry walls.
- M. Securely fasten electrical items and their supports to the building structure, unless otherwise indicated. Perform fastening according to the following unless other fastening methods are indicated:
 - 1. Wood: Fasten with wood screws or screw-type nails.
 - 2. Masonry: Toggle bolts on hollow masonry units and expansion bolts on solid masonry units.
 - 3. New Concrete: Concrete inserts with machine screws and bolts.
 - 4. Existing Concrete: Expansion bolts.
 - 5. Instead of expansion bolts, threaded studs driven by a powder charge and provided with lock washers may be used in existing concrete.
 - 6. Steel: Welded threaded studs or spring-tension clamps on steel.
 - a. Field Welding: Comply with AWS D1.1.
 - 7. Welding to steel structure may be used only for threaded studs, not for conduits, pipe straps, or other items.
 - 8. Light Steel: Sheet-metal screws.
 - 9. Fasteners: Select so the load applied to each fastener does not exceed 25 percent of its proof-test load.

3.5 IDENTIFICATION MATERIALS AND DEVICES

- A. Install at locations for most convenient viewing without interference with operation and maintenance of equipment.

- B. Coordinate names, abbreviations, colors, and other designations used for electrical identification with corresponding designations indicated in the Contract Documents or required by codes and standards. Use consistent designations throughout Project.
 - C. Self-Adhesive Identification Products: Clean surfaces before applying.
 - D. Identify raceways and cables with color banding as follows:
 - 1. Bands: Pretensioned, snap-around, colored plastic sleeves or colored adhesive marking tape. Make each color band 2 inches (51 mm) wide, completely encircling conduit, and place adjacent bands of two-color markings in contact, side by side.
 - 2. Band Locations: At changes in direction, at penetrations of walls and floors, at 50-foot (15-m) maximum intervals in straight runs, and at 25-foot (8-m) maximum intervals in congested areas.
 - 3. Colors: As follows:
 - a. Fire Alarm System: Red.
 - b. Security System: Blue and yellow.
 - c. Telecommunication System: Green and yellow.
 - E. Tag and label circuits designated to be extended in the future. Identify source and circuit numbers in each cabinet, pull and junction box, and outlet box. Color-coding may be used for voltage and phase identification.
 - F. Install continuous underground plastic markers during trench backfilling, for exterior underground power, control, signal, and communication lines located directly above power and communication lines. Locate 6 to 8 inches (150 to 200 mm) below finished grade. If width of multiple lines installed in a common trench or concrete envelope does not exceed 16 inches (400 mm), overall, use a single line marker.
 - G. Color-code 208/120-V system secondary service, feeder, and branch-circuit conductors throughout the secondary electrical system as follows:
 - 1. Phase A: Black.
 - 2. Phase B: Red.
 - 3. Phase C: Blue.
 - 4. Neutral: White.
 - 5. Ground: Green.
 - H. Color-code 480/277-V system secondary service, feeder, and branch-circuit conductors throughout the secondary electrical system as follows:
 - 1. Phase A: BROWN.
 - 2. Phase B: ORANGE.
 - 3. Phase C: YELLOW.
 - 4. Neutral: White with a colored stripe or gray.
 - 5. Ground: Green.
 - I. Install warning, caution, and instruction signs where required to comply with 29 CFR, Chapter XVII, Part 1910.145, and where needed to ensure safe operation and maintenance of electrical systems and of items to which they connect. Install engraved plastic-laminated instruction signs with approved legend where instructions are needed for system or equipment operation. Install metal-backed butyrate signs for outdoor items.
 - J. Install engraved-laminated emergency-operating signs with white letters on red background with minimum 3/8-inch- (9-mm-) high lettering for emergency instructions on power transfer, load shedding, and other emergency operations.
- 3.6 UTILITY COMPANY ELECTRICITY-METERING EQUIPMENT
- A. Install equipment according to utility company's written requirements. Provide grounding and empty conduits as required by utility company.
- 3.7 FIRESTOPPING
- A. Apply firestopping to cable and raceway penetrations of fire-rated floor and wall assemblies to achieve fire-resistance rating of the assembly. Firestopping materials and installation requirements are specified in Division 7 Section "Firestopping."
- 3.8 CONCRETE BASES
- A. Construct concrete bases of dimensions indicated, but not less than 4 inches (100 mm) larger, in both directions, than supported unit. Follow supported equipment manufacturer's anchorage recommendations

and setting templates for anchor-bolt and tie locations, unless otherwise indicated. Use 3000-psi (20.7-MPa), 28-day compressive-strength concrete and reinforcement as specified in Division 3 Section "Cast-in-Place Concrete."

3.9 CUTTING AND PATCHING

- A. Cut, channel, chase, and drill floors, walls, partitions, ceilings, and other surfaces required to permit electrical installations. Perform cutting by skilled mechanics of trades involved.
- B. Repair and refinish disturbed finish materials and other surfaces to match adjacent undisturbed surfaces. Install new fireproofing where existing firestopping has been disturbed. Repair and refinish materials and other surfaces by skilled mechanics of trades involved.

3.10 FIELD QUALITY CONTROL

- A. Inspect installed components for damage and faulty work, including the following:
 - 1. Raceways.
 - 2. Building wire and connectors.
 - 3. Supporting devices for electrical components.
 - 4. Electrical identification.
 - 5. Electricity-metering components.
 - 6. Concrete bases.
 - 7. Electrical demolition.
 - 8. Cutting and patching for electrical construction.
 - 9. Touchup painting.
- B. Test Owner's electricity-metering installation for proper operation, accuracy, and usability of output data.
 - 1. Connect a load of known kW rating, 1.5 kW minimum, to a circuit supplied by the metered feeder.
 - 2. Turn off circuits supplied by the metered feeder and secure them in the "off" condition.
 - 3. Run the test load continuously for eight hours, minimum, or longer to obtain a measurable meter indication. Use a test load placement and setting that ensure continuous, safe operation.
 - 4. Check and record meter reading at end of test period and compare with actual electricity used based on test load rating, duration of test, and sample measurements of supply voltage at the test load connection. Record test results.
 - 5. Repair or replace malfunctioning metering equipment or correct test setup; then retest. Repeat for each meter in installation until proper operation of entire system is verified.

3.11 REFINISHING AND TOUCHUP PAINTING

- A. Refinish and touch up paint. Paint materials and application requirements are specified in Division 9 Section "Painting."
 - 1. Clean damaged and disturbed areas and apply primer, intermediate, and finish coats to suit the degree of damage at each location.
 - 2. Follow paint manufacturer's written instructions for surface preparation and for timing and application of successive coats.
 - 3. Repair damage to galvanized finishes with zinc-rich paint recommended by manufacturer.
 - 4. Repair damage to PVC or paint finishes with matching touchup coating recommended by manufacturer.

3.12 CLEANING AND PROTECTION

- A. On completion of installation, including outlets, fittings, and devices, inspect exposed finish. Remove burrs, dirt, paint spots, and construction debris.
- B. Protect equipment and installations and maintain conditions to ensure that coatings, finishes, and cabinets are without damage or deterioration at time of Substantial Completion.

END OF SECTION

SECTION 26 00 10**BASIC ELECTRICAL REQUIREMENTS****PART 1 – GENERAL****1.1 RELATED REQUIREMENTS**

- A. The General Provisions, Supplemental General Provisions, Special Provisions, Division 1 Specification Sections and all relevant documents shall form a part of this Division of the Specifications, and shall be incorporated in this Section and each Division 26 Section hereinafter as if repeated verbatim herein. All conditions imposed by these documents shall be applicable to all portions of the work under this Division. Certain specific paragraphs of said references may be referred to hereinafter in this Division. These references are intended to point out specific items to the Contractor, but in no way relieve him of the responsibility of reading and complying with all relevant parts of the entire Specification.
- B. The Contractor shall examine and coordinate with all Contract Drawings and Specifications, and all Addenda issued. Failure to comply shall not relieve him of responsibility. The omission of details of other portions of the work from this Division shall not be used as a basis for a request for additional compensation.
- C. The specific features and details for other portions of the work related to the construction in progress or to the adjacent building shall be determined by examination at the site.

1.2 SCOPE OF WORK

- A. The requirements contained in this Section apply to all work performed under Division 26 of these Specifications.
- B. The work covered by this Division of the Specifications comprises the furnishing of labor, material, equipment, transportation, tools and services, and performing operations required for, and reasonably incidental to, the installation of the work in accordance with the applicable Contract Documents, and subject to the terms and conditions of the Contract.
- C. Refer to other Divisions of the Specifications for related work.

1.3 DEFINITION OF "CONTRACTOR"

- A. Where the word "Contractor" is used under any Section of this Division of the Specifications, it shall mean the Contractor engaged to execute the work included under that Section, even though this Contractor may be technically described as a Subcontractor, or an authorized representative.
- B. If the Contractor, engaged to execute a portion of the work, employs a Subcontractor to perform some of that work, he shall be completely responsible for the proper execution of this Subcontractor's work, in full conformity with the Contract Documents.

1.4 RESPONSIBILITY OF THE CONTRACTOR

- A. The Contractor shall be responsible for all work of every description in connection with this Division of the Specifications. The Contractor shall specifically and distinctly assume, and does so assume, all risk for damage or injury from whatever cause to property or person used or employed on or in connection with this work and of all damages or injury to any person or property wherever located, resulting from an action or operation under the Contract in connection with the work, and undertake the responsibility to defend the Owner against all claims on account of any such damage or injury.
- B. The Contractor will be held responsible for the satisfactory execution and completion of the work in accordance with the true intent of the Contract Documents. The Contractor shall provide without extra charge all incidental items required as part of the work, even though it may not be specifically indicated. If the Contractor has reason for objecting to the use of any material, equipment, device or method of construction as indicated, the Contractor shall make report of such objections to the Owner's Representative, obtain proper approval and adjustment to the Contract, and shall proceed with the work.

1.5 TERMINOLOGY

- A. Whenever the words "furnish", "provide", "furnish and install", "provide and install", and similar phrases occur, it is the intent that the materials, equipment and devices described be furnished,

installed and connected under this Division, complete for operation, unless specifically noted to the contrary.

- B. It is also the intent, unless specifically noted to the contrary, that all materials, equipment and devices described and specified under this Division of the Specifications be similarly furnished, installed and connected under this Division, whether or not a phrase as described in the preceding paragraph has been actually included.
- C. Whenever the words "Owner's Representative" occurs, it is intended to refer to the Architect, Engineer and/or specific Owner's Representative responsible for or capable of providing the necessary direction pertaining to the referenced issue.

1.6 ORDINANCES, PERMITS AND CODES

- A. It shall be the Contractor's duty to perform the work and provide the materials covered by these specifications in conformance with all ordinances and regulations of all authorities having jurisdiction.
- B. All work herein shall conform to all applicable laws, ordinances and regulations of the local utility companies.
- C. The Contractor shall obtain and pay for all permit and connection fees as required for the complete installation of the specified systems, equipment, devices and materials.
- D. The Contractor shall obtain permits, plan checks, inspections and approvals applicable to the work as required by the regulatory authorities. Fees and costs of any nature whatsoever incidental to these permits, inspections and approvals shall be assumed and paid by the Contractor. The pro-rata costs, if any, for utilities serving this property will be paid for by the Owner and shall not be included as part of this Contract.
- E. The work shall be in accordance with, but shall not be limited to, the requirements of:
 - 1 National Fire Protection Association
 - 2 National Electrical Code
 - 3 National Safety Code
 - 4 State of Texas Safety Code
 - 5 Local City Building Codes
 - 6 State of Texas Building Codes
- F. Codes and standards referred to are minimum standards. Where the requirements of the Drawings or Specifications exceed those of the codes and regulations, the Drawings and Specifications govern.

1.7 MATERIALS, EQUIPMENT AND DEVICE DESCRIPTION

- A. Materials, equipment and devices shall be of the best quality customarily applied in quality commercial practice, and shall be the products of reputable manufacturers. Each major component shall bear a nameplate giving the name and address of the manufacturer, and the catalog number or designation of the component.
- B. Materials, equipment and devices furnished under this Division of the Specifications shall be essentially the standard product of the specified manufacturer, or where allowed, an alternate manufacturer. Where two or more units of the same kind or class of a specific item are required, these shall be the products of a single manufacturer; however, the component parts of the item need not be the products of one manufacturer.
- C. In describing the various materials, equipment and devices, in general each item will be described singularly, even though there may be a multiplicity of identical items. Also, where the description is only general in nature, exact sizes, duties, space arrangements, horsepower requirements and other data shall be determined by reference to the Contract Documents.
- D. Space allocations for materials, equipment and devices have been made on the basis of present and known future requirements and the dimensions of items of equipment or devices of a particular manufacturer whether indicated or not. The Contractor shall verify that all materials, equipment and devices proposed for use on this project are within the constraints of the allocated space.

1.8 QUALITY ASSURANCE

- A. Materials, equipment and devices shall be new and of the quality specified, and shall be free from defects at the time of installation. Materials, equipment and devices damaged in shipment or otherwise damaged or found defective prior to acceptance by the Owner shall not be repaired at the job site, but shall be replaced with new materials, equipment or devices identical with those damaged, unless specifically approved otherwise by the Owner's Representative.
- B. Wherever a UL standard has been established for a particular type of material, equipment or device, each item of such material, equipment or device provided on this project shall meet the requirements of the UL standard in every way, and shall be UL listed and labeled.

1.9 REFERENCE STANDARDS

- A. Materials, equipment, devices and workmanship shall comply with applicable local, county, state and national codes, laws and ordinances, utility company regulations and industry standards.
- B. In case of differences between building codes, state laws, local ordinances, industry standards, utility company regulations and the Contract Documents, the most stringent shall govern. The Contractor shall promptly notify the Owner's Representative in writing of any such difference. Should the Contractor perform any work that does not comply with local codes, laws and ordinances, industry standards or other governing regulations, the work shall be corrected of noncompliance deficiencies with the Contractor bearing all costs.
- C. In addition to the aforementioned ordinances, industry standards published by the following organizations shall apply:

- AABM - American Association of Battery Manufacturers
- ADA - American's with Disabilities Act
- AIA - American Institute of Architects
- ANSI - American National Standards Institute
- ASTM - American Society for Testing and Materials
- CBM - Certified Ballast Manufacturers Association
- ETL - Electrical Testing Laboratories
- FM - Factory Mutual
- ICEA - Insulated Cable Engineers Associated
- IEEE - Institute of Electrical and Electronic Engineers
- IES - Illuminating Engineering Society
- IRI - Industrial Risk Insurance
- NBS - National Bureau of Standards
- NEC - National Electrical Code
- NECA - National Electrical Contractors Association
- NEMA - National Electrical Manufacturers Association
- NESC - National Electrical Safety Code
- NETA - National Electrical Testing Association
- NFPA - National Fire Protection Association
- UL - Underwriters Laboratories



1.10 DRAWINGS AND SPECIFICATIONS

- A. The interrelation of the Drawings (including the schedules) and the Specifications are as follows:
 - 1 The Drawings establish quantities, locations, dimensions and details of materials, equipment and devices. The schedules on the Drawings indicate the capacities, characteristics and components.
 - 2 The Specifications provide written requirements for the quality, standard and nature of the materials, equipment, devices and construction systems.
- B. The Drawings and Specifications shall be considered as being compatible; therefore, the work

called for by one and not by the other shall be furnished and installed as though called for by both. Resolution of conflicts between Drawings and Specifications shall be as follows:

- 1 If the Drawings and Specifications disagree in themselves, or with each other, the Contractor's pricing shall be based on furnishing and installing the most expensive combination of quality and quantity of work indicated for a complete operable system. Contractor is responsible to notifying the Architect and Engineer. In the event of this type of disagreement, the resolution shall be determined by the Owner's Representative. The contractor shall assume for an operable system at the most expensive combination as per the latest National Electrical Code. The contractor shall review all drawings and specifications prior to bid date.
 - 2 The Contractor shall be responsible for bringing any conflicts in the Drawings and the Specifications to the attention of the Owner's Representative immediately, prior to bid date.
 - 3 In general, if there is conflict between the Drawings and Specifications, the Drawings shall govern the Specifications.
 - 4 Where the Specifications do not fully agree with schedules on the Drawings, the schedules shall govern. Actual numerical dimensions indicated on the Drawings govern scale measurements and large scale details govern small scale drawings.
 - 5 Materials, equipment and devices called for on the Drawings and not indicated herein, shall be completely provided and installed as though it were fully described herein.
 - 6 Materials, equipment and devices called for herein shall be completely provided and installed, whether or not it is fully detailed, scheduled or indicated on the Drawings.
- C. The Contractor shall examine the Drawings and Specifications of the other portions of the work for fixtures and finishes in connection with this work. The Contractor shall carefully examine the Drawings to determine the general construction conditions, and shall familiarize himself with all limitations caused by such conditions.
- D. When discrepancies exist between scale and dimension, or between the Drawings of the various portions of the work, they shall be called to the attention of the Owner's Representative for further instruction, whose instructions shall be final and binding and work promptly resumed without any additional cost to the Owner.
- E. Review the construction details of the building(s) as illustrated on the Drawings of the other portions of the work, i.e., architectural, structural, civil, landscape, etc., and be guided thereby. Route conduits and set all boxes as required by the pace of the general construction.
- F. The Drawings diagrammatically show the sizes and locations of the various equipment and devices, and the sizes of the major interconnecting wires, without showing exact details as to elevations, offsets, control wiring and other installation requirements. Carefully layout the work at the site to conform to the architectural and structural conditions, to avoid obstructions and to permit proper grading of pipe associated with other portions of the work. In cooperation with other Contractors, determine the exact location of equipment and devices and connections thereto by reference to the submittals and rough-in drawings, and by measurements at the site. Make minor relocations necessitated by the conditions at the site, or directed by the Owner's Representative, without additional cost to the Owner.
- G. The Drawings and Specifications are intended to describe and illustrate systems which will not interfere with the structure of the building(s), fit into the available spaces, and insure complete and satisfactory operating installations. Prepare installation drawings as required for all critical areas illustrating the installation of the work in this Division as related to the work of all other Divisions and correct all interferences with the other portions of the work or with the building structures before the work proceeds.
- H. The Drawings do not indicate the existing electrical installations other than to identify modifications or extensions thereto. Visit the site and ascertain the conditions to be met and the work to be accomplished in removing and modifying the existing work, and in installing the new

work. Failure to comply with this shall not constitute grounds for any additional payment in connection with removing or modifying any part of the existing installation or installing any new or temporary work under this Division.

1.11 SUBMITTALS

- A. Submit product data and shop drawings in accordance with Division 1 of the Specifications.
- B. Process product data and shop drawings to insure that the proposed materials, equipment and devices conform to the requirements of the Contract Documents, and that there are no omissions or duplications. Provide layouts, fabrication information and data for systems, materials, equipment and devices proposed for the project.
- C. Submittals shall be provided for review and approval on all systems, equipment, devices and materials proposed for use on this project. Submittals shall include, but not be limited to, the following:
 - 1 Lighting and Appliance Panelboards
 - 2 Disconnect Switches
 - 3 Circuit Breakers and Fuses
 - 4 Materials: conduit, conductors, connectors, supports, etc.
 - 5 Lighting Fixtures, Lamps and Control Systems/Devices
 - 6 Wiring Devices
 - 7 Transformers
 - 8 Distribution Panelboards
 - 9 Motor Control Center
 - 10 As indicated on each submittal section
- D. The product data shall not consist of manufacturer's catalogs or cut sheets that contain no indication of the exact item offered. The submission on individual items shall designate the exact item offered.
- E. Do not submit detailed quantitative listings of materials, equipment and devices. It is the Contractor's responsibility to provide proper sizes and quantities to conform to Contract Documents.
- F. Assemble submittals on related items procured from a single manufacturer in bound brochures or other suitable package form, rather than submitting a multiplicity of loose sheets.
- G. Prepare shop drawings whenever equipment proposed varies in physical size and arrangement from that indicated thus causing rearrangement of equipment space, where tight spaces require extreme coordination between this work and other work, where called for elsewhere in these Specifications and where specifically requested by the Owner's Representative. Shop drawings shall be prepared at a scale of not less than 1/4 inch equals 1 foot.
- H. The Contractor shall sign the submittal as an indication of compliance with the Contract Documents. If there are any deviations from the Contract Documents, he shall so indicate on the submittal. Any deviations not so indicated shall be cause for rejection and removal of the non-complying equipment at the Contractor's expense.

