REQUEST FOR BID

FOR

Hidalgo County Sheriff's Office

Hidalgo County Adult Detention Center and Law Enforcement Facility Repairs and/or Replacement

Bid No. 2013-133A-12-11-YSS

IN

EDINBURG, TEXAS

STRUCTURAL ENGINEER

CHANIN ENGINEERING, LLC

MEP ENGINEER

MEP SOLUTIONS ENGINEERING

ARCHITECT

SAM GARCIA ARCHITECTS

COPY NO. _____

DATED: _____

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HIDALGO COUNTY SHERIFF'S OFFICE
Hidalgo County Adult Detention Center and
Law Enforcement Facility Repairs and / or Replacement
Edinburg, TX

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HIDALGO COUNTY SHERIFF'S OFFICE
Hidalgo County Adult Detention Center and
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HIDALGO COUNTY

REQUEST FOR BIDS

Request for Bids for the work identified below in accordance with proposals documents and addenda as may be issued prior to date of proposal opening will be received by the Hidalgo County, until proposal closing date and time, as identified below. The County shall receive, publicly open, and read aloud the names of the Proposers and, if any are required to be stated, all prices stated in each proposal. The County shall evaluate each Bid submitted in relation to the published selection criteria. The County shall document the basis of its selection and shall make the evaluations public not later than the seventh day after the date the contract is awarded.

OWNER:	Hidalgo County Commissioner's Court 711 E. El Cibolo Rd. Edinburg, TX 78541
PROJECT NAME:	**HIDALGO COUNTY SHERIFF'S OFFICE** **Hidalgo County Adult Detention Center and Law Enforcement Facility Repairs and/or Replacement**
PROPOSAL OPENING DATE AND TIME:	
LOCATION OF PROPOSAL OPENING:	Hidalgo County Purchasing Department
CONSULTING ENGINEER: **(Structural)**	Chanin Engineering, LLC 400 Nolana, Suite N-2 McAllen, Texas 78504 Phone: (956) 687-9421
CONSULTING MEP:	Mep Solutions 600 E Beaumont Ave, McAllen, TX 78501 Ph:956-664-2727
CONSULTING ARCHITECT:	Sam Garcia Architects 1335 E. Jasmine Ave. McAllen, TX 78501 Ph: 956-212-4930
CONSTRUCTION PROJECT MANAGER:	Prodigy Construction Management, LLC 1335 E. Jasmine Ave. McAllen, TX 78501 Ph: 956-800-1122

Responsible Bidders may obtain sets of plans and specifications at place identified upon deposit of **$150.00** per set with check made payable to **Chanin Engineering, LLC**.

Bid Documents will be available beginning and may be obtained from the following address:

Chanin Engineering, LLC
400 Nolana Suite N2
McAllen, TX 78504
Phone: 956-687-9421

Office Hours are 8:00 AM to 5:00 PM

Full Refund: Deposits will be returned provided all Contract Documents and addendums are returned to the Engineer, complete with all sheets bound in their original order within ten (10) days after the deadline for submission or proposals.

Forfeit of Deposit: When the Documents are not returned under the conditions specified, none of the deposit will be returned. However, the Documents shall remain the property of the Owner and must be returned.

The Owner reserves the right to reject any and all Bids and to waive any informality in the Bid process.

No Bid shall be withdrawn within forty-five (45) days after the Bid opening without the specific consent of the Owner.

SECTION 00100
INSTRUCTION TO BIDDERS

PROJECT: **HIDALGO COUNTY SHERIFF'S OFFICE**
Hidalgo County Adult Detention Center and
Law Enforcement Facility Repairs and/or Replacement

STRUCTURAL ENGINEER: CHANIN ENGINEERING, LLC
400 Nolana, Suite N-2
McAllen TX, 78504
(956)687-9421

1.0 METHOD OF BIDDING: The Owner invites the following proposal(s):

BASE PROPOSAL: All work for the HCSO ADC and LEC and all related work as indicated by the Contract Documents except the work indicated by the alternates.

ALTERNATES:

Alternate No. 1: Remove and Replace existing Quarry Tile in ADC Kitchen.

Alternate No. 2: Remove and Replace existing Suspended Ceiling and Accessories in ADC Kitchen.

Alternate No. 3: Remove and Replace Three Cooler/ Freezer Doors and Components in ADC Kitchen.

Alternate No. 4: Remove and Replace Cooler/ Freezer Compressor for ADC Kitchen.

Alternate No. 5: Remove and Replace six (6) light poles on LEC Parking Lot.

2.0 RESPONSIBLE BIDDERS

2.1 Bids will be accepted from responsible Bidders only for the entire scope of work described in the Contract Documents. As prerequisite to a Bidder's qualifying for the award of contract on this work, the Bidder must complete each item of the Hidalgo County Statement of Credentials Form. The Statement and other requested information must be submitted with the bid, no later than the bid opening time and date. Facsimile transmittals are not acceptable. All Bidders submitting a Bid are encouraged to attend the bid opening.

2.2 The primary purposes of the evaluation process will be to:
1.2.1 Gather information for the Owner's evaluation procedure.
1.2.2 Enable the Owner and/or Engineer to evaluate the Bids.

2.3 In arriving at his/her opinion concerning the Bidder's qualifications, the Engineer will use the same criteria that the Owner will use in determination of the selection of the Bidders.

2.4 In the event the Bidders fail to submit the Hidalgo County Statement of Credentials Form no later than the bid opening time and date, it will result in disqualification of the bid.

3.0 BIDDER'S PRESENTATION: The Bidder, by signing and executing this bid, certifies and represents to the County that:

3.1 Bidder has read and understands the Bid Documents and his bid is made in accordance therewith.

3.2 Bidder has visited the site, has familiarized himself with the local conditions under which the work is to be performed and has correlated his observations with the requirements of the proposed Contract Documents.

3.3 Bidder agrees to comply with use of the Davis Bacon wages rates for Hidalgo and Cameron County. The prevailing rates of wages are the minimums that must be paid in conformance with all applicable laws of the State of Texas and the Hidalgo County. These rates are attached to the contract documents and labeled as Attachment "A".

3.4 Bidder agrees to comply with the requirements outlined in Section 3.5. These requirements are absolute, and any Bidder who subsequently does not agree to comply with these requirements will automatically disqualify himself from receiving award of the contract.

3.5 Bidder agrees that:

- 3.5.1 Each Bidder by making his bid represents that his bid includes only material and equipment specified in the Bid Documents and supplemented, if necessary, for a complete and operating system.
- 3.5.2 Each Bidder (and Sub-Bidder or supplier submitting a bid to a Bidder) shall submit an affidavit stating that no asbestos, PCBs or lead building materials shall be used.
- 3.5.3 Where subcontract work is involved and where Acceptable Subcontractors are designated for particular sections of phases of the Work, each Bidder by making his bid represents that his bid includes only firms designated as Acceptable Subcontractors.
- 3.5.4 The Bidder will furnish and pay for a bid bond in the form of a bid bond, postal money order, certified check or cashier's check in the amount of **five percent (5%) of the total greatest amount, bid including any applicable alternates**, in accordance with Section 8.0.
- 3.5.5 If awarded, the Bidder shall furnish and pay for a Performance Bond and a Payment Bond each in the full contract amount in accordance with Section 9.0. Include this cost in your proposal.
- 3.5.6 Work on the project will begin immediately upon receipt of signed Contract or Notice to Proceed.
- 3.5.7 Bidder shall carry and keep in full force for the duration of the Project, insurance coverage for builder's risk, workmen's compensation, comprehensive general liability, and automobile liability as required by the General Conditions and/or Supplementary General Conditions of the Specifications, as outlined in Section 10.0.
- 3.5.8 Bidder will participate as a team member in cooperation with the Project Engineer.
- 3.5.9 The Bidder will assign a competent full-time superintendent, to the project, and that superintendent shall be maintained on the project for the duration of the project, subject only to his continuous employment. The superintendent shall be on site at all times and shall have a minimum of ten (10) years experience as a superintendent.

3.6 Bidder has not offered, conferred or agreed to confer any pecuniary benefit, as defined by §1.07(a)(6) of the Texas Penal Code, or any other thing of value, as consideration for the receipt of information or any special treatment or advantage relating to this bid.

3.7 Bidder has not offered, conferred or agreed to confer any pecuniary benefit or other things of value as consideration for the recipient's decision, opinion, recommendation, vote or other exercise of discretion concerning this bid.

3.8 Bidder has neither coerced nor attempted to influence the exercise of discretion by any officer, trustee, agent or employee of the County concerning this bid on the basis of any consideration not authorized by law.

3.9 Bidder has not received any information not available to other Bidders so as to give the undersigned a preferential advantage with respect to this bid.

3.10 Bidder has not violated any state, federal or local law, regulation or ordinance relating to bribery, improper influence, collusion or the like.

3.11 Bidder will not in the future offer, confer, or agree to confer any pecuniary benefit or other thing of value to any officer, trustee, agent or employee of the County in return for the person having exercised the person's official discretion, power or duty with respect to this bid.

3.12 Bidder has not now and will not in the future offer, confer, or agree to confer a pecuniary benefit or other thing of value to any officer, trustee, agent or employee of the County in connection with information regarding this bid, the submission of this bid, the award of this bid or the performance, delivery or sale pursuant to this bid.

4.0 REQUEST FOR BID

4.1 Bid Documents include the Request for Bid Documents, General Terms Font Size and Conditions, the Bid Form, Project Scope (Plans and Specifications), and the Proposed Contract Documents, including any Addenda issued prior to receipt of bids. The Contract Documents for the work consist of the Owner-Contractor Agreement, the Conditions of the Contract (General, Supplementary and other Conditions), the Drawings, the Specifications, and all Addenda issued prior to receipt of Bids.

4.2 In addition to documents issued to Bidder, bid documents will be available at the following location(s).

Chanin Engineering, LLC
400 Nolana Suite N2
McAllen, TX 78504
Phone: 956-687-9421

4.3 **Subcontractors:** Subcontractors and Suppliers intending to submit bids to General Construction Bidders are required to prepare their bids based on a complete set of bid documents. If after reviewing the complete set of bid documents, Subcontractors and Supplier Bidders desire to purchase individual drawings and specification section for their bid convenience, they may do so by ordering the specific drawings and specifications directly from the reproduction company. Each Bidder purchasing a partial set of proposal documents is responsible for determining exactly which documents he requires and is responsible for all costs associated with printing and delivery. Subcontractors and Suppliers exercising this option must agree to do so on the basis that 1) all documents shall be returned to the Engineer, without refund, after submitting a bid and 2) documents shall not be used on other construction projects.

4.4 Successful Subcontractors and Supplier Bidders may retain their Bid documents until completion of the construction.

5.0 REQUEST FOR BID PROCEDURES

5.1 A bid is invalid if it has not been received at the designated location prior to the time and date for receipt of bids indicated in the Request for Bids, or prior to any extension thereof issued to the Bidders by Addenda.

5.2 All requested Alternates shall be included. If no change in the Base Bid is required, enter "No Change".

5.3 Prior to the receipt of bids, Addenda will be mailed or delivered to each person or firm recorded by the Engineer as having received the bid documents and will be available for inspection wherever the bid documents are kept available for that purpose.

5.4 Bid will be received only on the Owner's Form of bid for the work as indicated by the bid documents, filled in, and enclosed in a sealed envelope addressed as listed below. Bids will be received at no other place.

Name of Bidder
BID 2013-133A-12-11-YSS
HIDALGO SHERIFF'S OFFICE-HIDALGO COUNTY
Adult Detention Center and Law Enforcement Facility Repairs and/or Replacement
Attn:

5.5 Estimated Budget Cost: The estimated budget for Sheriff's Substation is $4,200,000.00.

5.6 Pre-Bid Conference: A pre-bid conference will be held on Monday December 2, 2013 @ 1:00 p.m. at Hidalgo County ADC 711 E. El Cibolo Rd, Edinburg, Texas, 78541. Attendance by representatives of the building contractors is highly desirable and encouraged. Sub-Contractors and material suppliers who expect to be associated with the project are invited and urged to attend. Representatives of the Architects, Engineers and Architects Consultants will review the plans, specifications, details, materials, demolition, alterations and requirements of the work. An addendum indicating any change in the Contract Documents will be issued, if necessary, if subsequent to this meeting.

5.7 Pre-Construction Conference: A pre-construction conference will be held prior to beginning any work on this project. After full execution of the contract, performance and payment bonds, and insurance certificate, the Contractor shall contact the Architect and set up a date, time and place to meet on site with the Contractor, his major subcontractors, Owner and the Architect. The purpose of this meeting will be to discuss schedules, procedures, special considerations, and any other pertinent items related to this project.

5.8 The Owner reserves the right to reject any bid if the evidence submitted by, or investigation of, such Bidder fails to satisfy the Owner that such Bidder is properly qualified to carry out the obligations of the contract and to complete the work therein. Conditional bids will not be accepted.

5.9 The County shall select the Bidder that offers the best, lowest and most responsible value based on the published selection criteria.

5.10 Conditions of Work: Each bidder must inform himself fully of the conditions relating to the construction of the project and the employment of labor thereon. Failure to do so will not relieve a successful bidder of his obligation to furnish all material and labor necessary to carry out the provisions of his contract.

5.11 Obligation of Offerer: At the time of the opening of bids each bidder will be presumed to have inspected the site and to have read and to be thoroughly familiar with the Contract Documents (including all addenda). The failure or omission of any bidder to examine any form, instrument or document shall in no way relieve the bidder from any obligation in respect of this bids.

5.12 The County shall first attempt to negotiate contract with the selected Bidder. The County and its engineers may discuss with the selection Bidder options for a scope or time modification and any price change associated with the modification. If the County is unable to negotiate a contract with the selected Bidder, the County shall, formally and in writing, end negotiations with that Bidder and proceed to the next Bidder in the order of the selection ranking until a contract is reached or all bids are rejected.

5.13 In determining best value for the County, the County is not restricted to considering price alone, but may consider any other factor stated in the selection criteria.

5.14 Time of Completion: Time of completion of this Contract is of importance to the Owner and may be considered in the award of the Contract. Payments on the Contract will be made as provided by the Contract. Payments on the Contract will not be made on the Contract after 30 days prior to the completion date set by the Contractor, until final completion and acceptance by the Engineer Construction Project Manager and Owner. The Contractor shall include in his bid a time to complete the base bid (stated in calendar days) that includes his best anticipation of the number of working days that construction may be unable to take place, due to inclement weather and muddy ground. This anticipated number of lost working days shall be included on the bid form in the space designated for the total number of calendar required to complete the base bid. Extensions to the Completion Date will be granted only if, in the opinion of the Engineer and Owner, climatological conditions that impede the progress of construction significantly exceed conditions for the local area. A guide for average climatological conditions will be the bulletin "Local Climatological Data", published by the Department of Commerce.

5.15 A bid may be withdrawn only upon request by the Bidder or his duly authorized representative, provided such request is received by the Owner at the place designated for receipt of bids and prior to the time fixed for the opening of bids. A withdrawal of a bid shall not be effective unless a written confirmation of the withdrawal is received by the Owner at said place within 48 hours before the time fixed for the opening of bids. The Bid Bond will be returned with the bid if withdrawn in accordance with the above. The withdrawal of a bid does not prejudice the right to the Bidder to file a new bid at the time and place stated.

No bid may be withdrawn after the time fixed for the opening of bids for a period of 30 days.

5.16 Rejection of Request for Bids: The Owner shall have the right to reject any or all bids and to reject a bid not accompanied by any required bid security, or by other data required by the bid documents, or to reject a bid which is in any way incomplete or irregular.

5.17 Phasing of Construction: The Contractor is to submit a Phasing of Construction Plan for review and approval by the Owner and Architect within ten (10) days of notice of award. Also included herein are the anticipated areas of construction to be included in each phase.

5.18 List of Subcontractors: the successful offeror shall submit a List of Subcontractors within (10) ten days of the award of contract.

5.19 Site Maintenance/Special Temporary Facilities: The successful offeror shall be required to fulfill the following requirements:

a. Provide temporary 6' chain link fence around entire staging areas.
b. Provide adequate signage for:
    -Construction area warning
    -entrance/exits for trucks and workers
1. Adequate traffic direction for construction vehicles.
2. Daily site cleanup.
3. Job Trailer for use of County personnel and their agents.

6.0 INTERPRETATION OF REQUEST FOR BID DOCUMENTS

6.1 Bidders and sub-Bidders requiring clarification or interpretation of the bid documents shall make a written request which shall reach the Structural Engineer no later than. Questions may be faxed to (956) 687-3211 or e-mailed to miguel@chaninengineering.com

6.2 Any interpretation, correction or change of the bid documents will be made by Addendum. Interpretations, corrections or changes of the bid documents made in any other manner will not be binding.

6.3 Addenda and Interpretation: No interpretation of the meaning of the plans, specifications or other pre-bid documents will be made to any bidder orally. Every request for such interpretation should be in writing addressed to the Engineer, and to be given consideration must be received at least (5) days prior to the date fixed for the opening of bids. Any and all such interpretations and any supplemental instruction will be in the form of written addenda to the specifications which, if issued, will be mailed to all prospective bidders not later than three days prior to the date fixed for the opening of bids. Failure of any bidder to receive any such addendum or interpretation shall not relieve such bidder from any obligation under his bid as submitted. All addenda so issued shall become part of the contract documents.

7.0 SUBSTITUTIONS OF MATERIALS AND EQUIPMENT

7.1 The materials, products and equipment described in the bid documents establish a standard of required function, dimension, appearance and quality to be met by any proposed substitution. The materials and equipment named in, and the procedures covered by these specifications have been selected as a standard because of quality, particular suitability or record of satisfactory performance. It is not intended to preclude the use of equal or better materials or equipment provided that same meets the requirements of the particular project and is approved in an addendum as a substitution prior to the submission of bids.

7.2 No substitution will be considered prior to receipt of bids unless written request for approval has been received by the Engineer at least seven (7) calendar days prior to the date for receipt of bids. Each such request shall include the name of the material or equipment for which it is to substituted and a complete description of the proposed substitute including drawings, cuts, performance and test data and any other information necessary for an evaluation. The Engineer's decision of approval or disapproval of a proposed substitution shall be final.

7.3 If the Engineer approves any proposed substitution prior to receipt of bids, such approval will be set forth in an Addendum. Bidders shall not rely upon approvals made in any other manner.

7.4 No substitutions will be considered after the Contract award.

8.0 BID BOND/BID GUARANTEE

Bid bonds are required for bids in excess of $25,000. A bid bond will be submitted in the form of a Bid bond, postal money order, certified check or cashier's check in an amount not less the **five percent (5%) of the total greatest amount, bid including any applicable alternates**, payable without recourse to Hidalgo County. Failure to furnish a bid guarantee in the proper form and amount by the time set for opening may be caused for rejection of the bid. If the successful Bidder, upon acceptance of his bid by the County within the period specified therein for acceptance, fails to execute such further contractual documents, if any, and give such bond(s) (i.e., performance bonds, payment bonds, delivery, etc.) as may be required within the time specified (ten [10] calendar days if no period is specified) after receipt of the forms by him, then he shall be liable for any cost of procuring the work which exceeds the amount of his bid, and the bid guarantee shall be available toward such difference.

9.0 PERFORMANCE BOND AND PAYMENT BOND

Performance bonds are required for bids in excess of $100,000. Payment bonds are required for bids in excess of $25,000.

9.1 When a performance or payment bond is required, the amounts shall be for 100% of the contract amount. Any required bond(s) must be filed with the County within 10 days from the date of the Notice Of Award.

9.2 The only forms of surety acceptable as a performance or payment bond are: Cashier's Check, Certified Check, or a Surety or Blanket Bond from a company chartered or authorized to do business in Texas. Bonds completed (signed) by an out-of-Texas surety require a counter signature by a Texas resident agent of a company chartered or authorized to do business in Texas.

9.3 Bonds and other forms of surety must be made payable to Hidalgo County.

9.4 Bonds in excess of $100,000 must be from a surety that holds a Certificate of Authority from the United States Department of Treasury or have reinsurance for liability in excess of $100,000 from a United States Treasury listed reinsurer.

9.5 Payment and Performance Bonds must be in accordance with Texas Government Code 2253.

10.0 INSURANCE

10.1 Each Bidder shall include in his bid the complete cost for insurance required under the General Terms and Conditions and any Supplementary Conditions.

10.2 Bidder shall carry and keep in full force for the duration of the project the following coverage's:

10.2.1 Workers' Compensation – Statutory Limits
10.2.2 Employer's Liability:
9.11.1.1 Bodily Injury by Accident - $500,000 Each Accident
9.11.1.2 Bodily Injury by Disease - $500,000 Each Employee
9.11.1.3 Bodily Injury by Disease - $1,000,000 Aggregate
9.11.1.4 Bodily Injury by Accident - $1,000,000 Aggregate

10.3 Commercial General Liability (Premises Operations, Independent Contractors, Products/Completed Operations, Personal Injury, Contractual Liability, Explosion, Collapse, Underground and Broad Form Property Damage) – Combine Single Limit for Bodily Injury and Property Damage of $1,000,000 per Occurrence.

10.4 Comprehensive Automotive Liability - $1,000,000 Combined Single Limit per Occurrence.

10.5 Owner's Protective Liability Insurance Policy – The successful Bidder must obtain at it expense an owner's liability insurance policy naming the County, its employees and the Engineer insured with the following limits: Bodily Injury - $1,000,000 Each Occurrence and $1,000,000 Aggregate.

10.6 Builder's Risk Insurance: The successful Bidder must obtain at its expense, on an all risk basis, builder's risk insurance coverage, including workmanship acceptable to the County, in the amount of insurance equal at all times to 100% of the contract sum. The policy must also name its subcontractors and the County as additional insured, as their respective interests may appear. The policy must have the following endorsement: "This insurance shall be specific as to coverage and not considered as contributing insurance with any permanent insurance maintained on the present premises." For renovation projects, the County waives subrogation for damage by fire to an existing building structure if building structure is in the care, custody or control of the

contractor and the builder's risk policy must be endorsed to include coverage for an existing building structure.

10.7 All policies shall contain special endorsements to include:

10.2.7.1 The County as an additional insured (except for Workers' Compensation).

10.2.7.2 Waiver of subrogation in favor of the County under the Workers' Compensation and Employers' Liability policies.

10.2.7.3 A statement that a notice shall be given to County by certified mail thirty (30) days prior to cancellation or upon any materials change in coverage.

END OF SECTION 00100

REQUEST FOR BIDS (RFB)

HIDALGO COUNTY SHERIFF'S OFFICE

"Hidalgo County Adult Detention Center and Law Enforcement Facility Repairs and/or Replacement"

BID No. 2013-133A-12-11-YSS

Acceptance Date: **DECEMBER 11, 2013**

Martha L. Salazar, CPPB, Purchasing Agent
Hidalgo County Purchasing Department

Project Buyer Contact Information:

Yvette Salinas, Buyer III
(956) 292-7000 Ext. 4874
yvette.salinas@co.hidalgo.tx.us

Form HCPD-03

1. Sealed bids will be received for the construction of: **"HIDALGO COUNTY SHERIFF'S OFFICE–"Hidalgo County Adult Detention Center and Law Enforcement Facility Repairs and/or Replacement"** in accordance with the specifications attached as Exhibit "A" hereto. Bids should address all specifications set forth. Bidders may suggest substitutions of features which they feel would be in the best interest of Hidalgo County ("County"). Strong rationale must be presented for any deviation from the specifications. Hidalgo County reserves the right to reject the deviation and its effect on the overall bid.

2. One (1) original and three (3) copies of all bids are required with the bidders name and return address clearly typed/printed on upper left hand corner and the proper notation clearly typed/printed on the lower left hand corner of the envelope and/or package: **"BID-2013-133A-12-11-YSS-HIDALGO COUNTY SHERIFF'S OFFICE– Hidalgo County Adult Detention Center and Law Enforcement Facility Repairs and/or Replacement"** and in County's Purchasing Department, physical address: 2802 S. Business Hwy 281, mailing address 2812 S. Business 281 New Administration Building,, Edinburg, Texas, **on or before 3:00, December 11, 2013.**

   NO FACSIMILES OR LATE ARRIVALS WILL BE ACCEPTED. ANY RFB RECEIVED AFTER THAT TIME WILL NOT BE OPENED AND WILL BE RETURNED. OVERNIGHT MAIL MUST ALSO BE PROPERLY LABELED ON THE OUTSIDE OF EXPRESS ENVELOPE OR PACKAGE WITH REFERENCE TO "REQUEST FOR BIDS-2013-133A-12-11-YSS-HIDALGO COUNTY SHERIFF'S OFFICE– Hidalgo County Adult Detention Center and Law Enforcement Facility Repairs and/or Replacement".

   WRITTEN QUESTIONS WILL BE ACCEPTED. Written RFI's shall be sent to the office of project architect/engineer: Chanin Engineering LLC, to the attention of Miguel Chanin, P.E. at Miguel@chaninengineering.com, Please call 956-687-9421 to confirm receipt of RFI. RFI's will not be answered by phone. NO HAND WRITTEN RFI'S will be answered. All inquiries shall be forwarded by 5:00 pm local time on December 04, 2013. Inquiries beyond this date will not be responded. Contact project architect for copies of Addenda. All bidders who paid a deposit will be required to return Addenda as part of the Construction Documents in order to receive full deposit refund.

   Hidalgo County reserves the right to refuse and reject any/all RFB and to waive any/all formalities or technicalities, or to accept the RFB considered the best and most advantageous to Hidalgo County

3. Hidalgo County reserves the right to: A. separate and accept, or eliminate any item(s) listed under this bid that it deems necessary to accommodate budgetary and/or operational requirements; B. reject any or all bids submitted and further reserves the right to design the evaluation criteria to be used in selecting the lowest and best bid for approval; and C. award the bid to one bidder or to multiple bidders if the County determines it is in its best interest to do so."

4. The Bidder shall not substitute items named in the bid without the express written

consent of Hidalgo County. Failure of the delivered item(s) to perform as specified, or failure to meet the stated delivery schedule shall release Hidalgo County from all obligations to the contracting party with regard to the item(s) in question. In such event, County may elect to award the contract to the next-lowest responsible bidder, or to reject all bids and re-advertise.

5. For work to be performed at a County owned or operated location, each bidder shall, in its sole discretion, visit the job site before preparing the bid and thoroughly familiarize himself/herself with existing conditions. Bidder should take field dimensions and note all circumstances which affect the dollar amount of the bid.

6. Descriptive specifications are referenced in this document to indicate the general kind and quality of equipment desired by Hidalgo County. Due to various styles and models of equipment, bidders are required to include illustrations, specifications, explanation of warranties, and service data with their bid including catalogue numbers and any necessary references.

7. No bid may be withdrawn within thirty (30) days from the scheduled time to open bids.

8. Proposed prices are to remain firm for a minimum of ninety (90) days after bid opening.

9. Any interpretations, amendments, corrections or changes to this bid document must be in a written addendum and signed by the County Judge or his designee. Addenda will be mailed to all who are known to have received a copy of the Request for Bids. Bidders shall acknowledge receipt of all addenda as a part of their bid.

10. County reserves the right to accept or reject any or all bids.

11. Costs are to be net F.O.B., County Prepaid.

12. County is exempt from Federal Excise Tax, State Tax and Local Tax. Do Not include tax in cost figure. If it is determined that tax was included in the cost figures it will not be included in the tabulation of any awards. Tax exemption certificates will be furnished upon request.

13. Funds for this procurement have been provided through the County budget for this fiscal year only. County, on an annual basis, has the right to reconsider a contract during the budget process for ensuing years if financial resources of County are insufficient to meet the liabilities of said contract. The award of a bid or contract hereunder will not be construed to create a debt of the County which is payable out of funds beyond the current fiscal year.

14. Upon award and prior to execution of a contract, Sole Proprietorships are required to submit a copy of their social security cards to the Hidalgo County Auditor's Office in order to establish an account with the County. All awarded vendors must submit a completed W-9 and a copy o their Federal ID Number Certificate.

15. DELIVERY INSTRUCTIONS:

- No deliveries accepted after 3:00 P.M., Monday-Friday.
- At least seventy two (72) hours prior notice of delivery must be given to Martha

L. Salazar, Purchasing Agent before delivery will be accepted.

. If you need additional information call the office listed below:

Hidalgo County Purchasing Department
Martha L. Salazar, Purchasing Agent
(956) 318-2626

16. BILLING AND PAYMENT INSTRUCTIONS:

. Invoices must include:

a) Name and address of successful bidder
b) Name and address of receiving department or official
c) Purchase Order Number (if any)
d) Notation – **"BID-2013-133A-12-11-YSS-HIDALGO COUNTY SHERIFF'S OFFICE– Hidalgo County Adult Detention Center and Law Enforcement Facility Repairs and/or Replacement"** Descriptive information as to the items or services delivered, including product code, item number, quantity, etc.

. Discount payments will be considered when offered.

. Contact person for Billing and Payment questions:

Ray Eufracio, CPA, Hidalgo County Auditor
2802 S. Business Hwy 281
Edinburg, TX 78539
(956) 318-2511

17. Schedule

Pre-Bid Conference,	**1:00 PM**	**December 02, 2013**
Bid Opening,	**3:00 PM**	**December 11, 2013**
Award of Contract		_____, 20XX
Commence Work or Deliver Products		_____, 20XX

HIDALGO COUNTY APPROVED HOLIDAYS

2013 YEAR	
New Year's Day	12/31/12 and 01/01/13
Martin Luther King Day	01/21/13
President's Day	02/18/13
Good Friday	03/29/13
Easter	04/01/13
Memorial Day	05/27/13
Independence Day	07/04/13
Labor Day	09/02/13
Columbus Day	10/07/13
Veteran's Day	11/11/13
Thanks Giving Day	11/28/13 and 11/29/13
Christmas Day	12/24/13 and 12/25/13

18. Bid or Performance Bond and Debarment Certification; Payment Under Contract:

. If the contract proposed is for the construction of public works or is for a contract for goods & services exceeding $100,000, all bidders shall furnish a good and sufficient bid bond in the amount of five percent of the total contract price. A bid bond must be executed with a surety company authorized to do business in Texas. All bidders are also required to furnish a certification or acknowledgment stating that the contractor or vendor is free from suspension or debarment pursuant to federal regulation 45CFR Part 76.

. Together with the signing of a contract or issuance of a purchase order following the acceptance of a bid, and prior to commencement of the actual work, the bidder shall furnish a performance bond to the County for the full amount of the contract, if that contract exceeds $100,000.

. If the contract is for $50,000 or less, no money will be paid to the contractor until completion and acceptance of the work or the fulfillment of the purchase obligation to the County, and, if applicable, the receipt by County of satisfactory evidence that all subcontractors and material men have been paid.

. If a contract is for the construction, alteration or repair of public buildings or public works, the contractor *shall* provide a payment bond for a contract in excess of Twenty Five Thousand Dollars ($25,000.00), as required by Tex. Govt. Code Ch. 2253.

. For requirements contracts, bond requirements are determined by applying the proposed unit price to the estimated quantities included in the specifications.

19. Ethical Standards:

. It shall be a breach of ethics to offer, give or agree to give any elected official, department head or employee, or former elected official, department head or employee, of the County, or for any elected official, department head or employee or former elected official, department head or employee of the County, to solicit, demand, accept or agree to accept from another person, entity or organization, a gratuity or an offer of employment in connection with any decision, approval, disapproval, recommendation, preparation or any part of a program requirement or purchase request, influencing the content of any specification or procurement standard, rendering of advice, investigation, auditing, or in any other advisory capacity in any proceeding or application, request for ruling, determination, claim or controversy, or other particular matter pertaining to any program requirement or a contract or subcontract, or to any solicitation or proposal therefore pending before any department or agency of the County.

. It shall be a breach of ethics for any payment, gratuity or offer of employment to be made by or on behalf of a subcontractor under a contract to the prime contractor or higher tier subcontractor for any contract for the County, or any person associated therewith, as an inducement for the award of a subcontract or order.

. No public official shall have an interest in a contract awarded hereunder except in accordance with Tex. Loc. Govt. Code Chapter 171.

- NOTICE:

ALL COMMUNICATIONS BY A VENDOR TO THE COUNTY, ITS OFFICIALS, AND DEPARTMENT HEADS REGARDING THIS PROCUREMENT SHALL BE DONE THROUGH THE HIDALGO COUNTY PURCHASING DEPARTMENT.

No vendor, its representative, agent, or employee shall engage in private communication with a member of the Hidalgo County Commissioners Court or county department heads regarding any procurement of goods or services by the County from the date that the Bid, RFP, or RFQ is released. No private communication regarding the purchase shall be permitted until the procurement process is complete and a purchase order is granted or a contract is entered into. Members of the commissioners court are required to make a reasonable effort to inform themselves regarding potential procurements and have a duty to inquire of vendors, their representatives or employees, the nature of any private communication being sought prior to engaging in any communication. "Private Communication" means communication with any vendor outside of a posted meeting of the governing body, a regular meeting of a standing or appointed committee, or a negotiation with a vendor which has been specifically authorized by the governing body.