1.12 SUBSTITUTIONS

- A. Where a single manufacturer is mentioned by trade name or manufacturer's name, unless specifically noted otherwise, it is the only manufacturer that will be accepted.
- B. Where multiple manufacturers are listed, none other than those manufacturers will be accepted.
- C. Manufacturers not listed will be considered for substitution prior to bid only. The substitute manufacturer shall submit a complete copy of the appropriate technical specification section minimum seven (7) business days prior to bid with each sub-paragraph noted with the comment, "compliance", "deviation", "alternate" or "not applicable". In the case of non-primary, vendor-supplied items, the name of the sub-vendor supplying said item, including model number, shall be indicated.
 - 1 By noting the term "compliance" or "C", it shall be understood that the manufacturer is in

full compliance with the item specified and will provide exactly the same with no deviations.

- 2 By noting the term "deviation" or "D", it shall be understood that the manufacturer prefers to provide a different component in lieu of that specified. Manufacturer shall indicate all deviations.
- 3 By noting the term "alternate" or "A", it shall be understood that the manufacturer proposes to provide the same operating function but prefers to do it in a different manner. An alternate shall be fully described as to what the manufacturer proposes to provide.
- 4 By noting the term "not applicable" or "N/A", it shall be understood that the specified item is not applicable to the project.

- D. It shall be understood that space allocations have been made on the basis of present and known future requirements and the dimensions of items of equipment or devices of a particular manufacturer whether indicated or not. If any item of equipment or device is offered in substitution which differs substantially in dimension or configuration from that indicated on the Drawings or specifications, provide as part of the submittal 1/4 inch equals 1 foot scaled drawings showing that the substitute can be installed in the space available without interfering with other portions of the work or with access for operations and maintenance in the completed project.
- E. Where substitute equipment or devices requiring different arrangement or connections from that indicated is accepted by the Owner's Representative, install the equipment or devices to operate properly and in harmony with the intent of the Contract Documents, making all incidental changes in piping, ductwork or wiring resulting from the equipment or device selection without any additional cost to the Owner. The Contractor shall pay all additional costs incurred by other portions of the work in connection with the substituted equipment or device.
- F. The Owner's Representative reserves the right to call for samples of any item of material, equipment or device offered in substitution, together with a sample of the specific item when, in their opinion, the quality of the item and/or the appearance is involved, and it is deemed that an evaluation of the item may be better made by visual inspection.
- G. When any request for a substitution of material, equipment or device is submitted and rejected, the item named in the Contract Documents shall be furnished. Repetitive submittal of substitutions for the same item will not be considered.

1.13 INSTALLATION DRAWINGS

- A. Prepare installation drawings for coordinating the work of this Division with the work of other Divisions, to illustrate its concealment in finished spaces, to avoid obstructions, and to demonstrate the adaptability of any item of material, equipment or device in the space upon which the Contract Documents are based.
- B. Use these drawings in the field for the actual installation of this work. Provide three (3) copies, not for approval, to the Owner's Representative for his information, review and record.

1.14 WORKMANSHIP AND INSTALLATION

- A. In no case shall the Contractor provide a class of material, equipment, device or workmanship less than that required by the Contract Documents or applicable codes, regulations, ordinances or standards. All modifications which may be required by a local authority having legal jurisdiction over all or any part of the work shall be made by the Contractor without any additional charge. In all cases where such authority requires deviations from the requirements of the Drawings or Specifications, the Contractor shall report same to the Owner's Representative and shall secure his approval before the work is started.
- B. The work shall be performed by properly licensed technicians skilled in their respective trades. All materials, equipment and devices shall be installed in accordance with the recommendations of the manufacturer and in the best standard practice to bring about results of a first class condition.
- C. The NECA "Standards of Installation" as published by the National Electrical Contractors Association shall be considered a part of these Specifications, except as specifically modified by

other provisions contained in these Specifications.

1.15 INSPECTION OF SITE

- A. The accompanying drawings do not indicate existing installations other than to identify modifications of and extensions thereto. The Contractor shall visit the site, inspect the installations and ascertain the conditions to be met and the work to be performed. Failure to comply with this shall not constitute ground for any additional payments in connection with removing or modifying any part of the existing installations and/or installing any new work under this Division.
- B. Review construction details of the adjacent building presently under construction during the site inspection and include all work required to modify the existing installations and install new materials, comprising a part of the installation. Review all construction details of the new building as illustrated on the drawings and be guided thereby.

1.16 WARRANTY

- A. All materials, equipment, devices and workmanship shall be warranted for a period of one year from the date of acceptance by the Owner's Representative for beneficial use by the Owner, except that where specific equipment is noted to have extended warranties. The warranty shall be in accordance with AIA Document A201. The Contractor shall be responsible for the proper registration of these warranties so that the Owner can make all proper claims should future need develop.
- B. The Contractor shall furnish to the Owner's Representative for transmittal to the Owner, the name, address and telephone number of those persons responsible for service on systems and equipment covered by the warranty.

1.17 OPERATION PRIOR TO ACCEPTANCE

- A. When any equipment is operable, and it is to the advantage of the Contractor to operate the equipment, the Contractor may do so provided that he properly supervises the operation, and retains full responsibility for the equipment operated. Regardless of whether or not the equipment has or has not been operated, the Contractor shall clean the equipment properly, make required adjustments and complete punch list items before final acceptance by the Owner.

1.18 INSTRUCTION OF OWNER'S PERSONNEL

- A. Provide the services of competent engineers and/or technicians acceptable to the Owner's Representative to instruct other representatives of the Owner in the complete and detailed operation of each item of equipment or device of all the various electrical systems. These instructions shall be provided for whatever periods may be necessary to accomplish the desired results. Upon completion of these instructions, the Contractor shall obtain a letter of release, acknowledged by the Owner or his authorized representative, stating the dates on which the various kinds of instruction were given, and the personnel to whom the instructions were given.
- B. The Contractor shall be fully responsible for proper maintenance of equipment and systems until the instructions have been given to the Owner's personnel and the letter of release acknowledged.
- C. In providing the instructions to the Owner's personnel, the written operating and maintenance manuals shall be followed in all instances, and the Owner's personnel shall be familiarized with such manuals. Operating and maintenance manuals used for instructions shall include wiring diagrams, manufacturer's operating and maintenance instructions, parts lists (with sources identified), and other data as appropriate for each system.

1.19 SCHEDULE AND SEQUENCE OF WORK

- A. The Contractor shall meet and cooperate with the Owner and Owner's Representative to schedule and sequence this work so as to insure meeting scheduled completion dates and avoid delaying other portions of the work. Work requiring special sequencing shall be at no additional cost to the Owner and shall have no impact on the schedule.

1.20 INSTALLATION INSPECTIONS AND CERTIFICATIONS

- A. Obtain timely inspections of the installation by the regulatory authorities. Remedy any deficiencies to the satisfaction of the inspecting official.

- B. Upon final completion of the work, obtain certificates of acceptance from the regulatory authorities. Deliver the certificates to the Owner's Representative for transmission to the Owner.
- 1.21 EQUIPMENT INSTALLATION
- A. Install equipment and devices in a manner to permit access to all surfaces or components, requiring such access, without the need to disassemble other unrelated parts of the work.
- B. Equipment specified to be factory assembled and tested prior to shipment shall not be disassembled at the job site and reassembled at its final location. Apparatus not so specified may be disassembled and reassembled in the proper location.
- C. Furnish all scaffolding, rigging and hoisting required for the installation of all the work.
- 1.22 CONCRETE HOUSEKEEPING PADS
- A. Concrete housekeeping pads shall be provided for all floor mounted equipment, unless noted or required otherwise.
- B. All pads shall be not less than 3-1/2" high and extend a maximum 3" beyond the actual equipment size. Coordinate the proper size of the pad with the equipment furnished. Pads shall be poured in forms built of new dressed lumber with corners chamfered using sheet metal or triangular wood strips nailed to the form. Use 6 x 6 No. 3 mesh for reinforcing. Install heavy duty adjustable anchor bolts, set in the form and positioned using templates, prior to pouring concrete. After the equipment is set on the pad, the equipment shall be aligned, leveled and fully grouted to the pad and all void spaces shall be filled with a non-shrinking grout.
- C. Perform all concrete work specified to be provided under this Division in strict accordance with the applicable provisions of Division 3, CONCRETE.
- 1.23 SLEEVES
- A. Each conduit, regardless of material, which passes through a concrete slab, masonry wall, or roof or portion of the building structure shall be free from the structure and shall pass through a sleeve.
- B. All sleeves shall be constructed from electrical-metallic tubing or equivalent weight galvanized steel tubing and shall be flush on both sides of the surface penetrated, unless noted otherwise. All sleeves penetrating the roof areas shall extend a minimum 10 inches above the roof with approved weatherproof counterflashing attached to the conduit above the roof. All sleeves penetrating floors shall extend a minimum of 6 inches above the finished floors. The sleeves shall be sized to allow free passage of the conduit to be inserted.
- C. Sleeves passing through walls or floors on or below grade or in moist areas shall be constructed of galvanized rigid steel and shall be designed with a suitable flange in the center to form a waterproof passage. After the conduit has been installed in the sleeves, the void space around the conduit shall be caulked and filled with an asphalt-base compound to insure a waterproof penetration. Jute twine caulking shall not be used due to susceptibility to termite infestation.
- 1.24 ESCUTCHEONS
- A. In each finished space, provided a chromium plated, sectional escutcheon on each conduit, or hanger rod penetrating a wall, floor or ceiling.
- B. Size escutcheons and collars to fit snugly around conduit and rods.
- C. Where required, provide escutcheons with set screws so that they fit snugly against the finished surface.
- 1.25 ACCESS PANELS
- A. Provide wall and ceiling access panels for unrestricted access to all concealed electrical equipment items and devices installed behind furrings, chases or non-removable suspended ceilings.
- B. Access panels shall be UL listed and labeled as required to suit the fire rating of the surface in which installed, with mounting straps, concealed hinges, screwdriver locks, 180 degree open door design, 16 gauge steel construction and door and frame finished in prime coat finish. Panels shall be 12-inch by 12-inch minimum size, but shall be larger as the access requirement of the concealed electrical equipment item or device increases.
- 1.26 SEALING OF PENETRATIONS

- A. All penetrations in horizontal or vertical fire-rated construction shall be sealed using approved fire-rated sealing materials equivalent to the following:
 - 1 Foam: Dow Corning 3-6548 RTV silicone foam, liquid component Part 4 (black) and liquid component Part B (off-white).
 - 2 Sealant: Dow Corning 96-081 RTV silicone adhesive sealant.
 - 3 Damming Materials: Mineral fiberboard, mineral fiber matting, mineral fiber putty, plywood or particle board, as selected by applicator.
 - B. Preparation: Remove combustible materials and loose impediments from penetration opening and involved surfaces. Remove free liquid and oil from penetration surfaces.
 - C. Installation: In accordance with manufacturer's instructions, install damming materials and sealant to cover and seal penetration openings; inject foam mixtures into openings.
 - D. In addition to the Dow Corning products, equal products by Spec Seal Firestop Products, 3M Fire Barrier or CS240 Firestop are acceptable.
- 1.27 PROTECTION OF APPARATUS
- A. At all times take every precaution to properly protect apparatus from damage due to dust, dirt, water, etc. or from damage due to physical forces. Include the erection of temporary shelters as required, to adequately protect any apparatus stored at the site, the cribbing of any apparatus directly above the construction, and the covering of apparatus in the incomplete building with tarpaulins or other protective covering. Failure on the part of the Contractor to comply with the above to the entire satisfaction of the Owner's Representative will be sufficient cause for the rejection of the pieces of apparatus in question.
 - B. Responsibility for the protection of apparatus extend also to existing apparatus involved in this Division of the work, whether such apparatus is designated to be used temporarily and later removed, or is to be reused as a part of the permanent installation. Erect temporary sheltering structures, provide temporary bracing and supports, or cover equipment as required or directed to afford proper protection for that equipment.
 - C. The Contractor shall protect this work and the work of all other Contractors from damage by his work or workmen and shall make good any damage thus caused. He shall also be responsible for the proper protection of his equipment, machinery, materials and accessories delivered and installed on the job.
- 1.28 INSTALLATION OF CONTROL AND OPERATING DEVICES
- A. The highest operable part of controls (light switches, dimmer switches, emergency power off devices, etc.), receptacles (electrical and communications) and other operable devices shall be 48" above finish floor. The lowest operable part shall be no less than 15" above finished floor. For purposes of uniformity, unless noted otherwise, the top of a device shall be maximum 48" AFF and the bottom of a device shall be minimum 15" AFF. Refer to the electrical symbols list on the Drawings for specific requirements.
 - B. Visual alarm appliances shall be placed 80" above finished floor (the highest floor level within a space) or 6" below the ceiling, whichever is lower.
- 1.29 INSTALLATION AND CONNECTION OF OTHER DIVISION'S EQUIPMENT
- A. Verify the electrical requirements of all equipment furnished under other Divisions, separate contracts, or by the Owner. Install conduit, power wiring, control wiring, devices, etc. as required for complete operation of all equipment.
- 1.30 OPTION TO RELOCATE OUTLETS AND RELATED DEVICES
- A. The location of power, data and telephone outlets, wall switches and other related devices may be relocated at the Owner's option, at no additional cost to the Owner, to a point within 10 feet of their present location provided the Contractor is notified prior to installation.
- 1.31 COOPERATION AND CLEAN-UP
- A. It shall be the responsibility of the Contractor to cooperate fully to keep the job site in a clean and safe condition. Upon the completion of the job, the Contractor shall immediately remove all of his

- tools, equipment, surplus materials and debris.
- B. After the installation is complete, and before the equipment is energized, clean the interior and exterior of all equipment thoroughly. Clean equipment, removing all debris, rubbish and foreign materials. Each component shall be cleaned and
 - C. all dust and other foreign material removed. Components shall be
 - D. cleaned of oxidation. The inside and outside of all switchgear shall also be wiped clean with a lemon-oil rag after all other cleaning is complete.
 - E. Any portion of the work requiring touch-up finishing shall be so finished to equal the specified finish on the product.
- 1.32 **RECORD DRAWINGS AND DOCUMENTATION FOR OWNER**
- A. The Contractor shall obtain at his own expense a complete set of blue-line prints on which to keep an accurate record of the installation of all materials, equipment and devices covered by the Contract. The Contractor shall record up to date information at least once a week and retain the set of prints on site for periodic review by the Architect/Engineer. The record drawings shall indicate the location of all equipment and devices, and the routing of all systems. If the Contractor prepared large scale installation drawings of electrical rooms, conduit routing, busduct, routing, etc., these drawings or reproducible sepia's therefrom shall be revised as required to accurately illustrate the actual installation. All conduit buried in concrete slabs, walls and below grade shall be located by dimension; both horizontally and by vertical elevation, unless a surface mounted device in each space indicates the exact location.
 - B. Upon anticipated completion of the job, obtain one complete reproducible set of the original drawings on which to neatly, legibly and accurately transfer all project related notations and deliver these record drawings to the Architect/Engineer at job completion before final payment and delivery to the Owner. This information shall be delivered prior to final acceptance.
 - C. The Contractor shall accumulate in duplicate during the job progress, the following data prepared in indexed 3-ring looseleaf, hard-back binders sized for 8-1/2 inch by 11 inch sheets. No binder shall exceed 3-1/2 inches thick. This data shall be turned over to the Owner's Representative for review and subsequent delivery to the Owner prior to final acceptance.
 - 1 Warranties, guarantees and manufacturer's directions on material, equipment and devices covered by the Contract.
 - 2 Approved lighting fixture brochures, wiring diagrams and control diagrams.
 - 3 Copies of approved submittals and shop drawings.
 - 4 Operating instructions and recommended maintenance procedures for major apparatus.
 - 5 Copies of all other data and/or drawings required during construction.
 - 6 Repair parts list of major apparatus, including name, address and telephone number of local supplier or representative.
 - 7 Tag charts and diagrams hereinbefore specified.
- 1.33 **FINAL OBSERVATION**
- A. The purpose of the final observation is to determine whether the Contractor has completed the construction in accordance with the Contract Documents and that in the Owner Representative's opinion the installation is satisfactory for final acceptance by the Owner.
 - B. It shall be the responsibility of the Contractor to assure that the installation is ready for final acceptance prior to calling upon the Owner's Representative to make a final observation.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 26 01 00SUMMARY OF ELECTRICAL WORK

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions, Division 1 Specification Sections and other Division 25 Specification Sections, apply to this Section.

1.2 WORK COVERED BY CONTRACT DOCUMENTS

- A. The following Summary of Work is intended as an aid to achieve an understanding of the various elements of work included in the project, as is not intended to be all-inclusive. Detailed descriptions of work and requirements are given in drawings and specifications.
- B. General Scope of Work:
 - 1. Providing new panels, feeders, conduits, disconnect, rough-in for telephone and data system, fire alarm system and new light fixtures.

1.4 COORDINATION

- A. All electrical work shall be done under sub-contract to a General Contractor. Electrical Contractor shall coordinate all work through General Contractor, even in areas where only electrical work is to take place.
- B. Work shall take place with minimal disruption to Owner's operations in areas surrounding the new building.
- C. Cooperate fully with other contractors so that work under those contracts may be carried out smoothly, without interfering with or delaying work under this Contract.
- D. Fully coordinate with mechanical contractor for providing power to mechanical equipment.

1.5 UTILITIES

- 1. Coordinate with power company and provide conduit, and trenching from transformer to power source. Coordinate with water, telephone, cable and gas utilities to locate all utilities prior to digging in any area.
- 2. Obtain any approvals required from utilities to relocate utilities.
- 3. Cost of relocating or bypassing utilities indicated on drawings shall be included in Base Bid.

1.6 CONTRACTOR USE OF PREMISES

- A. Use of the Site: Limit use of the premises to work in areas indicated. Confine operations to areas within contract limits indicated. Do not disturb portions of the site beyond the areas in which the Work is indicated.
 - 1. Owner Occupancy: Allow for Owner occupancy and use by the public.
 - 2. Driveways and Entrances: Keep driveways and entrances serving the premises, clear and available to the Owner, the Owner's employees, and emergency vehicles at all time. Do not use these areas for parking or storage of materials. Schedule deliveries to minimize space and time requirements for storage of materials and equipment on-site.
- B. Site Safety: Take every precaution to ensure the site does not present a threat to the safety of occupants and/or workers. Minimal safety requirements include, but are not limited to the following:
 - 1. Temporary fencing around construction areas.
 - 2. Yellow caution tape and construction barricades along open trenches during the day. Trenches shall be covered at night and warning lights provided on construction barricades.
 - 3. Temporary fencing around equipment while site work is in progress.

1.7 SUBMITTALS

1. To expedite the submittal process more efficiently, do not piece-meal the submittals. Submit entire electrical in a bound enclosure. This will eliminate delays in the submittal process. Unbound submittals shall be returned without review. Submit 10 copies minimum.

END OF SECTION

SECTION 26 05 19 LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes building wires and cables and associated connectors, splices, and terminations for wiring systems rated 600 V and less.

1.3 SUBMITTALS

- A. Field Test Reports: Indicate and interpret test results for compliance with performance requirements.

1.4 QUALITY ASSURANCE

- A. Listing and Labeling: Provide wires and cables specified in this Section that are listed and labeled.
 - 1. The Terms "Listed" and "Labeled": As defined in NFPA 70, Article 100.
- B. Comply with NFPA 70.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver wires and cables according to NEMA WC 26.

1.6 COORDINATION

- A. Coordinate layout and installation of cables with other installations.
- B. Revise locations and elevations from those indicated, as required to suit field conditions and as approved by Architect.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Wires and Cables:
 - a. American Insulated Wire Corp.; Leviton Manufacturing Co.
 - b. BICC Brand-Rex Company.
 - c. Carol Cable Co., Inc.
 - d. Senator Wire & Cable Company.
 - e. Southwire Company.
 - 2. Connectors for Wires and Cables:
 - a. AMP Incorporated.
 - b. General Signal; O-Z/Gedney Unit.
 - c. Monogram Co.; AFC.
 - d. Square D Co.; Anderson.
 - e. 3M Company; Electrical Products Division.

2.2 BUILDING WIRES AND CABLES

- A. UL-listed building wires and cables with conductor material, insulation type, cable construction, and rating as specified in Part 3 "Wire and Insulation Applications" Article.
- B. Rubber Insulation Material: Comply with NEMA WC 3.
- C. Thermoplastic Insulation Material: Comply with NEMA WC 5.
- D. Ethylene Propylene Rubber Insulation Material: Comply with NEMA WC 8.
- E. Conductor Material: Copper.
- F. Stranding: Solid conductor for No. 10 AWG and smaller; stranded conductor for larger than No. 10 AWG.
- G. Plenum rated cable for all cables above the ceiling.

2.3 CONNECTORS AND SPLICES

- A. UL-listed, factory-fabricated wiring connectors of size, ampacity rating, material, type, and class for application and service indicated. Comply with Project's installation requirements and as specified in Part 3 "Wire and Insulation Applications" Article.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine raceways and building finishes to receive wires and cables for compliance with requirements for installation tolerances and other conditions affecting performance of wires and cables. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 WIRE AND INSULATION APPLICATIONS

- A. Service Entrance: Type RHW or THWN, in raceway.
- B. Feeders: Type 75C insulation THHN/THWN, in raceway.
- C. Fire-Pump Feeder: Type MI, 3-conductor.
- D. Branch Circuits: Type THHN/THWN, in raceway.
- E. Fire Alarm Circuits: Type THHN/THWN, in raceway.
- F. Class 1 Control Circuits: Type THHN/THWN, in raceway.
- G. Class 2 Control Circuits: Type THHN/THWN, in raceway.
- H. Equipment or any device rated 100 amperes or less, conductor shall be rated 60C as per National Electrical Code.
- I. Equipment or any device rated over 100 amperes, conductor shall be rated 75C as per National Electrical Code.

3.3 INSTALLATION

- A. Install wires and cables as indicated, according to manufacturer's written instructions and NECA's "Standard of Installation."
- B. Remove existing wires from raceway before pulling in new wires and cables.
- C. Pull Conductors: Use manufacturer-approved pulling compound or lubricant where necessary; compound used must not deteriorate conductor or insulation. Do not exceed manufacturer's recommended maximum pulling tensions and sidewall pressure values.
- D. Use pulling means, including fish tape, cable, rope, and basket-weave wire/cable grips, that will not damage cables or raceway.
- E. Install exposed cables, parallel and perpendicular to surfaces of exposed structural members, and follow surface contours where possible.
- F. Support cables according to Division 26 Section "Basic Electrical Materials and Methods."
- G. Seal around cables penetrating fire-rated elements according to Division 7 Section "Firestopping."
- H. Identify wires and cables according to Division 26 Section "Basic Electrical Materials and Methods."
- I. Identify wires and cables according to Division 26 Section "Electrical Identification."

3.4 CONNECTIONS

- A. Conductor Splices: Keep to minimum.
- B. Install splices and tapes that possess equivalent or better mechanical strength and insulation ratings than conductors being spliced.
- C. Use splice and tap connectors compatible with conductor material.
- D. Use oxide inhibitor in each splice and tap connector for aluminum conductors.
- E. Wiring at Outlets: Install conductor at each outlet, with at least 12 inches (300 mm) of slack.
- F. Connect outlets and components to wiring and to ground as indicated and instructed by manufacturer.
- G. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A and UL 486B.

3.5 FIELD QUALITY CONTROL

- A. Testing: On installation of wires and cables and before electrical circuitry has been energized, demonstrate product capability and compliance with requirements.
 - 1. Procedures: Perform each visual and mechanical inspection and electrical test stated in NETA ATS, Section 7.3.1. Certify compliance with test parameters.
- B. Correct malfunctioning conductors and cables at Project site, where possible, and retest to demonstrate compliance; otherwise, remove and replace with new units and retest.

END OF SECTION

SECTION 26 05 26

GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes grounding and bonding of electrical systems and equipment. Grounding requirements specified in this Section may be supplemented by special requirements of systems described in other Sections.
- B. Related Sections include the following:
 - 1. Division 26/33 Section "Underground Ducts and Utility Structures" for ground test wells.

1.3 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Product Data: For the following:
 - 1. Ground rods.
 - 2. Chemical rods.
- C. Qualification Data: For firms and persons specified in "Quality Assurance" Article.
- D. Field Test Reports: Submit written test reports to include the following:
 - 1. Test procedures used.
 - 2. Test results that comply with requirements.
 - 3. Results of failed tests and corrective action taken to achieve test results that comply with requirements.

1.4 QUALITY ASSURANCE

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
 - 1. Comply with UL 467.
- B. Comply with NFPA 70; for overhead-line construction and medium-voltage underground construction, comply with IEEE C2.
- C. Comply with NFPA 780 and UL 96 when interconnecting with lightning protection system.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Grounding Conductors, Cables, Connectors, and Rods:
 - a. Apache Grounding/Erico Inc.
 - b. Boggs, Inc.
 - c. Chance/Hubbell.
 - d. Copperweld Corp.
 - e. Dossert Corp.
 - f. Erico Inc.; Electrical Products Group.
 - g. Framatome Connectors/Burndy Electrical.
 - h. Galvan Industries, Inc.
 - i. Hastings Fiber Glass Products, Inc.
 - j. Ideal Industries, Inc.
 - k. ILSCO.
 - l. Kearney/Cooper Power Systems.
 - m. Korns: C. C. Korns Co.; Division of Robroy Industries.
 - n. Lightning Master Corp.
 - o. Lyncole XIT Grounding.
 - p. O-Z/Gedney Co.; a business of the EGS Electrical Group.
 - q. Raco, Inc.; Division of Hubbell.

- r. Robbins Lightning, Inc.
- s. Salisbury: W. H. Salisbury & Co.
- t. Superior Grounding Systems, Inc.
- u. Thomas & Betts, Electrical.

2.2 GROUNDING CONDUCTORS

- A. For insulated conductors, comply with Division 26 Section "Conductors and Cables."
- B. Material: copper.
- C. Equipment Grounding Conductors: Insulated with green-colored insulation.
- D. Isolated Ground Conductors: Insulated with green-colored insulation with yellow stripe. On feeders with isolated ground, use colored tape, alternating bands of green and yellow tape to provide a minimum of three bands of green and two bands of yellow.
- E. Grounding Electrode Conductors: Stranded cable.
- F. Underground Conductors: stranded, unless otherwise indicated.
- G. Copper Bonding Conductors: As follows:
 - 1. Bonding Cable: 28 kcmil, 14 strands of No. 17 AWG copper conductor, 1/4 inch (6.4 mm) in diameter.
 - 2. Bonding Conductor: No. 4 or No. 6 AWG, stranded copper conductor.
 - 3. Bonding Jumper: Bare copper tape, braided bare copper conductors, terminated with copper ferrules; 1-5/8 inches (42 mm) wide and 1/16 inch (1.5 mm) thick.
 - 4. Tinned Bonding Jumper: Tinned-copper tape, braided copper conductors, terminated with copper ferrules; 1-5/8 inches (42 mm) wide and 1/16 inch (1.5 mm) thick.
- H. Ground Conductor and Conductor Protector for Wood Poles: As follows:
 - 1. No. 4 AWG minimum, soft-drawn copper conductor.
 - 2. Conductor Protector: Half-round PVC or wood molding. If wood, use pressure-treated fir, or cypress or cedar.
- I. Grounding Bus: Bare, annealed copper bars of rectangular cross section, with insulators.

2.3 CONNECTOR PRODUCTS

- A. Comply with IEEE 837 and UL 467; listed for use for specific types, sizes, and combinations of conductors and connected items.
- B. Bolted Connectors: Bolted-pressure-type connectors, or compression type.
- C. Welded Connectors: Exothermic-welded type, in kit form, and selected per manufacturer's written instructions.

2.4 GROUNDING ELECTRODES

- A. Ground Rods: Copper-clad steel.
 - 1. Size: 3/4 by 120 inches (19 by 3000 mm) in diameter.
- B. Chemical Electrodes: Copper tube, straight or L-shaped, filled with nonhazardous chemical salts, terminated with a 4/0 bare conductor. Provide backfill material recommended by manufacturer.
- C. Test Wells: Provide handholes as specified in Division 26/33 Section "Underground Ducts and Utility Structures."

PART 3 - EXECUTION

3.1 APPLICATION

- A. Use only copper conductors for both insulated and bare grounding conductors in direct contact with earth, concrete, masonry, crushed stone, and similar materials.
- B. In raceways, use insulated equipment grounding conductors.
- C. Exothermic-Welded Connections: Use for connections to structural steel and for underground connections, except those at test wells.
- D. Equipment Grounding Conductor Terminations: Use bolted pressure clamps.
- E. Ground Rod Clamps at Test Wells: Use bolted pressure clamps with at least two bolts.
- F. Grounding Bus: Install in electrical and telephone equipment rooms, in rooms housing service equipment, and elsewhere as indicated.
 - 1. Use insulated spacer; space 1 inch (25.4 mm) from wall and support from wall 6 inches (150 mm) above finished floor, unless otherwise indicated.
 - 2. At doors, route the bus up to the top of the door frame, across the top of the doorway, and down to the specified height above the floor.

- G. Underground Grounding Conductors: Use tinned copper conductor, No. 2/0 AWG minimum. Bury at least 24 inches (600 mm) below grade or bury 12 inches (300 mm) above duct bank when installed as part of the duct bank.

3.2 EQUIPMENT GROUNDING CONDUCTORS

- A. Comply with NFPA 70, Article 250, for types, sizes, and quantities of equipment grounding conductors, unless specific types, larger sizes, or more conductors than required by NFPA 70 are indicated.
- B. Install equipment grounding conductors in all feeders and circuits.
- C. Install insulated equipment grounding conductor with circuit conductors for the following items, in addition to those required by NEC:
 - 1. Feeders and branch circuits.
 - 2. Lighting circuits.
 - 3. Receptacle circuits.
 - 4. Single-phase motor and appliance branch circuits.
 - 5. Three-phase motor and appliance branch circuits.
 - 6. Flexible raceway runs.
 - 7. Armored and metal-clad cable runs.
- D. Busway Supply Circuits: Install insulated equipment grounding conductor from the grounding bus in the switchgear, switchboard, or distribution panel to equipment grounding bar terminal on busway.
- E. Computer Outlet Circuits: Install insulated equipment grounding conductor in branch-circuit runs from computer-area power panels or power-distribution units.
- F. Isolated Grounding Receptacle Circuits: Install an insulated equipment grounding conductor connected to the receptacle grounding terminal. Isolate grounding conductor from raceway and from panelboard grounding terminals. Terminate at equipment grounding conductor terminal of the applicable derived system or service, unless otherwise indicated.
- G. Isolated Equipment Enclosure Circuits: For designated equipment supplied by a branch circuit or feeder, isolate equipment enclosure from supply raceway with a nonmetallic raceway fitting listed for the purpose. Install fitting where raceway enters enclosure, and install a separate equipment grounding conductor. Isolate equipment grounding conductor from raceway and from panelboard grounding terminals. Terminate at equipment grounding conductor terminal of the applicable derived system or service, unless otherwise indicated.
- H. Nonmetallic Raceways: Install an equipment grounding conductor in nonmetallic raceways unless they are designated for telephone or data cables.
- I. Air-Duct Equipment Circuits: Install an equipment grounding conductor to duct-mounted electrical devices operating at 120 V and more, including air cleaners and heaters. Bond conductor to each unit and to air duct.
- J. Water Heater, Heat-Tracing, and Antifrost Heating Cables: Install a separate equipment grounding conductor to each electric water heater, heat-tracing, and antifrost heating cable. Bond conductor to heater units, piping, connected equipment, and components.
- K. Signal and Communication Systems: For telephone, alarm, voice and data, and other communication systems, provide No. 4 AWG minimum insulated grounding conductor in raceway from grounding electrode system to each service location, terminal cabinet, wiring closet, and central equipment location.
 - 1. Service and Central Equipment Locations and Wiring Closets: Terminate grounding conductor on a 1/4-by-2-by-12-inch (6.4-by-50-by-300-mm) grounding bus.
 - 2. Terminal Cabinets: Terminate grounding conductor on cabinet grounding terminal.
- L. Metal Poles Supporting Outdoor Lighting Fixtures: Provide a grounding electrode in addition to installing a separate equipment grounding conductor with supply branch-circuit conductors.

3.3 INSTALLATION

- A. Ground Rods: Install at least three rods spaced at least one-rod length from each other and located at least the same distance from other grounding electrodes.
 - 1. Drive ground rods until tops are 2 inches (50 mm) below finished floor or final grade, unless otherwise indicated.
 - 2. Interconnect ground rods with grounding electrode conductors. Use exothermic welds, except at test wells and as otherwise indicated. Make connections without exposing steel or damaging copper coating.

- B. Grounding Conductors: Route along shortest and straightest paths possible, unless otherwise indicated. Avoid obstructing access or placing conductors where they may be subjected to strain, impact, or damage.
- C. Bonding Straps and Jumpers: Install so vibration by equipment mounted on vibration isolation hangers and supports is not transmitted to rigidly mounted equipment. Use exothermic-welded connectors for outdoor locations, unless a disconnect-type connection is required; then, use a bolted clamp. Bond straps directly to the basic structure taking care not to penetrate any adjacent parts. Install straps only in locations accessible for maintenance.
- D. Metal Water Service Pipe: Provide insulated copper grounding conductors, in conduit, from building's main service equipment, or grounding bus, to main metal water service entrances to building. Connect grounding conductors to main metal water service pipes by grounding clamp connectors. Where a dielectric main water fitting is installed, connect grounding conductor to street side of fitting. Bond metal grounding conductor conduit or sleeve to conductor at each end.
- E. Water Meter Piping: Use braided-type bonding jumpers to electrically bypass water meters. Connect to pipe with grounding clamp connectors.
- F. Bond interior metal piping systems and metal air ducts to equipment grounding conductors of associated pumps, fans, blowers, electric heaters, and air cleaners. Use braided-type bonding straps.
- G. Bond each aboveground portion of gas piping system upstream from equipment shutoff valve.
- H. Install one test well for each service at the ground rod electrically closest to the service entrance. Set top of well flush with finished grade or floor.
- I. Ufer Ground (Concrete-Encased Grounding Electrode): Fabricate according to NFPA 70, Paragraph 250-81(c), using a minimum of 20 feet (6 m) of bare copper conductor not smaller than No. 4 AWG. If concrete foundation is less than 20 feet (6 m) long, coil excess conductor within the base of the foundation. Bond grounding conductor to reinforcing steel in at least four locations and to anchor bolts. Extend grounding conductor below grade and connect to building grounding grid or to a grounding electrode external to concrete.

3.4 CONNECTIONS

- A. General: Make connections so galvanic action or electrolysis possibility is minimized. Select connectors, connection hardware, conductors, and connection methods so metals in direct contact will be galvanically compatible.
 - 1. Use electroplated or hot-tin-coated materials to ensure high conductivity and to make contact points closer to order of galvanic series.
 - 2. Make connections with clean, bare metal at points of contact.
 - 3. Make aluminum-to-steel connections with stainless-steel separators and mechanical clamps.
 - 4. Make aluminum-to-galvanized steel connections with tin-plated copper jumpers and mechanical clamps.
 - 5. Coat and seal connections having dissimilar metals with inert material to prevent future penetration of moisture to contact surfaces.
- B. Exothermic-Welded Connections: Comply with manufacturer's written instructions. Welds that are puffed up or that show convex surfaces indicating improper cleaning are not acceptable.
- C. Equipment Grounding Conductor Terminations: For No. 8 AWG and larger, use pressure-type grounding lugs. No. 10 AWG and smaller grounding conductors may be terminated with winged pressure-type connectors.
- D. Noncontact Metal Raceway Terminations: If metallic raceways terminate at metal housings without mechanical and electrical connection to housing, terminate each conduit with a grounding bushing. Connect grounding bushings with a bare grounding conductor to grounding bus or terminal in housing. Bond electrically noncontinuous conduits at entrances and exits with grounding bushings and bare grounding conductors, unless otherwise indicated.
- E. Connections at Test Wells: Use compression-type connectors on conductors and make bolted- and clamped-type connections between conductors and ground rods.
- F. Tighten screws and bolts for grounding and bonding connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A and UL 486B.

- G. Compression-Type Connections: Use hydraulic compression tools to provide correct circumferential pressure for compression connectors. Use tools and dies recommended by connector manufacturer. Provide embossing die code or other standard method to make a visible indication that a connector has been adequately compressed on grounding conductor.
- H. Moisture Protection: If insulated grounding conductors are connected to ground rods or grounding buses, insulate entire area of connection and seal against moisture penetration of insulation and cable.

3.5 FIELD QUALITY CONTROL

- A. Testing: Owner will engage a qualified testing agency to perform the following field quality-control testing:
- B. Testing: Engage a qualified testing agency to perform the following field quality-control testing:
- C. Testing: Perform the following field quality-control testing:
 - 1. After installing grounding system but before permanent electrical circuitry has been energized, test for compliance with requirements.
 - 2. Test completed grounding system at each location where a maximum ground-resistance level is specified, at service disconnect enclosure grounding terminal, and at ground test wells. Measure ground resistance not less than two full days after the last trace of precipitation, and without the soil being moistened by any means other than natural drainage or seepage and without chemical treatment or other artificial means of reducing natural ground resistance. Perform tests, by the fall-of-potential method according to IEEE 81.
 - 3. Provide drawings locating each ground rod and ground rod assembly and other grounding electrodes, identify each by letter in alphabetical order, and key to the record of tests and observations. Include the number of rods driven and their depth at each location and include observations of weather and other phenomena that may affect test results. Describe measures taken to improve test results.
 - a. Equipment Rated 500 kVA and Less: 10 ohms.
 - b. Equipment Rated 500 to 1000 kVA: 5 ohms.
 - c. Equipment Rated More Than 1000 kVA: 3 ohms.
 - d. Substations and Pad-Mounted Switching Equipment: 5 ohms.
 - e. Manhole Grounds: 10 ohms.
 - 4. Excessive Ground Resistance: If resistance to ground exceeds specified values, notify Architect promptly and include recommendations to reduce ground resistance.

3.6 GRADING AND PLANTING

- A. Restore surface features, including vegetation, at areas disturbed by Work of this Section. Reestablish original grades, unless otherwise indicated. If sod has been removed, replace it as soon as possible after backfilling is completed. Restore areas disturbed by trenching, storing of dirt, cable laying, and other activities to their original condition. Include application of topsoil, fertilizer, lime, seed, sod, sprig, and mulch. Comply with Division 32 Section "Landscaping." Maintain restored surfaces. Restore disturbed paving as indicated.

END OF SECTION

SECTION 26 05 29

HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 RELATED REQUIREMENTS

- A. The General Provisions, Supplemental General Provisions, Special Provisions and Division 1 Specification sections, apply to work covered by this Section.
- B. Comply with Division 26 Sections, as applicable. Refer to other Division for coordination of work.

1.2 SCOPE OF WORK

- A. Provide labor, material, equipment, tools and services, and perform operations required for, and reasonably incidental to, the providing of supporting devices, including related systems and accessories.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. Unistrut Corp.
- B. B-Line Systems, Inc.
- C. Midland Ross-Kindorf

2.2 MATERIALS

A. Suspension Hangers

1.1 Suspension hangers for individual conduit runs shall be zinc plated formed steel type.

B. Vertical Supports

1.1 Malleable iron one hole pipe straps shall be used for vertical runs.

C. Clamps

1.1 Beam clamps shall be used for bar joists and beams.

D. Anti-Vibration Hangers

1.1 Anti-vibration hangers shall be combination type having a double deflection neoprene element in series with a steel coil spring; double deflection of 0.30"; steel coil spring shall be selected from a 1" static deflection series with a minimum additional travel to solid of 1/2"; spring diameters shall be large enough to permit 15 degree angular misalignment of the rod connecting the hanger to the ceiling support without rubbing the hanger box.