20. Disclosure of Conflict of Interest

. Effective January 1, 2006, Chapter 176 of the Texas Local Government Code requires that any vendor, person, consultant or contractor considering doing business with Hidalgo County ("the County") to disclose in the Conflict of Interest Questionnaire (the "CIQ") attached as Exhibit D, the vendor, person, consultant or contractor's affiliation or business relationship that might cause a conflict of interest with the County. By law, the CIQ must be filed with the Hidalgo County Clerk's Office no later than the seventh business day after the date the person becomes aware of facts that require that statement to be filed. The disclosure requirement applies to a person or business who contracts or seeks to contract with Hidalgo County for the sale or purchase of property, goods or service. Any purchase order or contract resulting from this process shall be considered null and void if the successful bidder fails to comply with Texas Local Government Code Chapter 176. Vendors, consultants, contractors and others who desire to conduct business with Hidalgo County are encouraged to refer to Texas Local Government Code Chapter 176 for the details of this law. An offense under Texas Local Government Code Chapter 176 is a Class C Misdemeanor.

Please Submit completed CIQ forms to the Hidalgo County Clerk's Office located at 100 N. Closner, Edinburg, Texas 78539-Hidalgo County Courthouse
COMPLETION AND SUBMISSION OF FORM CIQ IS THE SOLE RESPONSIBILITY OF THE PROSPECTIVE BIDDER.

21. If, during the life of any contract or bid awarded, the successful bidder's net prices generally available to other customers for items awarded herein are reduced below the contracted price, it is understood and agreed that the benefits of such reduction shall be extended to County.

22. Bids, and all goods and services provided thereunder, shall comply with all federal, state and local laws concerning this type(s) of goods and/or services

23. Minimum Standards For Responsible Prospective Bidders: A prospective bidder must affirmatively demonstrate bidder's responsibility. A prospective bidder, by submitting a bid, represents to County that it meets the following requirements:

- **Possess and submit a Certificate of Account Status indicating bidder is in "Good Standing" with the Texas Comptroller of Public Accounts if such bidder is incorporated in the State of Texas. If the bidder is not incorporated with the Texas, the bidder must submit the appropriate evidence of filing with the Texas Secretary of State stating that the business is authorized to transact business in Texas.**
- Possess or is able to obtain adequate financial resources as required to perform under the bid;
- Be able to comply with the required or proposed delivery schedule;
- Have a satisfactory record of performance;
- Have a satisfactory record of integrity and ethics;
- Be otherwise qualified and eligible to receive an award.

24. Successful bidder will pay or cause to be paid, without cost or expenses to County, all FICA, FUTA/SUTA and Federal Income Withholding Taxes of all employees, and all wages and benefits as required by Federal or State law. Successful bidder's officers, agents and/or employees will not be entitled to any benefits of an employee or elected official of County, including, but not limited to, benefits associated with County's civil service system.

25. Any contract award to a successful bidder will be in effect until (a) the contract expires, (b) delivery and acceptance of products, and/or performance of services ordered, or (c) terminated by County with thirty day's written notice prior to cancellation.

26. County reserves the right to enforce performance of any contract awarded hereunder in any manner prescribed by law or deemed to be in the best interest of the County in the event of breach or default by successful bidder; County reserves the right to terminate any contract immediately in the event a successful bidder fails to:

A. Meet schedules;
B. Pay any required fees or taxes; or
C. Otherwise perform in accordance with the specifications.

27. Successful bidder shall defend, indemnify and save harmless County and all its elected officials, officers, agents and employees from all suits, actions, or other claims of any character, name and description brought for or on account of any injuries or damages received or sustained by any person, persons, or property on account of any negligent act or fault of the successful bidder, or of any agent, employee, subcontractor or supplier of successful bidder in the execution of, or performance under, any contract which may result from bid award or which arises from any event or casualty happening on or within County premises themselves or happening upon or in any halls, elevators, entrances, stairways or approaches of or to such County facilities. Successful bidder shall pay any judgment with costs which may be obtained against County growing out of such injury or

damages, and shall, upon request, provide a defense to County by counsel reasonably acceptable to County. Successful bidder's indemnity hereunder shall include, but is not limited to, claims relating to patent, copyright or trademark infringement, and the like, arising out of the goods and services provided by successful bidder.

28. Successful bidder shall warrant that all items/services shall conform with the specifications and/or all warranties provided under the Uniform Commercial Code and be free from all defects in material, workmanship and the like. Items supplied under a contract pursuant to this Request for Bids shall be subject to County's approval. Items found to be defective or not meeting specifications shall be replaced by successful bidder within two business days at no expense to County. Items not picked up within one (1) week after notification shall be deemed a donation to County and may be used or disposed of at County's discretion and without waiver of any other rights of County as to the item's nonconformity.

29. ***Vendors hereby assigns to purchaser any and all claims for overcharges associated with this contract which arise under the antitrust laws of the United States, 15 USCA, Section 1 et. seq., and which arise under the antitrust laws of the State of Texas, Bus. & Com. Code, Section 15.01, et. seq.***

30. This document and any disputes arising hereunder shall be governed and construed according to the laws of the State of Texas, and will be performable exclusively in Hidalgo County, Texas.

31. The successful bidder shall not assign, sell, transfer or convey its rights under any awarded contract, in whole or in part, without the prior written consent of County.

32. Statement of Credentials:

In order to assist the Owner in determining the ability of each Bidder to properly fulfill the requirements of this proposed contract, the Bidder will complete the "STATEMENT OF CREDENTIALS." All questions must be answered and the data given must be clear and comprehensive. **The statement must be notarized.** If necessary, questions may be answered on separate attached sheets. The Bidder may submit any additional information he/she desires.

It must include the following: general bidder information, experience, contracts on hand, and subcontractor(s) information.

In addition, except as otherwise provided, the **general contractor/**bidder shall perform no **more** than eighty percent **(80%)** of the work with his own organization, and **no less than** twenty percent **(20%)** of the work may be subcontracted.

The organization of the specifications into divisions, sections, articles, etc., and the arrangement and titles of project drawings shall not control the Bidder in dividing the work among subcontractors or in establishing the extent of work to be performed by any trade.

Awarded bidder shall assign a project superintendent who is directly employed by the Bidder, that superintendent will be required to be on the job on a daily basis. No subcontractors will be allowed to act as project superintendents at any point during the construction of said project.

Bidder shall have a significant business presence with the Rio Grande Valley Area, the

business must be headquartered in either Hidalgo, Cameron, or Starr County or a local office must be located in either of the three counties (Hidalgo, Cameron, Starr) with at least thirty percent (30%) of the total company workforce employed at the local office. County reserves the right to request payrolls and any necessary documentation to confirm that the local office meets these requirements.

Bidders shall carefully examine the plans, specifications and other documents, visit the site of the work, and fully inform themselves as to all conditions and matters which can affect the work or cost thereof. Should the bidder find discrepancies in, or omissions from the plans, specifications or other documents, or should he/she be in doubt as their meaning, he/she should at once notify the **Architect/Engineer** and obtain clarification by addendum prior to submitting any bid.

Bidder herby certifies that said company carried liability coverage and workers compensation insurance coverage that meets the requirements set forth in this Request for Bids/Proposals when performing work on this project for Hidalgo County.

Furthermore, bidder certifies that any subcontractor on the project shall provide the said company with a certificate relating that all employees of the subcontractor also are provided with workers' compensation insurance coverage. Bidder will provide copies of all of these certificates to Hidalgo County during the course of the project for all subcontractors working on the project.

When applicable, all **contractors and** subcontractors must comply with federally determined prevailing Davis-Bacon and Related Acts wage rate.

Hidalgo County encourages the hiring of minority women subcontractors and/or suppliers whenever and wherever feasible.

BIDDERS ACKNOWLEDGEMENT
Bid for

HIDALGO COUNTY SHERIFF'S OFFICE

"Hidalgo County Adult Detention Center and Law Enforcement Facility Repairs and/or Replacement"
BID-2013-133A-12-11-YSS

To: Martha L. Salazar, CPPB, Purchasing Agent
Hidalgo County Purchasing Department
2802 S. Bus. Hwy. 281
Edinburg, Texas 78539

In accordance with the Specifications, and subject to all laws and regulations of the United States and state and local laws, the undersigned bidder proposes and commits to furnish all labor, equipment, material, software and services as set forth in the documents hereinbefore mentioned. The undersigned bidder further agrees, upon acceptance of its bid, to execute a contract and/or Purchase Order issued by Hidalgo County for performing and completing the work described in the Specifications within the time stated and for the prices proposed in the documents attached hereto and made a part hereof.

Bidder acknowledges receipt of all of the pages of the documents referenced in the Invitation to Bid Checklist presented in connection with this procurement. Bidder understands that Hidalgo County reserves the right to reject any or all bids and further reserves the right to design the evaluation criteria to be used in selecting the lowest and best bid.

Bidder agrees that this bid shall be good and may not be withdrawn for a period of ninety (90) calendar days after the scheduled closing time for receiving bids, as contained in the Specifications.

Respectfully submitted,

Bidder: _____

Address: _____

By: _____

Printed Name: _____

Title: _____

(This page must be submitted in response)

STATEMENT OF CREDENTIALS

for Facility Construction and Related Projects
(none-road improvements)

1. GENERAL: In order to assist the Owner in determining the ability of each Bidder to properly fulfill the requirements of this proposed contract, the Bidder will complete the following items. **All questions must be answered** and the data given must be clear and comprehensive. **This statement must be notarized.** If necessary, questions may be answered on separate attached sheets. The Bidder may submit any additional information he/she desires.

Name of Bidder: _____

Address: _____

_____

Date Organized: _____ Date Incorporated: _____

Office Number: _____ Fax Number: _____

Number of years in business under present name: _____

Type of work performed by your company: _____

_____

Have you ever failed to complete any work awarded to you? _____

Have you ever defaulted on a contract? _____

2. EXPERIENCE: The Bidder will give below a list of similar projects which he/she has completed within the last five (5) years.

1. Owner: _____

Address: _____

Ph/Fx Number: _____ Email: _____

Scope of Work Description: _____

Date Completed: _____Total Cost: _____

****

2. Owner: _____

Address: _____

Ph/Fx Number: _____ Email: _____

Scope of Work Description: _____

Date Completed: _____Total Cost: _____

****

3. Owner: _____

Address: _____

Ph/Fx Number: _____ Email: _____

Scope of Work Description: _____

Date Completed: _____Total Cost: _____

****

4. Owner: _____

Address: _____

Ph/Fx Number: _____ Email: _____

Scope of Work Description: _____

Date Completed: _____Total Cost: _____

****

5. Owner: _____

Address: _____

Ph/Fx Number: _____ Email: _____

Scope of Work Description: _____

Date Completed: _____Total Cost: _____

****

3. **CONTRACTS ON HAND:** The Bidder shall provide below a list of any contracts/projects he/she currently has on hand:

4. **SUBCONTRACTORS:** List any subcontractors you propose to use on the Hidalgo County's project. Use additional page if necessary. This information is considered preliminary and may be revised prior if bid is awarded and re-submitted during the pre-construction phase. However, it is expressly understood that the use of any subcontractor other than those listed with bid shall require written approval from Hidalgo County.

   Failure to submit the information as required may result in a disqualification of your bid.

5. **PERFORMANCE OF WORK BY BIDDER:** Except as otherwise provided, the **general contractor/**bidder shall perform no **more** than eighty percent **(80%)** of the work with his own organization, and **no less than** twenty percent **(20%)** of the work may be subcontracted.

   The organization of the specifications into divisions, sections, articles, etc., and the arrangement and titles of project drawings shall not control the Bidder in dividing the work among subcontractors or in establishing the extent of work to be performed by any trade.

   Awarded bidder shall assign a project superintendent who is directly employed by the Bidder, that superintendent will be required to be on the job on a daily basis. No subcontractors will be allowed to act as project superintendents at any point during the construction of said project.

   Bidder shall have a significant business presence with the Rio Grande Valley Area, the business must be headquartered in either Hidalgo, Cameron, or Starr County or a local office must be located in either of the three counties (Hidalgo, Cameron, Starr) with at least thirty percent (30%) of the total company workforce employed at the local office. County reserves the right to request payrolls and any necessary documentation to confirm that the local office meets these requirements.

   Bidders shall carefully examine the plans, specifications and other documents, visit the site of the work, and fully inform themselves as to all conditions and matters which can affect the work or cost thereof. Should the bidder find discrepancies in, or omissions from the plans, specifications or other documents, or should he/she be in doubt as their meaning, he/she should at once notify the Engineer and obtain clarification by addendum prior to submitting any bid.

   Bidder herby certifies that said company carried liability coverage and workers compensation insurance coverage that meets the requirements set forth in this Request for Bids/Proposals when performing work on this project for Hidalgo County.

   Furthermore, bidder certifies that any subcontractor on the project shall provide the said company with a certificate relating that all employees of the subcontractor also are provided with workers' compensation insurance coverage. Bidder will provide copies of all of these certificates to Hidalgo County during the course of the project for all subcontractors working on the project.

   All subcontractors must comply with federally determined prevailing Davis-Bacon and Related Acts wage rate.

   Hidalgo County encourages the hiring of minority women subcontractors and/or suppliers whenever and wherever feasible.

The undersigned hereby authorizes and requests any person, firm, or corporation to furnish any information requested by the owner in verification of the recitals comprising this Statement of Credentials.

Executed this _____ day of _____, 20_____.

_____

By_____

Title_____

Subscribed and sworn to me this ____ day of _____, 20___.

By:_____

Notary Public in and for _____County, Texas

My commission expires _____

EXHIBIT "C"

Insurance Requirements
Applicable to the Acquisition of Goods and /or Services (other than Professional Services)

The Bidder awarded the contract shall furnish proof of insurance, which will also include any subcontractor that is subcontracted by the bidder in at least the following limits, to be in place prior to providing any services under this Contract and to continue at all times in force in effect during the term of this Contract:

1. A Five Hundred Thousand Dollar ($500,000.00) Comprehensive General Liability insurance policy providing additional coverage to all underlying liabilities of County.

2. Automobile liability insurance policy with limits of at least Three Hundred Thousand Dollars ($300,000.00) per person and Five Hundred Thousand Dollars ($500,000.00) per occurrence. Coverage should include injury to or death of persons and property damage claims with limits up to Five Hundred Thousand ($500,000.00) arising out of the services provided to County hereunder.

3. Uninsured/Underinsured motorist coverage in an amount equal to the bodily injury limits set forth immediately above;

4. Workers compensation insurance in amounts established by Texas law, unless the Bidder is specifically exempted from the Texas Workers Compensation Act, Texas Labor Code Chapter 401, et. seq.

Hidalgo County will only accept certificates of insurance on an Acord form (as attached hereto). Certificates of insurance naming County as an additional insured shall be submitted to County for approval prior to any services being performed by Contractor. Each policy of insurance required hereunder shall extend for a period equivalent to, or longer than the term of the Contract, and any insurer hereunder shall be required to give at least thirty (30) days written notice to the County prior to the cancellation of any such coverage on the termination date, or otherwise. This Contract shall be automatically suspended upon the cancellation, or other termination, of any required policy of insurance hereunder, and such suspension shall continue until evidence adequate replacement coverage is provided to County. If replacement coverage is not provided within thirty (30) days following suspension of the Contract, this Contract shall automatically terminate.

ACORD CERTIFICATE OF INSURANCE

DATE (MM/DD/YY)

PRODUCER

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW.

INSURERS AFFORDING COVERAGE

INSURED

INSURER A:

INSURER B:

INSURER C:

INSURER D:

INSURER E:

COVERAGES

THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THER TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. AGGREGATE LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

INSR LTR	TYPE OF INSURANCE	POLICY NUMBER	POLICY EFFECTIVE DATE (MM/DD/YY)	POLICY EXPIRATION DATE (MM/DD/YY)	LIMITS	
A	**GENERAL LIABILITY** ☐ COMMERCIAL GENERAL LIABILITY ☐ ☐ CLAIMS MADE OCCUR ☐ OWNER'S & CONT. PROT ☐ OWNER'S PROTECTIVE LIABILITY GEN'L AGGREGATE LIMIT APPLIES PER: ☐ POLICY PROJECT ☐ LOC				EACH OCCURRENCE	$
					FIRE DAMAGE (Any one fire)	$
					MED (Any one person)	$
					PERS & ADV INJURY	$
					AL AGGREGATE	$
					ODUCTS – COMP/OP GG	$
B	**AUTOMOBILE LIABILITY** ☐ ANY AUTO ☐ ALL OWNED AUTOS ☐ SCHEDULED AUTOS ☐ HIRED AUTOS ☐ NON-OWNED AUTOS				COMBINED SINGLE LIMIT (Ea accident)	$
					BODILY INJURY (Per person)	$
					BODILY INJURY (Per accident)	$
					PROPERTY DAMAGE (Per accident)	$
	GARAGE LIABILITY ☐ ANY AUTO				AUTO ONLY-EA ACCIDENT	$
					OTHER THAN AUTO ONLY EA ACC	$
					AGG	$
C	**EXCESS LIABILITY** ☐ OCCUR ☐ CLAIMS MADE ☐ DEDUCTIBLE ☐ RETENTION $				EACH OCCURENCE	$
					AGGREGATE	$
						$
						$
						$
D	**WORKERS COMPENSATION AND EMPLOYER'S LIABILIT**				WC STATU-TORY LIMITS ☐ OTHER	
					E.L. EACH ACCIDENT	$
					E.L. DISEASE-EA EMPLOYEE	$
					E.L. DISEASE-POLICY LIMIT	$
	OTHER					

DESCRIPTION OF OPERATIONS / LOCATION / VEHICLES / EXCLUSIONS ADDED BY ENDORSEMENT / SPECIAL PROVISIONS

County of Hidalgo shall be named as additional insured on all Commercial General Liability policies.

CERTIFICATE HOLDER

Hidalgo County
Attn: Purchasing Department
2812 S Highway Bus. 281
Edinburg, Texas 78539

ADDITIONAL INSURED; INSURER LETTER: _____

CANCELLATION

SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BY CANCELLED BEFORE THE EXPIRATION DATE THEREOF, THE ISSUING INSURER WILL ENDEAVOR TO MAIL ***30*** DAYS WRITTEN NOTICE TO THE CERTIFICATE HOLDER NAMED TO THE LEFT, BUT FAILURE TO DO SO SHALL IMPOSE NO OBLIGATION OR LIABILITY OF ANY KIND UPON THE INSURER, ITS AGENTS OR REPRESENTATIVES.

AUTHORIZED REPRESENTATIVE

SAMPLE

Insurance Requirement Acknowledgment

I, _____, authorized representative for _____,
Company/Vendor

hereby acknowledge receipt of the County's required insurance limits. Said requirements:

❒ will be acquired within 10 working days after notification from Purchasing Department of bid awarded by the Hidalgo County Commissioners' Court;

❒ will acquire additional amounts required to meet the County's requirements within 10 working days after notification from Purchasing Department of bid award by the Hidalgo County Commissioners' Court; currently carry the following:

Automobile Liability: $_____ General Liability: $_____

❒ have already been met, see attached copy of insurance certificate.

_____ _____.
Authorized Representative Date

Notice to Bidder:
A certificate of insurance for the required insurance limits shall be provided to the Purchasing Department's Contract Managers in order to qualify for award of bid and to execute a contract between your Company and the County

Failure to provide Certificates of Insurance to the Purchasing Department's Contract Managers will cause the bid award to be rescinded and re-awarded to next lowest bidder. Certificates of Insurance will be monitored and verified on a **quarterly basis** to ensure coverage policy is in place. It is the Company's obligation to maintain the appropriate insurance coverage throughout the term of the contract.

THIS FORM MUST ACCOMPANY BID PACKET

PROJECT REQUIREMENTS ACKNOWLEDGMENT

This is to certify that I, _____, possess all of the APPLICABLE:

1. Licenses: _____.
2. Bonds: _____.
3. Certificates: _____.
4. Permits: _____.
5. Other: _____.

necessary to carry out the required project. Furthermore, I am providing copies of the required documentation so that, if my company is awarded this bid, I may be eligible to enter into a contract with Hidalgo County and proceed to complete the project in a timely manner.

* Any licenses, bonds, certificates, permits, etc. which are required must be presented as part of the bid packet in order to expedite the bid evaluation process. Failure to provide said documentation will result in the disqualification of your bid.

_____ _____.
Authorized Signature Date

_____.
Company

_____.
Address

_____.
City, State, Zip

EXHIBIT "D"

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

Adopted 06/29/2007

PROPOSER'S AFFIDAVIT
Exhibit "E"

PROPOSER'S AFFIDAVIT OF NON-COLLUSION
NON-CONFILICT OF INTERST, AND ANTI-LOBBYING

STATE OF TEXAS
COUNTY OF HIDALGO

Affiant, _____, being first duly sworn, deposes that:

(1) Affiant does hereby state neither the Proposer nor any of the Proposer's officers, partners, owners, agents, representatives, employees, or parties in interest, has in any way colluded, conspired, agreed, directly or indirectly with any person, firm, corporation, or other proposer, or potential proposer, to provide any money or other valuable consideration for assistance in procuring or attempting to procure a contract or fix the prices in the attached proposed or the proposal of any other proposer, and further states that no such money or other reward will be hereinafter paid.

(2) Affiant further states they have neither recommended or suggested to Hidalgo County or any of its officials or employees, any of the terms or provisions set forth in their Request for Proposal and subsequent agreement, except at a meeting open to all interested proposers, of which proper notice was given.

(3) Affiant, further states their officers, employees, or agents have not, and will not attempt to lobby, directly or indirectly, the Hidalgo County Commissioner's Court between proposal submission date and award by the Hidalgo County Commissioner's Court.

(4) Affiant further states no officer, or stockholder of the Proposer is a member of the staff, or related to any employee of the Hidalgo County except as noted herein below:

Signature/Title: _____

Subscribed and sworn to before me this _____day of _____, 20___.

_____

Notary Public

My commission expires:_____, 20___

Certification
Regarding Debarment, Suspension Ineligibility

As is required by the Federal Regulations Implementing Executive Order 12549, Debarment and Suspension, 45 CFR Part 76, Government-wide Debarment and Suspension, in the applicant certifies, to the best of his or her knowledge and belief, that both it and its principals:

a. Are not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participation in this transaction by any federal department or agency;

b. Have not within a three-year period preceding this bid/proposal and/or application been convicted of or had a civil judgment rendered against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (federal, state or local) transaction or contract under a public transaction, violation of federal or state antitrust statutes or commission of embezzlement, theft, theory, forgery, bribery, falsification or destruction of records, making false statements, or receiving stolen property;

c. Are not presently indicted for or otherwise criminally or civilly charged by a government entity with commission of any of the offenses enumerated herein; and

d. Have not within a three-year period preceding this bid/proposal and/or application had one or more public transactions terminated of cause or default.

Signature:_____

Print Name:_____

Title:_____

Telephone Number:_____

Date:_____

If the proposer is unable to certify to all of the statements in this Certification, such proposer should attach an explanation to this proposal.

HIDALGO COUNTY
PURCHASING DEPARTMENT
Proposer/Vendor Application

Complete in print or type. Please return this application to the Hidalgo County Purchasing Department
thru Facsimile: (956) 318-2629 or (956) 292-7612
in person or regular mail to:
Mailing/Postal Address: 2812 S. Business Hwy. 281
Physical Address: 2802 S. Business Hwy. 281
Edinburg, Texas 78539
or e-mail: purchasing@co.hidalgo.tx.us

Company Name: **Telephone No. ( )**

dba Name:

Legal Name:

Mailing Address: **Fax No. ( )**

Physical Address:

City, State, Zip **Tax I.D. No.**

Remit to Address : **City, State, Zip**

E-Mail Address:

Representative(s) Name(s) & Title(s)

Type of Organization (check one): _____ Individual _____ Partnership _____ Corporation _____Non-Profit
_____ LLC _____ Sole Proprietor _____ Other, Specify
State Identification No._____ (Please attached completed W-9 form with this application)
Federal Identification No. or (if individual) SS No.

State of Incorporation: _____ Date:_____ Other:

Type of Business (check one): _____ Manufacturer _____ Wholesaler _____ Retailer _____ Broker
_____ Distributor _____ Service Organization _____ Other, Specify

Name & Title of Person(s) Authorized to Sign Bids, Proposals, and/or Contracts:

Small and/or Disadvantaged Business Information (check application criteria)

Small Business:	**Disadvantaged Business (At Least 51% Ownership)**	
☐ Less than 125,000 annual gross receipt	☐ Black American	☐ Native American
☐ Less than 250,000 annual gross receipt	☐ Hispanic American	☐ Women
☐ Less than 499,000 annual gross receipt	☐ Asian Pacific American	☐ Other
☐ More than 500,000 annual gross receipt		

Have you been certified as a HUB or an MBE/WBE source?: ☐ Yes ☐ No

Indicate Certification No.(s):_____ or are Certificate(s) attached?: ☐ Yes ☐ No

What type of product(s) is/are solicited by your company?:

Would you like to be provided with specifications for procurements of such products?: ☐ Yes ☐ No

To Be Completed by the County: Rec'd by (Purchasing):_____ Date Rec'd by (Purchasing):

Date Forwarded Information to Auditor's Office:_____Entry Date: _____ Vendor No.:

(THIS PAGE MUST BE SUBMITTED WITH PROPOSAL)

HISTORICALLY UNDERUTILIZED BUSINESS (HUB) DECLARATION

The primary objective of the Hidalgo County HUB Program is to ensure Historically Underutilized Businesses receive a fair and equal opportunity for participation in the County's procurement process. This fact holds true for Services (Professional & Non-Professional), Commodities, and Construction contracts and any subcontracts thereto. The program strongly encourages Prime Contractors to provide subcontracting opportunities to Certified Hub Contractors/Vendors. Our goal for HUB contractor/vendor participation, as well as HUB subcontractor participation is 30%. To be considered as a "Certified HUB Contractor/Vendor" the contractor/vendor must have been certified by, and hold a current and valid certification with any of the three agencies listed below.

Have you been Certified as a HUB or an MBE/WBE source?: □Yes □ No

If yes, by whom?: □ Texas Building & Procurement Commission □ Other_____

Indicate Certification No(s).:_____ or Are Certificate(s) Attached?: □ Yes □ No

LIST OF CERTIFIED HUB SUBCONTRACTORS

(Attach additional pages if necessary)

What percentage of the Bid, RFP, or RFQ is to be subcontracted with Certified HUB sources?: _____%
(List HUB Subcontractor information below).

HUB Subcontractor Name: _____ HUB Status:
Certifying Agency (Check all applicable): □Texas Building & Procurement Commission □other
Address: _____ City: _____ State: _____ Zip:
Contact Person: _____ Title: _____ Phone No.: ( )
Subcontract Amount: $_____ Description of Work to be Performed:

HUB Subcontractor Name: _____ HUB Status:
Certifying Agency (Check all applicable): □Texas Building & Procurement Commission □other
Address: _____ City: _____ State: _____ Zip:
Contact Person: _____ Title: _____ Phone No.: ( )
Subcontract Amount: $_____ Description of Work to be Performed:

HUB Subcontractor Name: _____ HUB Status:
Certifying Agency (Check all applicable): □Texas Building & Procurement Commission □other
Address: _____ City: _____ State: _____ Zip:
Contact Person: _____ Title: _____ Phone No.: ( )
Subcontract Amount: $_____ Description of Work to be Performed:

(THIS PAGE MUST BE SUBMITTED WITH PROPOSAL)

Form **W-9**
(Rev. November 2005)
Department of the Treasury
Internal Revenue Service

Request for Taxpayer Identification Number and Certification

Give form to the requester. Do not send to the IRS.

Print or type See Specific Instructions on page 2.

Name (as shown on your income tax return)

Business name, if different from above

Check appropriate box: ☐ Individual/ Sole proprietor ☐ Corporation ☐ Partnership ☐ Other ► ---------- ☐ Exempt from backup withholding

Address (number, street, and apt. or suite no.)

Requester's name and address (optional)

City, state, and ZIP code

List account number(s) here (optional)

Part I Taxpayer Identification Number (TIN)

Enter your TIN in the appropriate box. The TIN provided must match the name given on Line 1 to avoid backup withholding. For individuals, this is your social security number (SSN). However, for a resident alien, sole proprietor, or disregarded entity, see the Part I instructions on page 3. For other entities, it is your employer identification number (EIN). If you do not have a number, see *How to get a TIN* on page 3.

Note. If the account is in more than one name, see the chart on page 4 for guidelines on whose number to enter.

Social security number
			–			–		

or

Employer identification number
			–					

Part II Certification

Under penalties of perjury, I certify that:

1. The number shown on this form is my correct taxpayer identification number (or I am waiting for a number to be issued to me), and
2. I am not subject to backup withholding because: (a) I am exempt from backup withholding, or (b) I have not been notified by the Internal Revenue Service (IRS) that I am subject to backup withholding as a result of a failure to report all interest or dividends, or (c) the IRS has notified me that I am no longer subject to backup withholding, and
3. I am a U.S. person (including a U.S. resident alien).

Certification instructions. You must cross out item 2 above if you have been notified by the IRS that you are currently subject to backup withholding because you have failed to report all interest and dividends on your tax return. For real estate transactions, item 2 does not apply. For mortgage interest paid, acquisition or abandonment of secured property, cancellation of debt, contributions to an individual retirement arrangement (IRA), and generally, payments other than interest and dividends, you are not required to sign the Certification, but you must provide your correct TIN. (See the instructions on page 4.)

Sign Here Signature of U.S. person ► Date ►

Purpose of Form

A person who is required to file an information return with the IRS, must obtain your correct taxpayer identification number (TIN) to report, for example, income paid to you, real estate transactions, mortgage interest you paid, acquisition or abandonment of secured property, cancellation of debt, or contributions you made to an IRA.

U.S. person. Use Form W-9 only if you are a U.S. person (including a resident alien), to provide your correct TIN to the person requesting it (the requester) and, when applicable, to:

1. Certify that the TIN you are giving is correct (or you are waiting for a number to be issued),
2. Certify that you are not subject to backup withholding, or
3. Claim exemption from backup withholding if you are a U.S. exempt payee.

In 3 above, if applicable, you are also certifying that as a U.S. person, your allocable share of any partnership income from a U.S. trade or business is not subject to the withholding tax on foreign partners' share of effectively connected income.

Note. If a requester gives you a form other than Form W-9 to request your TIN, you must use the requester's form if it is substantially similar to this Form W-9.

For federal tax purposes, you are considered a person if you are:

- An individual who is a citizen or resident of the United States,
- A partnership, corporation, company, or association created or organized in the United States or under the laws of the United States, or
- Any estate (other than a foreign estate) or trust. See Regulations sections 301.7701-6(a) and 7(a) for additional information.

Special rules for partnerships. Partnerships that conduct a trade or business in the United States are generally required to pay a withholding tax on any foreign partners' share of income from such business. Further, in certain cases where a Form W-9 has not been received, a partnership is required to presume that a partner is a foreign person, and pay the withholding tax. Therefore, if you are a U.S. person that is a partner in a partnership conducting a trade or business in the United States, provide Form W-9 to the partnership to establish your U.S. status and avoid withholding on your share of partnership income.

The person who gives Form W-9 to the partnership for purposes of establishing its U.S. status and avoiding withholding on its allocable share of net income from the partnership conducting a trade or business in the United States is in the following cases:

- The U.S. owner of a disregarded entity and not the entity,

- The U.S. grantor or other owner of a grantor trust and not the trust, and
- The U.S. trust (other than a grantor trust) and not the beneficiaries of the trust.

Foreign person. If you are a foreign person, do not use Form W-9. Instead, use the appropriate Form W-8 (see Publication 515, Withholding of Tax on Nonresident Aliens and Foreign Entities).

Nonresident alien who becomes a resident alien. Generally, only a nonresident alien individual may use the terms of a tax treaty to reduce or eliminate U.S. tax on certain types of income. However, most tax treaties contain a provision known as a "saving clause." Exceptions specified in the saving clause may permit an exemption from tax to continue for certain types of income even after the recipient has otherwise become a U.S. resident alien for tax purposes.

If you are a U.S. resident alien who is relying on an exception contained in the saving clause of a tax treaty to claim an exemption from U.S. tax on certain types of income, you must attach a statement to Form W-9 that specifies the following five items:

1. The treaty country. Generally, this must be the same treaty under which you claimed exemption from tax as a nonresident alien.
2. The treaty article addressing the income.
3. The article number (or location) in the tax treaty that contains the saving clause and its exceptions.
4. The type and amount of income that qualifies for the exemption from tax.
5. Sufficient facts to justify the exemption from tax under the terms of the treaty article.

Example. Article 20 of the U.S.-China income tax treaty allows an exemption from tax for scholarship income received by a Chinese student temporarily present in the United States. Under U.S. law, this student will become a resident alien for tax purposes if his or her stay in the United States exceeds 5 calendar years. However, paragraph 2 of the first Protocol to the U.S.-China treaty (dated April 30, 1984) allows the provisions of Article 20 to continue to apply even after the Chinese student becomes a resident alien of the United States. A Chinese student who qualifies for this exception (under paragraph 2 of the first protocol) and is relying on this exception to claim an exemption from tax on his or her scholarship or fellowship income would attach to Form W-9 a statement that includes the information described above to support that exemption.