2.3 Light Fixture Hangers

- A. Refer to Section 265600

- B. Corrosive Areas: PVC; at factory apply a minimum of 10-mil-thick PVC coating, bonded to metal, inside and outside.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Hangers

- 1 Approved hangers and stiff leg supports shall be installed in quantity and size as required to carry the weight of raceway and contents and shall be arranged to prevent vibration transmission to the building and allow for raceway movement.
- 2 Hangers shall be supported by means of uncoated solid steel rods which are threaded to allow vertical adjustments. Lock nuts shall be provided in sufficient number and location to lock all rod adjustments permanently at the adjusted height. Two lock nuts shall be used unless the nut tightens against a threaded socket. Minimum rod diameters shall be as follows:

NOMINAL CONDUIT SIZE	ROD DIAMETER
1/2" through 2"	1/4"
2-1/2" through 3"	3/8"
4" and 5"	1/2"
- 3 Hanger spacing shall be as required for proper and adequate support raceway, but in no case shall be less than one hanger per 8'-0" of raceway length except that conduit less than 1" diameter shall be supported at least every 6'-0".
- 4 Where numerous conduits are run parallel to one another, they may be supported from a trapeze type hanger arrangement with strut bottom.
- 5 Anti-vibration type hangers shall be provided for equipment as required to minimize vibration and/or as directed by the Architect/Engineer.

B. Supports

- 1 Support of hangers shall be by means of sufficient quantities of individual after set steel expansion shields, or beam clamps attached to structural steel.
- 2 Stiff-legs shall be furnished and installed in cases where support from overhead structure is not possible.
- 3 Ceiling mounted lighting fixtures shall be supported from the building structure at two opposite corners. The Contractor shall provide fixture hangers to properly interface with the ceiling system.
- 4 Furnish and install complete any additional structural support steel, brackets, fasteners, etc., as required to adequately support all raceway and equipment.
- 5 Support of hangers from concrete slabs shall be by means of sufficient quantity of "U" brackets attached with after set expansion shields and bolts.
- 6 Support of hangers from concrete tees shall be by means of sufficient quantity of angle iron brackets attached with after set expansion shields and bolts.

END OF SECTION

SECTION 26 05 33

RACEWAYS AND BOXES FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes raceways, fittings, boxes, enclosures, and cabinets for electrical wiring.
 - 1. Raceways include the following:
 - a. RMC.
 - b. IMC.
 - c. PVC externally coated, rigid steel conduits.
 - d. PVC externally coated, IMC.
 - e. EMT.
 - f. FMC.
 - g. LFMC.
 - h. LFNC.
 - i. RNC.
 - j. ENT.
 - k. Wireways.
 - l. Surface raceways.
 - 2. Boxes, enclosures, and cabinets include the following:
 - a. Device boxes.
 - b. Floor boxes.
 - c. Outlet boxes.
 - d. Pull and junction boxes.
 - e. Cabinets and hinged-cover enclosures.
- B. Related Sections include the following:
 - 1. Division 26 Section "Basic Electrical Materials and Methods" for raceways and box supports.
 - 2. Division 26 Section "Wiring Devices" for devices installed in boxes and for floor-box service fittings.

1.3 DEFINITIONS

- A. EMT: Electrical metallic tubing.
- B. ENT: Electrical nonmetallic tubing.
- C. FMC: Flexible metal conduit.
- D. IMC: Intermediate metal conduit.
- E. LFMC: Liquidtight flexible metal conduit.
- F. LFNC: Liquidtight flexible nonmetallic conduit.
- G. RMC: Rigid metal conduit.
- H. RNC: Rigid nonmetallic conduit.

1.4 SUBMITTALS

- A. Product Data: For surface raceways, wireways and fittings, floor boxes, hinged-cover enclosures, and cabinets.
- B. Shop Drawings: Include layout drawings showing components and wiring for nonstandard boxes, enclosures, and cabinets.

1.5 QUALITY ASSURANCE

- A. Listing and Labeling: Provide raceways and boxes specified in this Section that are listed and labeled.
 - 1. The Terms "Listed" and "Labeled": As defined in NFPA 70, Article 100.
 - 2. Listing and Labeling Agency Qualifications: A "Nationally Recognized Testing Laboratory" as defined in OSHA Regulation 1910.7.
- B. Comply with NECA's "Standard of Installation."
- C. Comply with NFPA 70.

1.6 COORDINATION 1.1

- A. Coordinate layout and installation of raceways and boxes with other construction elements to ensure adequate headroom, working clearance, and access.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Metal Conduit and Tubing:
 - a. Alflex Corp.
 - b. Anamet, Inc.; Anaconda Metal Hose.
 - c. Anixter Brothers, Inc.
 - d. Carol Cable Co., Inc.
 - e. Cole-Flex Corp.
 - f. Electri-Flex Co.
 - g. Flexcon, Inc.; Coleman Cable Systems, Inc.
 - h. Grinnell Co.; Allied Tube and Conduit Div.
 - i. Monogram Co.; AFC.
 - j. Spiraduct, Inc.
 - k. Triangle PWC, Inc.
 - l. Wheatland Tube Co.
2. Nonmetallic Conduit and Tubing:
 - a. Anamet, Inc.; Anaconda Metal Hose.
 - b. Arnco Corp.
 - c. Breeze-Illinois, Inc.
 - d. Cantex Industries; Harsco Corp.
 - e. Certainteed Corp.; Pipe & Plastics Group.
 - f. Cole-Flex Corp.
 - g. Condux International; Electrical Products.
 - h. Electri-Flex Co.
 - i. George-Ingraham Corp.
 - j. Hubbell, Inc.; Raco, Inc.
 - k. Lamson & Sessions; Carlon Electrical Products.
 - l. R&G Sloan Manufacturing Co., Inc.
 - m. Spiraduct, Inc.
 - n. Thomas & Betts Corp.
3. Conduit Bodies and Fittings:
 - a. American Electric; Construction Materials Group.
 - b. Crouse-Hinds; Div. of Cooper Industries.
 - c. Emerson Electric Co.; Appleton Electric Co.
 - d. Hubbell, Inc.; Killark Electric Manufacturing Co.
 - e. Lamson & Sessions; Carlon Electrical Products.
 - f. O-Z/Gedney; Unit of General Signal.
 - g. Scott Fetzer Co.; Adalet-PLM.
 - h. Spring City Electrical Manufacturing Co.
4. Metal Wireways:
 - a. Hoffman Engineering Co.
 - b. Keystone/Rees, Inc.
 - c. Square D Co.

2.2 METAL CONDUIT AND TUBING

- A. Rigid Steel Conduit: ANSI C80.1.
- B. Rigid Aluminum Conduit: ANSI C80.5.
- C. IMC: ANSI C80.6.
- D. EMT and Fittings: ANSI C80.3.

1. Fittings: Set-screw type.
 - E. Fittings: NEMA FB 1; compatible with conduit/tubing materials.
 - 2.3 NONMETALLIC CONDUIT AND TUBING
 - A. RNC: NEMA TC 2, Schedule 40 or 80 PVC.
 - B. RNC Fittings: NEMA TC 3; match to conduit or conduit/tubing type and material.
 - C. LFNC: UL 1660.
 - 2.4 METAL WIREWAYS
 - A. Material: Sheet metal sized and shaped as indicated.
 - B. Fittings and Accessories: Include couplings, offsets, elbows, expansion joints, adapters, hold-down straps, end caps, and other fittings to match and mate with wireways as required for complete system.
 - C. Select features, unless otherwise indicated, as required to complete wiring system and to comply with NFPA 70.
 - D. Wireway Covers: Screw – cover type flanged-and-gasketed type.
 - E. Finish: Manufacturer's standard enamel finish.
 - 2.5 OUTLET AND DEVICE BOXES
 - A. Sheet Metal Boxes: NEMA OS 1.
 - B. Cast-Metal Boxes: NEMA FB 1, Type FD, cast box with gasketed cover.
 - 2.6 PULL AND JUNCTION BOXES
 - A. Small Sheet Metal Boxes: NEMA OS 1.
 - B. Cast-Metal Boxes: NEMA FB 1, cast aluminum with gasketed cover.
 - 2.7 ENCLOSURES AND CABINETS
 - A. Hinged-Cover Enclosures: NEMA 250, Type 1, with continuous hinge cover and flush latch.
 1. Metal Enclosures: Steel, finished inside and out with manufacturer's standard enamel.
 2. Nonmetallic Enclosures: Plastic, finished inside with radio-frequency-resistant paint.
 - B. Cabinets: NEMA 250, Type 1, galvanized steel box with removable interior panel and removable front, finished inside and out with manufacturer's standard enamel. Hinged door in front cover with flush latch and concealed hinge. Key latch to match panelboards. Include metal barriers to separate wiring of different systems and voltage, and include accessory feet where required for freestanding equipment.
- PART 3 - EXECUTION
- 3.1 EXAMINATION
 - A. Examine surfaces to receive raceways, boxes, enclosures, and cabinets for compliance with installation tolerances and other conditions affecting performance of raceway installation. Do not proceed with installation until unsatisfactory conditions have been corrected.
 - 3.2 WIRING METHODS
 - A. Outdoors: Use the following wiring methods:
 1. Exposed: Rigid steel.
 2. Concealed: Rigid steel.
 3. Underground, Single Run: RNC.
 4. Underground, Grouped: RNC.
 5. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): LFMC.
 6. Boxes and Enclosures: NEMA 250, Type 3R .
 - B. Indoors: Use the following wiring methods:
 1. Exposed: EMT.
 2. Concealed: EMT.
 3. Underground, Single Run: RNC.
 4. Underground, Grouped: RNC
 5. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): FMC; except in wet or damp locations, use LFMC.
 6. Damp or Wet Locations: Rigid steel conduit.
 7. Boxes and Enclosures: NEMA 250, Type 1, except as follows:
 - a. Damp or Wet Locations: NEMA 250, Type 4, stainless steel.
 - 3.3 INSTALLATION

- A. Install raceways, boxes, enclosures, and cabinets as indicated, according to manufacturer's written instructions.
- B. Minimum Raceway Size: **3/4-inch trade size (DN21)**.
- C. Conceal conduit and EMT, unless otherwise indicated, within finished walls, ceilings, and floors.
- D. Keep raceways at least **6 inches (150 mm)** away from parallel runs of flues and steam or hot-water pipes. Install horizontal raceway runs above water and steam piping.
- E. Install raceways level and square and at proper elevations. Provide adequate headroom.
- F. Complete raceway installation before starting conductor installation.
- G. Support raceways as specified in Division 26 Section "Basic Electrical Materials and Methods."
- H. Use temporary closures to prevent foreign matter from entering raceways.
- I. Protect stub-ups from damage where conduits rise through floor slabs. Arrange so curved portion of bends is not visible above the finished slab.
- J. Make bends and offsets so ID is not reduced. Keep legs of bends in the same plane and straight legs of offsets parallel, unless otherwise indicated.
- K. Use raceway fittings compatible with raceways and suitable for use and location. For intermediate steel conduit, use threaded rigid steel conduit fittings, unless otherwise indicated.
- L. Run concealed raceways, with a minimum of bends, in the shortest practical distance considering the type of building construction and obstructions, unless otherwise indicated.
- M. Raceways Embedded in Slabs (Must be indicated on drawings to be embedded. Please notify Engineer if required but not shown): Install in middle third of slab thickness where practical, and leave at least **1-inch (25-mm)** concrete cover.
 - 1. Secure raceways to reinforcing rods to prevent sagging or shifting during concrete placement.
 - 2. Space raceways laterally to prevent voids in concrete.
 - 3. Run conduit larger than **1-inch trade size (DN27)** parallel to or at right angles to main reinforcement. Where at right angles to reinforcement, place conduit close to slab support.
 - 4. Transition from nonmetallic tubing to Schedule 80 nonmetallic conduit, rigid steel conduit, or IMC before rising above floor.
- N. Install exposed raceways parallel to or at right angles to nearby surfaces or structural members, and follow the surface contours as much as practical.
 - 1. Run parallel or banked raceways together, on common supports where practical.
 - 2. Make bends in parallel or banked runs from same centerline to make bends parallel. Use factory elbows only where elbows can be installed parallel; otherwise, provide field bends for parallel raceways.
- O. Join raceways with fittings designed and approved for the purpose and make joints tight.
 - 1. Make raceway terminations tight. Use bonding bushings or wedges at connections subject to vibration. Use bonding jumpers where joints cannot be made tight.
 - 2. Use insulating bushings to protect conductors.
- P. Tighten set screws of threadless fittings with suitable tools.
- Q. Terminations: Where raceways are terminated with locknuts and bushings, align raceways to enter squarely and install locknuts with dished part against the box. Where terminations are not secure with 1 locknut, use 2 locknuts: 1 inside and 1 outside the box.
- R. Where raceways are terminated with threaded hubs, screw raceways or fittings tightly into the hub so the end bears against the wire protection shoulder. Where chase nipples are used, align raceways so the coupling is square to the box and tighten the chase nipple so no threads are exposed.
- S. Install pull wires in empty raceways. Use No. 14 AWG zinc-coated steel or monofilament plastic line with not less than **200-lb (90-kg)** tensile strength. Leave at least **12 inches (300 mm)** of slack at each end of the pull wire.
- T. Telephone and Signal System Raceways, **2-Inch Trade Size (DN53)** and Smaller: In addition to the above requirements, install raceways in maximum lengths of **150 feet (45 m)** and with a maximum of two 90-degree bends or equivalent. Separate lengths with pull or junction boxes where necessary to comply with these requirements.
- U. Install raceway sealing fittings according to manufacturer's written instructions. Locate fittings at suitable, approved, and accessible locations and fill them with UL-listed sealing compound. For concealed

raceways, install each fitting in a flush steel box with a blank cover plate having a finish similar to that of adjacent plates or surfaces. Install raceway sealing fittings at the following points:

1. Where conduits pass from warm to cold locations, such as the boundaries of refrigerated spaces.
 2. Where otherwise required by NFPA 70.
- V. Stub-up Connections: Extend conduits through concrete floor for connection to freestanding equipment. Install with an adjustable top or coupling threaded inside for plugs set flush with the finished floor. Extend conductors to equipment with rigid steel conduit; FMC may be used **6 inches (150 mm)** above the floor. Install screwdriver-operated, threaded flush plugs flush with floor for future equipment connections.
- W. Flexible Connections: Use maximum of **6 feet (1830 mm)** of flexible conduit for recessed and semirecessed lighting fixtures; for equipment subject to vibration, noise transmission, or movement; and for all motors. Use liquidtight flexible conduit in wet or damp locations. Install separate ground conductor across flexible connections.
- X. Install nonferrous conduit or tubing for circuits operating above 60 Hz. Where aluminum raceways are installed for such circuits and pass through concrete, install in a nonmetallic sleeve.
- Y. Do not install aluminum conduits embedded in or in contact with concrete.
- Z. PVC Externally Coated, Rigid Steel Conduits: Use only fittings approved for use with that material. Patch all nicks and scrapes in PVC coating after installing conduits.
- AA. Surface Raceways: Install a separate, green, ground conductor in raceways from junction box supplying the raceways to receptacle or fixture ground terminals.
1. Select each surface raceway outlet box, to which a lighting fixture is attached, of sufficient diameter to provide a seat for the fixture canopy.
 2. Where a surface raceway is used to supply a fluorescent lighting fixture having central-stem suspension with a backplate and a canopy (with or without extension ring), no separate outlet box is required.
 3. Provide surface metal raceway outlet box, and the backplate and canopy, at the feed-in location of each fluorescent lighting fixture having end-stem suspension.
 4. Where a surface metal raceway extension is made from an existing outlet box on which a lighting fixture is installed, no additional surface-mounted outlet box is required. Provide a backplate slightly smaller than the fixture canopy.
- BB. Set floor boxes level and adjust to finished floor surface.
- CC. Set floor boxes level and trim after installation to fit flush to finished floor surface.
- DD. Install hinged-cover enclosures and cabinets plumb. Support at each corner.
- EE. **NO PVC CONDUIT ALLOWED ABOVE THE CEILING OR IN THE A/C RETURN PLENUM. PROVIDE RIGID CONDUIT.** Verify all MEP documents.
- 3.4 PROTECTION
- A. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and Installer, that ensure coatings, finishes, and cabinets are without damage or deterioration at the time of Substantial Completion.
1. Repair damage to galvanized finishes with zinc-rich paint recommended by manufacturer.
 2. Repair damage to PVC or paint finishes with matching touchup coating recommended by manufacturer.
- 3.5 CLEANING
- A. On completion of installation, including outlet fittings and devices, inspect exposed finish. Remove burrs, dirt, and construction debris and repair damaged finish, including chips, scratches, and abrasions.

END OF SECTION

'CH-1'

'AHU-1'

FED FROM 'MDP'

FED FROM 'DPA'

- 10. Provide for each feeder protective device in each distribution panelboard and any other similar equipment furnished under this Division, identification as to the specific load that it serves.
- 11. Nameplates shall be laminated, white core, plastic with beveled edges, minimum 1/16 inch thick. Lettering shall be machine-engraved, not less than 1/4" high, cut through the black or red surface to the white core.
- 2. B. Junction Boxes and Pull Boxes
- 12. 1. Identification shall be with a black permanent marking pen on the top of 4" x 4" junction box covers or on the back of an outlet box cover plate identifying the branch circuits and systems within the conduit. Pull boxes shall be provided with a nameplate stating voltage and system served.
- 3. C. Wiring Device Wall Plates
- 13. 1. On the back side of wiring device wall plates identify with a black permanent marking pen the panelboard and branch circuit number the device is served from.
- 4. D. Wire Markers
- 14. 1. Wire markers for identification of wiring shall be self-adhesive type having letters and numerals indicating serving equipment and feeder or branch circuit number.
- 5. Rotation Tags
- 15. Rotation tags shall be brass or aluminum securely attached to equipment.

PART 3 EXECUTION

- 3.6 3.1 PREPARATION
- 1. Surfaces to receive labels or nameplates shall be carefully prepared in accordance with the manufacturer's instructions and recommendations.
- 3.7 3.2 NAMEPLATES
- 1. A. Nameplates shall be properly attached to identify panelboards, feeder circuit breakers, disconnect switches, pull boxes and other similar equipment furnished under this Division.
- 3.8 3.3 WIRE MARKERS
- 1. A. Wire markers shall be applied to each conductor or cable within panelboards, motor starter enclosures, circuit breaker enclosures, disconnect switches, cabinets, junction boxes, pull boxes, and other similar equipment identifying the serving equipment and feeder or branch circuit from which the conductors originate.

END OF SECTION

SECTION 26 21 17

SITE ELECTRICAL

PART 1 GENERAL

1.1 RELATED REQUIREMENTS

- A. The General Provisions, Supplemental General Provisions, Special Provisions and Division 1 Specification sections, apply to work covered by this Section.

1.2 SCOPE OF WORK

- A. Provide labor, materials, equipment, tools and services, and perform operations required for, and reasonably incidental to, the providing of all site electrical work.
- B. The site electrical work shall include, but not be limited to, the furnishing and installation of necessary materials and making arrangements for:
 - 1. The connection of electrical and telephone utilities.
 - 2. Underground conduit.

1.3 SUBMITTALS

- A. Submit product data and shop drawings in accordance with Division 1 for products specified under PARTS 2 PRODUCTS.

1.4 REFERENCE STANDARDS

- A. National Electrical Code (NEC), Article 300
- B. Service installation standards of the serving utility company(s).

PART 2 PRODUCTS

2.1 ELECTRICAL SERVICE

- A. Coordination: The location of the service entrance shall be coordinated with all other trades. Provide materials and equipment required to connect the electrical service. Contractor shall coordinate with the Power Company for all requirements prior to bid date. Contractor shall include all cost to for Utility Company to extend service to project site bid.
- B. Materials: Provide materials in accordance with other Sections of these Specifications.

2.2 COMMUNICATION SERVICE

- A. Coordination: The location of the telephone, cable, and internet service entrance shall be coordinated with all other trades. Provide materials and equipment required to connect the telephone, cable and internet services. Contractor shall coordinate with the Telephone, cable, and internet company for all requirements prior to bid date. Contractor is responsible to coordinate with utility companies.
- B. Materials: Provide materials in accordance with other sections of this specification.

PART 3 EXECUTION

3.1 GENERAL

- A. Underground installation of more than one conduit shall be in a duct arrangement as indicated. All conduits shall be laid so joints are staggered. All bends and stub-ups shall be rigid steel.
- B. Pour a red colored concrete envelope 3" thick over utility service, emergency generator and fire pump conduits. Where conduits cross a driveway, road or parking area, reinforcing rods shall be installed.
- C. Perform excavation, shoring, backfilling and concrete work in connection with electrical work in accordance with other Divisions of the Specifications.
- D. All conduit shall be sloped away from the building to negate water entering the building through the conduit system.