If you are a nonresident alien or a foreign entity not subject to backup withholding, give the requester the appropriate completed Form W-8.

What is backup withholding? Persons making certain payments to you must under certain conditions withhold and pay to the IRS 28% of such payments (after December 31, 2002). This is called "backup withholding." Payments that may be subject to backup withholding include interest, dividends, broker and barter exchange transactions, rents, royalties, nonemployee pay, and certain payments from fishing boat operators. Real estate transactions are not subject to backup withholding.

You will not be subject to backup withholding on payments you receive if you give the requester your correct TIN, make the proper certifications, and report all your taxable interest and dividends on your tax return.

Payments you receive will be subject to backup withholding if:

1. You do not furnish your TIN to the requester,
2. You do not certify your TIN when required (see the Part II instructions on page 4 for details),
3. The IRS tells the requester that you furnished an incorrect TIN,
4. The IRS tells you that you are subject to backup withholding because you did not report all your interest and dividends on your tax return (for reportable interest and dividends only), or
5. You do not certify to the requester that you are not subject to backup withholding under 4 above (for reportable interest and dividend accounts opened after 1983 only).

Certain payees and payments are exempt from backup withholding. See the instructions below and the separate Instructions for the Requester of Form W-9.

Also see *Special rules regarding partnerships* on page 1.

Penalties

Failure to furnish TIN. If you fail to furnish your correct TIN to a requester, you are subject to a penalty of $50 for each such failure unless your failure is due to reasonable cause and not to willful neglect.

Civil penalty for false information with respect to withholding. If you make a false statement with no reasonable basis that results in no backup withholding, you are subject to a $500 penalty.

Criminal penalty for falsifying information. Willfully falsifying certifications or affirmations may subject you to criminal penalties including fines and/or imprisonment.

Misuse of TINs. If the requester discloses or uses TINs in violation of federal law, the requester may be subject to civil and criminal penalties.

Specific Instructions

Name

If you are an individual, you must generally enter the name shown on your income tax return. However, if you have changed your last name, for instance, due to marriage without informing the Social Security Administration of the name change, enter your first name, the last name shown on your social security card, and your new last name.

If the account is in joint names, list first, and then circle, the name of the person or entity whose number you entered in Part I of the form.

Sole proprietor. Enter your individual name as shown on your income tax return on the "Name" line. You may enter your business, trade, or "doing business as (DBA)" name on the "Business name" line.

Limited liability company (LLC). If you are a single-member LLC (including a foreign LLC with a domestic owner) that is disregarded as an entity separate from its owner under Treasury regulations section 301.7701-3, enter the owner's name on the "Name" line. Enter the LLC's name on the "Business name" line. Check the appropriate box for your filing status (sole proprietor, corporation, etc.), then check the box for "Other" and enter "LLC" in the space provided.

Other entities. Enter your business name as shown on required federal tax documents on the "Name" line. This name should match the name shown on the charter or other legal document creating the entity. You may enter any business, trade, or DBA name on the "Business name" line.

Note. You are requested to check the appropriate box for your status (individual/sole proprietor, corporation, etc.).

Exempt From Backup Withholding

If you are exempt, enter your name as described above and check the appropriate box for your status, then check the "Exempt from backup withholding" box in the line following the business name, sign and date the form.

Generally, individuals (including sole proprietors) are not exempt from backup withholding. Corporations are exempt from backup withholding for certain payments, such as interest and dividends.

Note. If you are exempt from backup withholding, you should still complete this form to avoid possible erroneous backup withholding.

Exempt payees. Backup withholding is not required on any payments made to the following payees:

1. An organization exempt from tax under section 501(a), any IRA, or a custodial account under section 403(b)(7) if the account satisfies the requirements of section 401(f)(2),
2. The United States or any of its agencies or instrumentalities,
3. A state, the District of Columbia, a possession of the United States, or any of their political subdivisions or instrumentalities,
4. A foreign government or any of its political subdivisions, agencies, or instrumentalities, or
5. An international organization or any of its agencies or instrumentalities.

Other payees that may be exempt from backup withholding include:

6. A corporation,
7. A foreign central bank of issue,
8. A dealer in securities or commodities required to register in the United States, the District of Columbia, or a possession of the United States,
9. A futures commission merchant registered with the Commodity Futures Trading Commission,
10. A real estate investment trust,
11. An entity registered at all times during the tax year under the Investment Company Act of 1940,
12. A common trust fund operated by a bank under section 584(a),
13. A financial institution,
14. A middleman known in the investment community as a nominee or custodian, or
15. A trust exempt from tax under section 664 or described in section 4947.

The chart below shows types of payments that may be exempt from backup withholding. The chart applies to the exempt recipients listed above, 1 through 15.

IF the payment is for . . .	THEN the payment is exempt for . . .
Interest and dividend payments	All exempt recipients except for 9
Broker transactions	Exempt recipients 1 through 13. Also, a person registered under the Investment Advisers Act of 1940 who regularly acts as a broker
Barter exchange transactions and patronage dividends	Exempt recipients 1 through 5
Payments over $600 required to be reported and direct sales over $5,000 [1]	Generally, exempt recipients 1 through 7 [2]

[1] See Form 1099-MISC, Miscellaneous Income, and its instructions.

[2] However, the following payments made to a corporation (including gross proceeds paid to an attorney under section 6045(f), even if the attorney is a corporation) and reportable on Form 1099-MISC are not exempt from backup withholding: medical and health care payments, attorneys' fees; and payments for services paid by a federal executive agency.

Part I. Taxpayer Identification Number (TIN)

Enter your TIN in the appropriate box. If you are a resident alien and you do not have and are not eligible to get an SSN, your TIN is your IRS individual taxpayer identification number (ITIN). Enter it in the social security number box. If you do not have an ITIN, see *How to get a TIN* below.

If you are a sole proprietor and you have an EIN, you may enter either your SSN or EIN. However, the IRS prefers that you use your SSN.

If you are a single-owner LLC that is disregarded as an entity separate from its owner (see *Limited liability company (LLC)* on page 2), enter your SSN (or EIN, if you have one). If the LLC is a corporation, partnership, etc., enter the entity's EIN.

Note. See the chart on page 4 for further clarification of name and TIN combinations.

How to get a TIN. If you do not have a TIN, apply for one immediately. To apply for an SSN, get Form SS-5, Application for a Social Security Card, from your local Social Security Administration office or get this form online at *www.socialsecurity.gov*. You may also get this form by calling 1-800-772-1213. Use Form W-7, Application for IRS Individual Taxpayer Identification Number, to apply for an ITIN, or Form SS-4, Application for Employer Identification Number, to apply for an EIN. You can apply for an EIN online by accessing the IRS website at *www.irs.gov/businesses* and clicking on Employer ID Numbers under Related Topics. You can get Forms W-7 and SS-4 from the IRS by visiting *www.irs.gov* or by calling 1-800-TAX-FORM (1-800-829-3676).

If you are asked to complete Form W-9 but do not have a TIN, write "Applied For" in the space for the TIN, sign and date the form, and give it to the requester. For interest and dividend payments, and certain payments made with respect to readily tradable instruments, generally you will have 60 days to get a TIN and give it to the requester before you are subject to backup withholding on payments. The 60-day rule does not apply to other types of payments. You will be subject to backup withholding on all such payments until you provide your TIN to the requester.

Note. Writing "Applied For" means that you have already applied for a TIN or that you intend to apply for one soon.

Caution: *A disregarded domestic entity that has a foreign owner must use the appropriate Form W-8.*

Part II. Certification

To establish to the withholding agent that you are a U.S. person, or resident alien, sign Form W-9. You may be requested to sign by the withholding agent even if items 1, 4, and 5 below indicate otherwise.

For a joint account, only the person whose TIN is shown in Part I should sign (when required). Exempt recipients, see *Exempt From Backup Withholding* on page 2.

Signature requirements. Complete the certification as indicated in 1 through 5 below.

1. Interest, dividend, and barter exchange accounts opened before 1984 and broker accounts considered active during 1983. You must give your correct TIN, but you do not have to sign the certification.

2. Interest, dividend, broker, and barter exchange accounts opened after 1983 and broker accounts considered inactive during 1983. You must sign the certification or backup withholding will apply. If you are subject to backup withholding and you are merely providing your correct TIN to the requester, you must cross out item 2 in the certification before signing the form.

3. Real estate transactions. You must sign the certification. You may cross out item 2 of the certification.

4. Other payments. You must give your correct TIN, but you do not have to sign the certification unless you have been notified that you have previously given an incorrect TIN. "Other payments" include payments made in the course of the requester's trade or business for rents, royalties, goods (other than bills for merchandise), medical and health care services (including payments to corporations), payments to a nonemployee for services, payments to certain fishing boat crew members and fishermen, and gross proceeds paid to attorneys (including payments to corporations).

5. Mortgage interest paid by you, acquisition or abandonment of secured property, cancellation of debt, qualified tuition program payments (under section 529), IRA, Coverdell ESA, Archer MSA or HSA contributions or distributions, and pension distributions. You must give your correct TIN, but you do not have to sign the certification.

What Name and Number To Give the Requester

For this type of account:	Give name and SSN of:
1. Individual	The individual
2. Two or more individuals (joint account)	The actual owner of the account or, if combined funds, the first individual on the account [1]
3. Custodian account of a minor (Uniform Gift to Minors Act)	The minor [2]
4. a. The usual revocable savings trust (grantor is also trustee)	The grantor-trustee [1]
b. So-called trust account that is not a legal or valid trust under state law	The actual owner [1]
5. Sole proprietorship or single-owner LLC	The owner [3]
For this type of account:	**Give name and EIN of:**
6. Sole proprietorship or single-owner LLC	The owner [3]
7. A valid trust, estate, or pension trust	Legal entity [4]
8. Corporate or LLC electing corporate status on Form 8832	The corporation
9. Association, club, religious, charitable, educational, or other tax-exempt organization	The organization
10. Partnership or multi-member LLC	The partnership
11. A broker or registered nominee	The broker or nominee
12. Account with the Department of Agriculture in the name of a public entity (such as a state or local government, school district, or prison) that receives agricultural program payments	The public entity

[1] List first and circle the name of the person whose number you furnish. If only one person on a joint account has an SSN, that person's number must be furnished.

[2] Circle the minor's name and furnish the minor's SSN.

[3] You must show your individual name and you may also enter your business or "DBA" name on the second name line. You may use either your SSN or EIN (if you have one). If you are a sole proprietor, IRS encourages you to use your SSN.

[4] List first and circle the name of the legal trust, estate, or pension trust. (Do not furnish the TIN of the personal representative or trustee unless the legal entity itself is not designated in the account title.) Also see *Special rules regarding partnerships* on page 1.

Note. If no name is circled when more than one name is listed, the number will be considered to be that of the first name listed.

Privacy Act Notice

Section 6109 of the Internal Revenue Code requires you to provide your correct TIN to persons who must file information returns with the IRS to report interest, dividends, and certain other income paid to you, mortgage interest you paid, the acquisition or abandonment of secured property, cancellation of debt, or contributions you made to an IRA, or Archer MSA or HSA. The IRS uses the numbers for identification purposes and to help verify the accuracy of your tax return. The IRS may also provide this information to the Department of Justice for civil and criminal litigation, and to cities, states, the District of Columbia, and U.S. possessions to carry out their tax laws. We may also disclose this information to other countries under a tax treaty, to federal and state agencies to enforce federal nontax criminal laws, or to federal law enforcement and intelligence agencies to combat terrorism.

You must provide your TIN whether or not you are required to file a tax return. Payers must generally withhold 28% of taxable interest, dividend, and certain other payments to a payee who does not give a TIN to a payer. Certain penalties may also apply.

HIDALGO COUNTY SHERIFF'S OFFICE

"Hidalgo County Adult Detention Center and Law Enforcement Facility Repairs and/or Replacement"

BID No. 2013-133A-12-11-YSS

SUBMITTAL CHECK LIST

The following list of forms must be included in the RFB response, failure to submit any of these forms may be considered non responsive.

Indicate with a check mark (✓) the Forms completed and included in response:

_____ Page 9 of Legal Notice

_____ Exhibit "C" -Acknowledgement forms (pages 3 and 4)

_____ Exhibit "D" -CIQ Form.

_____ Exhibit "E" –Proposers Affidavit

_____ Certification Regarding Debarment

_____ Vendor Bidder Application and IRS form W-9

_____ STATEMENT OF CREDENTIALS

_____ One (1) original and three (3) copies of complete Response, including any other documentation requested in this RFB not herein listed (i.e. Bid Form, Bid Bond, Sub-Contractors List, references, etc).

Name: _____

Signature: _____ Date: _____

REQUEST FOR BIDS

TO SUPPLY HIDALGO COUNTY with sealed bids for: **2013-133A-12-11-YSS "HIDALGO COUNTY ADULT DETENTION CENTER AND LAW ENFORCEMENT FACILITY REPAIRS AND/OR REPLACEMENT."**

A BIDDER'S BOND from a reliable surety company licensed to operate in the State of Texas or certified Cashier's Check, payable without recourse to the County of Hidalgo, for the amount of not less than **5%** of the total bid shall accompany the bid as guaranty that, if awarded the contract, the bidder will enter into a contract with the County of Hidalgo. Payment and Performance Bonds shall be executed except in the event into a single payment contract with the County of Hidalgo in lieu of a Performance Bond. In the event the total amount bid is $25,000 or less, the successful contract has the option to enter into a single payment contract with the County of Hidalgo in lieu of a Payment and Performance Bond.

Bid Packets may be obtained at the office of the project engineer Miguel Chanin, P.E., ***Chanin Engineering LLC*, 400 Nolana Suite N-2, McAllen, TX 78504 (956) 687-9421** for the amount of **$150.00.** General and/or Prime Contractors submitting bids and/or proposals to the County of Hidalgo shall be refundable.

PRE-BID CONFERENCE is scheduled for Monday, December 02, 2013 at 3:00 P.M. at HIDALGO COUNTY SHERIFF'S OFFICE LAW ENFORCEMENT FACILITY, 711 El Cibolo Road, Edinburg, TX 78541.

UPON SUBMITTING SEALED BID, bidders are required to properly identify (handwritten, typed or printed) sealed envelope and/or packet as follows: Bidders' name and address on the upper left hand corner of the sealed envelope and/or package and Bid **No.:2013-133A-12-11-YSS-"Hidalgo County Adult Detention Center and Law Enforcement Facility Repairs and/or Replacement"** on the lower left hand corner of sealed envelope/and or packet. **OVERNIGHT MAIL MUST ALSO BE PROPERLY LABELED ON THE OUTSIDE OF EXPRESS ENVELOPE OR PACKAGE.**

The sealed bid must contain one (1) original and three (3) copies of bid and must be clearly identified and addressed for delivery to:

Martha L. Salazar, CPPB, Hidalgo County Purchasing Agent
Hidalgo County Purchasing Department

US Postal Mail/Courier Address	Physical Location:
Hidalgo County New Administration Building	Hidalgo County New Administration Building
2812 S. Business Hwy 281	2802 S. Business Hwy. 281
Edinburg, Texas 78539	(Southeast of Canton Rd & Business 281)
	Edinburg, Texas 78539

BIDS ACCEPTANCE: Sealed bids will be accepted until **3:00 p.m. on Wednesday December 11, 2013** at which time they will be opened in the Hidalgo County Purchasing Department Conference Room at **Physical Location: 2802 S. Business Hwy 281, Hidalgo County New Administration Building, Edinburg, Texas 78539.** NO FACSIMILES OR LATE ARRIVALS WILL BE ACCEPTED. ANY BID RECEIVED AFTER THAT TIME WILL NOT BE OPENED AND WILL BE RETURNED.

Attention is called to the fact that not less than, the federally determined prevailing **(Davis-Bacon and Related Acts)** wage rate, as issued and contained in the contract documents, must be paid on this project. In addition the successful bidder must ensure that employees and applicants for employment are not discriminated against because of race, color, religion, sex, age, disability or national origin.

BIDS MAY BE HELD by the County of Hidalgo for a period not to exceed ninety (90) days from the date of the opening of bids for the purpose of reviewing the bids and investigating the qualifications of bidders, prior to awarding of the contract.

THE COUNTY reserves the right to refuse and reject any/all bids and to waive any/all formalities or technicalities, or accept the bids considered the best and most advantageous to the County.

Typed-written bidding RFI's shall be faxed to 956-687-3218 or emailed to Miguel Chanin, P.E. at miguel@chaninengineering.com. Please call 956-687-9421 to confirm receipt of faxed RFI. RFI's **will not be answered by phone**. NO HAND WRITTEN RFI'S will be processed/answered. All inquiries shall be forwarded by December 04, 2013. Inquiries beyond this date will not be responded. Contact project engineer's office for copies of Addenda. All bidders who paid a deposit will be required to return Addenda as part of the Construction Documents in order to receive full deposit refund.

BY ORDER OF THE COMMISSIONERS COURT OF HIDALGO COUNTY, TEXAS on this the 19th day of November, 2013.

MARTHA L. SALAZAR, CPPB
HIDALGO COUNTY PURCHASING AGENT

REPORT ROAD HAZARDS@1-866-HCR-SAFE OR 1-866-427-7233

THE STATE OF TEXAS §
§
COUNTY OF HIDALGO §

CONSTRUCTION CONTRACT
C-13-133A-00-00

This Agreement, entered into this _____day of _____, 2___ by and between Hidalgo County (hereinafter called the "OWNER," and, _____ (a Texas corporation), of County of Hidalgo, and State of Texas, hereinafter called "CONTRACTOR".

WITNESSETH

That for and in consideration of the payments and agreement hereinafter mentioned, to be made and performed by the OWNER, the CONTRACTOR hereby agrees with the OWNER to commence and complete the construction described as follows:

Hidalgo County Adult Detention Center and Law Enforcement Facility Repairs and/or Replacement

Hereinafter called the project, for the sum of _____ Dollars and _____ Cents and all extra work in connection therewith, under the terms and stated in the General and Special Conditions of the Contract; and at his (its or their) own proper cost and expense to furnish all the materials, supplies, machinery, equipment, tools, superintendence, labor, insurance, and other accessories and services necessary to complete the said project in accordance with the conditions and prices stated in the Proposal, the General Conditions and Special Conditions printed or written explanatory matter thereof, the specifications and contract documents therefore as prepared by ___ _____engineer_____, entitled the Architect/Engineer, and as enumerated in Paragraph 1.01.A.12 of the General Conditions, all of which are made a part hereof and collectively evidence and constitute the contract.

The CONTRACTOR hereby agrees to commence work under this contract on or after a date to be specified in written "Notice to Proceed" of the OWNER and to fully complete the project within _____consecutive calendar days thereafter. The CONTRACTOR further agrees to pay, as liquidated damages, the sum of $_____for each consecutive calendar day thereafter.

The OWNER agrees to pay the CONTRACTOR in current funds for the performance of the contract, subject to additions and deductions, as provided in the General Conditions of the contract, and to make payments on account thereof as provided in Paragraphs 14.02.C and 14.07.C of the General Conditions.

DRAFT

IN WITNESS WHREOF, the parties to these present have executed this contract in four (4) counterparts, each of which shall be deemed an original, in year and day first above mentioned.

APPROVED BY COMMISIONERS COURT ON, _____, 2_____.

CONTRACTOR:_____
Print Name & Title: _____
Name of Firm: _____
_____
Address: _____
_____
Fed I.D. #/SS #: _____

STATE OF TEXAS

COUNTY OF HIDALGO

This instrument was acknowledged before me on this the _____day of _____,

2_____, by _____Of and on behalf of _____
(Title) (A corporation)

_____
Notary Public-Signature

APPROVED AS TO FORM:
Atlas & Hall, L.L.P.
800 Pecan
McAllen, Texas 78504

BY: _____

ATTEST:

_____
Arturo Guajardo, Jr., County Clerk

COUNTY OF HIDALGO:

_____
Ramon Garcia, County Judge

DRAFT

BID FORM (Need to insert unit prices and allowance)

PROJECT: **HIDALGO COUNTY SHERIFF'S OFFICE Hidalgo County Adult Detention Center and Law Enforcement Facility Repairs and/or Replacement**
PLACE: Hidalgo County Purchasing Department
Hidalgo County New Administration Building
DATE: December 11, 2013
SUBMISSION TIME: 3:00 p.m.

Pursuant to and in compliance with the Request for Bids and the proposed Contract Documents, prepared by Chanin Engineering, LLC. relating to the above referenced project, the undersigned, having become thoroughly familiar with the terms and conditions of the proposed Contract Documents and with local conditions affecting the performance and costs of the work at the place where the work is to be completed, and having fully inspected the site in all particulars, hereby proposes and agrees to fully perform the work within the time stated and in strict accordance with the proposed Contract Documents, and addenda, thereto, including furnishing of any and all labor and materials for all General Construction and Site Work, for the following sum of money:

A. BID
All labor, materials, services and equipment necessary for completion of the work shown on the drawings and in the specifications. All divisions included, minus alternates.

TOTAL COST DOLLAR ($_____)

1. If awarded this Contract, the undersigned will execute a satisfactory Construction Contract, Performance Bond, Labor and Material Payment Bond and proof of insurance coverage, with the Owner for the entire work as per the Contract Documents within ten (10) days after notice of award. It is agreed that this proposal is subjected to the Owner's acceptance for a period of ninety (90) days from the date of opening.

B. The following are alternates to the Base Proposal: It is understood that if no figure is listed for an Alternate may be accepted and there will be no change in the Base Proposal amount indicated above. Strike out (add) or (deduct) as required for each alternate. Refer Division 1 Section "Alternates" for complete description of the Alternates.

Alternates

1. Remove and Replace existing Quarry Tile in ADC Kitchen.

If the Owner elects to proceed with Alternate Number One, (add) (deduct) the sum of:
$_____

2. Remove and Replace existing Suspended Ceiling and Accessories in ADC Kitchen.

If the Owner elects to proceed with Alternate Number Two, (add) (deduct) the sum of:
$_____

3. Remove and Replace Three Cooler/ Freezer Doors and Components in ADC Kitchen.
If the Owner elects to proceed with Alternate Number Three, (add) (deduct) the sum of:

$_____

4. Remove and Replace Cooler/ Freezer Compressor.

If the Owner elects to proceed with Alternate Number Four, (add) (deduct) the sum of:
$_____

5. Remove and Replace Light Poles on LEC Parking Lot

C. **Unit Price Schedule: Provide Unit Costs for the Following Items**

	Description	Unit Pricing
1.	Fire alarm Devices with rough-in (1 each)	_____
2.	Pull Station with Stopper II (1 each)	_____
3.	Audio Visual Device (1 each)	_____
4.	Visual Device (1 each)	_____
5.	Ceiling Smoke Detector (1 each)	_____
6.	Smoke Detector Guard (1 each)	_____
7.	Audio Visual Guard (1 each)	_____
8.	Duct Detector (1 each)	_____
9.	Fire Alarm Relay Module (1 each)	_____
10.	Fire Alarm Monitor Module (1 each)	_____
11.	Fire Alarm Notification Power Supply (1 each)	_____
12.	Fiber Optic cable per 100 ft six strand multimode 62.5 Micron Plenum Rated (1 each)	_____
13.	A/C diffusers in Kitchen (1 each)	_____
14.	Drop In lights In kitchen (1 each)	_____
15.	2 Welded ½" rods at (e) steel joist bottom chord, 20' lengths each	_____
16.	Replacement of wet roof areas identified by the Thermocore® Infrared Scan. Description: Provide wet roof area replacement according to Section 07551 Modified Bitumen Membrane Roofing (Re-Cover). Unit of Measurement: 1 square foot.	_____

17. Deteriorated existing metal roof decking repair or replacement. _____

Description: Provide deteriorated metal roof decking repair or replacement with new metal roofing to match existing according to Section 05310 Steel Deck Repair/Replacement (If Required).
Unit of Measurement: 1 square foot.

18. Deteriorated existing wood blocking or nailer repair or replacement. _____

Description: Provide deteriorated wood blocking and nailer repair or replacement with new pressure-treated wood blocking or nailers according to Section 06105 Miscellaneous Carpentry.
Unit of Measurement: 1 board foot.
Supply Cost for 2x4
2x6
2x8

D. Contract Execution:

If awarded this contract the undersigned will execute a satisfactory Construction Contract, Performance Bond, Labor and Material Payment Bond and proof of insurance coverage, with the Owner for the entire work as per the contract Documents within 10 days after notice of award. It is agreed that this proposal is subjected to the Owners acceptance for a period of 30 (thirty days) from the above date.

E. Enclosed is a Certified Check or Bid Bond in the amount of $_____ in compliance with the specification requirements. (5% of highest amount bid.)

The above Check or Bid Bond is to become the property of the Owner in the event the Construction Contract (when offered by the Owner) and the bonds and proof of insurance coverage are not executed within the time set forth above.

F. Extra Work:

The undersigned agrees that should any change in the work or extra work be ordered the allowance for overhead and profit combined shall be as scheduled below, but in no case shall it exceed 5%. The following applicable percentages shall be added to the extra work cost as defined by Article 12 of the General Conditions.

1. Allowance to the Contractor for overhead and profit for extra work provided by his own forces: Maximum 5%

2. Allowance to the Contractor for overhead and Profit for extra work provided by a subcontractor and supervised by the Contractor: Maximum 5%

3. The General Contractor shall not be allowed to charge the Owner for “extended overhead” changes relating to Change of Orders or weather delays.

G. The Undersigned agrees to the following:
   A. To furnish all labor and materials as shown and specified
   B. To complete the base proposal (and any alternates selected) including anticipated delays due to inclement weather or muddy ground conditions in ____ calendar days.
   C. To work ____ working days per week
   D. To start work ____ days after notice of award of contract.

H. The full amount of all Allowances as specified in the General Requirements. Division I, of the Specifications, is included in the proposal item price shown

I. Receipt is acknowledgment of the following addenda:

No._____	Dated_____
No._____	Dated_____
No._____	Dated_____
No._____	Dated_____
No._____	Dated_____
No._____	Dated_____

J. The Offeror attests and affirms that he and his subcontractors are skilled and experienced in the use and interpretation of plans, specifications, addenda and related proposal documents and, that he has carefully reviewed the plans, specifications, addenda and related proposal documents for this project and has found them to be free of conflicts and/or ambiguities and sufficient for proposal and construction purposes. Further, he has carefully examined the soils reports and the site of the work, and, through his own personal observations, has satisfied himself as to the nature, location and requirements of the work; the character, quality and quantity of materials required; the difficulties likely to be encountered; the other items and/or conditions which may affect the satisfactory performance of the work. He has based his bid solely on these documents, and personal observations, and has not relied in any way on any explanation or interpretation, oral or written, from any source other than those written and issued by the Architect/Engineer.

K. Offerer agrees that the Owner has the right to accept or reject any or all proposals and to waive all informalities

---

The undersigned affirms that the information provided herein is true and sufficiently complete so as not to be misleading and has the authority to bind the represented company to a contract.

_____	_____
Title of Official	Signature Official
_____	_____
Date	Company Name

SUPPLEMENTS TO BID FORMS

SECTION 00400

BID SECURITY

Each Bid must be accompanied by a Bid Security in the amount of 5% of the largest possible total of the Bid submitted.

The Bid Security may be by cash, certified check or a Bid Bond. The Bid Bond must be executed by the Bidder as principal. The Bid Bond form and security company are subject to approval by the Owner and the Surety must comply with requirements noted in Section 29 of the Supplementary General Conditions.

The Bid Security will be returned to all except the three lowest Bidders within three days after opening of the Bids.

The remaining Bid Securities will be returned promptly after the Owner and the accepted Bidder have executed the contract, or, if no award has been made within thirty days after the date of the opening of bids, upon demand of the Bidder anytime thereafter so long as he has not been notified of the acceptance of his bid.

END OF SECTION

AGREEMENT FORM

SECTION 00500

AGREEMENT (Stipulated Sum)

The Agreement shall be executed as per the attached sample form.

END OF SECTION

THESTATEOFTEXAS §
§
COUNTYOFHIDALGO §

CONSTRUCTION CONTRACT
C-XX-XXX-XX-XX

This Agreement, entered into this_____day of _____, 2____by and between Hidalgo County (hereinafter called the "OWNER," and,___(a Texas corporation), of County of Hidalgo, and State of Texas, hereinafter called "CONTRACTOR".

WITNESSETH

That for and in consideration of the payments and agreement hereinafter mentioned, to be made and performed by the OWNER, the CONTRACTOR hereby agrees with the OWNER to commence and complete the construction described as follows:

Hereinafter called the project, for the sum ofDollars and
Cents and all extra work in connection therewith, under the terms and stated in the General and Special Conditions of the Contract; and at his (its or their) own proper cost and expense to furnish all the materials, supplies, machinery, equipment , tools, superintendence, labor, insurance, and other accessories and services necessary to complete the said project in accordance with the conditions and prices stated in the Proposal, the General Conditions and Special Conditions printed or written explanatory matter thereof, the specifications and contract documents therefore as prepared by engineer _____, entitled the Architect/Engineer, and as enumerated in Paragraph 1.01.A.12 of the General Conditions, all of which are made a part hereof and collectively evidence and constitute the contract.

The CONTRACTOR hereby agrees to commence work under this contract on or after a date to be specified in written "Notice to Proceed" of the OWNER and to fully complete the project withinworking days thereafter. The CONTRACTOR further agrees to pay, as liquidated damages, the sum of $500for each consecutive calendar day thereafter.

The OWNER agrees to pay the CONTRACTOR in current funds for the performance of the contract, subject to additions and deductions, as provided in the General Conditions of the contract, and to make payments on account thereof as provided in Paragraphs 14.02.C and 14.07.C of the General Conditions

SAMPLE

IN WITNE SS WHREOF, the parties to these present have executed this contract in four (4) counterparts, each of which shall be deemed an original, in year and day first above mentioned.

APPROVED BY COMMISIONERS COURT ON,_____, 2_____.

CONTRACTOR:_____
Print Name & Title:_____
Name of Firm:_____
_____
Address:_____
_____
Fed I.D. #/SS #:_____

STATE OF TEXAS

COUNTY OF HIDALGO

This instrument was acknowledged before me on this the _____day of_____,

2____, by _____ Of and on behalf of_____
(Title) (A corporation)

_____
Notary Public-Signature

APPROVED AS TO FORM:
Atlas &Hall , L.L.P .
800 Pecan
McAllen , Texas 78504

BY:_____

ATTEST:

_____
Arturo Guajardo, Jr., County Clerk

COUNTY OF HIDALGO:

_____
Ramon Garcia, County Judge

SAMPLE

FORM OF AGREEMENT FOR ENGINEERING CONSTRUCTION

THIS AGREEMENT, MADE ON THE _th day of, by and between the
HIDALGO COUNTY
711 E. El Cibolo Rd.
Edinburg TX 78541

party of the first part, hereinafter called the OWNER, and **Contractor** Address

party of the second part, hereinafter called the CONTRACTOR.

It is understood ENGINEER representing OWNER shall be Chanin Engineering, LLC.

WITNESSETH, That the Contractor and the Owner, for the consideration hereinafter named, agree as follows:

ARTICLE I - SCOPE OF THE WORK.

The Contractor hereby agrees to furnish all of the materials and all of the equipment and labor necessary and to perform all of the work shown on the drawings and described in the specifications for the project entitled **HIDALGO COUNTY SHERIFF'S OFFICE Hidalgo County Adult Detention Center and Law Enforcement Facility Repairs and / or Replacement** for the contract sum of $_____ (IN WORDS), herein referred to as the Work.

The following shall be the Contract Documents:

1. Hidalgo County Construction Contract;
2. Form of Agreement For Engineering Construction;
3. The General Conditions for Engineering Construction;
4. The Drawings and Specifications prepared by Chanin Engineering LLC and Consultants for the project.
5. The Contractor's Response to Competitive Bid/Schedule of Values.

ARTICLE II - TIME OF COMPLETION.

The Contractor shall achieve Substantial Completion within one hundred and eighty days of issuance of a notice to proceed issued to the Contractor. Final Completion shall be obtained within thirty days of Substantial Completion.

Time is of the essence in all phases of the Work. It is specifically understood and agreed by and between Owner and Contractor that time is of the essence in the Substantial Completion and Final Completion of the Work and Owner shall sustain actual damages as a result of Contractor's failure, neglect or refusal to achieve said deadlines. Such actual and direct damages are, and will continue to be, impracticable and extremely difficult to determine. Execution of this Agreement under these specifications shall constitute agreement by Owner and Contractor that the amounts stated below are the minimum value of the costs and actual and direct damages caused by failure of Contractor to substantially complete the work within the allotted times, that such sums are liquidated direct damages and shall not be construed as a penalty, and that such sums may be deducted from payments due Contractor if such delay occurs. It is expressly understood that the said sum per day is agreed upon as a fair estimate of the pecuniary damages which will be sustained by the Owner in the event that the Work is not completed within the agreed time, or within the extended time, if any, otherwise provided for herein. Said sum shall be considered as liquidated damages only and in no sense shall be considered a penalty, said damages being caused by additional compensation to personnel, for loss of interest on money, and other miscellaneous increased costs, all of which are difficult to exactly ascertain. Failure to substantially complete the Work within the designated period, or as it may be extended, shall be construed as a breach of this Agreement.