3.2 UTILITIES

- A. The locations, elevations and voltage of electrical lines and the location of the telephone lines included within the area of this work are indicated on the Drawings or in the Specifications in accordance with information received by the Architect/Engineer and Owner.
- B. The Contractor shall examine the site and shall verify, to his own satisfaction, the location and elevation of all utilities, and shall adequately inform himself as to their relation to the work.
- C. Existing utility lines not indicated but encountered during construction shall be protected, relocated or capped as directed by the Architect/Engineer. All precautions shall be exercised to prevent damage to existing lines not shown, but should work become necessary, it must be authorized prior to execution

except in an emergency situation.

- D. Before beginning excavations of any nature whatsoever, the Contractor shall make an attempt to locate all underground utilities of every nature occurring within the bounds of the area to be excavated. The Contractor shall then proceed with caution in his excavation work so that no utility shall be damaged with a resultant loss of service.
- E. Should a damage result to any utility through the Contractor's negligence or failure to comply with the above directive, he shall be liable for such damage and for all expense incurred in the expeditious repair or replacement of such damaged utilities.
- F. Repair of damaged utilities shall be to a condition equal to or better than the adjacent undamaged portion of such utility and to the complete satisfaction of the Architect/Engineer and Owner.

END OF SECTION

SECTION 26 24 16

PANELBOARDS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes load centers and panelboards, overcurrent protective devices, and associated auxiliary equipment rated 600 V and less for the following types:
 - 1. Lighting and appliance branch-circuit panelboards.
 - 2. Distribution panelboards.

- B. Related Sections include the following:

- 1. Division 26 Section "Fuses."

1.3 DEFINITIONS

- A. EMI: Electromagnetic interference.
- B. GFCI: Ground-fault circuit interrupter.
- C. RFI: Radio-frequency interference.
- D. RMS: Root mean square.
- E. SPDT: Single pole, double throw.
- F. TVSS: Transient voltage surge suppressor.

1.4 SUBMITTALS

- A. Product Data: For each type of panelboard, overcurrent protective device, TVSS device, accessory, and component indicated. Include dimensions and manufacturers' technical data on features, performance, electrical characteristics, ratings, and finishes.

- B. Shop Drawings: For each panelboard and related equipment.

- 1. Dimensioned plans, elevations, sections, and details. Show tabulations of installed devices, equipment features, and ratings. Include the following:
 - a. Enclosure types and details for types other than NEMA 250, Type 1.
 - b. Bus configuration, current, and voltage ratings.
 - c. Short-circuit current rating of panelboards and overcurrent protective devices.
 - d. UL listing for series rating of installed devices.
 - e. Features, characteristics, ratings, and factory settings of individual overcurrent protective devices and auxiliary components.
- 2. Wiring Diagrams: Diagram power, signal, and control wiring and differentiate between manufacturer-installed and field-installed wiring.

- C. Qualification Data: Submit data for testing agencies indicating that they comply with qualifications specified in "Quality Assurance" Article.

- D. Field Test Reports: Submit written test reports and include the following:

- 1. Test procedures used.
- 2. Test results that comply with requirements.
- 3. Results of failed tests and corrective action taken to achieve test results that comply with requirements.

- E. Panelboard Schedules: For installation in panelboards. Submit final versions after load balancing.

- F. Maintenance Data: For panelboards and components to include in maintenance manuals specified in Division 1. In addition to requirements specified in Division 1 Section "Contract Closeout," include the following:

- 1. Manufacturer's written instructions for testing and adjusting overcurrent protective devices.
- 2. Time-current curves, including selectable ranges for each type of overcurrent protective device.

1.5 QUALITY ASSURANCE

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

- B. Comply with NEMA PB 1.

- C. Comply with NFPA 70.

1.6 COORDINATION

- A. Coordinate layout and installation of panelboards and components with other construction that penetrates walls or is supported by them, including electrical and other types of equipment, raceways, piping, and encumbrances to workspace clearance requirements.

1.7 EXTRA MATERIALS

- A. Keys: [SIX] 6 spares of each type of panelboard cabinet lock.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Panelboards, Overcurrent Protective Devices, Controllers, Contactors, and Accessories:
 - a. Eaton
 - b. Square D Co.
 - c. General Electric

2.2 FABRICATION AND FEATURES

- A. Enclosures: Flush- and surface-mounted cabinets. NEMA PB 1, Type 1, to meet environmental conditions at installed location.
 - 1. Outdoor Locations: NEMA 250, Type 3R.
 - 2. Other Wet or Damp Indoor Locations: NEMA 250, Type 4.
 - 3. Hazardous Areas Indicated on Drawings: NEMA 250, Type 7C.
- B. Front: Secured to box with concealed trim clamps. For surface-mounted fronts, match box dimensions; for flush-mounted fronts, overlap box.
- C. Hinged Front Cover: Entire front trim hinged to box and with standard door within hinged trim cover.
- D. Finish: Manufacturer's standard enamel finish over corrosion-resistant treatment or primer coat.
- E. Directory Card: With transparent protective cover, mounted inside metal frame, inside panelboard door.
- F. Bus: Hard-drawn copper, 98 percent conductivity.
- G. Main and Neutral Lugs: Copper mechanical type suitable for use with conductor material.
- H. Equipment Ground Bus: Copper and adequate for feeder and branch-circuit equipment ground conductors; bonded to box.
- I. Service Equipment Label: UL labeled for use as service equipment for panelboards with main service disconnect switches.
- J. Isolated Equipment Ground Bus: Copper and adequate for branch-circuit equipment ground conductors; insulated from box.
- K. Extra-Capacity Neutral Bus: Copper neutral bus rated 200 percent of phase bus and UL listed as suitable for nonlinear loads.
- L. Split Bus: Vertical buses divided into individual vertical sections.
- M. Skirt for Surface-Mounted Panelboards: Same gage and finish as panelboard front with flanges for attachment to panelboard, wall, and ceiling or floor.
- N. Gutter Barrier: Arrange to isolate individual panel sections.
- O. Column-Type Panelboards: Narrow gutter extension, with cover, to overhead junction box equipped with ground and neutral terminal buses.
- P. Feed-through Lugs: Copper mechanical type suitable for use with conductor material. Locate at opposite end of bus from incoming lugs or main device.

2.3 PANELBOARD SHORT-CIRCUIT RATING

- A. Fully rated to interrupt symmetrical short-circuit current available at terminals.

2.4 LIGHTING AND APPLIANCE BRANCH-CIRCUIT PANELBOARDS

- A. Branch Overcurrent Protective Devices: Plug-in or bolt on circuit breakers, replaceable without disturbing adjacent units.
- B. Doors: Front mounted with concealed hinges; secured with flush latch with tumbler lock; keyed alike.

2.5 DISTRIBUTION PANELBOARDS

- A. Doors: Front mounted, except omit in fused-switch panelboards; secured with vault-type latch with tumbler lock; keyed alike.

- B. Main Overcurrent Protective Devices: Circuit breaker.
 - C. Branch overcurrent protective devices shall be one of the following:
 - 1. For Circuit-Breaker Frame Sizes 125 A and Smaller: Plug-in or Bolt-on circuit breakers.
 - 2. For Circuit-Breaker Frame Sizes Larger Than 125 A: Bolt-on circuit breakers; plug-in circuit breakers where individual positive-locking device requires mechanical release for removal.
- 2.6 OVERCURRENT PROTECTIVE DEVICES
- A. Molded-Case Circuit Breaker: NEMA AB 1, with interrupting capacity to meet available fault currents.
 - 1. Thermal-Magnetic Circuit Breakers: Inverse time-current element for low-level overloads, and instantaneous magnetic trip element for short circuits. Adjustable magnetic trip setting for circuit-breaker frame sizes 250 A and larger.
 - 2. Electronic Trip Unit Circuit Breakers: RMS sensing; field-replaceable rating plug; with the following field-adjustable settings:
 - a. Instantaneous trip.
 - b. Long- and short-time pickup levels.
 - c. Long- and short-time time adjustments.
 - d. Ground-fault pickup level, time delay, and I^2t response.
 - 3. Current-Limiting Circuit Breakers: Frame sizes 400 A and smaller; let-through ratings less than NEMA FU 1, RK-5.
 - 4. Integrally Fused Circuit Breakers: Thermal-magnetic trip element with integral limiter-style fuse listed for use with circuit breaker; trip activation on fuse opening or on opening of fuse compartment door.
 - 5. GFCI Circuit Breakers: Single- and two-pole configurations with [5] [30]-mA trip sensitivity.
 - B. Molded-Case Circuit-Breaker Features and Accessories. Standard frame sizes, trip ratings, and number of poles.
 - 1. Lugs: Mechanical style, suitable for number, size, trip ratings, and material of conductors.
 - 2. Application Listing: Appropriate for application; Type SWD for switching fluorescent lighting loads; Type HACR for heating, air-conditioning, and refrigerating equipment.
 - 3. Ground-Fault Protection: Integrally mounted relay and trip unit with adjustable pickup and time-delay settings, push-to-test feature, and ground-fault indicator.
 - C. Fused Switch: NEMA KS 1, Type HD; clips to accommodate specified fuses; lockable handle.
- PART 3 - EXECUTION
- 3.1 INSTALLATION
- A. Install panelboards and accessories according to NEMA PB 1.1.
 - B. Mounting Heights: Top of trim 74 inches (1880 mm) above finished floor, unless otherwise indicated.
 - C. Mounting: Plumb and rigid without distortion of box. Mount recessed panelboards with fronts uniformly flush with wall finish.
 - D. Circuit Directory: Create a directory to indicate installed circuit loads after balancing panelboard loads. Obtain approval before installing. Use a computer or typewriter to create directory; handwritten directories are not acceptable.
 - E. Install filler plates in unused spaces.
 - F. Wiring in Panelboard Gutters: Arrange conductors into groups and bundle and wrap with wire ties after completing load balancing.
- 3.2 IDENTIFICATION
- A. Identify field-installed conductors, interconnecting wiring, and components; provide warning signs as specified in Division 26 Section "Basic Electrical Materials and Methods] [Electrical Identification."
 - B. Panelboard Nameplates: Label each panelboard with engraved metal or laminated-plastic nameplate mounted with corrosion-resistant screws.
- 3.3 CONNECTIONS
- A. Install equipment grounding connections for panelboards with ground continuity to main electrical ground bus.
 - B. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A and UL 486B.
- 3.4 FIELD QUALITY CONTROL

- A. Prepare for acceptance tests as follows:
 - 1. Test insulation resistance for each panelboard bus, component, connecting supply, feeder, and control circuit.
 - 2. Test continuity of each circuit.
 - B. Testing: After installing panelboards and after electrical circuitry has been energized, demonstrate product capability and compliance with requirements.
 - 1. Procedures: Perform each visual and mechanical inspection and electrical test indicated in NETA ATS, Section 7.5 for switches and Section 7.6 for molded-case circuit breakers. Certify compliance with test parameters.
 - 2. Correct malfunctioning units on-site, where possible, and retest to demonstrate compliance; otherwise, replace with new units and retest.
 - C. Balancing Loads: After Substantial Completion, but not more than 60 days after Final Acceptance, measure load balancing and make circuit changes as follows:
 - 1. Measure as directed during period of normal system loading.
 - 2. Perform load-balancing circuit changes outside normal occupancy/working schedule of the facility and at time directed. Avoid disrupting critical 24-hour services such as fax machines and on-line data-processing, computing, transmitting, and receiving equipment.
 - 3. After circuit changes, recheck loads during normal load period. Record all load readings before and after changes and submit test records.
 - 4. Tolerance: Difference exceeding 20 percent between phase loads, within a panelboard, is not acceptable. Rebalance and recheck as necessary to meet this minimum requirement.
 - D. Infrared Scanning: After Substantial Completion, but not more than 60 days after Final Acceptance, perform an infrared scan of each panelboard. Remove panel fronts so joints and connections are accessible to portable scanner.
 - 1. Follow-up Infrared Scanning: Perform an additional follow-up infrared scan of each panelboard 11 months after date of Substantial Completion.
 - 2. Instrument: Use an infrared scanning device designed to measure temperature or to detect significant deviations from normal values. Provide calibration record for device.
 - 3. Record of Infrared Scanning: Prepare a certified report that identifies panelboards checked and describes scanning results. Include notation of deficiencies detected, remedial action taken, and observations after remedial action.
- 3.5 ADJUSTING
- A. Set field-adjustable switches and circuit-breaker trip ranges.
- 3.6 CLEANING
- A. On completion of installation, inspect interior and exterior of panelboards. Remove paint splatters and other spots. Vacuum dirt and debris; do not use compressed air to assist in cleaning. Repair exposed surfaces to match original finish.

END OF SECTION

SECTION 26 27 17

EQUIPMENT WIRING

PART 1 - GENERAL

1.1 RELATED REQUIREMENTS

- A. The General Provisions, Supplemental General Provisions, Special Provisions and Division 1 Specification sections, apply to work covered by this Section.
- B. Comply with Division 26 Sections, as applicable. Refer to other Divisions for coordination of work.
- C. The furnishing and installation of control power wiring required for equipment furnished under Division 25 and not shown on the electrical drawings shall be furnished under Division 25. Control power wiring is defined as the line voltage (120V) power wiring for equipment control cabinets, temperature control, energy management, or building automation system panels and line voltage smoke/fire dampers. Provide 120V to equipment control devices. Coordinate with Division 25 prior to rough-ins.
- D. The furnishing and installation of the temperature control wiring, energy management system or building automation wiring not shown on the electrical drawings shall be furnished under Division 25. Temperature control, energy management system and building automation system wiring is defined as the interlock or interconnecting wiring required between system control devices, appurtenances and control panels to allow the system to function automatically. This includes wiring between the fire alarm system, smoke exhaust systems, door entry systems and any other system requiring interface with the temperature control, energy management and building automation system.

1.2 SCOPE OF WORK

- A. Provide labor, materials, equipment, tools and services, and perform operations required for, and reasonably incidental to, the providing of power wiring to each motor-driven and/or electrically-operated system or unit of equipment.
- B. Provide labor, materials, equipment, tools and services, and perform operations required for, and reasonably incidental to, the providing of the line voltage wiring serving power to a motor(s) or piece of electric powered equipment. The wiring shall allow the motor(s) or equipment to operate in a manual mode.
- C. All control wiring above the ceiling or in the A/C return plenum shall be plenum rated cable.
- D. Provide labor, materials, equipment, tools and services and perform operations required for, and reasonably incidental to, the providing of control wiring for miscellaneous systems. The Contractor shall be responsible for reviewing the project specifications to ascertain the extent of the control wiring required for the miscellaneous systems and shall assume the responsibility for performing the work.
- E. Provide labor, materials, equipment, tools and services, and perform operations required for and reasonably incidental to, the providing of a fully connected and operating smoke damper installation. Coordinate with the mechanical contractor th required work. The following is a description of the responsibilities for the specified system:
 - 1 The mechanical contractor will provide the smoke dampers and actuators as indicated in the specifications and on the plans. In addition, if the smoke dampers have pneumatic actuators, the mechanical contractor will provide all control air piping from a source to each smoke damper and the electro-pneumatic (EP) and/or pneumatic-electric (PE) switches as required for actuation of the smoke dampers.
 - 2 The electrical contractor shall provide the power wiring for the smoke damper actuators.
 - 3 The fire alarm contractor shall provide the signal and control wiring for the operation of the smoke dampers including all wiring of EP and/or PE switches.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Materials and equipment provided hereinafter shall comply with other Division 26 Sections and with Division 25 of these Specifications.

PART 3 - EXECUTION

3.1 MOTORS

- A. Except for items that are furnished with factory-installed, integral motors, an electric motor of required size and electrical characteristics will be provided and installed as specified in Division 25 for each item of motor-

driven equipment. As part of the work of this Section, complete the electrical installation of these motors in accordance with approved wiring diagrams and instructions.

- B. Where disconnect switches or circuit breakers are not provided integral with control equipment for motors and other electrical appurtenances, provide and install all disconnect switches required by the National Electrical Code and/or as indicated on the Drawings.

3.2 SYSTEM, EQUIPMENT AND DEVICE WIRING

- A. Connect complete for operation all items of heating, ventilation, air conditioning, plumbing, fire protection and all electrical systems, equipment and devices furnished by the Owner or specified in other Divisions of the Specifications. System, equipment and device outlets of various types have been indicated in the Specifications or on the drawings, but indication of exact location or scope of the work may not be indicated. Refer to the Owner and to the work specified in the other Divisions for the scope of connections to the equipment furnished by them and for the exact locations of all connections to the equipment furnished by them. Power wiring shall be provided under Division 26 as indicated. Control wiring not indicated to be provided under Division 26 shall be provided by the provider of the system, equipment, or device and installed and terminated under Division 26. Request all rough-in drawings required for proper installation of the electrical work in ample time to permit preparation of the installation drawings and thus avoid delays on the job.

END OF SECTION

SECTION 26 27 26

WIRING DEVICES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes receptacles, connectors, switches, and finish plates.

1.3 DEFINITIONS

- A. GFI: Ground-fault circuit interrupter.
- B. TVSS: Transient voltage surge suppressor.

1.4 SUBMITTALS

- A. Product Data: For each product specified.
- B. Shop Drawings: Legends for receptacles and switch plates.
- C. Samples: For devices and device plates for color selection and evaluation of technical features.
- D. Maintenance Data: For materials and products to include in maintenance manuals specified in Division 1.

1.5 QUALITY ASSURANCE

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction.
- B. Comply with NEMA WD 1.
- C. Comply with NFPA 70.

1.6 COORDINATION

- A. Receptacles for Owner-Furnished Equipment: Match plug configurations.
- B. Coordinate with pool contractor for special receptacles.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Wiring Devices:
 - a. Bryant Electric, Inc.
 - b. Eagle Electric Manufacturing Co., Inc.
 - c. GE Company; GE Wiring Devices.
 - d. Hubbell, Inc.; Wiring Devices Div.
 - e. Killark Electric Manufacturing Co.
 - f. Leviton Manufacturing Co., Inc.
 - g. Pass & Seymour/Legrand; Wiring Devices Div.
 - h. Pyle-National, Inc.; an Amphenol Co.

2.2 RECEPTACLES

- A. Straight-Blade and Locking Receptacles: Heavy-Duty grade. The device shall be 20-ampere, 125-volts, Nema configuration 5-20R, back and side wired.
- B. Special Receptacles for NEMA configuration refer to Manufacturer specs.
- C. GFI Receptacles: Feed-through type, with integral NEMA WD 6, Configuration 5-20R duplex receptacle arranged to protect connected downstream receptacles on same circuit. Design units for installation in a 2-3/4-inch- (70-mm-) deep outlet box without an adapter. Device shall have an indicator light.
- D. Isolated-Ground Receptacles: Equipment grounding contacts connected only to the green grounding screw terminal of the device with inherent electrical isolation from mounting strap. Device shall be white finish with the orange symbol.
 - 1. Devices: Listed and labeled as isolated-ground receptacles.
 - 2. Isolation Method: Integral to receptacle construction and not dependent on removable parts.

2.3 SWITCHES

- A. General
 - 1. Switches shall be toggle or decorative rocker type as indicated herein.. The body of the switch

shall be made of an arc-resistant thermoset material. All toggle switch handles shall be constructed of a thermoplastic material. All rocker switch handles shall be constructed of a thermoset material. All wall switches shall be of the quiet AC type.

1. Switches shall be SPST, DPST, 3-way or 4-way as indicated on the Drawings.
2. Switch color shall be white unless noted otherwise. Coordinate with Architect.

B. Specification Grade

1. Specification Grade switches shall be toggle type. The contact arms shall be made of one-piece copper alloy material. The switch shall include a green ground screw attached to the mounting strap. The switch shall be 20-ampere, 120/277-volts AC, horsepower rated, back and side-wired.

C. Dimmer Switches: Modular, full-wave, solid-state units with integral, quiet on/off switches and audible and electromagnetic noise filters.

1. Control: Continuously adjustable slide, toggle, or rotary knob. Single-pole or three-way switch to suit connections.
2. Incandescent Lamp Dimmers: Modular, 120 V, 60 Hz with continuously adjustable slide with "on/off" switch; single pole with soft tap or other quiet switch; electromagnetic filter to eliminate noise, RF, and TV interference; and 5-inch (130-mm) wire connecting leads. Dimmer to be sized per circuit load.

2.4 WALL PLATES(All wall plates)

A. For all single and combination types match corresponding wiring devices.

1. Plate-Securing Screws: Metal with head color to match plate finish.
2. Material for Finished Spaces: 0.04-inch- (1-mm-) thick, Type 302, satin-finished stainless steel.
3. Material for Unfinished Spaces: stainless steel.

2.5 FLOOR SERVICE FITTINGS

- A. Power Receptacle: NEMA WD 6, Configuration 5-20R, gray finish, unless otherwise indicated.
- B. Signal Outlet: Blank cover with bushed cable opening, unless otherwise indicated.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install devices and assemblies plumb and secure.
- B. Install wall plates when painting is complete.
- C. Install wall dimmers to achieve indicated rating after derating for ganging as instructed by manufacturer.
- D. Do not share neutral conductor on load side of dimmers.
- E. Arrangement of Devices: Unless otherwise indicated, mount flush, with long dimension vertical, and grounding terminal of receptacles on top. Group adjacent switches under single, multigang wall plates.
- F. Protect devices and assemblies during painting.
- G. Adjust locations at which floor service outlets and telephone/power service poles are installed to suit arrangement of partitions and furnishings.

3.2 IDENTIFICATION

- A. Comply with Division 26 Section "Electrical Identification."
- B. Comply with Division 26 Section "Basic Electrical Materials and Methods."
 1. Switches: Where three or more switches are ganged, and elsewhere as indicated, identify each switch with approved legend engraved on wall plate.
 2. Receptacles: Identify panelboard and circuit number from which served. Use machine-printed, pressure-sensitive, abrasion-resistant label tape on face of plate and durable wire markers or tags within outlet boxes.

3.3 CONNECTIONS

- A. Connect wiring device grounding terminal to branch-circuit equipment grounding conductor.
- B. Isolated-Ground Receptacles: Connect to isolated-ground conductor routed to designated isolated equipment ground terminal of electrical system.

- C. Tighten electrical connectors and terminals according to manufacturers published torque-tightening values. If manufacturers torque values are not indicated, use those specified in UL 486A and UL 486B.

3.4 FIELD QUALITY CONTROL

- A. Test wiring devices for proper polarity and ground continuity. Operate each device at least six times.
- B. Test GFCI operation with both local and remote fault simulations according to manufacturer's written instructions.
- C. Replace damaged or defective components.

3.5 CLEANING

- A. Internally clean devices, device outlet boxes, and enclosures. Replace stained or improperly painted wall plates or devices.

END OF SECTION

SECTION 26 28 13

FUSES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Fuses.

1.3 SUBMITTALS

- A. General: Submit each item in this Article according to the Conditions of the Contract and Division 1 Specification Sections.
- B. Product Data for each fuse type specified.
- C. Field test reports indicating and interpreting test results.
- D. Maintenance data for tripping devices to include in the operation and maintenance manual specified in Division 1.

1.4 QUALITY ASSURANCE

- A. Source Limitations: Obtain fuses from one source and by a single manufacturer.
- B. Comply with NFPA 70 for components and installation.
- C. Listing and Labeling: Provide fuses specified in this Section that are listed and labeled.
 - 1. The Terms "Listed" and "Labeled": As defined in the National Electrical Code, Article 100.
 - 2. Listing and Labeling Agency Qualifications: A "Nationally Recognized Testing Laboratory" (NRTL) as defined in OSHA Regulation 1910.7.

1.5 EXTRA MATERIALS

- A. Furnish extra materials described below that match products installed, are packaged with protective covering for storage, and are identified with labels describing contents.
 - 1. Spare Fuses: Furnish quantity equal to 20 percent of each fuse type and size installed, but not less than 1 set of 3 of each type and size.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering fuses that may be incorporated into the Work include, but are not limited to, the following:
- B. Manufacturers: Subject to compliance with requirements, provide fuses by one of the following:
 - 1. Cooper Industries, Inc.; Bussmann Div.
 - 2. Eagle Electric Mfg. Co., Inc.
 - 3. Ferraz Corp.
 - 4. General Electric Co.; Wiring Devices Div.
 - 5. Gould Shawmut.
 - 6. Tracor, Inc.; Littelfuse, Inc. Subsidiary.

2.2 CARTRIDGE FUSES

- A. Characteristics: NEMA FU 1, nonrenewable cartridge fuse; class as specified or indicated; current rating as indicated; voltage rating consistent with circuit voltage.

2.3 SPARE FUSE CABINET

- A. Cabinet: Wall-mounted, 0.05-inch- (1.27-mm-) thick steel unit with full-length, recessed piano-hinged door with key-coded cam lock and pull.
 - 1. Size: Adequate for orderly storage of spare fuses specified with 15 percent spare capacity minimum.
 - 2. Finish: Gray, baked enamel.
 - 3. Identification: Stencil legend "SPARE FUSES" in 1-1/2-inch (40-mm) letters on door.
 - 4. Fuse Pullers: For each size fuse.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine utilization equipment nameplates and installation instructions to verify proper fuse locations, sizes, and characteristics.
 - B. Do not proceed with installation until unsatisfactory conditions have been corrected.
- 3.2 FUSE APPLICATIONS
- A. Motor Branch Circuits: Class RK1, time delay.
 - B. Other Branch Circuits: Class RK5, non-time delay.
- 3.3 INSTALLATION
- A. Install fuses in fusible devices as indicated. Arrange fuses so fuse ratings are readable without removing fuse.
 - B. Install spare fuse cabinet where indicated.
- 3.4 IDENTIFICATION
- A. Install typewritten labels on inside door of each fused switch to indicate fuse replacement information.

END OF SECTION

SECTION 26 28 18

PART 1 GENERAL

1.1 RELATED REQUIREMENTS

- A. The General Provisions, Supplemental General Provisions, Special Provisions and Division 1 Specification sections, apply to work covered by this Section.

1.2 SCOPE OF WORK

- A. Provide labor, materials, equipment, tools and services, and perform operations required for, and reasonably incidental to, the providing of disconnect switches, including all related systems and accessories.

1.3 SUBMITTALS

- A. Submit product data and shop drawings in accordance with Division 1 for products specified under PART 2 - PRODUCTS.
- B. Provide outline drawings with dimensions, and equipment ratings for voltage, amperage, horsepower and short circuit.
- C. Provide designations for each disconnect. RE: to section 26 05 53.

1.4 REFERENCE STANDARDS

- A. Switches shall be manufactured in accordance with the following standards:
 - 1. UL 98 - Enclosed and Dead Front Switches
 - 2. NEMA KS1 - Enclosed Switches
 - 3. NEMA 250 - Enclosures for Electrical Equipment

PART 2 PRODUCTS

2.1 MANUFACTURER

- A. Eaton
- B. Square D Co.
- C. General Electric

2.2 GENERAL

- A. Switches shall be heavy duty type.

2.3 SWITCH INTERIOR

- A. Switches shall have switch blades which are visible when the switch is OFF and the cover is open.
- D. Lugs shall be copper and front removable and UL listed for 60°C or 75°C conductors 30-100 ampere, 75°C conductors 200 ampere and up.
- E. Current carrying parts shall be plated to resist corrosion.
- F. Switches shall have removable arc suppressor to facilitate easy access to line side lugs.
- G. Switches shall have provisions for a field installable electrical interlock.

2.4 SWITCH MECHANISM

- A. Switch operating mechanism shall be quick-make, quick-break such that, during normal operation of the switch, the operation of the contacts shall not be capable of being restrained by the operating handle after the closing or opening action of the contacts has started.
- B. The operating handle shall be an integral part of the box, not the cover.
- C. Provisions for padlocking the switch in the OFF position with at least three padlocks shall be provided.
- D. The handle position shall travel at least 90° between OFF and ON positions to clearly distinguish and indicate handle position.
- E. Switches shall have a dual cover interlock mechanism to prevent unintentional opening of the switch cover when the switch is ON and prevent turning the switch ON when the cover is open. The cover interlock mechanism shall have an externally operated override but the override shall not permanently disable the interlock mechanism. The tool used to override the cover interlock mechanism shall not be required to enter the enclosure in order to override the interlock.

2.5 SWITCH ENCLOSURES

- A. Switch covers shall be attached with welded pin-type hinges (Type 1) or top-hinged, attached with removable screws and securable in the open position (Type 3R).
- B. The enclosure shall be finished with gray baked enamel paint which is electrodeposited on cleaned, phosphate pre-treated steel (Type 1) or gray baked enamel paint which is electrodeposited on cleaned, phosphate pre-treated galvanized steel (Type 3R).
- C. The enclosure shall have ON and OFF markings stamped into the cover.

- D. The operating handle shall be provided with a dual colored, red/black position indication.
 - E. Switches shall have provisions to accept up to three 3/8" hasp padlocks to lock the operating handle in the OFF position.
 - H. Tangential knockouts shall be provided to facilitate ease of conduit entry (Type 1).
 - I. Type 3R enclosure shall contain no knockouts. Supply watertight hubs.
 - J. Type 4x shall be stainless steel enclosure with no knockouts. Supply watertight hubs.
- 2.6 SWITCH RATINGS
- A. Switches shall be horsepower rated.
 - B. The UL listed short circuit current rating of the switches shall be: 200,000 rms symmetrical amperes when used with or protected by Class R or Class J fuses 30-600 ampere employing appropriate fuse rejection schemes.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Install disconnect switches where indicated shown or not shown.
- B. Install fuses in fusible disconnect switches.

END OF SECTION

SECTION 26 43 13 SURGE PROTECTIVE DEVICES FOR LOW-VOLTAGE ELECTRICAL POWER CIRCUITS

PART 1 - GENERAL

1.1 RELATED REQUIREMENTS

- A. The General Provisions, Supplemental General Provisions, Special Provisions, apply to work covered by this Section.
- B. Comply with Division 26 Sections, as applicable. Refer to other Divisions for coordination of work.

1.2 SCOPE OF WORK

- A. Provide labor, material, equipment, tools and services, and perform operations required for, and reasonably incidental to, the providing of a high-energy power conditioning surge protection device(s) at branch circuit panelboards where indicated on the Drawings. The device shall incorporate transient voltage surge suppression (TVSS) and high-frequency electrical line noise filtering. The device shall provide effective high energy transient voltage suppression, surge current diversion, high-frequency attenuation, and line stabilization in ANSI/IEEE C62.41-2002 environments connected downstream from the facility's main overcurrent protective device. The device shall be connected in parallel with the facility's wiring system.
- B. The device shall be installed as an integral part or external of the panelboard, switchboard.

1.3 SUBMITTALS

- A. Submit product data and shop drawings for products specified under PART 2 - PRODUCTS.
- B. Manufacturers' Product Data: Submit material specifications and installation data for products specified under PART 2 - PRODUCTS.
- C. Shop Drawings: Submit shop drawings to indicate information not fully described by the product data to indicate compliance with the contract documents.

- 1 Include electrical characteristics and ratings for the specified equipment.
- 2 Include wiring diagrams indicating the internal connections of the specified equipment within its enclosure.
- 3 Drawings shall be provided indicating device dimensions, weights, mounting provisions, connection details and wiring diagrams.
- 4 Documentation of the specified device UL 1449 3rd Edition voltage protection rating (VPR) and per mode surge current rating shall be included. All submittals without this documentation will be rejected.
- 5 The manufacturer shall make available upon request certified documentation of applicable Location Category Testing in full compliance with ANSI/IEEE C62.41-1991 and ANSI/IEEE C62.45-1987 Guidelines.

D. Record Drawings

- 1 A complete set of manufacturers' product data and shop drawings indicating all post bid revisions and field changes.

1.4 QUALITY ASSURANCE

- A. Industry Reference Standards and Publications: The device shall be designed, manufactured, tested and installed in compliance with the latest editions of:
 - 1 American National Standards Institute (ANSI) and Institute of Electrical and Electronic Engineers (ANSI/IEEE C62.41-2002 and C62.45-2002)
 - 2 Federal Information Processing Standards Publication 94 (FIPS PUB 94)
 - 3 National Electrical Manufacturers Association (NEMA LS-1)
 - 4 National Fire Protection Association (NFPA 70, National Electrical Code (NEC), 75 and 78)
 - 5 Underwriters Laboratories UL 1449 Standard for Transient Voltage Surge Suppressors Surge Protection Devices and UL 1283 Standard for Electromagnetic Interference Filters.
- B. The device shall be UL listed under UL 1449 and UL 1283 complimentary listed.
- C. The device shall be warranted against defects in material and/or workmanship and any failure or end-of-life event including lighting for a minimum of TEN (10) years from the date of shipment.
- D. The device shall be thoroughly factory-tested before shipment. Testing of the device shall include but not be limited to quality control checks, maximum continuous operating voltage (MCOV) check, and clamping voltage verification tests. The MCOV check shall consist of a minimum of one (1) hour burn-in at the applicable MCOV.

1.5 SYSTEM DESCRIPTION

"Webb County Youth Village Rehabilitation Center"

Laredo, Texas

A. Environmental Requirements

- 1 Storage Temperature: Storage temperature range shall be -40° to +85° C (-40° to +185° F).
- 2 Operating Temperature: Operating temperature range shall be -40° to +60° C (-40° to 140° F).
- 3 Relative Humidity: Operation shall be reliable in an environment with 5% to 95% non-condensing relative humidity.
- 4 Operating Altitude: The device shall be capable of operation in an altitude of 0 - 12,000 feet above sea level.
- 5 Audible Noise: The device shall not generate any audible noise.
- 6 Magnetic Fields: No appreciable magnetic fields shall be generated. The device shall be capable of use directly in computer rooms in any location without danger to data storage systems or devices.

B. Electrical Requirements

- 1 Device Operating Voltage: The nominal operating voltage and configuration shall be that of the switchgear, distribution panel, sub or branch panelboard. Maximum Continuous Operating Voltage (MCOV): The allowable maximum continuous operating voltage of all suppression components utilized in the unit shall not be less than 115% of the nominal operating voltage.
- 2 Operating Frequency: The operating frequency range of the device shall be 47 to 63 Hertz.
- 3 Protection Modes: The devices primary mode of protection shall be line-to-neutral. The secondary modes of protection shall be line-to-ground and neutral-to-ground.
- 4 Surge Current Capacity and Voltage Protection Rating: Unless specifically noted on the drawings and/or the schedules, the surge current capacity, and the voltage protection rating of the SPD shall be not less than listed on the following table. The above text gives you the option to request a specific surge current rating on the riser or panel schedules

Location	Per Mode Surge Current Rating	120/208vac 3 phase VPR	277/480vac 3 phase VPR
Switchgear	200,000 amps	900v	1200v
Distribution Panel	150,000 amps	900v	1200v
Sub or Branch Panel	100,000 amps	900v	1200v

5. Construction: SPD's with a surge current rating of greater than 155,000 amps per mode shall be field serviceable modular devices. SPD's with a surge current rating of less than 155,000 amps may be non-modular.

1.6 DOCUMENTATION

- A. Equipment Manual. The manufacturer shall furnish an equipment manual with installation, operation, and maintenance instructions for the system.

PART 2 - PRODUCTS

2.1 MANUFACTURER

- 1 Square D
- 2 Cutler-Hammer
- 3 Current Technology
- 4 THOR SYSTEMS

2.2 TRANSIENT VOLTAGE SURGE SUPPRESSION COMPONENTS

- A. The device shall include a solid-state suppression system which includes arrays of fused non-linear voltage dependent metal oxide varistors (MOV's) with similar operating characteristics. The suppression system shall not utilize gas tubes, spark gaps, silicon avalanche diodes or other components which might short or crowbar the line, thus leading to interruption of normal power flow to or system upset of connected loads. The suppression system shall not incorporate any other components which may degrade performance or reliability of the

2.3 HIGH-FREQUENCY FILTER

- A. The device shall include a UL 1283 high frequency extended range tracking filter. The filter shall reduce fast

rise-time, high-frequency, error-producing transients and electrical line noise eliminating disturbances which may lead to system upset. The filter shall provide minimum insertion loss of 45 dB at 100 kHz attenuation frequency utilizing the MIL-STD-E220A 50 ohm insertion loss methodology.

2.4 INTERNAL CONNECTIONS

- A. All internal wiring associated with the suppression/filter device and subject to surge currents shall utilize low-impedance copper bus bar and/or #4 AWG copper conductor or larger. All internal connections associated with the suppression/filter device and subject to surge currents shall be made with compression solderless-type lugs and shall be bolted to the bus bars in order to reduce overall system impedance.

2.5 FIELD CONNECTIONS

- A. The device shall include mechanical lugs for each phase, neutral and ground, or permanently connected conductors as applicable. The lugs shall accommodate up to #4 AWG copper conductor.

2.6 ENCLOSURE

- A. The device shall be provided in a surface mounted NEMA 1 type hinged enclosure, with a NEMA rating that matches or exceeds that of the switchgear, distribution panel, sub or branch panelboard that is being protected. of minimum 14 gauge steel, painted inside and out. Enclosure width shall not be greater than 24 inches.

2.7 MONITORING

- A. The device shall include solid-state, long-life externally mounted LED visual status indicators that indicate the on-line status of each phase of the unit.
- B. Dry Contacts
- C. Audible alarm with silence switch
- D. For Service Entrance or Switchgear SPD's: LED visual status indicators, Audible alarm with silence switch, Dry Contacts plus Surge Event Counter.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. The installation and testing of the system shall be in full accordance with the manufacturer's installation, operation and maintenance instructions, and all national and local codes.
- B. The device shall be installed as close as practical to the facility's wiring system in accordance with NEC Article 285, IEEE 1100-2005 section 8.4.2.5, plus applicable national/local electrical codes and the manufacturer's recommended installation instructions. Connection shall be from a minimum 40A branch circuit breaker in the switchgear, distribution panel or panelboard with #4 AWG copper conductors not any longer than necessary, avoiding unnecessary bends. Advise the engineer if the installed In no case shall conductors will be longer than 3 feet in length. Verify circuit breaker size with manufacturer.

3.2 TESTING

- A. The system shall be field tested in the presence of the Owner. At the same time operational procedures shall be reviewed with the Owner.
- B. If external test equipment is required, two (2) testers shall be furnished to the owner and two (2) training sessions shall be furnished. The first training session shall be with 90 days of occupancy and the second training session shall be not less eight months, but not more than 12 months after the first training session. Training and test equipment shall be furnished at no additional cost to the owner.

END OF SECTION

SECTION 26 51 00

INTERIOR LIGHTING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes interior lighting fixtures, lighting fixtures mounted on exterior building surfaces, lamps, ballasts, emergency lighting units, and accessories.
- B. Related Sections include the following:

1.3 SUBMITTALS

- A. Product Data: For each type of lighting fixture indicated, arranged in order of fixture designation. Include data on features, accessories, and the following:
 - 1. Dimensions of fixtures.
 - 2. Certified results of laboratory tests for fixtures and lamps for photometric performance.
 - 3. Emergency lighting unit battery and charger.
 - 4. Fluorescent and high-intensity-discharge ballasts.
 - 5. Types of lamps.
- B. Shop Drawings: Show details of nonstandard or custom fixtures. Indicate dimensions, weights, method of field assembly, components, features, and accessories.
 - 1. Wiring Diagrams: Detail wiring for fixtures and differentiate between manufacturer-installed and field-installed wiring.
- C. Coordination Drawings: Reflected ceiling plans and sections drawn to scale and coordinating fixture installation with ceiling grid, ceiling-mounted items, and other components in the vicinity. Include work of all trades that is to be installed near lighting equipment.
- D. Product Certificates: Signed by manufacturers of lighting fixtures certifying that products comply with requirements.
- E. Field Test Reports: Indicate and interpret test results for compliance with performance requirements.
- F. Maintenance Data: For lighting fixtures to include in maintenance manuals specified in Division 1.

1.4 QUALITY ASSURANCE

- A. Fixtures, Emergency Lighting Units, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by an acceptable to authorities having jurisdiction.
- B. Comply with NFPA 70.
- C. NFPA 101 Compliance: Comply with visibility and luminance requirements for exit signs.

1.5 COORDINATION

- A. Fixtures, Mounting Hardware, and Trim: Coordinate layout and installation of lighting fixtures with ceiling system and other construction.

1.6 WARRANTY

- A. General Warranty: Special warranty specified in this Article shall not deprive Owner of other rights Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by Contractor under requirements of the Contract Documents.
- B. Special Warranties for Fluorescent Ballasts: Written warranty, executed by manufacturer agreeing to replace fluorescent ballasts that fail in materials or workmanship within specified warranty period.
 - 1. Special Warranty Period for Electronic Ballasts: Five years from date of manufacture, but not less than four years from date of Substantial Completion.