It is expressly agreed as a part of the consideration inducing the Owner to execute this Agreement that the Owner may deduct from the Final Payment made to the General Contractor a sum equal to $500.00 per day for each and every additional calendar day beyond the agreed date of Substantial Completion.

Timely Final Completion is an essential condition of this Agreement. Contractor agrees to achieve Final Completion of the Agreement within 30 days of the designated or extended date of Substantial Completion. Owner and Contractor agree that should Contractor fail to achieve Final Completion of the Agreement by the deadline, Owner shall continue to be damaged to a greater degree by such delay. Contractor and Owner agree that the amount of liquidated damages for each calendar day Final Completion is delayed beyond the date set for Final Completion shall be the sum of $500.00 per day. Owner may deduct form the Final Payment made to Contractor, or, if sufficient funds are not available, then Contractor shall pay Owner the amounts specified per day for each and every calendar day the breach continues after the deadline for Final Completion of the Work.

Such damages shall be in addition to, and not in lieu of, any other right or remedies. Owner may have against Contractor for failure to timely achieve Substantial and/or Final Completion. If the Work is not completed by the time stated in the Agreement, or as extended, no payments for Work completed beyond that time shall be made until the Project reaches Final Completion

ARTICLE III - THE CONTRACT SUM.

The contract sum shall be $_____ (IN WORDS),
Changes in the work made under Section 16 of the General Conditions, and not included in Article I, that cannot be classified as coming under any of the Contract units may be done at mutually agreed-upon unit price, or under the provisions of Article V “Extra Work”.

ARTICLE IV - PROGRESS PAYMENTS
The Owner shall make payments on account of the Contract as follows:
Attached hereto as is the Schedule of Values apportioning the various divisions or phases of Work. Each line item contained in the Schedule of Values shall be assigned a monetary price such that the total of all such items shall equal the Contract Price.
The Contractor shall submit to the Owner and Engineer a monthly application for payment no later than the twenty-fifth (25th) day of the calendar month for the preceding thirty (30) days. Applications for payments shall be itemized and supported by the Contractor’s Schedule of Values and any other substantiating data as required by the Owner. Payment applications may include payment requests on the account of properly authorized interim Change Documents. The Owner shall pay the amount otherwise due on any payment application, less any amounts as set forth below, no later than thirty days after Owner and Engineer receive the monthly application. The Owner may deduct, from any progress payment, such amounts as may be retained.
If approved by the Owner, applications for payment may include materials and equipment not incorporated into the Work but delivered to the suitable stored on-site and applicable insurance, storage and transportation costs to the site. Approval of payment applications for stored materials and equipment shall be conditioned on submission by the Contractor of bills of sale and proof of applicable insurance, or such other procedures satisfactory to the Owner to establish the proper valuation of the stored materials and equipment, the Owner’s title to such materials and equipment, and to otherwise protect the Owner’s interests therein, including transportation to the site.
As a prerequisite for payment, the Contractor shall provide, if requested by the Owner, partial lien and claim waivers in the amount of the application for payment and affidavits from its Subcontractors, materialmen and suppliers for the completed Work. **If such waivers are conditioned upon payment, Owner shall have the right to pay the amount due to such Subcontractor, materialman or supplier directly in return for an unconditional waiver.**
From each progress payment made prior to the time Substantial Completion of the Work has been reached, the Owner shall retain five percent (5%) of the amount otherwise due after deduction of any amounts as provided herein.
The Owner may adjust or reject a Contractor payment application or nullify a previously approved Contractor payment application, in whole or in part, as may reasonably be necessary to protect the Owner from loss or damage based upon the following, to the extent that the Contractor is responsible therefor under the Agreement:

1. the Contractor’s repeated failure to perform the Work as required by the Contract Documents;
2. loss or damage arising out of or relating to this Agreement and caused by Contractor, to

the Owner, or others to whom the Owner may be liable.

3. the Contractor's failure to properly pay Subcontractors for labor, materials, equipment or supplies furnished in connection with the Work.

4. nonconforming or Defective Work not corrected in a timely fashion;

5. reasonable evidence of delay in performance of the Work such that the Work will not be completed within the Contract Time, and that the unpaid balance of the Contract Price is not sufficient to offset any direct damages that may be sustained by the Owner as a result of the anticipated delay caused by the Contractor; and

6. reasonable evidence demonstrating that the unpaid balance of the Contract Price is insufficient to fund the cost to complete the Work.

The Owner shall give written notice to the Contractor at the time of disapproving or nullifying an application for payment of the specific reasons therefor. When the above reasons for disapproving or nullifying an application for payment are removed, payment will be made for the amounts previously withheld.

Neither the Owner's payment of progress payments nor its partial or full use or occupancy of the project constitutes acceptance of Work not complying with the Contract Documents.

ARTICLE V - EXTRA WORK

If the Engineer orders, in writing, the performance of any work not covered by the Drawings or included in the Specifications, and for which no items in the contract are provided, and for which no unit price or lump sum are provided.

(a) The contractor shall be reimbursed for all costs incurred in doing the work, and shall receive an additional payment of 5% of all such cost to cover his indirect overhead costs, plus 5% of all costs, including indirect overhead, as his fee.

(b) The "Cost of the Work" shall be determined as the net sum of the following items:

1. Job Office and all necessary temporary facilities such as buildings, use of land not furnished by the Owner, access roads and utilities. The costs of these items include construction, furnishings and equipment, maintenance during the period that they are needed, demolition and removal. Salvage valued agreed on or received by the Contractor shall be credited to the Owner.

2. All materials used on the work whether for temporary or permanent construction.

3. All small tools and supplies; all fuel, lubricants, power, light, water and telephone service.

4. All plant and equipment at specified rental rates and terms of use. If the rental rates do not include an allowance for running repairs and repair parts needed for ordinary maintenance of the plant and equipment, then such items of cost are to be included in the Cost of the Work.

5. All transportation costs on equipment, material and men.

6. All labor for the project and including the salaries of superintendents, foremen, engineers, inspectors, clerks and other employees or officers, who do not devote their full time to their work.

7. All payroll charges such as Social Security payments, unemployment insurance, workmen's compensation insurance premiums, pension and retirement allowances, and social insurance premiums, vacation and sick leave allowances applicable to wages or salaries paid to employees for work done in connection with the contract.

8. All premiums on fire, public liability, property damage or other insurance coverage authorized or required by the Engineer or the Owner or regularly paid by the Contractor in the conduct of his business.

9. All sales, use, excise, privilege, business, occupation, gross receipt and all other

taxes paid by the Contractor in connection with the work, but excluding state income derived from this contract and Federal Income taxes.

10. All travel or other related expense of general supervisory employees for necessary visits to the job excluding expenses of such employees incurred at the Home Office of the contractor.

11. All Subcontracts approved by the Engineer or Owner.

12. Any other cost incurred by the Contractor as a direct result of executing the Order, subject to approval by the Engineer.

13. Credit to the Owner for the following items:
    a. Such discounts on invoices as may be obtained provided that the Owner advances sufficient funds to pay the invoices within the discount period.

    b. The mutually agreed salvage value of materials, tools or equipment charged to the Owner and taken over by the Contractor for his use or sale at the completion of the work.

    c. Any rebates, refunds, returned deposits or other allowances properly credited to the Cost of the work.

(c) The cost of the work done each day shall be submitted to the Engineer in a satisfactory form on the succeeding day, and shall be approved by him or adjusted at once.

(e) Prior to Contractor's performance of any "extra work," the Owner, Engineer and Contractor shall execute a change order to memorialize the work and the cost.

ARTICLE VI – CONTRACT ATTACHMENTS

Attached and made part of the contract documents are the following:

1. Hidalgo County Purchasing Department Bidder/Vendor Application
2. HUB Declaration
3. Conflict of Interest Questionnaire
4. W-9

IN WITNESS WHEREOF the parties hereto have executed this Agreement, the day and year first above written.

AGREED: OWNER

BY: _____

WITNESS:

BY: _____

CONTRACTOR

BY: _____
PRESIDENT

WITNESS:

BY: _____ (CORPORATE SEAL)

BONDS AND CERTIFICATES

SECTION 00600

The Contractor shall furnish the following Bonds and Certificates to be delivered simultaneously with the executed contract:

A. Performance Bond
B. Labor and Materials Payment Bond
C. Certificates of Insurance

The Performance, Labor and Materials bond shall be provided on Bonds which comply with Article 5160 of the Revised Civil Statutes of the State of Texas as amended by Acts of the 64th Legislature 1975 and Acts of the 65th Legislature, 1977.

The Surety on such bonds shall be a surety company satisfactory to the Owner. See Article 11 of the supplementary condition.

Costs of the above stated bonds and insurance are to be included in the bid.

Attorneys-in-Fact who sign bonds must file with each bond a certified and effective dated copy of their Power of Attorney.

The Performance Bond shall guarantee the repair and maintenance of all defects due to faulty materials and workmanship that appear within one (1) year from date of substantial completion.

END OF SECTION

GENERAL CONDITIONS

SECTION 00700

The General Conditions of the Contract are set forth in the Documents that follow containing sections 1-45 and are hereby made part of the Contract Documents.

END OF SECTION

GENERAL CONDITIONS OF CONTRACT FOR ENGINEERING CONSTRUCTION

SEC. 1 - DEFINITIONS

SEC. 2 - COPIES OF DRAWINGS FURNISHED

SEC. 3 - ORDER OF COMPLETION

SEC. 4 - OWNER OF DRAWINGS

SEC. 5 - **FAMILIARITY WITH WORK**

SEC. 6 - CHANGED CONDITIONS

SEC. 7 - MATERIALS AND APPLIANCES

SEC. 8 - EMPLOYEES

SEC. 9 - ROYALTIES AND PATENTS

SEC. 10 - SURVEYS

SEC. 11 - PERMITS, LICENSES AND REGULATIONS

SEC. 12 - PROTECTION OF THE PUBLIC AND OF WORK AND PROPERTY

SEC. 13 - INSPECTION OF WORK

SEC. 14 - SUPERINTENDENCE

SEC. 15 - DISCREPANCIES

SEC. 16 - CHANGES IN THE WORK

SEC. 17 - EXTENSION OF TIME

SEC. 18 - CLAIMS

SEC. 19 - DEDUCTIONS FOR UNCORRECTED WORK

SEC. 20 - CORRECTION OF WORK BEFORE FINAL PAYMENT

SEC. 21 - SUSPENSION OF WORK

SEC. 22 - THE OWNER'S RIGHT TO TERMINATE CONTRACT

SEC. 23 - CONTRACTOR'S RIGHT TO STOP WORK OR TERMINATE CONTRACT

SEC. 24 - REMOVAL OF EQUIPMENT

SEC. 25 - RESPONSIBILITY FOR WORK

SEC. 26 - PARTIAL COMPLETION AND ACCEPTANCE

SEC. 27 - PAYMENTS WITHHELD PRIOR TO FINAL ACCEPTANCE OF WORK

SEC. 28 - CONTRACTOR'S INSURANCE

SEC. 29 - SURETY BONDS

SEC. 30 - ASSIGNMENT

SEC. 31 - RIGHTS OF VARIOUS INTERESTS

SEC. 32 - SEPARATE CONTRACTS

SEC. 33 - SUBCONTRACTS

SEC. 34 - ENGINEER'S STATUS

SEC. 35 - ENGINEER'S DECISIONS

SEC. 36 - ARBITRATION
SEC. 37 - LAND FOR WORK
SEC. 38 - CLEANING UP
SEC. 39 - ACCEPTANCE AND FINAL PAYMENT
SEC. 40 - GENERAL GUARANTY
SEC. 41 - SHOP DRAWINGS/SUBMIT/RFI'S
SEC. 42 - TESTING
SEC. 43 - PAYMENT SCHEDULE
SEC. 44 - RETAINAGE
SEC. 45 - INDEMNITY AND HOLD HARMLESS AGREEMENT

SEC. 1 - DEFINITIONS

(a) The Contract Documents shall consist of Advertisement for Bids or Notice to Contractors, Instructions to Bidders, form of Bid or Proposal, the signed Agreement, the General and Special conditions of contract, the Drawings, and the Specifications, including all modifications thereof incorporated in any of the documents before the execution of the Agreement.

(b) The Owner, the Contractor and the Engineer are those named as such in the Agreement. They are treated throughout the contract Documents as if each were of singular number and masculine gender.

(c) Wherever in this contract the word "Engineer" is used it shall be understood as referring to the Engineer of the Owner, acting personally or through assistants duly authorized in writing by the Engineer.

(d) Written notice shall be deemed to have been duly served if delivered in person to the individual or to a member of the firm or to an officer of the corporation for whom it is intended, or to an authorized representative of such individual, firm, or corporation, or if delivered at or sent by registered mail to the last business address known to him who gives the notice, with a copy sent to the central office of the contractor.

(e) The term "Subcontractor" shall mean anyone (other than the contractor) who furnished at the site, under an Agreement with the contractor, labor, or labor and materials, or labor and equipment, but shall not include any person who furnishes services of a personal nature.

(f) Work shall mean the furnishing of all labor, materials, equipment, and other incidentals as are required to complete the Contract for the purpose for which it was intended but was not shown on the Drawings or called for in the Specifications, or is desired by the Owner in addition to that work called for in the Drawings and Specifications.

(g) Dispute shall mean lack of agreement between any parties that have any obligations, duties, or responsibilities under the terms of the contract, Drawings, or Specifications.

SEC. 2 - COPIES OF DRAWINGS FURNISHED

Unless otherwise provided in the Contract Documents, the Engineer will furnish to the Contractor, free of charge, all copies of Drawings and Specifications reasonably necessary for the execution of the work. Twenty five (25) copies will be furnished to the Contractor. Additional copies may be requested at a cost of $150 each.

Drawings may not be reproduced in any way without prior clearance from the Owner and Engineer.

SEC. 3 - ORDER OF COMPLETION

The contractor shall submit, at such times as may be reasonably requested by the Engineer, schedules which shall show the order in which the Contractor proposes to carry on the work, with dates at which the Contractor will start the several parts of the work, and estimated dates of completion of the several parts.

Work on ADC and LEC may only occur on working days.

All OSHA regulations must be followed at all times.

Contractor to provide all roof access locations to Engineer and Owner in writing at least seven (7) days in advance for pre-approval.

Contractor to provide to Engineer and Owner in writing all projected work days, including number and names of personnel to be on site, at least seven (7) days in advance.

Any changes to the schedule must be submitted in writing to the Owner and Engineer at least seven (7) days in advance.

Owner must be notified at all times of projected work areas. Temperature control in the facility must be maintained at all times. Mechanical and Roofing work must be coordinated accordingly.

SEC. 4 - OWNER OF DRAWINGS

All drawings, Specifications and copies thereof furnished by the Engineer shall not be reused on other work and, with the exception of the signed Contract, sets are to be returned to him on request, at the completion of the work.

SEC. 5 - FAMILIARITY WITH WORK

The Owner shall make known to all prospective bidders, prior to the receipt of bids, all information that he may have as to subsurface conditions in the vicinity of the work, topographical maps, or other information that might assist the bidder in properly evaluating the amount and character of the work that might be required. Such information is given, however, as being the best factual information available to the Owner. The Contractor, by careful examination, shall satisfy himself as to the nature and location of the work, the character of equipment and facilities needed preliminary to and during the prosecution of the work, the general and local conditions, and all other matters which can in any way affect the work under this Contract.

SEC. 6 - CHANGED CONDITIONS

The Contractor shall promptly, and before such conditions are disturbed, notify the Engineer in writing of: (1) Subsurface or latent physical conditions at the site differing materially from those indicated in this Contract; or (2) previously unknown physical or other conditions at the site, or an unusual nature, differing materially from those ordinarily encountered and generally recognized as inherent in work of the character provided for in this Contract. The Engineer shall promptly investigate the conditions, and if he finds that such conditions do so materially differ and cause an increase or decrease in the cost of, or the time required for, performance of this Contract, an equitable adjustment shall be made and the Contract modified in writing accordingly. Any claim of the Contractor for adjustment hereunder shall not be allowed unless he has given notice as above required; provided that the Engineer may, if he determines the facts so justify, consider and adjust any such claims asserted before the date of final settlement of the Contract. If the parties fail to agree upon the adjustment to be made, the dispute shall be determined as provided in Section 39 hereof.

SEC. 7 - MATERIALS AND APPLIANCES

Unless otherwise stipulated, the Contractor shall provide and pay for all materials, labor, water, tools, equipment, light, power, transportation and other facilities necessary for the execution and completion of the work. Unless otherwise specified, all materials incorporated in the permanent work shall be new and both workmanship and materials shall be of good quality. The Contractor shall, if required, furnish satisfactory evidence as to the kind and quality of materials.

SEC. 8 - EMPLOYEES

The Contractor shall at all times enforce strict discipline and good order among his employees, and shall seek to avoid employing on the work any unfit person or anyone not skilled in the work assigned to him. The Owner shall have the authority to request that Contractor remove any objectionable employee from project site.

Adequate sanitary facilities shall be provided by the Contractor.

Contractor shall submit a list of all personnel for General Contractor and any Sub Contractors that will be on site for background check and approval by Owner.

All pre-approved personnel that will be on site shall wear a Picture ID Badge at all times that includes their respective company logo. They shall also wear a hard hat and fluorescent green vest at all times. Failure to comply with any of these requirements will be justification for removal from the project by the Owner.

Random searches of Contractor or Subcontractor personnel vehicles by Owner may occur.

SEC. 9 - ROYALTIES AND PATENTS

The Contractor shall pay all royalties and license fees. He shall defend all suits or claims for infringement of any patent rights and shall save the Owner harmless from loss on account thereof except that the Owner shall be responsible for all such loss when a particular process or the product of a particular manufacturer or manufacturers is specified, unless the Owner has notified the Contractor prior to the signing of the contract that the particular process or product is patented or is believed to be patented.

SEC. 10 - SURVEYS

Unless otherwise specified, the Owner shall furnish all land surveys and establish all base lines for locating the principal component parts of the work together with a suitable number of bench marks adjacent to the work. From the information provided by the Owner, the Contractor shall develop and make all detail surveys needed for construction such as slope stakes, batter boards, stakes for pile locations and other working points, lines and elevations.

The contractor shall carefully preserve bench marks, reference points and stakes and, in case of willful or careless destruction, he shall be charged with the resulting expense and shall be responsible for any mistakes that may be caused by their unnecessary loss or disturbance.

SEC. 11 - PERMITS, LICENSES AND REGULATIONS

Permits and licenses of a temporary nature necessary for the prosecution of the work shall be secured and paid for by the Contractor. Permits, licenses and easements for permanent structures or permanent changes in existing facilities shall be secured and paid for by the Owner, unless otherwise specified. The Contractor shall give all notices and comply with all laws, ordinances, rules and regulations bearing on the conduct of the work as drawn and specified. If the contractor observes that the Drawings and Specifications are at variance therewith, he shall promptly notify the Engineer in writing, and any necessary changes shall be adjusted as provided in the Contract for changes in the work.

SEC. 12 - PROTECTION OF THE PUBLIC AND OF WORK AND PROPERTY

The Contractor shall provide and maintain all necessary watchmen, barricades, warning lights and signs and take all necessary precautions for the protection, and safety of the public. He shall take all reasonable precautions to protect the Owner's property from injury or loss arising in connection with this contract. He shall make good any damage, injury or loss to his work and to the property of the Owner resulting from lack of reasonable protective precautions, except such as resulting from lack of reasonable protective precautions, except such as may be due to errors in the Contract Documents, or caused by agents or employees of the Owner. He shall adequately protect adjacent private and public property, as provided by law and the Contract Documents.

In an emergency affecting the safety of life, of the work, or of adjoining property, the Contractor is, without special instructions or authorization from the Engineer, hereby permitted to act at his discretion to prevent such threatened loss or injury. He shall also so act, without appeal, if so authorized or instructed by the Engineer.

Any compensation claimed by the Contractor on account of emergency work, shall be determined by agreement or arbitration.

SEC. 13 - OBSERVATION OF WORK

The Owner shall provide sufficient competent personnel, working under the supervision of a qualified Engineer, for the observation of the work while such work is in progress to ascertain that the completed work will comply in all respects with the standards and requirements set forth in the Specifications. Notwithstanding such observation, the Contractor will be held responsible for the acceptability of the finished work.

The Engineer and his representatives shall at all times have access to the work whenever it is in preparation or progress, and the Contractor shall provide proper facilities for such access, and for observation.

If the Specifications, the Engineer's instructions, laws, ordinances, or any public authority require any work to be specially tested or approved, the Contractor shall give the Engineer timely notice of its readiness for observation, and if the observed is by an authority other than the Engineer of the date fixed for such observation. Observations by the Engineer shall be made promptly, and where practicable at the source of supply. If any work should be covered up without approval or consent of the Engineer, it must be uncovered if required by the Engineer at the Contractor's expense, unless the Engineer has unreasonably delayed inspection.

Re-examination of the work may be ordered by the Engineer, and, if so ordered, the work must be uncovered by the Contractor. If such work is found to be in accordance with the Contract Documents, the Owner shall pay the cost of re-examination and replacement. If such work is not in accordance with the Contract Documents, the Contractor shall pay such cost.

SEC. 14 - SUPERINTENDENCE

The Contractor shall keep on his work, during its progress, a competent superintendent with more than ten (10) years experience as a superintendent and any necessary assistants. The superintendent shall be on site at all times. The superintendent shall represent the Contractor, and all directions given to him shall be binding as if given to the Contractor. Important directions shall immediately be confirmed in

writing to the Contractor. Other directions shall be so confirmed on written request in each case. The Contractor shall give efficient superintendence to the work, using his best skill and attention.

SEC. 15 - DISCREPANCIES

If the Contractor, in the course of the work, finds any discrepancy between the Drawings and the physical conditions of the locality, or any errors or omissions in Drawings he shall immediately inform the Engineer, in writing, and the Engineer shall promptly verify the same. Any work done after such discovery, until authorized will be done at the Contractor's risk.

SEC. 16 - CHANGES IN THE WORK

The Owner may make changes in the Drawings and Specifications of scheduling of the Contract within the general scope at any time by a written order. If such changes add to or deduct from the contractor's cost of the work, the Contract shall be adjusted accordingly. All such work shall be executed under the conditions of the original Contract except that any claim for extension of time caused thereby shall be adjusted at the time of ordering such change.

In giving instructions, the Engineer shall have authority to make minor changes in the work not involving extra cost, and not inconsistent with the purposes of the work, but otherwise, except in an emergency endangering life or property, no extra work or change shall be made unless in pursuance of a written order by the Engineer, and no claim for an addition to the Contract Sum shall be valid unless the additional work was so ordered.

The Contractor shall proceed with the work as changed and the value of any such extra work or change shall be determined as provided in the Agreement.

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.

Upon receipt of a Construction Change Directive, the Contractor shall promptly proceed with the change in the Work involved and advise the Engineer 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.

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.

SEC. 17 - EXTENSION OF TIME

Extension of time stipulated in the Contract for completion of the Work will be made when changes in the work occur, as provided in Section 18; when the work is suspended as provided in Section 23; and when the work of the Contractor is delayed on account of conditions which could not have been foreseen, or which were beyond the control of the Contractor, his Subcontractors or suppliers, and which were not the result of their fault or negligence. Extension of time for completion shall also be allowed for any delays in the progress of the work caused by any act (except as provided elsewhere in these General Conditions) or neglect of the Owner or of his employees or by other contractors employed by the Owner, or by any delay in the furnishing of Drawings and necessary information by the Engineer, or by any other cause which in the opinion of the Engineer entitled the Contractor to an extension of time, including but not restricted to acts of the public enemy, acts of any government in either its sovereign or any applicable contractual capacity, acts of another contractor in the performance of a contract with the Owner, fires, floods, epidemics, quarantine restrictions, freight embargoes, usually severe weather, or labor disputes.

The Contractor shall notify the Engineer promptly of any occurrence or conditions which in the Contractor's opinion entitle him to an extension of time. Such notice shall be in writing and shall be submitted in ample time to permit full investigation and evaluation of the contractor's claim. In no case shall the Contractor make a claim for an extension of time more than 30 days after the delay has commenced. The Engineer shall acknowledge receipt of the Contractor's notice within 5 days of its receipt. Failure to provide such notice shall constitute a waiver by the Contractor of any claim. The Owner has discretion to determine whether an extension of time request is with our without merit.

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. Extensions of time may be requested for any month of construction for days lost due to adverse weather in excess of the normally expected lost time; provided, however, if Engineer determines that the seasonal average of adverse weather days during construction is less than would be normally expected, no Change Order shall be issued and the request for extension of time shall be denied.

SEC. 18 - CLAIMS

If the Contractor claims that any instructions by Drawings or other media issued after the date of the Contract involve extra cost under this Contract, he shall give the Engineer written notice thereof within 7 days after the receipt of such instructions, and in any event before proceeding to execute the work, except in emergency endangering life or property, and the procedure shall then be as provided for changes in the work. No such claim shall be valid unless so made.

SEC. 19 - DEDUCTIONS FOR UNCORRECTED WORK

If the Engineer deems it inexpedient to correct work that has been damaged or that was not done in accordance with the Contract, an equitable deduction from the Contract price shall be made therefore, unless the Contractor elects to correct to work.

SEC. 20 - CORRECTION OF WORK BEFORE FINAL PAYMENT

The Contractor shall promptly remove from the premises all materials and work condemned by the Engineer as failing to meet Contract requirements, whether incorporated in the work or not. The Contractor shall promptly replace and re-execute his own work in accordance with the Contract and without expense to the Owner and shall bear the expense of making good all work of other contractors destroyed or damaged by such removal or replacement.

If the Contractor does not take action to remove such condemned materials and work within 10 days after written notice, the Owner may remove such condemned material and may store the material at the expense of the Contractor. If the Contractor does not pay the expense of such removal and storage within ten days' time thereafter, the Owner may, upon ten days' written notice, sell such materials at auction or private sale and shall pay to the Contractor any net proceeds thereof, after deducting all the costs and expenses that should have been borne by the Contractor.

SEC. 21 - SUSPENSION OF WORK

The Owner may at any time suspend the work, or any part thereof by giving 1 day notice to the Contractor in writing. The work shall be resumed by the Contractor within ten (10) days after the date fixed in the written notice from the Owner to the Contractor so to do.

If the work, or any part thereof, shall be stopped by notice in writing aforesaid, and if the Owner does not give notice in writing to the Contractor to resume work at a date within 15 days of the date fixed in the written notice to suspend, then the contractor may abandon that portion of the work so suspended and he will be entitled to the estimates and payments for all work done on the portions so abandoned, if any, plus 10% of the value of the work so abandoned, to compensate for loss of overhead, plant expense, and anticipated profit.

SEC. 22 - THE OWNER'S RIGHT TO TERMINATE CONTRACT

If the Contractor should be adjudged as bankrupt, or if he should make a general assignment for the benefit of his creditors, or if a receiver should be appointed as a result of his insolvency, or if he should be deemed by the Owner to be in violation of the Contract, then the Owner, upon the certificate of the Engineer that sufficient cause exists to justify such action, may, without prejudice to any other right or remedy and after giving the Contractor and his Surety seven days' written notice terminate the employment of the Contractor and take possession of the premises and of all materials, tools, equipment and other facilities installed on the work and paid for by the Owner, and finish the work by whatever method he may deem expedient. In such case the Contractor shall not be entitled to receive any further payment until the work is finished. If the unpaid balance of the Contract price shall exceed the expense of finishing the work, including compensation for additional managerial and administrative services, such excess shall be paid to the Contractor. If such expense shall exceed such unpaid balance, the Contractor shall pay the difference to the Owner.

SEC. 23 - CONTRACTOR'S RIGHT TO STOP WORK OR TERMINATE CONTRACT

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;

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 21 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.

If one of the reasons described in Section 23.1 or 23.2 exists, the Contractor may, upon seven days' written notice to the Owner and Engineer, terminate the Contract and recover from the Owner payment for Work properly executed in accordance with the Contract Documents. .

Owner shall not be responsible for damages for loss of anticipated profits on Work not performed on account of any termination described in Subparagraphs 23.1 and 23.2.

SEC. 24 - REMOVAL OF EQUIPMENT

In the case of termination of this Contract before completion from any cause whatever, the Contractor, if notified to do so by the Owner, shall promptly remove any part or all of his equipment and supplies from the property of the Owner, failing which the Owner shall have the right to remove such equipment and supplies at the expense of the Contractor.

SEC. 25 - RESPONSIBILITY FOR WORK

The Contractor assumes full responsibility for the work. Until its final acceptance, the Contractor shall be responsible for damage to or destruction of the work (except for any part covered by Substantial acceptance as set forth in Sec. 26). He agrees to make no claims against the Owner for damages to the work from any cause except negligence or willful acts of the Owner, acts of an Enemy, or acts of war.

Existing Structures: The Contractor shall, at his own expense immediately make permanent repairs and restore to original condition any and all utility lines, irrigation lines, pipe lines, pavement, or structures that are to remain in place and damaged by the Contractor's equipment or workmen during the performance of work under this contract, or damaged as a result of improperly executed work.

Traffic Areas, Driveways, Entrances: All traffic areas, driveways and entrances shall be restored to usable condition at the Contractor's expense as the work progresses. The Contractor shall make every effort to cooperate with the wishes of the individual property owners in providing access to private property along the site of the work.

Detours: The Contractor shall do such work as may be necessary to provide and maintain a detour adjacent to all road structures for public travel. The Contractor shall maintain the detours in such condition that the public can travel over same in comfort and safety, and shall at his own expense perform such work as may be required to keep said detours open to the public at all times. The Contractor shall cooperate with the Engineer in the regulation of traffic and shall so govern his work that when it becomes necessary to suspend construction for a considerable period of time, the roadways will be re-opened to public travel. Materials and equipment shall be stored and the work shall be so conducted as to obstruct public travel as little as possible, and in no case shall there be less than twenty (20) feet in width of unobstructed roadway for the use of traffic. Materials and equipment stored in or near the path of traffic shall be protected with applicable traffic control devices in compliance with the Texas MUTCD.

Traffic Control Devices: When any section of the contraction site is closed to traffic, the Contractor shall furnish and maintain at each end of the closed section and at all intersecting streets - roads - construction site within the section, standard barricades, adequate warning signs and directional

signs. All lights shall be kept burning from sunset to sunrise. If at any time the barricades are not, in the opinion of the Engineer, sufficient to prevent traffic from entering the closed portions of the street-road-construction site, the Contractor shall provide and maintain watchmen at such points and for such periods of time as the Engineer may direct. When directed by the Engineer, the Contractor shall provide and maintain such standard barricades, signs, lights and flags within the closed portion of the street-road-construction site as may be necessary to protect the work and safeguard local traffic.

No direct compensation except as specifically provided in these specifications will be made to the Contractor for the work and material involved in constructing and maintaining detours and approaches; furnishing, installing and maintaining barricades, danger, warning, and necessary for the proper direction, safety, and convenience of traffic during the Contract period, as this work is to be considered subsidiary to the several items for which unit prices are requested in the proposal.

SEC. 26 - SUBSTANTIAL COMPLETION AND ACCEPTANCE

If at any time prior to the issuance of the final certificate referred to in Section 39 hereinafter, any portion of the permanent construction has been satisfactorily completed, and if the Engineer determines that such portion of the permanent construction is not required for the operations of the Contractor but is needed by the Owner, the Engineer shall issue to the Contractor a certificate of Substantial completion, and thereupon or at any time thereafter the Owner may take over and use the portion of the permanent construction described in such certificate, and exclude the Contractor there from.

The issuance of a certificate of substantial completion shall not be constructed to constitute an extension of the Contractor's time to complete the portion of the permanent construction to which it relates if he has failed to complete it in accordance with the terms of this contract. The issuance of such a certificate shall not operate to release the Contractor or his sureties from any obligations under this contract or the performance bond. If any prior use increases the cost of or delays the work, the Contractor shall be entitled to extra compensation, or extension of time, or both, as the Engineer may determine, unless otherwise provided.

Substantial Completion is the stage in the progress of the Work when the Work or designated portion thereof (which Owner agrees to accept separately) is sufficiently complete in accordance with the Contract Documents so that the Owner can occupy or utilize the Work for its intended use.

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.