1.7 EXTRA MATERIALS

- A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the products indicated in the Interior Lighting Fixture Schedule at the end of Part 3.
- B. Products: Subject to compliance with requirements, provide one of the products indicated for each designation in the Interior Lighting Fixture Schedule in the plans. Submit Manufacturers as is in the Lighting Fixture Schedule or Equal. Submit Equal Manufacturers 10 days prior to bidding day for approval. For Equal Manufacturers submit lighting calculation for each equal fixture submitted for approval.

2.2 FIXTURES AND FIXTURE COMPONENTS, GENERAL

- A. Metal Parts: Free from burrs, sharp corners, and edges.
- B. Sheet Metal Components: Steel, unless otherwise indicated. Form and support to prevent warping and sagging.
- C. Doors, Frames, and Other Internal Access: Smooth operating, free from light leakage under operating conditions, and arranged to permit relamping without use of tools. Arrange doors, frames, lenses, diffusers, and other pieces to prevent accidental falling during relamping and when secured in operating position.
- D. Reflecting Surfaces: Minimum reflectance as follows, unless otherwise indicated:
 - 1. White Surfaces: 85 percent.
 - 2. Specular Surfaces: 83 percent.
 - 3. Diffusing Specular Surfaces: 75 percent.
 - 4. Laminated Silver Metallized Film: 90 percent.
- E. Lenses, Diffusers, Covers, and Globes: 100 percent virgin acrylic plastic or annealed crystal glass, unless otherwise indicated.
 - 1. Plastic: High resistance to yellowing and other changes due to aging, exposure to heat, and ultraviolet radiation.
 - 2. Lens Thickness: 0.125 inch (3 mm) minimum, unless greater thickness is indicated.

2.3 FLUORESCENT LAMP BALLASTS

- A. General Requirements: Unless otherwise indicated, features include the following:
 - 1. Designed for type and quantity of lamps indicated at full light output.
 - 2.
- B. Electronic Ballasts for Linear Lamps: Unless otherwise indicated, features include the following, besides those in "General Requirements" Paragraph above:
 - 1. Certified Ballast Manufacturer Certification: Indicated by label.
 - 2. Encapsulation: Without voids in potting compound.
 - 3. Parallel Lamp Circuits: Multiple lamp ballasts connected to maintain full light output on surviving lamps if one or more lamps fail.
- C. Ballasts for Compact Lamps in Recessed Fixtures: Unless otherwise indicated, additional features include the following:
 - 1. Type: Electronic or electromagnetic, fully encapsulated in potting compound.
 - 2. Power Factor: 90 percent, minimum.
 - 3. Operating Frequency: 20 kHz or higher.
 - 4. Flicker: Less than 5 percent.

5. Lamp Current Crest Factor: Less than 1.7.
 6. Transient Protection: Comply with IEEE C62.41 for Category A1 locations.
 7. Interference: Comply with 47 CFR, Chapter 1, Part 18, Subpart C for limitations on electromagnetic and radio-frequency interference for nonconsumer equipment.
- D. Ballasts for Compact Lamps in Nonrecessed Fixtures: Unless otherwise indicated, additional features include the following:
1. Power Factor: 90 percent, minimum.
 2. Ballast Coil Temperature: 65 deg C, maximum.
 3. Transient Protection: Comply with IEEE C62.41 for Category A1 locations.
 4. Interference: Comply with 47 CFR, Chapter 1, Part 18, Subpart C for limitations on electromagnetic and radio-frequency interference for nonconsumer equipment.
- 2.4 EXIT SIGNS
- A. General Requirements: Comply with UL 924 and the following:
1. Sign Colors and Lettering Size: Comply with authorities having jurisdiction.
- B. Internally Lighted Signs: As follows:
1. Lamps for AC Operation: Light-emitting diodes, 70,000 hours minimum rated lamp life.
- 2.5 EMERGENCY LIGHTING UNITS
- A. General Requirements: Self-contained units. Comply with UL 924. Units include the following features:
1. Battery: Sealed, maintenance-free, lead-acid type with minimum 5-year nominal life and special warranty.
 2. Charger: Fully automatic, solid-state type with sealed transfer relay.
 3. Operation: Relay automatically turns lamp on when supply circuit voltage drops to 80 percent of nominal voltage or below. Lamp automatically disconnects from battery when voltage approaches deep-discharge level. When normal voltage is restored, relay disconnects lamps, and battery is automatically recharged and floated on charger.
- 2.6 EMERGENCY FLUORESCENT POWER SUPPLY UNIT
- A. Internal Type: Self-contained, modular, battery-inverter unit factory mounted within fixture body. Comply with UL 924.
1. Test Switch and Light-Emitting Diode Indicator Light: Visible and accessible without opening fixture or entering ceiling space.
 2. Battery: Sealed, maintenance-free, nickel-cadmium type with minimum 5-year nominal life.
 3. Charger: Fully automatic, solid-state, constant-current type.
 4. Operation: Relay automatically energizes lamp from unit when normal supply circuit voltage drops to 80 percent of nominal voltage or below. When normal voltage is restored, relay disconnects lamp, and battery is automatically recharged and floated on charger.
- 2.7 LAMPS
- A. Noncompact Fluorescent Lamp Life: Rated average is 20,000 hours at 3 hours per start when used on rapid-start circuits.
- 2.8 FINISHES
- A. Fixtures: Manufacturer's standard, unless otherwise indicated.
- PART 3 - EXECUTION
- 3.1 INSTALLATION
- A. Fixtures: Set level, plumb, and square with ceiling and walls, and secure according to manufacturer's written instructions and approved submittal materials. Install lamps in each fixture.
- B. Support for Fixtures in or on Grid-Type Suspended Ceilings: Do not use grid for support.

1. Install a minimum of two ceiling support system wires for each fixture. Locate not more than 6 inches (150 mm) from fixture corners.
 2. Support Clips: Fasten to fixtures and to ceiling grid members at or near each fixture corner.
 3. Fixtures of Sizes Less Than Ceiling Grid: Arrange as indicated on reflected ceiling plans or center in acoustical panel, and support fixtures independently with at least two 3/4-inch (20-mm) metal channels spanning and secured to ceiling tees.
- C. Suspended Fixture Support: As follows:
1. Pendants and Rods: Where longer than 48 inches (1200 mm), brace to limit swinging.
 2. Stem-Mounted, Single-Unit Fixtures: Suspend with twin-stem hangers.
- 3.2 CONNECTIONS
- A. Ground equipment.
1. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A and UL 486B.
- 3.3 FIELD QUALITY CONTROL
- A. Inspect each installed fixture for damage. Replace damaged fixtures and components.
- B. Advance Notice: Give dates and times for field tests.
- C. Provide instruments to make and record test results.
- D. Tests: As follows:
1. Verify normal operation of each fixture after installation.
 2. Emergency Lighting: Interrupt electrical supply to demonstrate proper operation.
 3. Verify normal transfer to battery source and retransfer to normal.
 4. Report results in writing.
- E. Malfunctioning Fixtures and Components: Replace or repair, then retest. Repeat procedure until units operate properly.
- F. Corrosive Fixtures: Replace during warranty period.
- 3.4 CLEANING AND ADJUSTING
- A. Clean fixtures internally and externally after installation. Use methods and materials recommended by manufacturer.
- B. Adjust aimable fixtures to provide required light intensities.

END OF SECTION

SECTION 26 56 00

EXTERIOR LIGHTING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes exterior lighting units with luminaires and lamps.
- B. Related Sections include the following:
 - 1. Division 26 Section "Interior Lighting" for interior fixtures, lamps, ballasts, emergency lighting units, and accessories; and for exterior luminaires normally mounted on buildings.

1.3 DEFINITIONS

- A. Lighting Unit: A luminaire or an assembly of luminaires complete with a common support, including pole, post, or other structure, and mounting and support accessories.
- B. Luminaire (Light Fixture): A complete lighting device consisting of lamp(s) and ballast(s), when applicable, together with parts designed to distribute light, to position and protect lamps, and to connect lamps to power supply.

1.4 SUBMITTALS

- A. Product Data: For each type of lighting unit indicated, arranged in order of lighting unit designation. Include data on features, accessories, finishes, and the following:
 - 1. Materials and dimensions of luminaires.
 - 2. Certified results of independent laboratory tests for fixtures and lamps for electrical ratings and photometric data.
 - 3. Certified results of laboratory tests for fixtures and lamps for photometric performance.
 - 4. High-intensity-discharge luminaire ballasts.
- B. Product Certificates: Signed by manufacturers of lighting units certifying that products comply with requirements.
- C. Field Test Reports: Indicate and interpret test results for compliance with performance requirements.
- D. Maintenance Data: For lighting units to include in maintenance manuals specified in Division 1.

1.5 QUALITY ASSURANCE

- A. Luminaires and Accessories: Listed and labeled as defined in NFPA 70, Article 100, for their indicated use, location, and installation conditions by acceptable to authorities having jurisdiction
- B. Comply with ANSI C2.
- C. Comply with NFPA 70.

1.6 WARRANTY

- A. General Warranty: Special warranty specified in this Article shall not deprive Owner of other rights Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by Contractor under requirements of the Contract Documents. Warranty one labor.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the products indicated in the Exterior Lighting Unit Schedule at the end of Part 3.
- B. Products: Subject to compliance with requirements, provide one of the products indicated for each designation in the Interior Lighting Fixture Schedule in the plans. Submit Manufacturers as is in the Lighting

Fixture Schedule or Equal. Submit Equal Manufacturers 10 days prior to bidding day for approval. For Equal Manufacturers submit lighting calculation for each equal fixture submitted for approval.

2.2 LUMINAIRES

- A. Comply with IESNA RP-8 for parameters of lateral light distribution patterns indicated for luminaires.
- B. Metal Parts: Free from burrs, sharp corners, and edges.
- C. Sheet Metal Components: Corrosion-resistant aluminum, unless otherwise indicated. Form and support to prevent warping and sagging.
- D. Housings: Rigidly formed, weather- and light-tight enclosures that will not warp, sag, or deform in use. Provide filter/breather for enclosed luminaires.
- E. Doors, Frames, and Other Internal Access: Smooth operating, free from light leakage under operating conditions, and arranged to permit relamping without use of tools. Arrange doors, frames, lenses, diffusers, and other pieces to prevent accidental falling during relamping and when secured in operating position. Provide for door removal for cleaning or replacing lens. Arrange to disconnect ballast when door opens.
- F. Exposed Hardware Material: Stainless steel.
- G. Plastic Parts: High resistance to yellowing and other changes due to aging, exposure to heat, and ultra-violet radiation.
- H. Reflecting Surfaces: Minimum reflectance as follows, unless otherwise indicated:
 - 1. White Surfaces: 85 percent.
 - 2. Specular Surfaces: 83 percent.
 - 3. Diffusing Specular Surfaces: 75 percent.
- I. Lenses and Refractors: Materials as indicated. Use heat- and aging-resistant, resilient gaskets to seal and cushion lens and refractor in luminaire doors.
- J. Photoelectric Relays: As follows:
 - 1. Contact Relays: Single throw, arranged to fail in the on position and factory set to turn light unit on at 1.5 to 3 fc (16 to 32 lx) and off at 4.5 to 10 fc (48 to 108 lx) with 15-second minimum time delay.
 - 2. Relay Mounting: In luminaire housing.
- K. High-Intensity-Discharge Ballasts: Comply with ANSI C82.4. Constant wattage autotransformer or regulating high-power-factor type, unless otherwise indicated.
 - 1. Single-Lamp Ballasts: Minimum starting temperature of minus 40 deg C.
 - 2. Open-circuit operation will not reduce average life.
 - 3. High-Pressure Sodium Ballasts: Equip with a solid-state igniter/starter having an average life in pulsing mode of 10,000 hours at an igniter/starter case temperature of 90 deg C.
 - 4. Noise: Uniformly quiet operation, with a noise rating of B or better.
- L. Lamps: Comply with the standard of the ANSI C78 series that is applicable to each type of lamp. Provide luminaires with indicated lamps of designated type, characteristics, and wattage. Where a lamp is not indicated for a luminaire, provide medium wattage lamp recommended by manufacturer for luminaire.

PART 3 - EXECUTION

3.1 CONNECTIONS

- A. Ground equipment.
 - 1. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A and UL 486B.
- B. Ground metal poles/support structures according to Division 26 Section "Grounding."

1. Nonmetallic Poles: Ground metallic components of lighting units and foundations. Connect luminaires to grounding system with No. 6 AWG conductor.

3.2 FIELD QUALITY CONTROL

- A. Inspect each installed unit for damage. Replace damaged units.
- B. Advance Notice: Give dates and times for field tests.
- C. Provide instruments to make and record test results.
- D. Tests and Observations: Verify normal operation of lighting units after installing luminaires and energizing circuits with normal power source, and as follows:

3.3 CLEANING AND ADJUSTING

- A. Clean units after installation. Use methods and materials recommended by manufacturer.

END OF SECTION

SECTION 27 05 33CONDUITS AND BACKBOXES FOR COMMUNICATIONS SYSTEMS

PART 1 - GENERAL

1.1 RELATED REQUIREMENTS

- A. The General Provisions, Supplemental General Provisions, Special Provisions and Division 1 Specification sections, apply to work covered by this Section.
- B. Comply with Division 26 Sections, as applicable. Refer to other Divisions for coordination of work.

1.2 SCOPE OF WORK

- A. Provide labor, materials, equipment, tools and services, and perform operations required for, and reasonably incidental to, the providing of a telephone and data communications empty conduit system, including all related systems and accessories.

1.3 SUBMITTALS

- A. Submit product data and shop drawings in accordance with Division 1 for products specified under PART 2 - PRODUCTS.

PART 2 - PRODUCTS

2.1 GENERAL

- A. Conduit, conduit sleeves, outlet boxes, cover plates and pullwire as indicated.
- B. Fireproofing material for telephone and data communication conduit and conduit sleeves through fire rated walls and floors.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install telephone and data communication raceways as indicated.
- B. Install individual raceways from telephone and data communications outlets to above accessible ceiling. In areas without a ceiling, raceways shall be routed to the nearest ceiling space. In building without a ceiling, raceways shall be extended back to the main telephone/ data communication board or to a location indicated on the Drawings.
 - 1 Minimum size conduit: one inch.
 - 2 Raceway installation shall be in accordance with Section 26 05 33.
 - 3 Coordinate raceway installations in millwork and other fabricated architectural items with the other portions of the Work.
 - 4 Provide pullwire in each raceway tagged on each end.
 - 5 Raceways shall be terminated with an insulating bushing or a suitable connector with an insulated throat.
- C. Provide telephone and data communications outlet boxes.
 - 1 Provide a one-gang outlet unless noted otherwise.
 - 2 Install outlet box and device ring at each location.
 - 3 Install telephone and data communications outlets at same height specified for convenience outlets unless noted otherwise. Group telephone and data communications outlets with related receptacle outlets unless noted otherwise.
 - 4 Install a blank cover plate on all unused communications outlet boxes.

END OF SECTION

SECTION 28 31 11DIGITAL, ADDRESSABLE FIRE-ALARM SYSTEMS

PART 1 - GENERAL

1.1 RELATED REQUIREMENTS

- A. The General Provisions, Supplemental General Provisions, Special Provisions and Division 1 Specification Sections apply to Work covered by this Section.
- B. Comply with other Division 26 Sections, as applicable. Refer to other Divisions for coordination of the Work.

1.2 SCOPE OF WORK

- A. Provide labor, materials, equipment, tools and services, and perform operations required for, and reasonably incidental to, the providing additional devices for the shell building fire alarm system, including all related systems and accessories. New Fire Alarm system shall be capable to communicate with existing Simplex systems remotely. New Fire Alarm system shall have internet capabilities.

1. Fire alarm control addressable panel
2. Remote Annunciator
3. Addressable or conventional manual fire alarm stations.
4. Addressable analog and conventional area smoke detectors.
5. Conventional beam detectors.
6. Addressable analog and conventional duct smoke detectors.
7. Addressable analog and conventional heat detectors.
8. Audible notification appliances; bells, horns, chimes.
9. Visual notification appliances; strobes.
10. Air handling systems shutdown control.
11. Magnetic door holder release.
12. Dry pipe sprinkler release valve/deluge valve control.
13. Dry pipe sprinkler release valve/deluge valve supervision.
14. Emergency generator supervision.
15. Battery standby.
16. System shall activate the overhead gates. Provide all accessories for an active system.

1.3 SUBMITTALS

- A. Submit product data and shop drawings in accordance with Division 1 for products specified under PART 2 - PRODUCTS. Shop drawings shall be generated by the Fire Alarm Contractor without the Engineers plans.
- B. The submittal data shall include, but not necessarily be limited to, the following:

- 1 Complete bill of material indicating quantity, part numbers and brief description.
- 2 Data sheets for all products. If multiple models are shown on the same data sheet, highlight the specific model used.
- 3 Provide drawing with all devices.
- 4 Provide single line riser diagram showing all equipment and type, number and size of all conductors.

1.4 REFERENCE STANDARDS

- A. The fire alarm system devices specified herein shall be designed, manufactured, installed and tested according to the latest version of the following standards:

- 1 National Fire Protection Association Standards
- 1 NFPA 70 - National Electric Code (NEC), Articles 725 & 760.
- 2 NFPA 71 - Central Station Signaling Systems
- 3 NFPA 72 - National Fire Alarm Code (NFAC)
- 4 NFPA 92A - Smoke Control Systems
- 5 NFPA 101 - Life Safety Code
- 2 Underwriters Laboratories, Inc.
- 1 UL 38 - Manually Activated Signaling Boxes
- 2 UL 228 - Door Holders for Fire Protective Signaling Systems
- 3 UL 268 - Smoke Detectors for Fire Protective Signaling Systems
- 4 UL268A - Smoke Detectors for Duct Applications
- 5 UL 346 - Waterflow Indicators for Fire Protective Signaling Systems

- 6 UL 464 - Audible Signaling Appliances
- 7 UL 864/UOJZ/APOU - Control Units for Fire Protective Signaling Systems
- 8 UL 1481 - Power Supplies for Fire Protective Signaling Systems
- 9 UL 1638 - Visual Signaling Appliances
- 10 UL 1711 - Amplifiers for Fire Protective Signaling Systems
- 11 UL 1971 - Standard for Fire Protective Signaling Systems
- 3 Americans with Disabilities Act (ADA)
- 4 Local and State Building Codes
- 5 Local Authorities Having Jurisdiction (LAHJ)

1.5 QUALITY ASSURANCE

- A. The fire alarm system devices shall be listed and labeled by Underwriters Laboratories, Inc. for use in fire protective signaling system.
- B. The Installing Contractor shall be factory authorized and trained and shall be NICET certified in the sub-field of Fire Alarm Systems, for the engineering and technical installation and supervision of the system. This certification shall be Level III for engineering and Level II for technical installation and supervision. Proof of certification shall be provided. All work shall be performed by skilled technicians, under the supervision and direction of the designated NICET engineering technician, all of whom shall be properly trained and qualified for the work.
- C. The fire alarm contractor shall not sub out portion of the work. The fire alarm shall be responsible to complete the job.
- D. Submission to Authority Having Jurisdiction: Submit copies of State Certificate as required by State Fire Marshall. Provide copy with operating and maintenance manual.

1.6 QUALIFICATIONS

- 1. The fire alarm contractor, as a business entity, shall be an authorized and designated representative of the equipment manufacturer and shall have been actively engaged in the business of selling, installation and servicing fire alarm systems for a period of at least (5) years prior to the bid date.
- 2. The fire alarm contractor shall have an office within 75 miles of the job site staffed with trained technicians who are qualified to manage the installation, to be responsible that the system is installed as submitted, to conduct system start-up, to instruct the project coordinators representatives and local authorities in the proper operation of the system, and to provide service throughout the warranty period.
- 3. The fire alarm contractor SHALL NOT HAVE any grievances or complaints on record regarding workmanship, code compliance, or service response with either the project coordinator, Architect, Engineer, Owner or the State Fire Marshals office. A contractor that has any prior finding(s) of a Fire Alarm license violation or has any litigation in process with the State Fire Marshal is unacceptable.
- 3. The fire alarm contractor shall be an active installer on the approved manufacturer for a minimum of 5 years.

1.7 WARRANTY

Warranty of all control equipment, sensors, I/O modules and all other peripherals and of materials, installation and workmanship shall be for one (1) year from date of acceptance.