Upon receipt of the Contractor's list, the Engineer will make an inspection to determine whether the Work or designated portion thereof is substantially complete. If the Engineer'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 or its intended use, the Contractor shall, before issuance of the Certificate of Substantial Completion, complete or correct such item upon notification by the Engineer. In such case, the Contractor shall then submit a request for another inspection by the Engineer to determine Substantial Completion

When the Work or designated portion thereof is substantially complete, the Engineer 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 issuance of the certificate of final payment by Engineer unless otherwise provided in the Certificate of Substantial Completion. The Work will not be considered suitable for Substantial Completion review until all Project systems included in the Work are operational as designed and scheduled, all designated or required governmental inspections and certifications have been made and posted, designated instruction of Owner's personnel in the operation of systems has been completed, and all final finishes within the Contract are in place. In general, the only remaining Work shall be minor in nature, so that Owner and/or Owner's employees and if applicable, the public, could occupy the building on that date and the completing of the Work by Contractor would not materially interfere or hamper Owner's or Owner's employees and if applicable, the public, (or those claiming by, through, or under Owner) from normal County operations. As a further condition of Substantial Completion acceptance, Contractor shall certify that all remaining Work will be completed within thirty (30) consecutive calendar days or as agreed

upon following the Date of Substantial Completion. If Contractor requests a Substantial Completion review, and Engineer, after performing the Substantial Completion review, finds that the Project was not ready for the Substantial Completion review, then Contractor shall pay the Engineer's fees for any additional Substantial Completion reviews

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 designed portion thereof. Such payment shall be adjusted for Work that is incomplete or not in accordance with the requirements of the Contract Document

SEC. 27 - PAYMENTS WITHHELD PRIOR TO FINAL ACCEPTANCE OF WORK

The Owner, as a result of subsequently discovered evidence, may withhold or nullify the whole or part of any payment certificate to such extent as may be necessary to protect himself from loss caused by:

(a) Defective work not remedied.
(b) Claims filed or reasonable evidence indicating probable filing of claims by other parties against the Contractor.
(c) Failure of the Contractor to make payments properly to Subcontractors or for material or labor.
(d) Damage to another contractor.

When the above grounds are removed or the contractor provides a Surety Bond satisfactory to the Owner which will protect the Owner in the amount withheld, payment shall be made for amounts withheld because of them.

SEC. 28 - CONTRACTOR'S INSURANCE

The Contractor shall secure and maintain such insurance policies as will protect himself, his Subcontractors, and unless otherwise specified, the OWNER, from claims for bodily injuries, death or property damage which may arise from operations under this Contract whether such operations be by himself or by any Subcontractor or anyone employed by them directly or indirectly.

Certificates and/or copies of policy of such insurance shall be filed with the Engineer, and shall be subject to his approval as to adequacy of protection, within the requirements set forth below. Said certificates of insurance shall contain a 10 day's written notice of cancellation in favor of the Owner.

a. Workers' Compensation – Statutory Limits

b. Employer's Liability:
Bodily Injury by Accident - $500,000 Each Accident
Bodily Injury by Disease - $500,000 Each Employee
Bodily Injury by Disease - $1,000,000 Aggregate
Bodily Injury by Accident - $1,000,000 Aggregate

c. Commercial General Liability (Premises Operations, Independent Contractors, Products/Completed Operations, Personal Injury, Contractual Liability, Explosion, Collapse, Underground and Broad Form Property Damage) – $500,000.00 per person and Combined Single Limit for Bodily Injury and Property Damage of $1,000,000 per Occurrence.

d. Comprehensive Automotive Liability - $500,000.00 per person and $1,000,000 Combined Single Limit per Occurrence.

e. Owner's Protective Liability Insurance Policy – Bodily Injury - $1,000,000 Each Occurrence and $1,000,000 Aggregate.

f. Builder's Risk Insurance: In the amount equal to 100% of the contract sum (including any change orders or extra work). The policy must also name Contractor's subcontractors and Owner as additional insureds, as their respective interests may appear. The policy must have the following endorsement: "This insurance shall be specific as to coverage and not considered as contributing insurance with any permanent insurance maintained on the present premises." For renovation projects, the County waives subrogation for damage by fire to an existing building structure if

building structure is in the care, custody or control of the contractor and the builder's risk policy must be endorsed to include coverage for an existing building structure.

g. All policies shall contain special endorsements to include:
   1. The County as an additional insured (except for Workers' Compensation).
   2. Waiver of subrogation in favor of the Owner under the Workers' Compensation and Employers' Liability policies.
   3. A statement that a notice shall be given to County by certified mail thirty (30) days prior to cancellation or upon any materials change in coverage.

SEC. 29 - SURETY BONDS

The Contractor shall furnish a bond covering the faithful performance of the Contract and the payment of all obligations arising thereunder, in such form as the Owner may prescribe in the bidding documents and executed by one or more financially responsible sureties. The bonds shall sufficiently cover the cost and performance of the Contractor's obligation to perform its obligation to the Owner and any subcontractor, supplier, or material man.

SEC. 30 - ASSIGNMENT

Neither party to the Contract shall assign the Contract or sublet it as a whole without the written consent of the other, nor shall the Contractor assign any moneys due to him or to become due to him hereunder, except to bank or financial institution acceptable to the Owner.

SEC. 31 - RIGHTS OF VARIOUS INTERESTS

Whenever work being done by the Owners or by other contractor's forces is contiguous to work covered by this Contract, the respective rights of the various interests involved shall be established by the Engineer, to secure the completion of the various portions of the work in general harmony.

SEC. 32 - SEPARATE CONTRACTS

The Owner reserves the right to let other contracts in connection with this project. The Contractor shall afford other contractors reasonable opportunity for the introduction and storage of their materials and the execution of their work, and shall properly connect and coordinate his work with theirs.

If the proper execution or results of any part of the Contractor's work depends upon the work of any other contract, the Contractor shall inspect and promptly report to the Engineer any defects in such work that render it unsuitable for such proper execution and results.

SEC. 33 - SUBCONTRACTS

The Contractor shall, as soon as practical after signing of the Contract, notify the Engineer in writing of the names of Subcontractors proposed for the work.

The Contractor agrees that he is as fully responsible to the Owner for the acts and omissions of his Subcontractors and of persons either directly or indirectly employed by them, as he is for the acts and omissions of persons directly employed by him.

Nothing contained in the Contract Documents shall create any contractual relation between any Subcontractor and the Owner.

No Subcontractors may be replaced without the prior approval from the Engineer and Owner.

SEC. 34 - ENGINEER'S STATUS

The Engineer shall perform technical observation of the work. He has authority to stop the work whenever such stoppage may be necessary to insure the proper execution of the contract. He shall also have authority to reject all work and materials which do not conform to the Contract and to decide questions which arise in the execution of the work.

SEC. 35 - ENGINEER'S DECISION

The Engineer shall, within a reasonable time after their presentation to him, make decisions in

writing on all claims of the Owner or the Contractor and on all other matters relating to the execution and progress of the work or the interpretation of the Contract Documents.

SEC. 36 - ARBITRATION

Any controversy or claim arising out of or relating to this contract, or the breach thereof which cannot be resolved by mutual agreement, shall be settled by arbitration in accordance with the Rules of the American Arbitration Association, and judgment upon the award rendered by the Arbitrator(s) may be entered in any Court having jurisdiction thereof.

SEC. 37 - LAND FOR WORK

The Owner shall provide as indicated on Drawings and not later than the date when needed by the Contractor the lands upon which the work under this Contract is to be done, right-of-ways for access to same, and such other lands which are designated on the Drawings for the use of the Contractor. Such lands and right-of-ways shall be adequate for the performance of the Contract. Any delay in the furnishing of these lands by the Owner shall be deemed proper cause for an equitable adjustment in both Contract price and time of completion.

The Contractor shall provide at his own expense and without liability to the Owner any additional land and access thereto that may be required for temporary construction facilities, or for storage of material.

SEC. 38 - CLEANING UP

The Contractor shall remove at his own expense from the Owner's property and from all public and private property all temporary structures, rubbish and waste materials resulting from his operations. This requirement shall not apply to property used for permanent disposal of rubbish or waste, materials in accordance with permission of such disposal granted to the Contractor by the Owner thereof.

SEC. 39 - ACCEPTANCE AND FINAL PAYMENT

(1) Upon receipt of written notice that the work is substantially completed or ready for final inspection and acceptance, the Engineer will promptly make such inspection, and when he finds the work acceptable under the Contract and the Contract fully performed or substantially completed he shall promptly issue a certificate, over his own signature, stating that the work required by this Contract has been completed or substantially completed and is accepted by him under the terms and conditions thereof, and the entire balance found to be due the Contractor, including the retained percentage, less a retention based on the Engineer's estimate of the fair value of the claims against the Contractor and the cost completing the incomplete or unsatisfactory items of work with specified amounts for each incomplete or defective item of work, is due and payable. The date of substantial completion of a project or specified area of a project is the date when the construction is sufficiently completed in accordance with the Contract Documents as modified by any change orders agreed to by the parties so that the Owner can occupy the project for the use for which it was intended.

(2) Before issuance of final payment, the Contractor, if required in the Special Conditions, shall certify in writing to the Engineer that all payrolls, material bills, and other indebtedness or liens, with the work have been paid, or otherwise satisfied, except that in case of disputed indebtedness or liens, if the Contract does not include a payment of all such disputed amounts, including all related costs and interest in connection with said disputed indebtedness or lien which the Owner may be compelled to pay upon adjudication.

(3) The making and acceptance of the final payment shall constitute a waiver of all Claims by the Owner, other than those arising from unsettled liens, from faulty work appearing within a one year guarantee period from date of acceptance, from the requirements of the Drawings and Specifications, or from the manufacturer's guarantees. It shall also constitute a waiver of all claims by the Contractor, except those previously made and still unsettled.

(4) If after the work has been substantially completed, full completion thereof is materially delayed through no fault of the Contractor's and the Engineer so certified, the Owner shall, upon certificate of the Engineer, and without terminating the contract, make payment of the balance due for that portion of the work fully completed and accepted. Such payment shall be made under the terms and conditions governing final payment, except that it shall not constitute a waiver of claims.

SEC. 40 - GENERAL GUARANTY

Neither the final certificate of payment nor any provision in the Contract Documents nor partial or entire occupancy of the premises by the Owner shall constitute an acceptance of work not done in accordance with the Contract Documents or relieve the Contractor of liability in respect to any express warranties or responsibility for faulty materials or workmanship. The Contractor shall guarantee all materials and equipment furnished and Work performed for a period of one (1) year from the date of Substantial Completion. The Contractor warrants and guarantees for a period of one (1) year from the date of Final Acceptance of the system that the completed system is free from all defects due to faulty materials or workmanship and the Contractor shall promptly make such corrections as may be necessary by reason of such defects including the repairs of any damage to other parts of the system or other work resulting from such defects.

The Owner will give notice of observed defects with reasonable promptness. In the event that the Contractor should fail to make such repairs, adjustments, or other work that may be made necessary by such defects, the Owner may do so and charge the Contractor the cost thereby incurred. The Performance Bond shall remain in full force and effect through the guarantee period.

SEC. 41 - SHOP DRAWINGS/SUBMITTALS/RFI's

The approval of (shop) drawings by the Engineer shall not be construed as a complete check, but will indicate only that the general method of construction and detailing is satisfactory. Approval of such drawings will not relieve the Contractor of the responsibility for any error which may exist as the contractor shall be responsible for the dimensions and design of adequate connections, details and satisfactory construction of all work.

Shop drawings and submittals will require a minimum of two (2) weeks for review.

Contractor generated RFI's will require a minimum of 48 hours for review and response.

SEC. 42 - TESTING

All testing authorized by the Engineer that meets specification requirements will be paid for by the Owner; however, tests on materials that fail will be billed to and paid for by the Contractor.

A $10,000 testing allowance shall be included in this project.

SEC. 43 - PAYMENT SCHEDULE

Where the Contract is based on a stipulated sum or Guaranteed Maximum Price, the Contractor shall submit to the Owner and to the Engineer, before the first Application for Payment, a schedule of values allocating the entire Contract Sum to the various portions of the Work which in the aggregate equals the total Contract Sum, divided so as to facilitate payments to Subcontractors, supported by such evidence of correctness as Engineer may direct or as required by Owner. This schedule, when approved by Engineer and Owner, shall be used to monitor the progress of the Work and as a basis for Certificates for Payment. All items with entered values will be transferred by Contractor to the "Application and Certificate for Payment," and shall include the latest approved Change Orders and Construction Change Directives. Change Order values and Construction Change Directives values shall be broken down to show the various subcontracts. The Application for Payment shall be on a form as provided by Engineer and approved by Owner. Each item shall show its total scheduled value, value of previous applications, value of the application, percentage completed, value completed, and value yet to be completed. All blanks and columns must be filled in, including every percentage complete figure. This schedule, unless objected to by the Engineer, shall be used as a basis for reviewing the Contractor's Applications for Payment

At least ten days before the date established for each progress payment, the Contractor shall submit to the Construction Manager an itemized Aplication for Payment prepared in accordance with the schedule of values, 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 may require, such as copies of requisitions from Subcontractors and material suppliers, and shall reflect retainage if provided for in the Contract Documents. Any allowances included in the Application for Payment shall be separately itemized with supporting data attached. The Application for Payment shall be accompanied by a certification by an office of Contractor to the effect that:

There are no known mechanics', materialman's or laborers' liens or claims, or any other liens or claims, legal or equitable, contractual, statutory, or constitutional, outstanding or known to exist at the date of this Application; all due and payable bills with respect to the Work have been paid to date or are included in the amount requested in the current Application and there is no known basis for the filing of any mechanics', materialman's or laborers' lien or claim, or any other lien or claim, legal or equitable, contractual, statutory, or constitutional, on the Work; and waivers and releases from all Subcontractors, laborers, and material men for Work done and materials furnished have been obtained in such form as to constitute an effective waiver and release of all such liens and claims under the laws of the state within which the Project is located and shall be delivered to Construction Manager together with Contractor's waiver and release of liens and claims at the time of submission of the Application for Payment.

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 Construction Manager, but not yet included in Change Orders

Application for Payment shall not include requests for payment for portions of the Work for which the Contractor does not inted to pay a Subcontractor or material supplier, unless such Work has been performed by others whom the Contractor intends to pay.

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 Contracor, Subcontractors, material suppliers, or other persons or entities making a claim by reason of having provided labor, materials and equipment relating to the Work. The vesting of such title shall not impose any obligations on Owner or relieve Contractor of any of its obligations under the Contract, that Contractor shall remain responsible for damage to or loss of the Work, whether completed or under construction, until responsibility for the Work has been accepted by Owner in the manner set forth in the Contract Document.

SEC. 44 – RETAINAGE

The Owner shall retain 5% of each payment certified by the Engineer until final completion of the project.

SEC. 45 - INDEMNITY AND HOLD HARMLESS AGREEMENT

The CONTRACTOR will indemnify and hold harmless the Owner and the Engineer and their agents and employees from any and all claims, damages, losses and expenses, including attorneys' fees. Such attorney's fees shall include the duty to defend, arising out of or resulting from the performance of the WORK, and provided that any such claims, damage, loss or expenses attributable to bodily injury, sickness, death or to any injury to destruction of tangible property, including the loss of use resulting therefrom, is caused in whole or in part by any negligent or willful act or admission of the CONTRACTOR, SUBCONTRACTOR, anyone directly or indirectly employed by them or anyone for whose acts any of them may be liable. This provision is meant to comply with the Express Negligence Rule.

GENERAL CONSTRUCTION AND SPECIFICATIONS

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, 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.

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. He shall leave the site of the work in a neat and orderly condition equal to that which originally existed. Surplus and waste materials removed from the site of the work shall be disposed of at locations satisfactory to the Engineer. Grounds around any structure shall be dressed to final grade as shown on plans.

EXISTING STRUCTURES:

The plans show the locations of all known surface and sub-surface structures. However, the exact location of gas mains, water mains, conduits, sewers, etc., is unknown and the Owner assumed no responsibility for failure to show any or all of these structures on the plans or to show them in their exact location. It is mutually agreed that such failure will not be considered sufficient basis for claims for additional compensation for extra work or for increasing the pay quantities in any manner whatsoever, unless the obstruction encountered is such as necessitates, or requires the building of special work, provision for which is not made in the plans and proposal, in which case the provisions in these specifications for extra work shall apply.

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; special provisions shall govern over both general and standard 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, he shall immediately call this to the attention of the Engineer.

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.

WAGES:

All employees directly employed on the work shall be paid the prevailing wage scale for work of a similar character in this locality. Minimum wage scale is also included in these specifications.

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.

MATERIAL 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 structures.

"OR EQUAL" CLAUSE:

Whenever a material, or article required is specified or shown on the plans by using the name of the proprietary product, or of a particular manufacturer or vendor, any material or article which will perform adequately the duties imposed by the general design will be considered equal and satisfactory, provided the material or article so proposed is of equal substance and function, and only after written approval by the Engineer.

CONSTRUCTION JOINTS:

Construction joints are to be kept to a minimum number, but when necessary they shall be designated in the plans or upon the approval of the Engineer. When pouring is stopped, dowels and 6-inch dumbbell Servicized polyvinyl plastic waterstops are to be inserted. Construction joints in walls shall be horizontal, unless otherwise allowed by the Engineer.

PAINTING:

All exposed metal surfaces of every nature, such as pumps, piping, general equipment, window frames, valves, fittings, gratings, etc., shall receive on rust inhibitive primer coat followed by two coats of machinery enamel. Colors for enamel finish coats to be selected by Owner or Engineer.

All wood surfaces are to receive one primer coat and two coats of first grade outside oil paint. Colors to be selected by Owner or Engineer.

Any specific structure, or portions of structure, which provides for occupancy or use by operations, or houses general equipment or supplies; whether structure is masonry or concrete; shall be painted inside and outside as directed by Engineer. An alkali resisting primer coat shall be first applied followed by two coats of first class oil paint especially prepared for concrete or masonry surfaces. Any questions regarding foregoing shall be clarified to his satisfaction by bidding Contractor before submitting a bid on project. Colors to be selected by Owner or Engineer.

HARDWARE:

All hardware must be strictly standard first grade, Contractor's choice, and approved by Engineer.

TELEPHONE CABLES:

Contractor shall notify Telephone Co. 24 hours in advance of work in the vicinity of buried telephone cables. No work shall be performed in vicinity of cable except in presence of telephone company representatives.

GAS LINES:

Contractor shall notify Gas Co. 24 hours in advance of work in the vicinity of gas distribution lines and the proper transmission company in the case of transmission gas lines.

CANAL CROSSINGS:

Construction methods and materials for canal crossings shall be in strict compliance with water County requirements. No work shall be started on canal right-of-ways until properly coordinated with the water County.

REQUIRED DOCUMENTS

HIDALGO COUNTY
PURCHASING DEPARTMENT
Bidder/Vendor Application

Complete in print or type. Please return this application to the Hidalgo County Purchasing Department thru Facsimile: (956) 318-2629 or (956) 292-7612 in person or regular mail to: 2812 S. Business Hwy. 281 , Edinburg, Texas 78539 or email: purchasing@co.hidalgo.tx.us

Company Name: **Telephone No. ( )**

dba Name:

Legal Name:

Mailing Address : **Fax No. ( )**

Physical Address:

City, State, Zip **Tax I.D. No.**

Remit to Address : **City, State, Zip**

E-Mail Address:

Representative(s) Name(s) & Title(s)

Type of Organization (check one): _____ **Individual** _____ **Partnership** _____ **Corporation** _____ **Non-Profit** _____ **LLC** _____ **Sole Proprietor** _____ **Other, Specify**

State Identification No._____ **(Please attached completed W-9 form with this application)**
Federal Identification No. or (if individual) SS No.

State of Incorporation: _____ **Date:**_____ **Other:**

Type of Business (check one): _____ **Manufacturer** _____ **Wholesaler** _____ **Retailer** _____ **Broker** _____ **Distributor** _____ **Service Organization** _____ **Other, Specify**

Name & Title of Person(s) Authorized to Sign Bids, Proposals, and/or Contracts:

Small and/or Disadvantaged Business Information (check application criteria)

Small Business:	**Disadvantaged Business (At Least 51% Ownership)**	
❒ Less than 125,000 annual gross receipt	❒ Black American	❒ Native American
❒ Less than 250,000 annual gross receipt	❒ Hispanic American	❒ Women
❒ Less than 499,000 annual gross receipt	❒ Asian Pacific American	❒ Other
❒ More than 500,000 annual gross receipt		

Have you been certified as a HUB or an MBE/WBE source?: ❒ Yes ❒ No

Indicate Certification No.(s):_____ **or are Certificate(s) attached?:** ❒ Yes ❒ No

What type of product(s) is/are solicited by your company?:

Would you like to be provided with specifications for procurements of such products?: ❒ Yes ❒ No

To Be Completed by the County: Rec'd by (Purchasing):_____ **Date Rec'd by (Purchasing):**

Date Forwarded Information to Auditor's Office:_____**Entry Date:** _____ **Vendor No.:**

Revised12/14/06

HISTORICALLY UNDERUTILIZED BUSINESS (HUB) DECLARATION

The primary objective of the Hidalgo County HUB Program is to ensure Historically Underutilized Businesses receive a fair and equal opportunity for participation in the County's procurement process. This fact holds true for Services (Professional & Non-Professional), Commodities, and Construction contracts and any subcontracts thereto. The program strongly encourages Prime Contractors to provide subcontracting opportunities to Certified Hub Contractors/Vendors. Our goal for HUB contractor/vendor participation, as well as HUB subcontractor participation is 30%. To be considered as a "Certified HUB Contractor/Vendor" the contractor/vendor must have been certified by, and hold a current and valid certification with any of the three agencies listed below.

Have you been Certified as a HUB or an MBE/WBE source?: ❒Yes ❒ No

If yes, by whom?: ❒ Texas Building & Procurement Commission ❒ Other_____

Indicate Certification No(s).:_____ or Are Certificate(s) Attached?: ❒ Yes ❒ No

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LIST OF CERTIFIED HUB SUBCONTRACTORS

(Attach additional pages if necessary)

What percentage of the Bid, RFP,or RFQ is to be subcontracted with Certified HUB sources?: _____%
(List HUB Subcontractor information below).

HUB Subcontractor Name: _____ HUB Status:
Certifying Agency (Check all applicable): ❒Texas Building & Procurement Commission ❒ Other
Address: _____ City: _____ State: _____ Zip:
Contact Person: _____ Title: _____ Phone No.: ( )
Subcontract Amount: $_____ Description of Work to be Performed:

HUB Subcontractor Name: _____ HUB Status:
Certifying Agency (Check all applicable): ❒Texas Building & Procurement Commission ❒ Other
Address: _____ City: _____ State: _____ Zip:
Contact Person: _____ Title: _____ Phone No.: ( )
Subcontract Amount: $_____ Description of Work to be Performed:

HUB Subcontractor Name: _____ HUB Status:
Certifying Agency (Check all applicable): ❒Texas Building & Procurement Commission ❒ Other
Address: _____ City: _____ State: _____ Zip:
Contact Person: _____ Title: _____ Phone No.: ( )
Subcontract Amount: $_____ Description of Work to be Performed:

Form **W-9**
(Rev. January 2005)
Department of the Treasury
Internal Revenue Service

Request for Taxpayer Identification Number and Certification

Give form to the requester. Do not send to the IRS.

Print or type
See Specific Instructions on page 2.

Name (as shown on your income tax return)

Business name, if different from above

Check appropriate box: ☐ Individual/ Sole proprietor ☐ Corporation ☐ Partnership ☐ Other ▶ ..... ☐ Exempt from backup withholding

Address (number, street, and apt. or suite no.) | Requester's name and address (optional)

City, state, and ZIP code

List account number(s) here (optional)

Part I Taxpayer Identification Number (TIN)

Enter your TIN in the appropriate box. The TIN provided must match the name given on Line 1 to avoid backup withholding. For individuals, this is your social security number (SSN). However, for a resident alien, sole proprietor, or disregarded entity, see the Part I instructions on page 3. For other entities, it is your employer identification number (EIN). If you do not have a number, see *How to get a TIN* on page 3.

Note. *If the account is in more than one name, see the chart on page 4 for guidelines on whose number to enter.*

Social security number
___ ___ ___ – ___ ___ – ___ ___ ___ ___

or

Employer identification number
___ ___ – ___ ___ ___ ___ ___ ___ ___

Part II Certification

Under penalties of perjury, I certify that:

1. The number shown on this form is my correct taxpayer identification number (or I am waiting for a number to be issued to me), and
2. I am not subject to backup withholding because: (a) I am exempt from backup withholding, or (b) I have not been notified by the Internal Revenue Service (IRS) that I am subject to backup withholding as a result of a failure to report all interest or dividends, or (c) the IRS has notified me that I am no longer subject to backup withholding, and
3. I am a U.S. person (including a U.S. resident alien).

Certification instructions. You must cross out item 2 above if you have been notified by the IRS that you are currently subject to backup withholding because you have failed to report all interest and dividends on your tax return. For real estate transactions, item 2 does not apply. For mortgage interest paid, acquisition or abandonment of secured property, cancellation of debt, contributions to an individual retirement arrangement (IRA), and generally, payments other than interest and dividends, you are not required to sign the Certification, but you must provide your correct TIN. (See the instructions on page 4.)

Sign Here | **Signature of U.S. person ▶** | **Date ▶**

Purpose of Form

A person who is required to file an information return with the IRS, must obtain your correct taxpayer identification number (TIN) to report, for example, income paid to you, real estate transactions, mortgage interest you paid, acquisition or abandonment of secured property, cancellation of debt, or contributions you made to an IRA.

U.S. person. Use Form W-9 only if you are a U.S. person (including a resident alien), to provide your correct TIN to the person requesting it (the requester) and, when applicable, to:

1. Certify that the TIN you are giving is correct (or you are waiting for a number to be issued),
2. Certify that you are not subject to backup withholding, or
3. Claim exemption from backup withholding if you are a U.S. exempt payee.

Note. *If a requester gives you a form other than Form W-9 to request your TIN, you must use the requester's form if it is substantially similar to this Form W-9.*

For federal tax purposes you are considered a person if you are:

- An individual who is a citizen or resident of the United States,
- A partnership, corporation, company, or association created or organized in the United States or under the laws of the United States, or
- Any estate (other than a foreign estate) or trust. See Regulations sections 301.7701-6(a) and 7(a) for additional information.

Foreign person. If you are a foreign person, do not use Form W-9. Instead, use the appropriate Form W-8 (see Publication 515, Withholding of Tax on Nonresident Aliens and Foreign Entities).

Nonresident alien who becomes a resident alien. Generally, only a nonresident alien individual may use the terms of a tax treaty to reduce or eliminate U.S. tax on certain types of income. However, most tax treaties contain a provision known as a "saving clause." Exceptions specified in the saving clause may permit an exemption from tax to continue for certain types of income even after the recipient has otherwise become a U.S. resident alien for tax purposes.

If you are a U.S. resident alien who is relying on an exception contained in the saving clause of a tax treaty to claim an exemption from U.S. tax on certain types of income, you must attach a statement to Form W-9 that specifies the following five items:

1. The treaty country. Generally, this must be the same treaty under which you claimed exemption from tax as a nonresident alien.
2. The treaty article addressing the income.
3. The article number (or location) in the tax treaty that contains the saving clause and its exceptions.

4. The type and amount of income that qualifies for the exemption from tax.

5. Sufficient facts to justify the exemption from tax under the terms of the treaty article.

Example. Article 20 of the U.S.-China income tax treaty allows an exemption from tax for scholarship income received by a Chinese student temporarily present in the United States. Under U.S. law, this student will become a resident alien for tax purposes if his or her stay in the United States exceeds 5 calendar years. However, paragraph 2 of the first Protocol to the U.S.-China treaty (dated April 30, 1984) allows the provisions of Article 20 to continue to apply even after the Chinese student becomes a resident alien of the United States. A Chinese student who qualifies for this exception (under paragraph 2 of the first protocol) and is relying on this exception to claim an exemption from tax on his or her scholarship or fellowship income would attach to Form W-9 a statement that includes the information described above to support that exemption.

If you are a nonresident alien or a foreign entity not subject to backup withholding, give the requester the appropriate completed Form W-8.

What is backup withholding? Persons making certain payments to you must under certain conditions withhold and pay to the IRS 28% of such payments (after December 31, 2002). This is called "backup withholding." Payments that may be subject to backup withholding include interest, dividends, broker and barter exchange transactions, rents, royalties, nonemployee pay, and certain payments from fishing boat operators. Real estate transactions are not subject to backup withholding.

You will not be subject to backup withholding on payments you receive if you give the requester your correct TIN, make the proper certifications, and report all your taxable interest and dividends on your tax return.

Payments you receive will be subject to backup withholding if:

1. You do not furnish your TIN to the requester, or

2. You do not certify your TIN when required (see the Part II instructions on page 4 for details), or

3. The IRS tells the requester that you furnished an incorrect TIN, or

4. The IRS tells you that you are subject to backup withholding because you did not report all your interest and dividends on your tax return (for reportable interest and dividends only), or

5. You do not certify to the requester that you are not subject to backup withholding under 4 above (for reportable interest and dividend accounts opened after 1983 only).

Certain payees and payments are exempt from backup withholding. See the instructions below and the separate Instructions for the Requester of Form W-9.

Penalties

Failure to furnish TIN. If you fail to furnish your correct TIN to a requester, you are subject to a penalty of $50 for each such failure unless your failure is due to reasonable cause and not to willful neglect.

Civil penalty for false information with respect to withholding. If you make a false statement with no reasonable basis that results in no backup withholding, you are subject to a $500 penalty.

Criminal penalty for falsifying information. Willfully falsifying certifications or affirmations may subject you to criminal penalties including fines and/or imprisonment.

Misuse of TINs. If the requester discloses or uses TINs in violation of federal law, the requester may be subject to civil and criminal penalties.

Specific Instructions

Name

If you are an individual, you must generally enter the name shown on your social security card. However, if you have changed your last name, for instance, due to marriage without informing the Social Security Administration of the name change, enter your first name, the last name shown on your social security card, and your new last name.

If the account is in joint names, list first, and then circle, the name of the person or entity whose number you entered in Part I of the form.

Sole proprietor. Enter your individual name as shown on your social security card on the "Name" line. You may enter your business, trade, or "doing business as (DBA)" name on the "Business name" line.

Limited liability company (LLC). If you are a single-member LLC (including a foreign LLC with a domestic owner) that is disregarded as an entity separate from its owner under Treasury regulations section 301.7701-3, enter the owner's name on the "Name" line. Enter the LLC's name on the "Business name" line. Check the appropriate box for your filing status (sole proprietor, corporation, etc.), then check the box for "Other" and enter "LLC" in the space provided.

Other entities. Enter your business name as shown on required Federal tax documents on the "Name" line. This name should match the name shown on the charter or other legal document creating the entity. You may enter any business, trade, or DBA name on the "Business name" line.

Note. You are requested to check the appropriate box for your status (individual/sole proprietor, corporation, etc.).

Exempt From Backup Withholding

If you are exempt, enter your name as described above and check the appropriate box for your status, then check the "Exempt from backup withholding" box in the line following the business name, sign and date the form.

Generally, individuals (including sole proprietors) are not exempt from backup withholding. Corporations are exempt from backup withholding for certain payments, such as interest and dividends.

Note. If you are exempt from backup withholding, you should still complete this form to avoid possible erroneous backup withholding.

Exempt payees. Backup withholding is not required on any payments made to the following payees:

1. An organization exempt from tax under section 501(a), any IRA, or a custodial account under section 403(b)(7) if the account satisfies the requirements of section 401(f)(2),

2. The United States or any of its agencies or instrumentalities,

3. A state, the District of Columbia, a possession of the United States, or any of their political subdivisions or instrumentalities,

4. A foreign government or any of its political subdivisions, agencies, or instrumentalities, or

5. An international organization or any of its agencies or instrumentalities.

Other payees that may be exempt from backup withholding include:

6. A corporation,

7. A foreign central bank of issue,

8. A dealer in securities or commodities required to register in the United States, the District of Columbia, or a possession of the United States,

9. A futures commission merchant registered with the Commodity Futures Trading Commission,

10. A real estate investment trust,

11. An entity registered at all times during the tax year under the Investment Company Act of 1940,

12. A common trust fund operated by a bank under section 584(a),

13. A financial institution,

14. A middleman known in the investment community as a nominee or custodian, or

15. A trust exempt from tax under section 664 or described in section 4947.

The chart below shows types of payments that may be exempt from backup withholding. The chart applies to the exempt recipients listed above, 1 through 15.

IF the payment is for . . .	THEN the payment is exempt for . . .
Interest and dividend payments	All exempt recipients except for 9
Broker transactions	Exempt recipients 1 through 13. Also, a person registered under the Investment Advisers Act of 1940 who regularly acts as a broker
Barter exchange transactions and patronage dividends	Exempt recipients 1 through 5
Payments over $600 required to be reported and direct sales over $5,000 [1]	Generally, exempt recipients 1 through 7 [2]

[1] See Form 1099-MISC, Miscellaneous Income, and its instructions.

[2] However, the following payments made to a corporation (including gross proceeds paid to an attorney under section 6045(f), even if the attorney is a corporation) and reportable on Form 1099-MISC are not exempt from backup withholding: medical and health care payments, attorneys' fees; and payments for services paid by a Federal executive agency.

Part I. Taxpayer Identification Number (TIN)

Enter your TIN in the appropriate box. If you are a resident alien and you do not have and are not eligible to get an SSN, your TIN is your IRS individual taxpayer identification number (ITIN). Enter it in the social security number box. If you do not have an ITIN, see *How to get a TIN* below.