2.The Contractor shall guarantee all wiring and raceways to be free from inherent mechanical or electrical defects for one (1) year from date of final acceptance.

PART 2 - PRODUCTS

2.1 MANUFACTURER

- A. Silent Knight

2.2 CIRCUITING GUIDELINES

- A. Each addressable analog loop shall be circuited as shown on the drawings but device loading in not to exceed 80% of loop capacity in order to leave for space for future devices. The loop shall have Class A B operation. When it is necessary to interface conventional initiating devices provide intelligent input modules to supervise Class A B zone wiring. The audio system components shall be an integral part of the fire alarm system control panel.
- B. Audio Amplifiers
 - 1 Each audio power amplifier shall have integral audio signal de-multiplexers, allowing the amplifier

to select any digitized audio channels. The channel selection shall be directed by the system software. Multiple and different audio signals shall be able to be broadcast simultaneously from the same system network node.

- 2 Each amplifier output shall include a dedicated, supervised speaker circuit which is suitable for connection of emergency speaker appliances. Each amplifier shall also include a notification appliance circuit for connection of visual (strobe) appliances. This circuit shall be fully programmable and it shall be possible to define the circuit for the support of audible, visible, or ancillary devices.
- 3 Standby audio amplifiers shall be provided that automatically sense the failure of a primary amplifier, and automatically program themselves to select and de-multiplex the same audio information channel of the failed primary amplifier, and fully replace the function of the failed amplifier.
- 4 In the event of a loss of the fully digitized, multiplexed audio riser, the audio amplifiers shall automatically default to an internally generated alarm tone.
- 5 Audio amplifiers shall automatically detect a short circuit condition on the connected speaker circuit wiring, and shall inhibit itself from driving into that short circuit condition.

2.3 DETECTORS

A. General

- 1 Detectors shall be capable of full digital communications using both broadcast and polling protocol. Each detector shall be capable of performing independent fire detection algorithms. The fire detection algorithm shall measure sensor signal dimensions, time patterns and combine different fire parameters to increase reliability and distinguish real fire conditions from unwanted deceptive nuisance alarms. Signal patterns that are not typical of fires shall be eliminated by digital filters.
- 2 Detectors shall have an integral microprocessor capable of making alarm decisions based on fire parameter information stored in the detector head. Distributed intelligence shall improve response time by decreasing the data flow between detector and loop controller. Detectors not capable of making independent alarm decisions shall not be acceptable. Maximum total loop response time for detectors shall be 0.5 seconds.
- 3 Detectors shall have a separate means of displaying communication and alarm status. A green LED shall flash to confirm communication with the loop controller. A red LED shall flash to display alarm status. Both LEDs on steady shall indicate alarm-standalone mode status. Both LEDs shall be visible through a full 360 degree viewing angle.
- 4 Detectors shall be capable of identifying diagnostic codes to be used for system maintenance. The diagnostic codes shall be stored at the detector.
- 5 Detectors shall be capable of transmitting pre-alarm and alarm signals in addition to the normal, trouble and need cleaning information. It shall be possible to program control panel activity to each level. Each detector shall be individually programmable to operate at various sensibility settings.
- 6 The detector microprocessor shall contain an environmental compensation algorithm which identifies and sets ambient "environmental thresholds." The microprocessor shall continually monitor the environmental impact of temperature, humidity, other contaminates as well as detector aging. The process shall employ digital compensation to adapt the detector to both long term and short term environmental changes. The microprocessor shall monitor the environmental compensation value and alert the system operator when the detector approaches the allowable environmental compensation value. Differential sensing algorithms shall maintain a constant differential between selected detector sensitivity and the "learned" base line sensitivity. The base line sensitivity information shall be permanently stored at the detector.
- 7 The detector and loop controller shall provide increased reliability and inherent survivability through intelligent conventional operation. The device shall automatically change to stand alone, conventional device operation in the event of a loop controller polling communications failure. In the standalone detector mode, the detector shall continue to operate using sensitivity and environmental compensation information, stored in its microprocessor at the time of communications failure. The loop controller shall monitor the loop and activate a loop alarm if a detector reaches its alarm sensitivity threshold.

- 8 Detectors shall be capable of automatic electronic addressing and/or custom addressing. Devices using DIP or rotary switches for addressing, either in the base or on the detector shall not be acceptable.
- 9 Detectors shall be suitable for operation in the following environment:
 - 1 Temperature: 32°F to 120°F
 - 2 Humidity: 0-93% RH, non-condensing
 - 3 Elevation: Up to 6,000 ft.
- B. Photoelectric Smoke Detectors
 - 1 Addressable intelligent photoelectric smoke detectors shall be provided as indicated on the Drawings. The detector shall use a light scattering type photo electric smoke sensor to sense changes in air samples from its surroundings. An integral microprocessor shall dynamically examine values from the sensor and initiate an alarm based on the analysis of data. The detector shall utilize digital filters to remove signal patterns that are not typical of fires. Each detector shall have twin red/green status LEDs. The red LED shall indicate alarm condition and green LED shall indicate normal.
 - 2 The detector shall continually monitor any changes in sensitivity due to the environmental affects of dirt, smoke, temperature and humidity. The information shall be stored in the integral processor and transferred to the loop controller.
 - 3 Detector shall be programmable for different sensitivity during day and night periods.
 - 4 The detector shall be suitable for direct insertion into air ducts up to 3 ft. high and 3 ft. wide with air velocities up to 5,000 ft/min.
 - 5 The detector shall be rated for ceiling installation at a minimum of 30 foot centers.
 - 6 The percent smoke obscuration per foot alarm setpoint for the detector shall be field selectable to various sensitive settings ranging from 1.0% to 3.5%.
- C. Detector Mounting Bases
 - 1 Detector mounting bases shall be suitable for mounting on a standard 4" square electrical outlet box. The base shall contain no electronics, support all detector types and have the following minimum requirements:
 - 1 Removal of the respective detector shall not affect communications with other detectors.
 - 2 Terminal connections shall be made on the room side of the base. Bases which must be removed to gain access to the terminals shall not be acceptable.
 - 3 Capable of supporting a remote LED indicator and test station. Provide remote LED indicators and test stations as indicated on the Drawings.
- D. Detector Mounting Plates
 - 1 Provide detector mounting plate assemblies to facilitate mounting detectors for direct insertion into low velocity ductwork. The mounting plate shall be code gauge steel with corrosion resistant red enamel finish.
- E. Duct Smoke Detectors
 - 1 Air duct mounted smoke detectors shall be provided in the air supply stream of all central air handling equipment above 2000 cfm, i.e. Provide all necessary interface wiring for proper system

operation.

- 2 The duct smoke detector shall be UL listed per UL 268A specifically for use in air handling systems. The detector shall operate at velocities of 300-4000 ft./min. The detector housing shall be equipped with an integral mounting base. It shall be capable of local testing via magnetic switch or remote testing using a remote test station. The duct detector housing shall incorporate an airtight smoke chamber in compliance with UL 268A. The housing shall be capable of mounting to either rectangular or round ducts without adaptor brackets. An integral filter system shall be included to reduce dust and residue effects on detector housing, thereby reducing maintenance and servicing. Sampling tubes shall be easily installed after the housing is mounted to the duct by passing through the duct housing. The housing shall have a red enamel finish.
- 3 For each duct smoke detector provide a remote LED indicator and test station to be mounted in a location indicated on the Drawings and approved by the local authority having jurisdiction.

F. Beam Type Smoke Detectors

1.

Provide projected beam type smoke detectors. Then beam detectors shall be four wire 24 Vdc and powered from the control panel 4 wire smoke power source. This unit shall consist of a separate transmitter and receiver capable of being powered separately or together. This unit shall operate in either a short range of 30 to 100 ft. (9.14 to 30.4m) or a long range of 100 to 300 ft. (30.4 to 91.4m). The detector shall feature a bank of four alignment LEDs on both the receiver and transmitter that are used to ensure proper alignment without the use of special tools. The beam detector shall feature automatic gain control which will compensate for gradual signal deterioration from dirt accumulation on lenses. Ceiling or mount as shown on the plans. Testing shall be carried out using calibrated test filters. Provide an activated remote test station>.

2.4 SYSTEM MODULES

- A. Addressable intelligent modules shall support supervised Class B circuits. The modules shall be multi-function capable of field programming. The modules shall have a minimum of 2 diagnostic LEDs mounted behind a finished cover plate. A green LED shall flash to confirm communication with the loop controller. A red LED shall flash to display alarm status. The module shall be capable of storing diagnostic codes which can be retrieved for troubleshooting assistance. Input and output circuit wiring shall be supervised for open and ground faults. The module shall be suitable for operation in the following environment:
 - 1 Temperature: 32°F to 120°F (0°C to 49°C)
 - 2 Humidity: 0-93% RH, non-condensing
- B. Single Input Module
 - 1 Addressable intelligent single input modules shall be provided as required for the system configuration. The single input module shall provide one (1) supervised Class B input circuit. The module shall be suitable for mounting on 4" square electrical box. The single input module shall support the following input circuit types:
 - 1 Normally-Open Alarm Latching (Manual Stations, Smoke Detectors, etc.)
 - 2 Normally-Open Alarm Delayed Latching (Waterflow Switches)
 - 3 Normally-Open Active Non-Latching (Monitors, Fans, Dampers, Doors, etc.)
 - 4 Normally-Open Active Latching (Supervisory, Tamper Switches)
- C. Dual Input Module
 - 1 Addressable intelligent dual input modules shall be provided as required for the system configuration. The dual input module shall provide two (2) supervised Class B input circuits. The module shall be suitable for mounting on a standard 4" square electrical box. The dual input module shall support the following input circuit types:
 - 1 Normally-Open Alarm Latching (Manual Stations, Smoke Detectors, etc.)
 - 2 Normally-Open Alarm Delayed Latching (Waterflow Switches)
 - 3 Normally-Open Active Non-Latching (Monitors, Fans, Dampers, Doors, etc.)
 - 4 Normally-Open Active Latching (Supervisory, Tamper Switches)
- D. Monitor Module
 - 1 Addressable intelligent monitor modules shall be provided as required for the system configuration.

The monitor module shall support one (1) supervised Class B normally-open active non-latching monitor circuit. The monitor module shall be suitable for mounting on a standard 4" square electrical box.

- E. Waterflow/Tamper Module
- 1 Addressable intelligent waterflow/tamper modules shall be provided as required for the system configuration. The waterflow/tamper module shall support two (2) supervised Class B input circuits. Channel A shall support a normally-open alarm delayed latching waterflow switch circuit. Channel B shall support a normally-open active latching tamper switch. The waterflow/tamper module shall be suitable for mounting on a standard 4" square electrical box.
- F. Single Input Signal Module
- 1 Addressable intelligent single input signal modules shall be provided as required for the system configuration. The single input signal module shall provide one (1) supervised Class B output circuit capable of supporting the operation of an audible/ visual signal power selector and a telephone power selector with ring tone for fire fighter's telephone. The module shall be suitable for mounting on a standard 4" square electrical box.
- G. Dual Input Signal Module
- 1 Addressable intelligent dual input signal modules shall be provided as required for the system configuration. The dual input signal module shall provide a means to selectively connect one of two (2) signaling circuits to one (1) supervised output circuit. The dual input signal modules shall be capable of supporting the operation of an audible/visual signal power selector. The module shall be suitable for mounting on a standard 4" square electrical box.
- H. Control Relay Module
- 1 Addressable intelligent control relay modules shall be provided as required for the system configuration. The control relay module shall provide one form "C" dry relay contact rated at 2 amps @ 24 Vdc to control external appliances or equipment shutdown. The control relay shall be rated for pilot duty and releasing systems. The position of the relay contact shall be confirmed by the system firmware. The control relay module shall be suitable for mounting on a standard 4" square electrical box.
- I. Universal Class A/B Module
- 1 Addressable intelligent class A/B modules shall be provided as required for the system configuration. The universal class A/B module shall be capable of numerous operations. The module shall be suitable for mounting on a standard 4" square electrical box. The universal class A/B module shall support the following circuit types:
 - 1 Two (2) supervised Class B Normally-Open Alarm Latching.
 - 2 Two (2) supervised Class B Normally-Open Alarm Delayed Latching.
 - 3 Two (2) supervised Class B Normally-Open Active Non-Latching.
 - 4 Two (2) supervised Class B Normally-Open Active Latching.
 - 5 One (1) form "C" dry relay contact rated at 2 amps @ 24 Vdc.
 - 6 One (1) supervised Class A Normally-Open Alarm Latching.
 - 7 One (1) supervised Class A Normally-Open Alarm Delayed Latching.
 - 8 One (1) supervised Class A Normally-Open Active Non-Latching.
 - 9 One (1) supervised Class A Normally-Open Active Latching.
 - 10 One (1) supervised Class A 2-wire Smoke Alarm Non-Verified.
 - 11 One (1) supervised Class B 2-wire Smoke Alarm Non-Verified.
 - 12 One (1) supervised Class A 2-wire Smoke Alarm Verified
 - 13 One (1) supervised Class B 2-wire Smoke Alarm Verified
 - 14 One (1) supervised Class A Signal Circuit, 24Vdc @ 2A.
 - 15 One (1) supervised Class B Signal Circuit, 24Vdc @ 2A.

2.5 MANUAL PULL STATIONS

- A. Addressable intelligent dual action, non-break glass type, key reset, semi-flush mounted manual pull stations shall be provided as indicated on the Drawings. The stations shall be of Lexan construction, finished in red

with white molded raised letters "PULL IN CASE OF FIRE". The station shall be suitable for mounting on a standard 4" square electrical box. The station shall have a minimum of 2 diagnostic LEDs mounted on their integral, factory assembled single or two stage input module. A green LED shall flash to confirm communication with the loop controller. A red LED shall flash to display alarm status. The station shall be capable of storing diagnostic codes which can be retrieved for troubleshooting assistance. Input circuit wiring shall be supervised for open and ground faults. The fire alarm pull station shall be suitable for operation in the following environment:

- 1 Temperature: 32°F to 120°F (0°C to 49°C)
- 2 Humidity: 0-93% RH, non-condensing

2.6 NOTIFICATION APPLIANCES

A. General

- 1 All appliances shall be UL listed for Fire Protective Service. All audible appliances, visual appliances and combination audible/visual appliances shall be capable of providing the equivalent facilitation which is allowed under the Americans with Disabilities Act Accesabilities Guidelines (ADA/AG), and shall be UL 1971, and ULC S526 listed.

B. Audible Only Notification Appliances

- 1 Audible appliances shall be a mylar cone type speaker. Paper type cones are not acceptable. The rear of the speaker shall be completely sealed protecting the cone during and after installation. Speakers shall provide power taps at 1/4w, 1/2w, 1w, and 2w. Speakers shall provide UL confirmed 90 dBA sound output at 2w.
- 2 Audible appliances shall be provided with in/out wiring terminals.
- 3 Audible appliances shall be flush for ceiling mounted and flush/semi-flush for wall mounted as indicated on the Drawings. They shall have a white faceplate for ceiling mounting and red faceplate for wall mounting. They shall mount to a standard 4" square electrical box.

C. Visual Only Notification Appliances

- 1 Visual appliances shall be a self-synchronized strobe. The strobe flashtube shall be enclosed in a rugged lexan lens with solid state circuitry. The strobe shall provide 15, 15/75, 30, 60 and 110 candela synchronized flash outputs. The strobe intensity selection shall be based on the installed location within the building.
- 2 Visual appliances shall be provided with in/out field wiring terminals.
- 3 Visual appliances shall have lens markings oriented for wall mounting where indicated on the Drawings. They shall have a red faceplate for flush/semi-flush wall mounting. They shall mount to a standard 4" square electrical outlet box.

D. Combination Audible/Visual Notification Appliances

- 1 Combination appliances shall be a combination of the audible and visual appliances specified previously. They shall have a red faceplate for flush/semi-flush wall mounting.
- 2 The majority, if not all, of the notification appliances shall be combination devices such that the visual and audible requirements of ADA shall be complied with. Visual notification appliances shall be located in all areas of common use, i.e. lobbies, hallways, restrooms, meeting/conference/assembly areas, break rooms, copy/fax/mail rooms, etc. Audible notification appliances shall produce a sound that exceeds the prevailing equivalent sound level in the room or space by at least 15dbA or exceeds any maximum sound level with a duration of 60 seconds by 5dbA, whichever is louder. Sound levels for alarm signals shall not exceed 120 dbA. It is the intent of the Drawings to show all devices that are required. The fire alarm system vendor/bidder shall provide all appliances shown and/or required by these specifications but it others are anticipated to be required the vendor/bidder shall qualify the provisions for the system making note of the additional cost for the anticipated additional requirements.

2.7 ANCILLARY DEVICES

A. Remote Relays

1 Multi-Voltage Control Relays

- 1 Remote control relays shall be provided as required for the system configuration for connection to supervised ancillary circuits for control of fans, dampers, door releases, etc. Relay contact ratings shall be SPDT or DPDT, as required, and rated for 10 amperes at 115 Vac. A single relay may be energized from a voltage source of 12 Vdc, 12 Vac, 24 Vdc, 24 Vac, 115 Vac, or 230 Vac, as

required. A red LED shall indicate the relay is energized. A metal enclosure shall be provided.

2 Manual Override Control Relays

1 Remote control relays with a manual override shall be provided as required for the system configuration for connection to supervised ancillary circuits for control of fans, dampers, door releases, etc. Relay contact ratings shall be SPDT and rated for 10 amperes at 115 Vac or 24 Vdc. A single relay may be energized from a voltage source of 24 Vdc or 24 Vac. A red LED shall indicate the relay is energized.

3 Heavy Duty Power Relays

1 Remote control relays shall be provided as required for the system configuration for connection to supervised ancillary circuits for control of fans, dampers, door releases, etc. Relay contact ratings shall be DPDT and rated for 30 amperes at 300 Vac or 2 HP motor load. A single relay may be energized from a voltage source of 24 Vac, 115 Vac, as required. A metal enclosure shall be provided.

2.8 ELECTROMAGNETIC DOOR HOLDERS

A. Provide single or double door, floor or wall mounted electromagnetic door holder/release devices as indicated on the Drawings. The devices shall be rated for 24V ac/dc input. The devices shall be brushed zinc finished.

2.9 FIRE ALARM CABLE

A. The fire alarm cable shall plenum rated and be UL listed and suitable for use as power limited fire protective signaling circuit cable in accordance with National Electric Code Article 760 (Fire Alarm Systems) and Article 725 (Class 1, Class 2 and Class 3 - Remote Control, Signaling and Power-Limited Circuits).

B. Cable Construction

1 Conductors shall be solid, soft annealed, uncoated copper.

2 Insulation shall be 300 volt, 105°C polyvinylchloride.

3 Two conductor, non-shielded cables shall be parallel; shielded and three or more conductors shall be cabled round.

4 Shielding shall be mylar backed aluminum foil, helically wrapped to provide 100% coverage. A suitable copper drain wire shall be provided with shielded cables.

5 Jacket shall be red, 105°C polyvinylchloride, rated 300 volt.

6 Cable shall be plenum rated when installed in air handling plenums.

C. In general, non-shielded cable is acceptable for use throughout except on voice circuits. All voice circuits shall utilize shielded, twisted pair cable.

PART 3 - EXECUTION

3.1 APPROVALS

A. Complete fire alarm system drawings shall be issued to the Local Authority Having Jurisdiction for approval prior to the installation of the fire alarm system.

3.2 INSTALLATION

A. Installation of the Fire Alarm System shall be in strict compliance with manufacturers recommendations. The entire system shall be installed in accordance with approved manufacturers manuals and wiring diagrams and as approved by the Local Authority Having Jurisdiction.

B. Fire alarm cable shall be installed in conduit in areas of exposed structure and within inaccessible ceilings. Conduit shall also be provided from outlet boxes within walls stubbed up to accessible ceilings. Provide end bushings on conduit stub-ups. Cable only is acceptable in accessible ceilings.

C. All conduit, wiring, outlet boxes, junction boxes, cabinets and similar devices necessary for the complete installation shall be included as part of the system. All junction box blank coverplates shall be labeled with a red "F.A." for identification purposes.

D. All wiring shall be color coded throughout.

E. The system shall be installed and fully tested under the supervision of trained manufacturer's representatives. The system shall be demonstrated to perform all the functions as specified.

END OF SECTION