If you are a sole proprietor and you have an EIN, you may enter either your SSN or EIN. However, the IRS prefers that you use your SSN.

If you are a single-owner LLC that is disregarded as an entity separate from its owner (see *Limited liability company (LLC)* on page 2), enter your SSN (or EIN, if you have one). If the LLC is a corporation, partnership, etc., enter the entity's EIN.

Note. See the chart on page 4 for further clarification of name and TIN combinations.

How to get a TIN. If you do not have a TIN, apply for one immediately. To apply for an SSN, get Form SS-5, Application for a Social Security Card, from your local Social Security Administration office or get this form online at *www.socialsecurity.gov/online/ss-5.pdf*. You may also get this form by calling 1-800-772-1213. Use Form W-7, Application for IRS Individual Taxpayer Identification Number, to apply for an ITIN, or Form SS-4, Application for Employer Identification Number, to apply for an EIN. You can apply for an EIN online by accessing the IRS website at *www.irs.gov/businesses/* and clicking on Employer ID Numbers under Related Topics. You can get Forms W-7 and SS-4 from the IRS by visiting *www.irs.gov* or by calling 1-800-TAX-FORM (1-800-829-3676).

If you are asked to complete Form W-9 but do not have a TIN, write "Applied For" in the space for the TIN, sign and date the form, and give it to the requester. For interest and dividend payments, and certain payments made with respect to readily tradable instruments, generally you will have 60 days to get a TIN and give it to the requester before you are subject to backup withholding on payments. The 60-day rule does not apply to other types of payments. You will be subject to backup withholding on all such payments until you provide your TIN to the requester.

Note. Writing "Applied For" means that you have already applied for a TIN or that you intend to apply for one soon.

Caution: *A disregarded domestic entity that has a foreign owner must use the appropriate Form W-8.*

Part II. Certification

To establish to the withholding agent that you are a U.S. person, or resident alien, sign Form W-9. You may be requested to sign by the withholding agent even if items 1, 4, and 5 below indicate otherwise.

For a joint account, only the person whose TIN is shown in Part I should sign (when required). Exempt recipients, see *Exempt From Backup Withholding* on page 2.

Signature requirements. Complete the certification as indicated in 1 through 5 below.

1. Interest, dividend, and barter exchange accounts opened before 1984 and broker accounts considered active during 1983. You must give your correct TIN, but you do not have to sign the certification.

2. Interest, dividend, broker, and barter exchange accounts opened after 1983 and broker accounts considered inactive during 1983. You must sign the certification or backup withholding will apply. If you are subject to backup withholding and you are merely providing your correct TIN to the requester, you must cross out item 2 in the certification before signing the form.

3. Real estate transactions. You must sign the certification. You may cross out item 2 of the certification.

4. Other payments. You must give your correct TIN, but you do not have to sign the certification unless you have been notified that you have previously given an incorrect TIN. "Other payments" include payments made in the course of the requester's trade or business for rents, royalties, goods (other than bills for merchandise), medical and health care services (including payments to corporations), payments to a nonemployee for services, payments to certain fishing boat crew members and fishermen, and gross proceeds paid to attorneys (including payments to corporations).

5. Mortgage interest paid by you, acquisition or abandonment of secured property, cancellation of debt, qualified tuition program payments (under section 529), IRA, Coverdell ESA, Archer MSA or HSA contributions or distributions, and pension distributions. You must give your correct TIN, but you do not have to sign the certification.

What Name and Number To Give the Requester

For this type of account:	Give name and SSN of:
1. Individual	The individual
2. Two or more individuals (joint account)	The actual owner of the account or, if combined funds, the first individual on the account [1]
3. Custodian account of a minor (Uniform Gift to Minors Act)	The minor [2]
4. a. The usual revocable savings trust (grantor is also trustee)	The grantor-trustee [1]
b. So-called trust account that is not a legal or valid trust under state law	The actual owner [1]
5. Sole proprietorship or single-owner LLC	The owner [3]
For this type of account:	**Give name and EIN of:**
6. Sole proprietorship or single-owner LLC	The owner [3]
7. A valid trust, estate, or pension trust	Legal entity [4]
8. Corporate or LLC electing corporate status on Form 8832	The corporation
9. Association, club, religious, charitable, educational, or other tax-exempt organization	The organization
10. Partnership or multi-member LLC	The partnership
11. A broker or registered nominee	The broker or nominee
12. Account with the Department of Agriculture in the name of a public entity (such as a state or local government, school district, or prison) that receives agricultural program payments	The public entity

[1] List first and circle the name of the person whose number you furnish. If only one person on a joint account has an SSN, that person's number must be furnished.

[2] Circle the minor's name and furnish the minor's SSN.

[3] You must show your individual name and you may also enter your business or "DBA" name on the second name line. You may use either your SSN or EIN (if you have one). If you are a sole proprietor, IRS encourages you to use your SSN.

[4] List first and circle the name of the legal trust, estate, or pension trust. (Do not furnish the TIN of the personal representative or trustee unless the legal entity itself is not designated in the account title.)

Note. If no name is circled when more than one name is listed, the number will be considered to be that of the first name listed.

Privacy Act Notice

Section 6109 of the Internal Revenue Code requires you to provide your correct TIN to persons who must file information returns with the IRS to report interest, dividends, and certain other income paid to you, mortgage interest you paid, the acquisition or abandonment of secured property, cancellation of debt, or contributions you made to an IRA, or Archer MSA or HSA. The IRS uses the numbers for identification purposes and to help verify the accuracy of your tax return. The IRS may also provide this information to the Department of Justice for civil and criminal litigation, and to cities, states, and the District of Columbia to carry out their tax laws. We may also disclose this information to other countries under a tax treaty, to federal and state agencies to enforce federal nontax criminal laws, or to federal law enforcement and intelligence agencies to combat terrorism.

You must provide your TIN whether or not you are required to file a tax return. Payers must generally withhold 28% of taxable interest, dividend, and certain other payments to a payee who does not give a TIN to a payer. Certain penalties may also apply.

CONTRACTOR'S AFFIDAVIT
AS TO STATUS OF LIENS

STATE OF _____

COUNTY OF _____

Personally appeared before me, the undersigned Notary Public for said County and State, (Name of Individual), _____ (Title), of _____ (Prime Contractor), who being duly sworn by me states on oath that to the best of his knowledge and belief, except as listed below, the Releases and Waivers of Claim attached hereto include all Subcontractors and all suppliers of labor, products, and equipment provided by all persons who may have lien against the property of (Owner), located at _____ (Location of Project), arising out of the construction of improvements thereon.

Exceptions: (If none, write "NONE." Any exception listed shall be bonded by the Contractor to indemnify the Owner, and a copy of each such bond shall be attached hereto.)

1.

2.

3.

4.

_____
(Name of Company)

By: _____
Type/Print Name

Title: _____

Date: _____

Sworn to and subscribed before me

this _____ day of _____, 20_____.

_____
Notary Public

My Commission Expires:

RELEASE AND WAIVER OF CLAIMS BY SUBCONTRACTORS AND PRODUCT VENDORS

STATE OF _____

COUNTY OF _____

Personally appeared before me the undersigned authority in and for said County and State (Name of Individual), _____ (Title) of _____ (Company), who, being duly sworn by me states on oath that all bills for labor and products, sales tax, privilege tax or license, old age benefits tax, state and federal unemployment insurance and other liability have been paid in full, or that funds are in hand to discharge such liabilities when due, incurred in the performance of its Subcontract for furnishing labor or products in the construction of improvements at (Name of Project), _____ (Location), upon receipt of check in the amount $_____, the undersigned company waives any claims and releases _____ (Owner) (Contractor) from any rights or claims for debts due and owing by virtue of the furnishing of any labor or products and any lien therefore.

_____
(Name of Company)

By: _____
Type/Print Name

Title: _____

Date: _____

Sworn to and subscribed before me

this _____ day of _____, 20___.

_____
Notary Public

My Commission Expires: _____

AFFIDAVIT AND WAIVER OF LIEN
PRIME CONTRACTOR

STATE OF _____

COUNTY OF _____

Personally appeared before me, the undersigned Notary Public for said County and State (Name of Individual), _____ (Title) of _____ (Prime Contractor), who being duly sworn by me states on oath that all product suppliers and Subcontractors, payrolls, sales tax, privilege tax or license, old age benefits tax, state and federal unemployment insurance, and other liabilities incurred in the performance of _____ (Type of Contract) Contract for the construction of improvements at _____ (Name of Project), have been paid in full and that the above named Prime Contractor waives any claims and released (Owner) from any rights or claims (including lien rights) for debts due and owing by virtue of the furnishing of any labor, products, and supplies furnished for such improvements.

The above named Prime Contractor agrees to indemnify the Owner and save him harmless on account of any loss he may sustain in reliance upon this Affidavit and Waiver of Lien including the amount of any lien he may be compelled to pay all costs relating thereto and a reasonable attorney's fee.

_____
(Prime Contractor)

By: _____
Type/Print Name

Title: _____

Date: _____

Sworn to and subscribed before me

this the ___ day of _____, 20__.

_____
Notary Public

My Commission Expires: _____

WAGE RATES

SECTION 00820

PART 1. GENERAL

1.1 Requirements:

A. Pay not less than the minimum wage scale and benefits accepted within the local construction industry.

B. No claims for additional compensation will be considered by the Owner because of payments of wage rates in excess of the applicable rate contained in this contract.

C. All contractors and subcontractors shall be equal opportunity employers.

1.2 Workmanship Standards:

Comply with the recognized workmanship quality standards within the industry as applicable to each unit of work, including ANSI standards where applicable. Project workmen should be paid in accordance with accepted pay scales for similar experience level and work in the area. It is a requirement that each category of tradesman or installer performing the work be pre-qualified, to the extent of being familiar with the applicable and recognized quality standards for his category of work, and being capable of workmanship complying with those standards.

1.3 Payroll:

A. In compliance with Article 515a, Sections 2 and 3, and Article 5159d, Section II of the Revised Civil Statute referenced above, the Owner reserves the following rights:

1. To receive weekly payroll records.
2. To have the Contractor provide required earning statements to employees.

1.4 Minimum Wage Rates:

A. Pay prevailing basic wage listed, plus any applicable fringe benefits.

B. In no case shall wages be less than the federally determined prevailing (Davis-Bacon and Related Acts) wage rate, as issued by the U.S. Department of Labor and contained in the contract documents. In addition the successful proposer must ensure that employees and applicants for employment are not discriminated against because of race, sex, age or national origin.

HIDALGO COUNTY SHERIFF'S OFFICE
Hidalgo County Adult Detention Center and
Law Enforcement Facility Repairs and / or Replacement
Edinburg, TX

PREVAILING WAGE SCALE NOTICE

1. This determination of prevailing wages shall not be construed to prohibit the payment of more than the rates named. Under no conditions shall any laborer, workman or mechanic employed on this job be paid less than the minimum wage scale.

2. In execution of this contract, the contractor must comply with all applicable state and federal laws, including but not limited to laws concerned with labor, equal employment opportunity, safety, and minimum wage.

END OF SECTION

SUMMARY

SECTION 01100

PART 1 GENERAL

1.1 SUMMARY

B. Section Includes:

1. Contract description.
2. Contractor's use of site and premises.
3. Future work.
4. Work sequence.
5. Owner occupancy.
6. Permits.
7. Specification conventions.

1.2 CONTRACT DESCRIPTION

A. Work of the Project includes renovations at the HCSO ADC and LEC.

B. Work will be performed under a single prime contract.

C. Project location = Edinburg, Texas.

1.3 CONTRACTOR'S USE OF SITE AND PREMISES

A. Limit use of site and premises to allow:
   1. Owner occupancy.

B. Access to Site: Limited to locations shown in drawings.

C. Construction Operations: Limited to areas noted on Drawings.

   1. Noisy and Disruptive Operations (such as Use of Jack Hammers and Other Noisy Equipment): Not allowed in close proximity to existing building during regular hours of operation. Coordinate and schedule such operations with Owner to minimize disruptions.

D. Time Restrictions for Performing Interior work at ADC kitchen 7:00pm – 2:00am on working days. All other interior/exterior work to be performed on working days only.

E. Utility Outages and Shutdown:

1. Coordinate and schedule electrical and other utility outages with Owner.

2. Outages: Allowed only at previously agreed upon times.

F. Construction Plan: Before start of construction, submit three copies of construction plan regarding access to work, use of Site, and utility outages for acceptance by Owner. After acceptance of plan, construction operations shall comply with accepted plan unless deviations are accepted by Owner in writing.

1.7 WORK SEQUENCE

A. Construct Work in phases during construction period. Coordinate construction schedule and operations with Engineer and Owner.

B. Sequencing of Construction Plan: Before start of construction, submit three copies of construction plan regarding phasing of renovation and new Work for acceptance by Owner. After acceptance of plan, construction sequencing shall comply with accepted plan unless deviations are accepted by Owner in writing at least 7 days in advanced.

1.8 OWNER OCCUPANCY

A. The Owner will occupy the premises during the entire period of construction.

B. Cooperate with Owner to minimize conflict, and to facilitate Owner's operations.

C. Schedule the Work to accommodate Owner occupancy.

D. Temperature control in the facility must be maintained at all times.

1.9 PERMITS

A. Furnish all necessary permits for construction Work.

1.10 SPECIFICATION CONVENTIONS

A. These specifications are written in imperative mood and streamlined form. This imperative language is directed to the Contractor unless specifically noted otherwise. The words "shall be" are included by inference where a colon (:) is used within sentences or phrases.

PART 2 PRODUCTS - Not Used

PART 3 EXECUTION - Not Used

END OF SECTION

PRICE AND PAYMENT PROCEDURES

SECTION 01200

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Allowances.

B. Contingency allowances.

C. Testing and inspection allowances.

D. Schedule of Values.

E. Application for Payment.

F. Change procedures.

G. Defect assessment.

H. Unit prices.

I. Alternates.

1.2 ALLOWANCES

A. Costs Included in Allowances: Cost of product to Contractor or Subcontractor, less applicable trade discounts; delivery to Site and applicable taxes unless stated otherwise in Allowance Schedule.

B. Costs Not Included in Allowances but Included in Contract Sum/Price: Product handling at Site including unloading, uncrating, and storage; protection of products from elements and from damage; and labor for installation and finishing unless stated otherwise in Allowance Schedule.

C. Architect/Engineer Responsibilities:
   1. Consult with Contractor for consideration and selection of products.
   2. Select products in consultation with Owner and transmit decision to Contractor.
   3. Prepare Change Order.

D. Contractor Responsibilities:
   1. Assist Architect/Engineer in selection of products, suppliers, and installers.
   2. Obtain proposals from suppliers and installers and offer recommendations.
   3. Upon notification of selection by Engineer, execute purchase agreement with designated supplier and installer.
   4. Arrange for and process Shop Drawings, Product Data, and Samples. Arrange for delivery.

5. Promptly inspect products upon delivery for completeness, damage, and defects. Submit claims for transportation damage.

E. Differences in costs will be adjusted by Supplemental Instructions.

F. Allowance Schedule:
1. Section 05120: Include the stipulated sum of $25,000 for purchase, delivery, and installation and delivery of steel support column as per structural drawings.
2. Section 03600: Include the stipulated sum of $5,000 for purchase, delivery and installation of grout repair at existing tilt walls.

1.3 CONTINGENCY ALLOWANCES

A. Include in Contract a stipulated sum/price of $210,000 for use upon Owner's instruction as a contingency allowance.

B. Contractor's costs for products, delivery, installation, labor, insurance, payroll, taxes, bonding, equipment rental, will be included in Supplemental Instructions authorizing expenditure of funds from this contingency allowance. No bonding, overhead, and profit will be included.

C. Funds will be drawn from contingency allowance only by Supplemental Instructions.

D. At closeout of Contract, funds remaining in contingency allowance will be credited to Owner by Change Order.

1.4 TESTING AND INSPECTION ALLOWANCES

A. Costs Included in Testing and Inspecting Allowances:
1. Cost of engaging testing and inspecting agency.
2. Execution of tests and inspecting.
3. Reporting results.

B. Costs Not Included in Testing and Inspecting Allowance but Included in Contract Sum/Price:
1. Costs of incidental labor and facilities required to assist testing or inspecting agency.
2. Costs of testing services used by Contractor separate from Contract Document requirements.
3. Costs of retesting upon failure of previous tests as determined by Architect/Engineer.

C. Payment Procedures:
1. Submit one copy of inspecting or testing firm's invoice with next Application for Payment.
2. Pay invoice upon approval by Architect/Engineer.

D. Testing and Inspecting Allowance Schedule:
1. Include sum of $10,000 for payment of inspecting laboratory services.

E. Differences in cost will be adjusted by Change Order.

1.5 SCHEDULE OF VALUES

A. Submit printed and electronic file schedule on AIA G702 - Continuation Sheet for G703 or similar document provided by Engineer.

B. Submit Schedule of Values as electronic file within 15 days after date of Owner-Contractor Agreement for approval by construction Project Manager.

C. Format: Use Table of Contents of this Project Manual. Identify each line item with number and title of major Specification Section. Also identify Site mobilization, bonds and insurance.

D. Include in each line item amount of allowances as specified in this Section. For unit cost allowances, identify quantities taken from Contract Documents multiplied by unit cost to achieve total for each item.

E. Include separately from each line item, direct proportional amount of Contractor's overhead and profit.

F. Revise schedule to list approved Change Orders with each Application for Payment.

1.6 APPLICATION FOR PAYMENT

A. Submit three copies AIA G702 - Application and Certificate for Payment and AIA G703 - Continuation Sheet for G702 or similar document provided by Engineer.

B. Content and Format: Use Schedule of Values for listing items in Application for Payment.

C. Submit updated construction schedule with each Application for Payment.

D. Payment Period: Submit at intervals stipulated in the Agreement.

E. Submit three copies of waivers requested by Owner.

F. Substantiating Data: When Architect/Engineer requires substantiating information, submit data justifying dollar amounts in question. Include the following with Application for Payment:

1. Partial release of liens from major Subcontractors and vendors.
2. Record Documents as specified in Section 01700 - Execution Requirements, for review by Owner, which will be returned to Contractor.
3. Affidavits attesting to off-Site stored products.
4. Construction Progress Schedule, revised and current as specified in Section 01330 - Submittal Procedures.

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. Submittals Schedule (preliminary if not final).
5. List of Contractor's staff assignments.
6. List of Contractor's principal consultants.
7. Initial progress report.
8. Report of preconstruction conference.
9. Certificates of insurance and insurance policies.
10. Performance and payment bonds.

H. Final Payment Application: 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. "Contractor's Affidavit of Payment of Debts and Claims."
5. "Contractor's Affidavit of Release of Liens."
6. "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.

1.7 CHANGE PROCEDURES

A. Submittals: Submit name of individual who is authorized to receive change documents and is responsible for informing others in Contractor's employ or Subcontractors of changes to the Work.

B. Carefully study and compare Contract Documents before proceeding with fabrication and installation of Work. Promptly advise Architect/Engineer of any error, inconsistency, omission, or apparent discrepancy.

C. Requests for Interpretation (RFI) and Clarifications: Allot time in construction scheduling for liaison with Architect/Engineer; establish procedures for handling queries and clarifications.
   1. Use Standard - Request for Information document for requesting interpretations.
   2. Architect/Engineer may respond with a direct answer on the Request for Interpretation form.

D. Architect/Engineer will advise of minor changes in the Work not involving adjustment to Contract Sum/Price or Contract Time by issuing supplemental instructions.

E. Architect/Engineer may issue Proposal Request including a detailed description of proposed change with supplementary or revised Drawings and Specifications, a change in Contract Time for executing the change. Contractor will prepare and submit estimate within 7 days.

F. Stipulated Sum/Price Change Order: Based on Proposal Request and Contractor's fixed price quotation .

G. Unit Price Change Order: For Contract unit prices and quantities, the Change Order will be executed on a fixed unit price basis. For unit costs or quantities of units of that which are not predetermined, execute Work under Construction Change Directive. Changes in Contract Sum/Price or Contract Time will be computed as specified for Change Order.

H. Execution of Change Orders: Architect/Engineer will issue Change Orders for signatures of parties as provided in Conditions of the Contract.

I. Correlation of Contractor Submittals:
   1. Promptly revise Schedule of Values and Application for Payment forms to record each authorized Change Order as separate line item and adjust Contract Sum/Price.
   2. Promptly revise Progress Schedules to reflect change in Contract Time, revise subschedules to adjust times for other items of Work affected by the change, and resubmit.
   3. Promptly enter changes in Record Documents.

1.8 DEFECT ASSESSMENT

A. Replace the Work, or portions of the Work, not conforming to specified requirements.

B. If, in the opinion of Engineer, it is not practical to remove and replace the Work, Engineer will direct appropriate remedy or adjust payment.

C. Individual Specification Sections may modify these options or may identify specific formula or percentage sum/price reduction.

D. Authority of Engineer to assess defects and identify payment adjustments is final.

E. Nonpayment for Rejected Products: Payment will not be made for rejected products for any of the following reasons:
   1. Products wasted or disposed of in a manner that is not acceptable.
   2. Products determined as unacceptable before or after placement.
   3. Products not completely unloaded from transporting vehicle.
   4. Products placed beyond lines and levels of the required Work.
   5. Products remaining on hand after completion of the Work.
   6. Loading, hauling, and disposing of rejected products.

1.9 UNIT PRICES

A. Authority: Measurement methods are delineated in individual Specification Sections.

B. Measurement methods delineated in individual Specification Sections complement criteria of this Section. In event of conflict, requirements of individual Specification Section govern.

C. Take measurements and compute quantities. Architect/Engineer will verify measurements and quantities.

D. Unit Quantities: Quantities and measurements indicated on Bid Form are for Contract purposes only. Actual quantities provided shall determine payment.
   1. When actual Work requires more or fewer quantities than those quantities indicated, provide required quantities at contracted unit sum/prices.

E. Payment Includes: Full compensation for required labor, products, tools, equipment, plant and facilities, transportation, services and incidentals; erection, application, or installation of item of the Work; overhead and profit.

F. Final payment for Work governed by unit prices will be made on basis of actual measurements and quantities accepted by Architect/Engineer multiplied by unit sum/price for Work incorporated in or made necessary by the Work.

G. Measurement of Quantities:
   1. Weigh Scales: Inspected, tested, and certified by applicable State of Texas weights and measures department within past year.
   2. Platform Scales: Of sufficient size and capacity to accommodate conveying vehicle.
   3. Metering Devices: Inspected, tested, and certified by applicable State of Texas department within past year.
   4. Measurement by Weight: Concrete reinforcing steel, rolled or formed steel, or other metal shapes will be measured by handbook weights. Welded assemblies will be measured by handbook or scale weight.
   5. Measurement by Volume: Measured by cubic dimension using mean length, width, and height or thickness.
   6. Measurement by Area: Measured by square dimension using mean length and width or radius.
   7. Linear Measurement: Measured by linear dimension, at item centerline or mean chord.
   8. Stipulated Sum/Price Measurement: Items measured by weight, volume, area, or linear means or combination, as appropriate, as completed item or unit of the Work.

H. Unit Price Schedule:

	Description	Unit Pricing
1.	Fire alarm Devices with rough-in (1 each)	_____
2.	Pull Station with Stopper II (1 each)	_____
3.	Audio Visual Device (1 each)	_____
4.	Visual Device (1 each)	_____
5.	Ceiling Smoke Detector (1 each)	_____
6.	Smoke Detector Guard (1 each)	_____
7.	Audio Visual Guard (1 each)	_____
8.	Duct Detector (1 each)	_____
9.	Fire Alarm Relay Module (1 each)	_____
10.	Fire Alarm Monitor Module (1 each)	_____
11.	Fire Alarm Notification Power Supply (1 each)	_____
12.	Fiber Optic cable per 100 ft six strand multimode 62.5 Micron Plenum Rated (1 each)	_____ _____
13.	A/C diffusers in Kitchen (1 each)	_____
14.	2 Welded ½" rods at (e) steel joist bottom chord, 20' lengths each-see detail (1 each)	_____ _____
15.	Replacement of wet roof areas identified by the Thermocore® Infrared Scan. 1) Description: Provide wet roof area replacement according to Section 07551 Modified Bitumen Membrane Roofing (Re-Cover).-See detail----- 2) Unit of Measurement: Cost per square foot.	
16.	Deteriorated existing metal roof decking repair or replacement. 1) Description: Provide deteriorated metal roof decking repair or replacement with new metal roofing to match existing according to Section 05310 Steel Deck Repair/Replacement (If Required). 2) Unit of Measurement: Per square foot.	_____
17.	Deteriorated existing wood blocking or nailer repair or replacement. 1) Description: Provide deteriorated wood blocking and nailer repair or replacement with new pressure-treated wood blocking or nailers according to Section 06105 Miscellaneous Carpentry. 2) Unit of Measurement: Per board foot.	_____

Supply Cost For: 2x4
2x6
2x8

1.10 ALTERNATES

A. Alternates quoted on Bid Forms will be reviewed and accepted or rejected at Owner's option. Accepted Alternates will be identified in Owner-Contractor Agreement. The Owner-Contractor Agreement may identify certain Alternates to remain an Owner option for a stipulated period of time.

B. Coordinate related Work and modify surrounding Work. Description for each Alternate is recognized to be abbreviated but requires that each change shall be complete for scope of Work affected.
   1. Coordinate related requirements among Specification Sections as required.
   2. Include as part of each Alternate: Miscellaneous devices, appurtenances, and similar items incidental to or necessary for complete installation.
   3. Coordinate Alternate with adjacent Work and modify or adjust as necessary to ensure integration.

C. Schedule of Alternates:

Alternate No. 1:Remove and Replace existing Quarry Tile in ADC Kitchen.
Alternate No. 2: Remove and Replace existing Suspended Ceiling and Accessories in ADC Kitchen.
Alternate No. 3: Remove and Replace Three Cooler/ Freezer Doors and Components in ADC Kitchen.
Alternate No. 4: Remove and Replace Cooler/ Freezer Compressor.
Alternate No.5: Remove and Replace (6) Light poles on LEC parking lot.

PART 2 PRODUCTS - Not Used

PART 3 EXECUTION - Not Used

END OF SECTION

PAYMENT PROCEDURES

SECTION 01290

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section specifies administrative and procedural requirements necessary to prepare and process Applications for Payment.

B. Related Sections include the following:

1. Division 1 Section "Allowances" for procedural requirements governing handling and processing of allowances.
2. Division 1 Section "Contract Modification Procedures" for administrative procedures for handling changes to the Contract.
3. Division 1 Section "Construction Progress Documentation" for administrative requirements governing preparation and submittal of Contractor's Construction Schedule and Submittals Schedule.

1.3 DEFINITIONS

A. Schedule of Values: A statement furnished by Contractor allocating portions of the Contract Sum to various portions of the Work and used as the basis for reviewing Contractor's Applications for Payment.

1.4 SCHEDULE OF VALUES

A. Coordination: Coordinate preparation of the Schedule of Values with preparation of Contractor's Construction Schedule

1. Correlate 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. Submittals Schedule.
c. Contractor's Construction Schedule.

PAYMENT PROCEDURES

2. Submit the Schedule of Values to Engineer at earliest possible date but no later than seven days before the date scheduled for submittal of initial Applications for Payment.

B. Format and Content: Use the 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 Engineer.
    c. Owner's project number.
    d. Contractor's name and address.
    e. Date of submittal.

2. Submit draft of AIA Document G703 Continuation Sheets or similar format.
3. Arrange the Schedule of Values in tabular form with separate columns to indicate the following for each item listed:

    a. Related Specification Section or Division.
    b. Description of the Work.
    c. Name of subcontractor.
    d. Name of manufacturer or fabricator.
    f. Change Orders (numbers) that affect value.
    g. Dollar value.

        1) Percentage of the Contract Sum to nearest one-hundredth percent, adjusted to total 100 percent.

4. Provide a breakdown of the Contract Sum in enough detail to facilitate continued evaluation of Applications for Payment and progress reports. Coordinate with the Project Manual table of contents. Provide several line items for principal subcontract amounts, where appropriate.
5. Round amounts to nearest whole dollar; total shall equal the Contract Sum.
6. 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.

    a. Differentiate between items stored on-site and items stored off-site. If specified, include evidence of insurance or bonded warehousing.

7. 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.
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.

PAYMENT PROCEDURES

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.

1.5 APPLICATIONS FOR PAYMENT

A. Each Application for Payment shall be consistent with previous applications and payments as certified by Engineer 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. Payment Application Forms: Use AIA Document G702 and AIA Document G703 or similar format
Continuation Sheets 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 3 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.

PAYMENT PROCEDURES

F. 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. Submittals Schedule (preliminary if not final).
5. List of Contractor's staff assignments.
6. List of Contractor's principal consultants.
7. Initial progress report.
8. Report of preconstruction conference.
9. Certificates of insurance and insurance policies.
10. Performance and payment bonds.

H. Final Payment Application: 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. "Contractor's Affidavit of Payment of Debts and Claims."
5. "Contractor's Affidavit of Release of Liens."
6. "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

ADMINISTRATIVE REQUIREMENTS

SECTION 01300

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Coordination and Project conditions.

B. Preconstruction meeting.

C. Site mobilization meeting.

D. Progress meetings.

E. Preinstallation meetings.

F. Closeout meeting.

G. Alteration procedures.

1.2 COORDINATION AND PROJECT CONDITIONS

A. Coordinate scheduling, submittals, and Work of various Sections of Project Manual to ensure efficient and orderly sequence of installation of interdependent construction elements.

B. Verify that utility requirements and characteristics of operating equipment are compatible with building utilities. Coordinate Work of various Sections having interdependent responsibilities for installing, connecting to, and placing operating equipment in service.

C. Coordinate space requirements, supports, and installation of mechanical and electrical Work indicated diagrammatically on Drawings. Follow routing shown for pipes, ducts, and conduit as closely as practical; place runs parallel with lines of building. Use spaces efficiently to maximize accessibility for other installations, for maintenance, and for repairs.
   1. Coordination Drawings: Prepare as required to coordinate all portions of Work. Show relationship and integration of different construction elements that require coordination during fabrication or installation to fit in space provided or to function as intended. Indicate locations where space is limited for installation and access and where sequencing and coordination of installations are important.

D. Coordination Meetings: In addition to other meetings specified in this Section, hold coordination meetings with personnel and Subcontractors to ensure coordination of Work.

E. In finished areas conceal pipes, ducts, and wiring within construction. Coordinate locations of fixtures and outlets with finish elements.

F. Coordinate completion and clean-up of Work of separate Sections in preparation for Substantial Completion.

G. After Owner's occupancy of premises, coordinate access to Site for correction of defective Work and Work not complying with Contract Documents, to minimize disruption of Owner's activities.

1.3 PRECONSTRUCTION MEETING

A. Engineer will schedule and preside over meeting after Notice of Award.

B. Attendance Required: Architect/Engineer, Owner, Resident Project Representative, appropriate governmental agency representatives, Construction Project Manager, and Contractor.

C. Minimum Agenda:
1. Execution of Owner-Contractor Agreement.
2. Submission of executed bonds and insurance certificates.
3. Distribution of Contract Documents.
4. Submission of list of Subcontractors, list of products, schedule of values, and Progress Schedule.
5. Designation of personnel representing parties in Contract, and Architect/Engineer.
6. Communication procedures.
7. Procedures and processing of requests for interpretations, field decisions, field orders, submittals, substitutions, Applications for Payments, proposal request, Change Orders, and Contract closeout procedures.
8. Scheduling.
9. Critical Work sequencing.

D. Construction Project Manager: Record minutes and distribute copies to participants within seven days after meeting, with Architect/Engineer, Owner, and those affected by decisions made.

1.4 SITE MOBILIZATION MEETING

A. Construction Project Manager will schedule and preside over meeting at Project Site prior to Contractor occupancy.

B. Attendance Required: Architect/Engineer, Owner, Contractor, Contractor's superintendent, Construction Project Manager.

C. Minimum Agenda:
1. Use of premises by Owner and Contractor.
2. Owner's requirements.
3. Construction facilities and controls.
4. Temporary utilities.
5. Security and housekeeping procedures.
6. Schedules.
7. Procedures for testing.
8. Procedures for maintaining record documents.
9. Requirements for startup of equipment.

10. Inspection and acceptance of equipment put into service during construction period.

D. Construction Project Manager: Record minutes and distribute to participants within 7 days after meeting.

1.5 PROGRESS MEETINGS

A. Schedule and administer meetings throughout progress of the Work at maximum weekly intervals.

B. Construction Project Manager shall make arrangements for meetings, prepare agenda with copies for participants, and preside over meetings.

C. Attendance Required: Job superintendent, major Subcontractors and suppliers, and Architect/Engineer, Owner, as appropriate to agenda topics for each meeting.

D. Minimum Agenda:
1. Review minutes of previous meetings.
2. Review of Work progress.
3. Field observations, problems, and decisions.
4. Identification of problems impeding planned progress.
5. Review of submittal schedule and status of submittals.
6. Review of off-Site fabrication and delivery schedules.
7. Maintenance of Progress Schedule.
8. Corrective measures to regain projected schedules.
9. Planned progress during succeeding work period.
10. Coordination of projected progress.
11. Maintenance of quality and work standards.
12. Effect of proposed changes on Progress Schedule and coordination.
13. Other business relating to Work.

E. Construction Project Manager: Record minutes and distribute to participants within 7 days after meeting.

1.6 PREINSTALLATION MEETINGS

A. When required in individual Specification Sections, convene preinstallation meetings at Project Site before starting Work of specific Section.

B. Require attendance of parties directly affecting, or affected by, Work of specific Section.

C. Notify Architect/Engineer four days in advance of meeting date.

D. Prepare agenda and preside over meeting:
1. Review conditions of installation, preparation, and installation procedures.
2. Review coordination with related Work.

E. Record minutes and distribute to participants within seven days after meeting.

1.7 CLOSEOUT MEETING

A. Schedule Project closeout meeting with sufficient time to prepare for requesting Substantial Completion. Preside over meeting and be responsible for minutes.

B. Attendance Required: Contractor, Construction Project Manager, Major Subcontractors, Architect/Engineer, Owner, and others appropriate to agenda.

C. Notify Architect/Engineer four days in advance of meeting date.

D. Minimum Agenda:
   1. Start-up of facilities and systems.
   2. Operations and maintenance manuals.
   3. Testing, adjusting, and balancing.
   4. System demonstration and observation.
   5. Operation and maintenance instructions for Owner's personnel.
   6. Contractor's inspection of Work.
   7. Contractor's preparation of an initial "punch list."
   8. Procedure to request Architect/Engineer inspection to determine date of Substantial Completion.
   9. Completion time for correcting deficiencies.
   10. Inspections by authorities having jurisdiction.
   11. Certificate of Occupancy and transfer of insurance responsibilities.
   12. Partial release of retainage.
   13. Final cleaning.
   14. Preparation for final inspection.
   15. Closeout Submittals:
      a. Project record documents.
      b. Operating and maintenance documents.
      c. Operating and maintenance materials.
      d. Affidavits.
   16. Final Application for Payment.
   17. Contractor's demobilization of Site.
   18. Maintenance.

E. Record minutes and distribute copies to participants within 7 days after meeting.

PART 2 PRODUCTS - Not Used

PART 3 EXECUTION

3.1 ALTERATION PROCEDURES

A. Entire facility will be occupied for normal operations during progress of construction. Cooperate with Owner in scheduling operations to minimize conflict and to permit continuous usage.
   1. Perform Work not to interfere with operations of occupied areas.

2. Keep utility and service outages to a minimum and perform only after written approval of Owner.
3. Indoor temperature control must be maintained at all times.
4. Clean Owner-occupied areas daily. Clean spillage, overspray, and heavy collection of dust in Owner-occupied areas immediately.

B. Materials: As specified in product Sections; match existing products with new [**and salvaged**] products for patching and extending Work.

C. Employ skilled and experienced installer to perform alteration and renovation Work.

D. Cut, move, or remove items as necessary for access to alterations and renovation Work. Replace and restore at completion. Comply with Section 01700 - Execution Requirements.

E. Remove unsuitable material not marked for salvage, including rotted wood, corroded metals, and deteriorated masonry and concrete. Replace materials as specified for finished Work.

F. Remove debris and abandoned items from area and from concealed spaces.

G. Prepare surface and remove surface finishes to permit installation of new Work and finishes.

H. Close openings in exterior surfaces to protect existing Work from weather and extremes of temperature and humidity.

I. Remove, cut, and patch Work to minimize damage and to permit restoring products and finishes to original condition.

J. Refinish existing visible surfaces to remain in renovated rooms and spaces, to renewed condition for each material, with neat transition to adjacent finishes.

K. Where new Work abuts or aligns with existing Work, provide smooth and even transition. Patch Work to match existing adjacent Work in texture and appearance.

END OF SECTION

CONSTRUCTION PROGRESS SCHEDULES

SECTION 01323

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Submittals.

B. Quality assurance.

C. Format for network analysis schedules.

D. Network analysis schedules.

E. Bar chart schedules.

F. Review and evaluation.

G. Updating schedules.

H. Distribution.

1.2 SUBMITTALS

A. Within 10 days after date of Owner-Contractor Agreement**,** submit proposed preliminary network diagram defining planned operations for first **60** days of Work, with general outline for remainder of Work.

B. Participate in review of preliminary and complete network diagrams jointly with Architect/Engineer.

C. Within 20 days after joint review of proposed preliminary network diagram, submit draft of proposed complete network diagram for review. Include written certification that major Subcontractors have reviewed and accepted proposed schedule.

D. Within 10 days after joint review, submit complete network analysis consisting of network diagrams and mathematical analyses.

E. Submit updated network schedules every 14 days.

F. Any changes to schedule must be submitted at least 7 days in advance.

G. Post as electronic file to Project Team.

H. Submit network schedules under transmittal letter form specified in Section 01330 - Submittal Procedures.

I. Schedule Updates:
1. Overall percent complete, projected and actual.
2. Completion progress by listed activity and sub activity, to within **five working** days prior to submittal.
3. Changes in Work scope and activities modified since submittal.
4. Delays in submittals or resubmittals, deliveries, or Work.
5. Adjusted or modified sequences of Work.
6. Other identifiable changes.
7. Revised projections of progress and completion.

J. Narrative Progress Report:
1. Submit with each monthly submission of Progress Schedule.
2. Summary of Work completed during the past period between reports.
3. Work planned during the next period.
4. Explanation of differences between summary of Work completed and Work planned in previously submitted report.
5. Current and anticipated delaying factors and estimated impact on other activities and completion milestones.
6. Corrective action taken or proposed.

1.3 QUALITY ASSURANCE

A. Scheduler: Contractor's personnel specializing in CPM scheduling with two years' minimum experience in scheduling construction work of complexity comparable to the Project and having use of computer facilities capable of delivering detailed graphic printout within 48 hours of request.

B. Contractor's Administrative Personnel: 2 years' minimum experience in using and monitoring CPM schedules on comparable Projects.

1.4 FORMAT FOR NETWORK ANALYSIS SCHEDULE

A. Listings: Reading from left to right, in ascending order for each activity. Identify each activity with applicable Specification Section number.

B. Scale and Spacing: To allow for notations and revisions.

1.5 NETWORK ANALYSIS SCHEDULES

A. Prepare network analysis diagrams and supporting mathematical analyses using critical path method.

B. Illustrate order and interdependence of activities and sequence of Work; how start of given activity depends on completion of preceding activities, and how completion of activity may restrain start of subsequent activities.

C. Illustrate complete sequence of construction by activity, identifying Work of separate stages. Indicate dates for submittals and return of submittals; dates for procurement and delivery of critical products; and dates for installation and provision for testing. Include legend for symbols and abbreviations used.

D. Mathematical Analysis: Tabulate each activity of detailed network diagrams using calendar dates, and identify for each activity:
   1. Preceding and following event numbers.
   2. Activity description.
   3. Estimated duration of activity, in maximum **15**-day intervals. Status of critical activities.
   4. Earliest start date.
   5. Earliest finish date.
   6. Actual start date.
   7. Actual finish date.
   8. Latest start date.
   9. Latest finish date.
   10. Total and free float; accrue float time to Owner and to Owner's benefit.
   11. Monetary value of activity, keyed to Schedule of Values.
   12. Percentage of activity completed.
   13. Responsibility.

E. Analysis Program: Capable of compiling monetary value of completed and partially completed activities, of accepting revised completion dates, and of recomputing of scheduled dates and float.

F. Required Sorts: List activities in sorts or groups:
   1. By preceding Work item or event number from lowest to highest.
   2. By longest float, then in order of early start.
   3. By responsibility in order of earliest possible start date.
   4. In order of latest allowable start dates.
   5. In order of latest allowable finish dates.
   6. Contractor's periodic payment request sorted by Schedule of Values list.
   7. List of basic input data-generating report.
   8. List of activities on critical path.

G. Prepare subschedules for each stage of Work and Sequencing of Construction Plan identified in Section 01100 – Summary.

H. Coordinate contents with Schedule of Values in Section 01330 - Submittal Procedures.

1.6 BAR CHART SCHEDULES

A. Format: Bar chart Schedule, to include at least:

1. Identification and listing in chronological order of those activities reasonably required to complete the Work, including:

    a. Subcontract Work.
    b. Major equipment design, fabrication, factory testing, and delivery dates including required lead times.
    c. Move-in and other preliminary activities.
    d. Equipment and equipment system test and startup activities.
    e. Project closeout and cleanup.
    f. Work sequences, constraints, and milestones.

2. Listings identified by Specification Section number.
3. Identification of the following:

    a. Horizontal time frame by year, month, and week.
    b. Duration, early start, and completion for each activity and subactivity.
    c. Critical activities and Project float.
    d. Subschedules to further define critical portions of Work.

1.7 REVIEW AND EVALUATION

A. Participate in joint review and evaluation of schedules with Architect/Engineer at each submittal.

B. Evaluate Project status to determine Work behind schedule and Work ahead of schedule.

C. After review, revise schedules incorporating results of review, and resubmit within 10 days.

1.8 UPDATING SCHEDULES

A. Maintain schedules to record actual start and finish dates of completed activities.

B. Indicate progress of each activity to date of revision, with projected completion date of each activity. Update schedules to depict current status of Work.

C. Identify activities modified since previous submittal, major changes in Work, and other identifiable changes.

D. Upon approval of a Change Order, include the change in the next schedule submittal.

E. Indicate changes required to maintain Date of Substantial Completion.

F. Submit sorts as required to support recommended changes.

G. Prepare narrative report to define problem areas, anticipated delays, and impact on schedule. Report corrective action taken or proposed and its effect including effects of changes on schedules of separate Contractors.

1.9 DISTRIBUTION

A. Following joint review, distribute copies of updated schedules to Contractor's Project site file, to Subcontractors, suppliers, Architect/Engineer, Owner.

B. Instruct recipients to promptly report, in writing, problems anticipated by projections shown in schedules.

PART 2 PRODUCTS - Not Used

PART 3 EXECUTION - Not Used

END OF SECTION

SUBMITTAL PROCEDURES

SECTION 01330

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Definitions.

B. Submittal procedures.

C. Construction progress schedules.

D. Proposed product list.

E. Product data.

F. Use of electronic CAD files of Project Drawings.

G. Shop Drawings.

H. Samples.

I. Other submittals.

J. Design data.

K. Test reports.

L. Certificates.

M. Manufacturer's instructions.

N. Manufacturer's field reports.

O. Erection Drawings.

P. Construction photographs.

Q. Contractor review.

R. Architect/Engineer review.

1.2 DEFINITIONS

A. Action Submittals: Written and graphic information and physical samples that require Architect/Engineer's and Construction Project Manager's responsive action.

B. Informational Submittals: Written and graphic information and physical Samples that do not require Architect/Engineer's and Construction Project Manager's responsive action. Submittals may be rejected for not complying with requirements.

1.3 SUBMITTAL PROCEDURES

A. Transmit each submittal with Transmittal Letter.

B. Identify: Project, Contractor, Subcontractor and supplier, pertinent Drawing and detail number, and Specification Section number appropriate to submittal.

C. Apply Contractor's stamp, signed or initialed, certifying that review, approval, verification of products required, field dimensions, adjacent construction Work, and coordination of information is according to requirements of the Work and Contract Documents.

D. Schedule submittals to expedite Project, and deliver to Engineer at business address. Coordinate submission of related items.

E. For each submittal for review, allow 15 days excluding delivery time to and from Contractor.

F. Identify variations in Contract Documents and product or system limitations that may be detrimental to successful performance of completed Work.

G. Allow space on submittals for Contractor and Architect/Engineer review stamps.

H. When revised for resubmission, identify changes made since previous submission.

I. Distribute copies of reviewed submittals as appropriate. Instruct parties to promptly report inability to comply with requirements.

J. Submittals not requested will not be recognized nor processed.

K. Incomplete Submittals: Architect/Engineer will not review. Complete submittals for each item are required. Delays resulting from incomplete submittals are not the responsibility of Architect/Engineer.

1.4 CONSTRUCTION PROGRESS SCHEDULES

A. Comply with Section 01323 - Construction Progress Schedules.

1.5 PROPOSED PRODUCT LIST

A. Within 15 days after date of Owner-Contractor Agreement, submit list of major products proposed for use, with name of manufacturer, trade name, and model number of each product.

B. For products specified only by reference standards, indicate manufacturer, trade name, model or catalog designation, and reference standards.

1.6 PRODUCT DATA

A. Product Data: Action Submittal: Submit to Architect/Engineer for review for assessing conformance with information given and design concept expressed in Contract Documents.

B. Submit number of copies Contractor requires, plus two copies Engineer will retain.

C. Mark each copy to identify applicable products, models, options, and other data. Supplement manufacturers' standard data to provide information specific to this Project.

D. Indicate product utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.

E. After review, produce copies and distribute according to "Submittal Procedures" Article and for record documents described in Section 01700 - Execution Requirements.

1.7 SHOP DRAWINGS

A. Shop Drawings: Action Submittal: Submit to Architect/Engineer for assessing conformance with information given and design concept expressed in Contract Documents.

B. Indicate special utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.

C. When required by individual Specification Sections, provide Shop Drawings signed and sealed by a professional Engineer responsible for designing components shown on Shop Drawings.
   1. Include signed and sealed calculations to support design.
   2. Submit Shop Drawings and calculations in form suitable for submission to and approval by authorities having jurisdiction.
   3. Make revisions and provide additional information when required by authorities having jurisdiction.

D. Submit number of opaque reproductions Contractor requires, plus **two** copies Engineer will retain.

E. After review, produce copies and distribute according to "Submittal Procedures" Article and for record documents described in Section 01700 - Execution Requirements.

1.8 SAMPLES

A. Samples: Action Submittal: Submit to Architect/Engineer for assessing conformance with information given and design concept expressed in Contract Documents.

B. Samples for Selection as Specified in Product Sections:
   1. Submit to Architect/Engineer for aesthetic, color, and finish selection.
   2. Submit Samples of finishes, textures, and patterns for Architect/Engineer selection.

C. Submit Samples to illustrate functional and aesthetic characteristics of products, with integral parts and attachment devices. Coordinate Sample submittals for interfacing work.

D. Include identification on each Sample, with full Project information.

E. Submit number of Samples specified in individual Specification Sections; Engineer will retain one Sample.

F. Reviewed Samples that may be used in the Work are indicated in individual Specification Sections.

G. Samples will not be used for testing purposes unless specifically stated in Specification Section.

H. After review, produce copies and distribute according to "Submittal Procedures" Article and for record documents described in Section 01700 - Execution Requirements.

1.9 OTHER SUBMITTALS

A. Closeout Submittals: Comply with Section 01700 - Execution Requirements.

B. LEED Submittals: Comply with Section 01351 - Sustainable Project Requirements.

C. Permits: Within 15 days after date of Owner-Contractor Agreement, submit a list of permits and licenses to be obtained, identifying the granting agency and the required date of permit submittal.

1.10 DESIGN DATA

A. Informational Submittal: Submit data for Architect/Engineer's knowledge as Contract administrator or for Owner.

B. Submit information for assessing conformance with information given and design concept expressed in Contract Documents.

1.11 TEST REPORTS

A. Informational Submittal: Submit reports for Architect/Engineer's knowledge as Contract administrator or for Owner.

B. Submit test reports for information for assessing conformance with information given and design concept expressed in Contract Documents.

1.12 CERTIFICATES

A. Informational Submittal: Submit certification by manufacturer, installation/application Subcontractor, or Contractor to Architect/Engineer, in quantities specified for Product Data.

B. Indicate material or product conforms to or exceeds specified requirements. Submit supporting reference data, affidavits, and certifications as appropriate.

C. Certificates may be recent or previous test results on material or product but must be acceptable to Architect/Engineer.

1.13 MANUFACTURER'S INSTRUCTIONS

A. Informational Submittal: Submit manufacturer's installation instructions for Architect/Engineer's knowledge as Contract administrator or for Owner.

B. Submit printed instructions for delivery, storage, assembly, installation, startup, adjusting, and finishing, to Architect/Engineer in quantities specified for Product Data.

C. Indicate special procedures, perimeter conditions requiring special attention, and special environmental criteria required for application or installation.

1.14 MANUFACTURER'S FIELD REPORTS

A. Informational Submittal: Submit reports for Architect/Engineer's knowledge as Contract administrator or for Owner.

B. Submit report within 5 days of observation to Architect/Engineer for information.

C. Submit reports for information for assessing conformance with information given and design concept expressed in Contract Documents.

1.15 ERECTION DRAWINGS

A. Informational Submittal: Submit Drawings for Architect/Engineer's knowledge as Contract administrator or for Owner.

B. Submit Drawings for information assessing conformance with information given and design concept expressed in Contract Documents.

C. Data indicating inappropriate or unacceptable Work may be subject to action by Architect/Engineer or Owner.

1.16 CONSTRUCTION PHOTOGRAPHS

A. Provide photographs of construction throughout progress of Work produced by an experienced photographer acceptable to Architect/Engineer.

B. Twice monthly submit photographs.

C. Digital Images: Deliver complete set of digital image electronic files on CD-ROM to Owner with Project record documents. Identify electronic media with date photographs were taken. Submit images that have same aspect ratio as sensor, uncropped.
   1. Digital Images: Uncompressed TIFF format, produced by digital camera with minimum sensor size of 4.0 megapixels, and image resolution of not less than 1024 by 768 pixels.
   2. Date and Time: Include date and time in filename for each image.

1.17 CONTRACTOR REVIEW

A. Review for compliance with Contract Documents and approve submittals before transmitting to Engineer.

B. Contractor: Responsible for:
   1. Determination and verification of materials including manufacturer's catalog numbers.
   2. Determination and verification of field measurements and field construction criteria.
   3. Checking and coordinating information in submittal with requirements of Work and of Contract Documents.
   4. Determination of accuracy and completeness of dimensions and quantities.
   5. Confirmation and coordination of dimensions and field conditions at Site.
   6. Construction means, techniques, sequences, and procedures.
   7. Safety precautions.
   8. Coordination and performance of Work of all trades.

C. Stamp, sign or initial, and date each submittal to certify compliance with requirements of Contract Documents.

D. Do not fabricate products or begin Work for which submittals are required until approved submittals have been received from Architect/Engineer.

1.18 ARCHITECT/ENGINEER REVIEW

A. Do not make "mass submittals" to Architect/Engineer. "Mass submittals" are defined as six or more submittals or items in one day or **15** or more submittals or items in one week. If "mass submittals" are received, Architect/Engineer's review time stated above will be extended as necessary to perform proper review. Architect/Engineer will review "mass submittals" based on priority determined by Architect/Engineer after consultation with Owner and Construction Project Manager.

B. Informational submittals and other similar data are for Architect/Engineer's information, do not require Architect/Engineer's responsive action, and will not be reviewed or returned with comment.

C. Submittals made by Contractor that are not required by Contract Documents may be returned without action.

D. Submittal approval does not authorize changes to Contract requirements unless accompanied by Change Order, or Construction Change Directive.

PART 2 PRODUCTS - Not Used

PART 3 EXECUTION - Not Used

END OF SECTION

QUALITY REQUIREMENTS

SECTION 01400

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Quality control.

B. Tolerances.

C. References.

D. Labeling.

E. Mockup requirements.

F. Testing and inspection services.

G. Manufacturers' field services.

1.2 QUALITY CONTROL

A. Monitor quality control over suppliers, manufacturers, products, services, Site conditions, and workmanship, to produce Work of specified quality.

B. Comply with specified standards as the minimum quality for the Work except where more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.

C. Perform Work using persons qualified to produce required and specified quality.

D. Products, materials, and equipment may be subject to inspection by Architect/Engineer and Owner at place of manufacture or fabrication. Such inspections shall not relieve Contractor of complying with requirements of Contract Documents.

E. Supervise performance of Work in such manner and by such means to ensure that Work, whether completed or in progress, will not be subjected to harmful, dangerous, damaging, or otherwise deleterious exposure during construction period.

1.3 TOLERANCES

A. Monitor fabrication and installation tolerance control of products to produce acceptable Work. Do not permit tolerances to accumulate.

B. Comply with manufacturers' recommended tolerances and tolerance requirements in reference standards. When such tolerances conflict with Contract Documents, request clarification from Architect/Engineer before proceeding.

C. Adjust products to appropriate dimensions; position before securing products in place.

1.4 REFERENCES

A. For products or workmanship specified by association, trade, or other consensus standards, comply with requirements of standard except when more rigid requirements are specified or are required by applicable codes.

B. Conform to reference standard by date of issue current as of date of Contract Documents except where specific date is established by code.

C. Obtain copies of standards and maintain on Site when required by product Specification Sections.

D. When requirements of indicated reference standards conflict with Contract Documents, request clarification from Architect/Engineer before proceeding.

E. Neither contractual relationships, duties, or responsibilities of parties in Contract nor those of Architect/Engineer shall be altered from Contract Documents by mention or inference in reference documents.

1.5 LABELING

A. Attach label from agency approved by authorities having jurisdiction for products, assemblies, and systems required to be labeled by applicable code.

B. Label Information: Include manufacturer's or fabricator's identification, approved agency identification, and the following information, as applicable, on each label:
   1. Model number.
   2. Serial number.
   3. Performance characteristics.

C. Manufacturer's Nameplates, Trademarks, Logos, and Other Identifying Marks on Products: Not allowed on surfaces exposed to view in public areas, interior or exterior.

1.6 MOCK-UP REQUIREMENTS

A. Tests will be performed under provisions identified in this Section and identified in individual product Specification Sections.

B. Assemble and erect specified or indicated items with specified or indicated attachment and anchorage devices, flashings, seals, and finishes.

C. Accepted mockups shall be comparison standard for remaining Work.

D. Where mockup has been accepted by Architect/Engineer and is specified in product Specification Sections to be removed, remove mockup and clear area when directed to do so by Architect/Engineer.

1.7 TESTING AND INSPECTION SERVICES

A. Employ and pay for services of an independent testing agency or laboratory acceptable to Owner to perform specified testing.
   1. Before starting Work, submit testing laboratory name, address, and telephone number, and names of full-time Professional Engineer or specialist and responsible officer.
   2. Submit copy of report of laboratory facilities' inspection made by Materials Reference Laboratory of National Bureau of Standards during most recent inspection, with memorandum of remedies of deficiencies reported by inspection.

B. Independent firm will perform tests, inspections, and other services specified in individual Specification Sections and as required by Architect/Engineer.
   1. Laboratory: Authorized to operate at Project location.
   2. Laboratory Staff: Maintain full-time Professional Engineer or specialist on staff to review services.
   3. Testing Equipment: Calibrated at reasonable intervals with devices of an accuracy traceable to National Bureau of Standards or accepted values of natural physical constants.

C. Testing, inspections, and source quality control may occur on or off Project Site. Perform off-Site testing as required by Architect/Engineer or Owner.

D. Reports shall be submitted by independent firm to Architect/Engineer, Contractor, and authorities having jurisdiction, indicating observations and results of tests and compliance or noncompliance with Contract Documents.
   1. Submit final report indicating correction of Work previously reported as noncompliant.

E. Cooperate with independent firm; furnish samples of materials, design mix, equipment, tools, storage, safe access, and assistance by incidental labor as requested.
   1. Notify Architect/Engineer and independent firm 24 hours before expected time for operations requiring services.
   2. Make arrangements with independent firm and pay for additional Samples and tests required for Contractor's use.

F. Employment of testing agency or laboratory shall not relieve Contractor of obligation to perform Work according to requirements of Contract Documents.

G. Retesting or re-inspection required because of nonconformance with specified or indicated requirements shall be performed by same independent firm on instructions from Architect/Engineer. Payment for retesting or re-inspection will be charged to Contractor by deducting testing charges from Contract Sum/Price.

H. Agency Responsibilities:
   1. Test Samples of mixes submitted by Contractor.

2. Provide qualified personnel at Site. Cooperate with Architect/Engineer and Contractor in performance of services.
3. Perform indicated sampling and testing of products according to specified standards.
4. Ascertain compliance of materials and mixes with requirements of Contract Documents.
5. Promptly notify Architect/Engineer and Contractor of observed irregularities or nonconformance of Work or products.
6. Perform additional tests required by Architect/Engineer.
7. Attend preconstruction meetings and progress meetings.

I. Agency Reports: After each test, promptly submit copies of report to Architect/Engineer, Contractor, and authorities having jurisdiction. When requested by Architect/Engineer, provide interpretation of test results. Include the following:
1. Date issued.
2. Project title and number.
3. Name of inspector.
4. Date and time of sampling or inspection.
5. Identification of product and Specification Section.
6. Location in Project.
7. Type of inspection or test.
8. Date of test.
9. Results of tests.
10. Conformance with Contract Documents.

J. Limits on Testing Authority:
1. Agency or laboratory may not release, revoke, alter, or enlarge on requirements of Contract Documents.
2. Agency or laboratory may not approve or accept any portion of the Work.
3. Agency or laboratory may not assume duties of Contractor.
4. Agency or laboratory has no authority to stop the Work.

1.8 MANUFACTURER'S FIELD SERVICES

A. When specified in individual Specification Sections, require material or product suppliers or manufacturers to provide qualified staff personnel to observe Site conditions, conditions of surfaces and installation, quality of workmanship, startup of equipment, testing, adjusting, and balancing of equipment and commissioning as applicable, and to initiate instructions when necessary.

B. Submit qualifications of observer to Architect/Engineer 30 days in advance of required observations. Observer is subject to approval of Architect/Engineer.

C. Report observations and Site decisions or instructions given to applicators or installers that are supplemental or contrary to manufacturer's written instructions.

D. Refer to Section 01330 - Submittal Procedures, "Manufacturer's Field Reports" Article.

PART 2 PRODUCTS - Not Used

PART 3 EXECUTION - Not Used

END OF SECTION

SECTION 01400 - QUALITY REQUIREMENTS- ROOFING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes administrative and procedural requirements for quality assurance and quality control.

B. Testing and inspecting services are required to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with the Contract Document requirements.
   1. Specific quality-assurance and -control requirements for individual construction activities are specified in the Sections that specify those activities. Requirements in those Sections may also cover production of standard products.
   2. Specified tests, inspections, and related actions do not limit Contractor's other quality-assurance and -control procedures that facilitate compliance with the Contract Document requirements.
   3. Requirements for Contractor to provide quality-assurance and -control services required by Owner, or authorities having jurisdiction are not limited by provisions of this Section.

1.3 DEFINITIONS

A. Quality-Assurance Services: Activities, actions, and procedures performed before and during execution of the Work to guard against defects and deficiencies and substantiate that proposed construction will comply with requirements.

B. Quality-Control Services: Tests, inspections, procedures, and related actions during and after execution of the Work to evaluate that actual products incorporated into the Work and completed construction comply with requirements. Services do not include contract enforcement activities performed by Owner.

C. Preconstruction Testing: Tests and inspections that are performed specifically for the Project before products and materials are incorporated into the Work to verify performance or compliance with specified criteria.

D. Product Testing: Tests and inspections that are performed by an NRTL, an NVLAP, or a testing agency qualified to conduct product testing and acceptable to authorities having jurisdiction, to establish product performance and compliance with industry standards.

E. Source Quality-Control Testing: Tests and inspections that are performed at the source, i.e., plant, mill, factory, or shop.

F. Field Quality-Control Testing: Tests and inspections that are performed on-site for installation of the Work and for completed Work.

G. Testing Agency: An entity engaged to perform specific tests, inspections, or both. Testing laboratory shall mean the same as testing agency.

H. Installer/Applicator/Erector: Contractor or another entity engaged by Contractor as an employee, Subcontractor, or Sub-subcontractor, to perform a particular construction operation, including installation, erection, application, and similar operations.

1. Using a term such as "carpentry" does not imply that certain construction activities must be performed by accredited or unionized individuals of a corresponding generic name, such as "carpenter." It also does not imply that requirements specified apply exclusively to trades-people of the corresponding generic name.

I. Experienced: When used with an entity, "experienced" means having successfully completed a minimum of five previous projects similar in size and scope to this Project; being familiar with special requirements indicated; and having complied with requirements of authorities having jurisdiction.

1.4 CONFLICTING REQUIREMENTS

A. General: If compliance with two or more standards is specified and the standards establish different or conflicting requirements for minimum quantities or quality levels, comply with the most stringent requirement. Refer uncertainties and requirements that are different, but apparently equal, to Owner for a decision before proceeding.

B. Minimum Quantity or Quality Levels: The quantity or quality level shown or specified shall be the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of requirements. Refer uncertainties to Owner for a decision before proceeding.

1.5 SUBMITTALS

A. Qualification Data: For testing agencies specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include proof of qualifications in the form of a recent report on the inspection of the testing agency by a recognized authority.

B. Reports: Prepare and submit certified written reports that include the following:
1. Date of issue.
2. Project title and number.
3. Name, address, and telephone number of testing agency.

4. Dates and locations of samples and tests or inspections.
5. Names of individuals making tests and inspections.
6. Description of the Work and test and inspection method.
7. Identification of product and Specification Section.
8. Complete test or inspection data.
9. Test and inspection results and an interpretation of test results.
10. Record of temperature and weather conditions at time of sample taking and testing and inspecting.
11. Comments or professional opinion on whether tested or inspected Work complies with the Contract Document requirements.
12. Name and signature of laboratory inspector.
13. Recommendations on retesting and reinspecting.

C. Permits, Licenses, and Certificates: For Owner's records, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, correspondence, records, and similar documents, established for compliance with standards and regulations bearing on performance of the Work.

1.6 QUALITY ASSURANCE

A. General: Qualifications paragraphs in this Article establish the minimum qualification levels required; individual Specification Sections specify additional requirements.

B. Installer Qualifications: A firm or individual experienced in installing, erecting, or assembling work similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful in-service performance.

C. Manufacturer Qualifications: A firm experienced in manufacturing products or systems similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.

D. Fabricator Qualifications: A firm experienced in producing products similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.

E. Testing Agency Qualifications: An NRTL, an NVLAP, or an independent agency with the experience and capability to conduct testing and inspecting indicated, as documented according to ASTM E 548; and with additional qualifications specified in individual Sections; and where required by authorities having jurisdiction, that is acceptable to authorities.
1. NRTL: A nationally recognized testing laboratory according to 29 CFR 1910.7.
2. NVLAP: A testing agency accredited according to NIST's National Voluntary Laboratory Accreditation Program.

F. Factory-Authorized Technical Representative Qualifications: An authorized, full-time technical specialist employee representative of manufacturer who is trained and approved by manufacturer to observe and inspect installation of roofing systems that are similar in material, design, and extent to those indicated for this Project.

1.7 QUALITY CONTROL

A. Owner Responsibilities: Where quality-control services are indicated as Owner's responsibility, Owner will engage a qualified testing agency to perform these services.
   1. Owner will furnish Contractor with names, addresses, and telephone numbers of testing agencies engaged and a description of types of testing and inspecting they are engaged to perform.
   2. Payment for these services will be made from testing and inspecting allowances, as authorized by Change Orders.
   3. Costs for retesting and re-inspecting construction that replaces or is necessitated by work that failed to comply with the Contract Documents will be charged to Contractor, and the Contract Sum will be adjusted by Change Order.

B. Tests and inspections not explicitly assigned to Owner are Contractor's responsibility. Unless otherwise indicated, provide quality-control services specified and those required by authorities having jurisdiction. Perform quality-control services required of Contractor by authorities having jurisdiction, whether specified or not.
   1. Where services are indicated as Contractor's responsibility, engage a qualified testing agency to perform these quality-control services.
      a. Contractor shall not employ same entity engaged by Owner, unless agreed to in writing by Owner.
   2. Notify testing agencies at least 24 hours in advance of time when Work that requires testing or inspecting will be performed.
   3. Where quality-control services are indicated as Contractor's responsibility, submit a certified written report, in duplicate, of each quality-control service.
   4. Testing and inspecting requested by Contractor and not required by the Contract Documents are Contractor's responsibility.
   5. Submit additional copies of each written report directly to authorities having jurisdiction, when they so direct.

C. Manufacturer's Field Services: Where indicated, engage a manufacturer-authorized technical representative to inspect field-assembled components. Report results in writing as specified in Division 1 Section "Submittal Procedures."

D. Retesting/Re-inspecting: Regardless of whether original tests or inspections were Contractor's responsibility, provide quality-control services, including retesting and reinspecting, for construction that replaced Work that failed to comply with the Contract Documents.

E. Testing Agency Responsibilities: Cooperate with Owner and Contractor in performance of duties. Provide qualified personnel to perform required tests and inspections.
   1. Notify Owner and Contractor promptly of irregularities or deficiencies observed in the Work during performance of its services.
   2. Determine the location from which test samples will be taken and in which in-situ tests are conducted.
   3. Conduct and interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from requirements.
   4. Submit a certified written report, in duplicate, of each test, inspection, and similar quality-control service through Contractor.

5. Do not release, revoke, alter, or increase the Contract Document requirements or approve or accept any portion of the Work.
6. Do not perform any duties of Contractor.

F. Associated Services: Cooperate with agencies performing required tests, inspections, and similar quality-control services, and provide reasonable auxiliary services as requested. Notify agency sufficiently in advance of operations to permit assignment of personnel. Provide the following:
1. Access to the Work.
2. Incidental labor and facilities necessary to facilitate tests and inspections, including minor cutting and patching.
3. Adequate quantities of representative samples of materials that require testing and inspecting. Assist agency in obtaining samples.
4. Facilities for storage of test samples.
5. Security and protection for samples and for testing and inspecting equipment at Project site.

G. Coordination: Coordinate sequence of activities to accommodate required quality-assurance and -control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspecting.
1. Schedule times for tests, inspections, obtaining samples, and similar activities.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 TEST AND INSPECTION LOG

A. Prepare a record of tests and inspections. Include the following:
1. Date test or inspection was conducted.
2. Description of the Work tested or inspected.
3. Date test or inspection results were transmitted to Owner.
4. Identification of testing agency or special inspector conducting test or inspection.

B. Maintain log at Project site. Post changes and modifications as they occur. Provide access to test and inspection log for Owner's reference during normal working hours.

3.2 REPAIR AND PROTECTION

A. General: On completion of testing, inspecting, sample taking, and similar services, repair damaged construction and restore substrates and finishes.
1. Provide materials and comply with installation requirements specified in other Specification Sections. Restore patched areas and extend restoration into adjoining areas with durable seams that are as invisible as possible.

2. Comply with the Contract Document requirements for Division 1 Section "Cutting and Patching."

B. Protect construction exposed by or for quality-control service activities.

C. Repair and protection are Contractor's responsibility, regardless of the assignment of responsibility for quality-control services.

END OF SECTION 01400

TEMPORARY FACILITIES AND CONTROLS

SECTION 01500

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Temporary facilities under Construction Management Agreement.

B. Temporary Utilities:
1. Temporary electricity.
2. Temporary lighting for construction purposes.
3. Temporary heating.
4. Temporary cooling.
5. Temporary ventilation.
6. Communication services.
7. Temporary water service.
8. Temporary sanitary facilities.

C. Construction Facilities:
1. Field offices and sheds.
2. Vehicular access.
3. Parking.
4. Progress cleaning and waste removal.
5. Project identification.
6. Traffic regulation.
7. Fire-prevention facilities.

D. Temporary Controls:
1. Barriers.
2. Enclosures and fencing.
3. Security.
4. Water control.
5. Dust control.
6. Erosion and sediment control.
7. Noise control.
8. Pest and rodent control.
9. Pollution control.

E. Removal of utilities, facilities, and controls.

1.2 REFERENCES

A. ASTM International:
   1. ASTM E 84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
   2. ASTM E 90 - Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements.
   3. ASTM E 119 - Standard Test Methods for Fire Tests of Building Construction and Materials.

1.3 TEMPORARY FACILITIES UNDER CONSTRUCTION MANAGEMENT AGREEMENT

A. Temporary Provisions Provided by Contractor:
   1. Temporary barriers, barricades, covered walkways, fencing, exterior closures, and interior closures.
   2. Temporary field offices.
   3. Cleaning during construction.
   4. Access roads and approaches.
   5. Temporary elevator.
   6. Temporary sanitary facilities.
   7. Temporary heating and ventilating after enclosure.
   8. Temporary electrical service and distribution system for power and lighting.
   9. Temporary telephone and internet service.

B. Each Contractor: Coordinate provisions with Construction Project Manager and provide the following items as necessary for execution of the Work including associated costs:
   1. Construction aids.
   2. Temporary fire protection, dust control, erosion and sediment control, water control, noise control, and other necessary temporary controls.
   3. Temporary barriers, barricades, and similar devices as necessary for safety and protection of construction personnel and public.
   4. On Construction Manager's approval, may provide temporary field office including electrical service and temporary telephone.
   5. Temporary tree and plant protection.
   6. Temporary heating before building enclosure.
   7. Electrical service required in addition to temporary service and distribution provided by Construction Manager.
   8. Temporary provisions for protection of installed Work.

1.4 TEMPORARY ELECTRICITY

A. Provide and pay for power service required from utility source as needed for construction operation.

B. Complement existing power service capacity and characteristics as required for construction operations.

C. Provide power outlets with branch wiring and distribution boxes located as required for construction operations. Provide suitable, flexible power cords as required for portable construction tools and equipment.

D. Permanent convenience receptacles shall not be used during construction.

1.5 COMMUNICATION SERVICES

A. Telephone Service: Provide, maintain, and pay for telephone service to field office at time of Project mobilization and until completion of Work.

B. Facsimile Service: Provide, maintain, and pay for facsimile service including dedicated telephone line to field office at time of Project mobilization and until completion of Work.

1.6 TEMPORARY WATER SERVICE

A. Provide and pay for suitable quality water service as needed to maintain specified conditions for construction operations.

1.7 TEMPORARY SANITARY FACILITIES

A. Provide and maintain required facilities and enclosures. Existing facility use is not permitted. Provide facilities at time of Project mobilization.

1.8 FIELD OFFICES AND SHEDS

A. Designated existing spaces may be used for field offices.

B. Do not use existing facilities for field offices or for storage.

C. Field Office: Weathertight, with lighting, electrical outlets, heating, cooling and ventilating equipment, and equipped with sturdy furniture including conference table, drawing rack, filing cabinets, and drawing display table.

D. Provide space for Project meetings, with table and chairs to accommodate six persons.

E. Do not use permanent facilities for field offices or for storage.

F. Construction: Portable or mobile buildings, or buildings constructed with floors raised aboveground, securely fixed to foundations with steps and landings at entrance doors.
   1. Construction: Structurally sound, secure, weathertight enclosures for office and storage spaces. Maintain during progress of Work; remove enclosures at completion of Work.
   2. Thermal Resistance of Floors, Walls, and Ceilings: Compatible with occupancy and storage requirements.
   3. Exterior Materials: Weather-resistant,finished in colors acceptable to Architect/Engineer.

4. Interior Materials in Field Offices: Sheet-type materials for walls and ceilings, prefinished or painted; resilient floors and bases.
5. Interior Materials in Storage Sheds: As required to provide specified conditions for storage of products.

G. Environmental Control:
1. Heating, Cooling, and Ventilating for Offices: Automatic equipment to maintain comfort conditions.
2. Storage Spaces: Heating and ventilating as needed to maintain products according to Contract Documents; lighting for maintenance and inspection of products.

H. Storage Areas and Sheds: Size to storage requirements for products of individual Sections, allowing for access and orderly provision for maintenance and inspection of products to suit requirements in Section 01600 - Product Requirements.

I. Preparation: Fill and grade Sites for temporary structures sloped for drainage away from buildings.

J. Installation:
1. Install field office spaces ready for occupancy 15 days after date established by Notice to Proceed.
2. Employee Residential Occupancy: Not allowed on Owner's property.

K. Maintenance and Cleaning:
1. Daily janitorial services for field offices; periodic cleaning and maintenance for sheds and storage areas.
2. Maintain walks free of mud, water, snow, and the like.

L. Removal: At completion of Work remove buildings, foundations, utility services, and debris. Restore areas to same or better condition as original condition.

1.9 VEHICULAR ACCESS

A. Construct temporary all-weather access roads from public thoroughfares to serve construction area, of width and load-bearing capacity to accommodate unimpeded traffic for construction purposes.

B. Construct temporary bridges and culverts to span low areas and allow unimpeded drainage.

C. Extend and relocate vehicular access as Work progress requires and provide detours as necessary for unimpeded traffic flow.

D. Locate as indicated on Drawings and approved by Owner.

E. Provide unimpeded access for emergency vehicles. Maintain 20 foot wide driveways with turning space between and around combustible materials.

F. Provide and maintain access to fire hydrants and control valves free of obstructions.

G. Provide means of removing mud from vehicle wheels before entering streets.

H. Use existing on-Site roads for construction traffic.

1.10 PARKING

A. **Provide** temporary surface parking areas to accommodate construction personnel.

B. Locate as indicated on Drawings and approved by Owner.

C. If Site space is not adequate, provide additional off-Site parking.

D. Use of designated areas of existing on-Site streets and driveways used for construction traffic is permitted. Tracked vehicles are not allowed on paved areas.

E. Use of existing parking facilities used by construction personnel is not permitted.

F. Do not allow heavy vehicles or construction equipment in parking areas.

G. Do not allow vehicle parking on existing pavement.

H. Permanent Pavements and Parking Facilities:
1. Avoid traffic loading beyond paving design capacity. Tracked vehicles are not allowed.
2. Use of permanent parking structures is not permitted.

I. Maintenance:
1. Maintain traffic and parking areas in sound condition free of excavated material, construction equipment, products, mud, snow, ice, and the like.
2. Maintain existing and permanent paved areas used for construction; promptly repair breaks, potholes, low areas, standing water, and other deficiencies, to maintain paving and drainage in original condition.

J. Removal, Repair:
1. Remove temporary materials and at Substantial Completion.
2. Repair existing, permanent facilities damaged by use, to original condition.

K. Mud from Site vehicles: Provide means of removing mud from vehicle wheels before entering streets.

1.11 PROGRESS CLEANING AND WASTE REMOVAL

A. Maintain areas free of waste materials, debris, and rubbish. Maintain Site in clean and orderly condition.

B. Remove debris and rubbish from pipe chases, plenums, attics, crawl spaces, and other closed or remote spaces, before enclosing spaces.

C. Broom and vacuum clean interior areas before starting surface finishing, and continue cleaning to eliminate dust.

D. Collect and remove waste materials, debris, and rubbish from Site weekly and dispose of off-Site.

E. Open free-fall chutes are not permitted. Terminate closed chutes into appropriate containers with lids.

1.12 PROJECT IDENTIFICATION

A. Project Identification Sign:
   1. One painted sign, 32 sq ft area, and bottom 6 feet aboveground.
   2. Content:
      a. Project number, title, logo, and name of Owner.
      b. Names and titles of authorities.
      c. Names and titles of Architect/Engineer and Consultants.
      d. Name of Prime Contractor.
   3. Graphic Design, Colors, and Style of Lettering: Designated by Architect/Engineer.

B. Design sign and structure to withstand 105 wind velocity.

C. Finishes, Painting: Adequate to withstand weathering, fading, and chipping for duration of construction.

D. Sign Materials:
   1. Structure and Framing: New wood structurally adequate.
   2. Sign Surfaces: Exterior grade plywood with medium-density overlay, minimum of **3/4** inches thick, standard large sizes to minimize joints.

E. Installation:
   1. Install Project identification sign within 15 days after date established by Notice to Proceed.
   2. Erect at designated location.
   3. Erect supports and framing on secure foundation, rigidly braced and framed to resist wind loadings.
   4. Install sign surface plumb and level, with butt joints. Anchor securely.
   5. Paint exposed surfaces of sign, supports, and framing.

F. Maintenance: Maintain clean signs and supports; repair deterioration and damage.

G. Removal: Remove signs, framing, supports, and foundations at completion of Project and restore area.

1.13 TRAFFIC REGULATION

A. Signs, Signals, and Devices:
   1. Post-Mounted and Wall-Mounted Traffic Control and Informational Signs: As approved by authorities having jurisdiction.
   2. Traffic Control Signals: As approved by local jurisdictions.
   3. Traffic Cones, Drums, Flares, and Lights: As approved by authorities having jurisdiction.
   4. Flag Person Equipment: As required by authorities having jurisdiction.

B. Flag Persons: Provide trained and equipped flag persons to regulate traffic when construction operations or traffic encroach on public traffic lanes.

C. Flares and Lights: Use flares and lights during hours of low visibility to delineate traffic lanes and to guide traffic.

D. Haul Routes:
   1. Consult with authorities having jurisdiction and establish public thoroughfares to be used for haul routes and Site access.
   2. Confine construction traffic to designated haul routes.
   3. Provide traffic control at critical areas of haul routes to regulate traffic and to minimize interference with public traffic.

E. Traffic Signs and Signals:
   1. Provide signs at approaches to Site and on Site, at crossroads, detours, parking areas, and elsewhere as needed to direct construction and affected public traffic.
   2. Provide, operate, and maintain **automatic** traffic control signals to direct and maintain orderly flow of traffic in areas under Contractor's control and areas affected by Contractor's operations.
   3. Relocate signs and signals as Work progresses, to maintain effective traffic control.

F. Removal:
   1. Remove equipment and devices at Substantial Completion.
   2. Repair damage caused by installation.
   3. Remove post settings to depth of 2 feet.

1.14 FIRE-PREVENTION FACILITIES

A. Prohibit smoking within buildings under construction and demolition. Designate area on Site where smoking is permitted. Provide approved ashtrays in designated smoking areas.

B. Establish fire watch for cutting, welding, and other hazardous operations capable of starting fires. Maintain fire watch before, during, and after hazardous operations until threat of fire does not exist.

C. Portable Fire Extinguishers: NFPA 10; 10-pound capacity, 4A-60B: C UL rating.
   1. Provide minimum of one fire extinguisher in every construction trailer and storage shed.

2. Provide minimum of one fire extinguisher on roof during roofing operations using heat-producing equipment.

1.15 ENCLOSURES AND FENCING

A. Construction: Commercial-grade chain-link fence.

B. Provide 6 foot high fence around construction Site; equip with vehicular of gates with locks.

C. Exterior Enclosures:
1. Provide temporary weathertight closure of exterior openings to accommodate acceptable working conditions and protection for products, to allow for temporary heating and maintenance of required ambient temperatures identified in individual Specification Sections, and to prevent entry of unauthorized persons. Provide access doors with self-closing hardware and locks.

D. Interior Enclosures:
1. Provide temporary partitions as indicated on Drawings to separate work areas from Owner-occupied areas, to prevent penetration of dust and moisture into Owner-occupied areas, and to prevent damage to existing materials and equipment.
2. Paint surfaces exposed to view from Owner-occupied areas.

1.16 SECURITY

A. Security Program:
1. Protect Work on existing premises from theft, vandalism, and unauthorized entry.
2. Initiate program in coordination with Owner's existing security system at Project mobilization.
3. Maintain program throughout construction period until Owner's acceptance precludes need for Contractor's security.

B. Entry Control:
1. Restrict entrance of persons and vehicles to Project Site.
2. Allow entrance only to authorized persons with proper identification.
3. Maintain log of workers and visitors and make available to Owner on request.
4. Owner will control entrance of persons and vehicles related to Owner's operations.

C. Personnel Identification:
1. Provide identification badge for each person authorized to enter premises.
2. Badge to Include: Personal photograph, name, expiration date, and employer logo.
3. Maintain list of accredited persons and submit copy to Owner on request.
4. Require return of badges at expiration of employment on the Work.

D. Restrictions:
1. Do not allow cellular phones on Site or photographs taken except by written approval of Owner.

2. Do no work on days indicated in Owner-Contractor Agreement.

1.17 WATER CONTROL

A. Grade Site to drain. Maintain excavations free of water. Provide, operate, and maintain necessary pumping equipment.

B. Protect Site from puddles or running water.

1.18 DUST CONTROL

A. Execute Work by methods that minimize raising dust from construction operations.

B. Provide positive means to prevent airborne dust from dispersing into atmosphere and into Owner-occupied areas.

1.19 EROSION AND SEDIMENT CONTROL

A. Plan and execute construction by methods to control surface drainage from cuts and fills from borrow and waste disposal areas. Prevent erosion and sedimentation.

B. Minimize surface area of bare soil exposed at one time.

C. Provide temporary measures including berms, dikes, drains, and other devices to prevent water flow.

D. Construct fill and waste areas by selective placement to avoid erosive surface silts and clays.

E. Periodically inspect earthwork to detect evidence of erosion and sedimentation. Promptly apply corrective measures.

1.20 NOISE CONTROL

A. Provide methods, means, and facilities to minimize noise and noise produced by construction operations.

1.21 PEST AND RODENT CONTROL

A. Provide methods, means, and facilities to prevent pests and insects from entering facility.

B. Provide methods, means, and facilities to prevent rodents from accessing or invading premises.

1.22 POLLUTION CONTROL

A. Provide methods, means, and facilities to prevent contamination of soil, water, and atmosphere from discharge of noxious, toxic substances and pollutants produced by construction operations.

B. Comply with pollution and environmental control requirements of authorities having jurisdiction.

1.23 REMOVAL OF UTILITIES, FACILITIES, AND CONTROLS

A. Remove temporary utilities, equipment, facilities, and materials before Substantial Completion inspection.

B. Remove underground installations to minimum depth of 2 feet.

C. Clean and repair damage caused by installation or use of temporary Work.

D. Restore existing facilities used during construction to original condition. Restore permanent facilities used during construction to specified condition.

PART 2 PRODUCTS - Not Used

PART 3 EXECUTION - Not Used

END OF SECTION

PRODUCT REQUIREMENTS

SECTION 01600

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Products.
B. Product delivery requirements.
C. Product storage and handling requirements.
D. Product options.
E. Equipment electrical characteristics and components.

1.2 PRODUCTS

A. At minimum, comply with specified requirements and reference standards.

B. Specified products define standard of quality, type, function, dimension, appearance, and performance required.

C. Furnish products of qualified manufacturers that are suitable for intended use. Furnish products of each type by single manufacturer unless specified otherwise. Confirm that manufacturer's production capacity can provide sufficient product, on time, to meet Project requirements.

D. Domestic Products: Except where specified otherwise, domestic products are required and interpreted to mean products mined, manufactured, fabricated, or produced in United States or its territories.

E. Do not use materials and equipment removed from existing premises except as specifically permitted by Contract Documents.

F. Furnish interchangeable components from same manufacturer for components being replaced.

1.3 PRODUCT DELIVERY REQUIREMENTS

A. Transport and handle products according to manufacturer's instructions.

B. Promptly inspect shipments to ensure products comply with requirements, quantities are correct, and products are undamaged.

C. Provide equipment and personnel to handle products; use methods to prevent soiling, disfigurement, or damage.

1.4 PRODUCT STORAGE AND HANDLING REQUIREMENTS

A. Store and protect products according to manufacturer's instructions.

B. Store products with seals and labels intact and legible.

C. Store sensitive products in weathertight, climate-controlled enclosures in an environment suitable to product.

D. For exterior storage of fabricated products, place products on sloped supports aboveground.

E. Cover products subject to deterioration with impervious sheet covering. Provide ventilation to prevent condensation and degradation of products.

F. Store loose granular materials on solid flat surfaces in well-drained area. Prevent mixing with foreign matter.

G. Provide equipment and personnel to store products; use methods to prevent soiling, disfigurement, or damage.

H. Arrange storage of products to permit access for inspection. Periodically inspect to verify products are undamaged and are maintained in acceptable condition.

1.5 PRODUCT OPTIONS

A. Products Specified by Reference Standards or by Description Only: Products complying with specified reference standards or description.

B. Products Specified by Naming One or More Manufacturers: Products of one of manufacturers named and complying with Specifications; no options or substitutions allowed.

C. Products Specified by Naming One or More Manufacturers with Provision for Substitutions: Submit Request for Substitution for any manufacturer not named, according to Section 01630 - Product Substitution Procedures.

PART 2 PRODUCTS

2.1 EQUIPMENT ELECTRICAL CHARACTERISTICS AND COMPONENTS

A. Wiring Terminations: Furnish terminal lugs to match branch circuit conductor quantities, sizes, and materials indicated. Include lugs for terminal box.

PART 3 EXECUTION - Not Used

END OF SECTION

HIDALGO COUNTY SHERIFF'S OFFICE
Hidalgo County Adult Detention Center and
Law Enforcement Facility Repairs and / or Replacement
Edinburg, TX

SECTION 01600 - PRODUCT REQUIREMENTS- ROOFING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes administrative and procedural requirements for selection of products for use in Project; product delivery, storage, and handling; manufacturers' standard warranties on products; special warranties; product substitutions; and comparable products.

1.3 DEFINITIONS

A. Products: Items purchased for incorporating into the Work, whether purchased for Project or taken from previously purchased stock. The term "product" includes the terms "material," "equipment," "system," and terms of similar intent.

1. Named Products: Items identified by manufacturer's product name, including make or model number or other designation shown or listed in manufacturer's published product literature that is current as of date of the Contract Documents.
2. New Products: Items that have not previously been incorporated into another project or facility. Products salvaged or recycled from other projects are not considered new products.
3. Comparable Product: Product that is demonstrated and approved through submittal process, or where indicated as a product substitution, to have the indicated qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics that equal or exceed those of specified product.

B. Substitutions: Changes in products, materials, equipment, and methods of construction from those required by the Contract Documents and proposed by Contractor.

C. Basis-of-Design Product Specification: Where a specific manufacturer's product is named and accompanied by the words "basis of design," including make or model number or other designation, to establish the significant qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics for purposes of evaluating comparable products of other named manufacturers.

1.4 SUBMITTALS

A. Product List: Submit a list, in tabular from, showing specified products. Include generic names of products required. Include manufacturer's name and proprietary product names for each product.
   1. Coordinate product list with Contractor's Construction Schedule and the Submittals Schedule.
   2. Completed List: Within 7 days after date of Notice of Award, submit 3 copies of completed product list. Include a written explanation for omissions of data and for variations from Contract requirements.
   3. Owner's Action: Owner will respond in writing to Contractor within 7 days of receipt of completed product list. Owner's response will include a list of unacceptable product selections and a brief explanation of reasons for this action. Owner's response, or lack of response, does not constitute a waiver of requirement to comply with the Contract Documents.

B. Substitution Requests: Submit 3 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. Substitution Request Form: Use CSI Form 13.1A or facsimile of form provided in this Project Manual.
   2. Documentation: Show compliance with requirements for substitutions and the following, as applicable:
      a. Statement indicating why specified material or product cannot be provided.
      b. Detailed comparison of significant qualities of proposed substitution with those of the Work specified. Significant qualities may include attributes such as performance, weight, size, durability, visual effect, and specific features and requirements indicated.
      c. Product Data, including drawings and descriptions of products and fabrication and installation procedures.
      d. Samples, where applicable or requested.
      e. List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners.
      f. Material test reports from a qualified independent testing agency indicating and interpreting test results for compliance with requirements indicated.
      g. Research/evaluation reports evidencing compliance with building code in effect for Project, from a model code organization acceptable to authorities having jurisdiction.
      h. Contractor's certification that proposed substitution complies with requirements in the Contract Documents and is appropriate for applications indicated.

   3. Owner's Action: If necessary, Owner will request additional information or documentation for evaluation within 7 days of receipt of a request for substitution. Owner will notify Contractor of acceptance or rejection of proposed substitution within 7 days of receipt of request, or 7 days of receipt of additional information or documentation, whichever is later.

a. Use product specified if Owner cannot make a decision on use of a proposed substitution within time allocated.

C. Comparable Product 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. Owner's Action: If necessary, Owner will request additional information or documentation for evaluation within one week of receipt of a comparable product request. Owner will notify Contractor of approval or rejection of proposed comparable product request within 7 days of receipt of request, or 7 days of receipt of additional information or documentation, whichever is later.
a. Use product specified if Owner cannot make a decision on use of a comparable product request within time allocated.

D. Basis-of-Design Product Specification Submittal: Comply with requirements in Division 1 Section "Submittal Procedures." Show compliance with requirements.

1.5 QUALITY ASSURANCE

A. Compatibility of Options: If Contractor is given option of selecting between two or more products for use on Project, product selected shall be compatible with products previously selected, even if previously selected products were also options.

1.6 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, and handle products using means and methods that will prevent damage, deterioration, and loss, including theft. Comply with manufacturer's written instructions.

B. Delivery and Handling:
1. Schedule delivery to minimize long-term storage at Project site and to prevent overcrowding of construction spaces.
2. Coordinate delivery with installation time to ensure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other losses.
3. Deliver products to Project site in an undamaged condition in manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.
4. Inspect products on delivery to ensure compliance with the Contract Documents and to ensure that products are undamaged and properly protected.

C. Storage:
1. Store products to allow for inspection and measurement of quantity or counting of units.
2. Store materials in a manner that will not endanger Project structure.
3. Store products that are subject to damage by the elements, under cover in a weather-tight enclosure above ground, with ventilation adequate to prevent condensation.
4. Store cementitious products and materials on elevated platforms.

5. Store foam plastic from exposure to sunlight, except to extent necessary for period of installation and concealment.
6. Comply with product manufacturer's written instructions for temperature, humidity, ventilation, and weather-protection requirements for storage.
7. Protect stored products from damage and liquids from freezing.

1.7 PRODUCT WARRANTIES

A. Warranties specified in other Sections shall be in addition to, and run concurrent with, other warranties required by the Contract Documents. Manufacturer's disclaimers and limitations on product warranties do not relieve Contractor of obligations under requirements of the Contract Documents.
   1. Special Warranty: Written warranty required by or incorporated into the Contract Documents, either to extend time limit provided by manufacturer's warranty or to provide more rights for Owner.

B. Special Warranties: Prepare a written document that contains appropriate terms and identification, ready for execution. Submit a draft for approval before final execution.
   1. Manufacturer's Standard Form: Modified to include Project-specific information and properly executed.

C. Submittal Time: Comply with requirements in Division 1 Section "Closeout Procedures."

PART 2 - PRODUCTS

2.1 PRODUCT SELECTION PROCEDURES

A. General Product Requirements: Provide products that comply with the Contract Documents, that are undamaged and, unless otherwise indicated, that are new at time of installation.
   1. Provide products complete with accessories, trim, finish, fasteners, and other items needed for a complete installation and indicated use and effect.
   2. Standard Products: If available, and unless custom products or nonstandard options are specified, provide standard products of types that have been produced and used successfully in similar situations on other projects.
   3. Owner reserves the right to limit selection to products with warranties not in conflict with requirements of the Contract Documents.
   4. Where products are accompanied by the term "as selected," Owner will make selection.
   5. Where products are accompanied by the term "match sample," sample to be matched is Owner's.
   6. Descriptive, performance, and reference standard requirements in the Specifications establish "salient characteristics" of products.

B. Product Selection Procedures:
   1. Products: Where Specifications include a list of names of both products and manufacturers, provide one of the products listed that complies with requirements.

2. Manufacturers: Where Specifications include a list of manufacturers' names, provide a product by one of the manufacturers listed that complies with requirements.
3. Product Options: Where Specifications indicate that sizes, profiles, and dimensional requirements on Drawings are based on a specific product or system, provide the specified product or system. Comply with provisions in Part 2 "Product Substitutions" Article for consideration of an unnamed product or system.
4. Basis-of-Design Product: Where Specifications name a product and include a list of manufacturers, provide the specified product or a comparable product by one of the other named manufacturers. Drawings and Specifications indicate sizes, profiles, dimensions, and other characteristics that are based on the product named. Comply with provisions in Part 2 "Comparable Products" Article for consideration of an unnamed product by the other named manufacturers.
5. Visual Matching Specification: Where Specifications require matching an established Sample, select a product that complies with requirements and matches Owner's sample. Owner's decision will be final on whether a proposed product matches.
    a. If no product available within specified category matches and complies with other specified requirements, comply with provisions in Part 2 "Product Substitutions" Article for proposal of product.
6. Visual Selection Specification: Where Specifications include the phrase "as selected from manufacturer's colors, patterns, and textures" or a similar phrase, select a product that complies with other specified requirements.
    a. Standard Range: Where Specifications include the phrase "standard range of colors, patterns, textures" or similar phrase, Owner will select color, pattern, density, or texture from manufacturer's product line that does not include premium items.
    b. Full Range: Where Specifications include the phrase "full range of colors, patterns, textures" or similar phrase, Owner will select color, pattern, density, or texture from manufacturer's product line that includes both standard and premium items.

2.2 PRODUCT SUBSTITUTIONS

A. Timing: Owner will consider requests for substitution if received at least 7 days prior to bid date. Requests received after that time may be considered or rejected at discretion of Owner.

B. Conditions: Owner will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Owner will return requests without action, except to record noncompliance with these requirements:
1. Requested substitution offers Owner a substantial advantage in cost, time, energy conservation, or other considerations, after deducting additional responsibilities Owner must assume. Owner's additional responsibilities may include compensation to Owner for redesign and evaluation services, increased cost of other construction by Owner, and similar considerations.
2. Requested substitution does not require extensive revisions to the Contract Documents.
3. Requested substitution is consistent with the Contract Documents and will produce indicated results.
4. Substitution request is fully documented and properly submitted.
5. Requested substitution will not adversely affect Contractor's Construction Schedule.

6. Requested substitution has received necessary approvals of authorities having jurisdiction.
7. Requested substitution is compatible with other portions of the Work.
8. Requested substitution has been coordinated with other portions of the Work.
9. Requested substitution provides specified warranty.
10. 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.

2.3 COMPARABLE PRODUCTS

A. Conditions: Owner will consider Contractor's request for comparable product when the following conditions are satisfied. If the following conditions are not satisfied, Owner will return requests without action, except to record noncompliance with these requirements:
   1. Evidence that the proposed product does not require extensive revisions to the Contract Documents that it is consistent with the Contract Documents and will produce the indicated results, and that it is compatible with other portions of the Work.
   2. Detailed comparison of significant qualities of proposed product with those named in the Specifications. Significant qualities include attributes such as performance, weight, size, durability, visual effect, and specific features and requirements indicated.
   3. Evidence that proposed product provides specified warranty.
   4. List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners, if requested.
   5. Samples, if requested.

PART 3 - EXECUTION (Not Used)

END OF SECTION 01600

PRODUCT SUBSTITUTION PROCEDURES

SECTION 01630

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Quality assurance.

B. Product options.

C. Product substitution procedures.

1.2 QUALITY ASSURANCE

A. Contract is based on products and standards established in Contract Documents without consideration of proposed substitutions.

B. Products specified define standard of quality, type, function, dimension, appearance, and performance required.

C. Substitution Proposals: Permitted for specified products except where specified otherwise. Do not substitute products unless substitution has been accepted and approved in writing by Owner.

1.3 PRODUCT OPTIONS

A. See Section 01600 - Product Requirements.

1.4 PRODUCT SUBSTITUTION PROCEDURES

A. Architect/Engineer and Owner and Construction Project Manager will consider requests for substitutions only within 15 days after date of Owner-Contractor Agreement.

B. Substitutions may be considered when a product becomes unavailable through no fault of Contractor.

C. Document each request with complete data, substantiating compliance of proposed substitution with Contract Documents, including:
   1. Manufacturer's name and address, product, trade name, model, or catalog number, performance and test data, and reference standards.
   2. Itemized point-by-point comparison of proposed substitution with specified product, listing variations in quality, performance, and other pertinent characteristics.
   3. Reference to Article and Paragraph numbers in Specification Section.

4. Cost data comparing proposed substitution with specified product and amount of net change to Contract Sum. Change must be a net credit for product consideration.
5. Changes required in other Work.
6. Availability of maintenance service and source of replacement parts as applicable.
7. Certified test data to show compliance with performance characteristics specified.
8. Samples when applicable or requested.
9. Other information as necessary to assist Owner/ PCM evaluation.

D. A request constitutes a representation that Contractor:
1. Has investigated proposed product and determined that it meets or exceeds quality level of specified product.
2. Will provide same warranty for substitution as for specified product.
3. Will coordinate installation and make changes to other Work that may be required for the Work to be complete with no additional cost to Owner.
4. Waives claims for additional costs or time extension that may subsequently become apparent.
5. Will coordinate installation of the accepted substitute, making such changes as may be required for the Work to be complete in all respects.
6. Will reimburse Owner for review or redesign services associated with reapproval by authorities having jurisdiction.

E. Substitutions will not be considered when they are indicated or implied on Shop Drawing or Product Data submittals without separate written request or when acceptance will require revision to Contract Documents.

F. Substitution Submittal Procedure:
1. Submit requests for substitutions on CSI Form 13.1A Substitution Request-After the Bidding/Negotiating Stage.
2. Submit three copies of Request for Substitution for consideration. Limit each request to one proposed substitution.
3. Submit Shop Drawings, Product Data, and certified test results attesting to proposed product equivalence. Burden of proof is on proposer.
4. Substitution must include a credit to the Owner.
5. Architect/Engineer will notify Contractor in writing of decision to accept or reject request.

1.5 INSTALLER SUBSTITUTION PROCEDURES

A. Architect/Engineer will consider requests for substitutions only within 15 days after date of Owner-Contractor Agreement.

B. Document each request with:
1. Installer's qualifications.
2. Installer's experience in work similar to that specified.
3. Other information as necessary to assist Architect/Engineer's evaluation.

C. Substitution Submittal Procedure:

1. Submit three copies Request for Substitution for consideration. Limit each request to one proposed substitution.
2. Architect/Engineer will notify Contractor in writing of decision to accept or reject request.

PART 2 PRODUCTS - Not Used

PART 3 EXECUTION - Not Used

END OF SECTION

EXECUTION REQUIREMENTS

SECTION 01700

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Closeout procedures.
B. Starting of systems.
C. Demonstration and instructions.
D. Testing, adjusting, and balancing.
E. Project record documents.
F. Operation and maintenance data.
G. Manual for materials and finishes.
H. Manual for equipment and systems.
I. Spare parts and maintenance products.
J. Product warranties and product bonds.
K. Maintenance service.
L. Examination.
M. Preparation.
N. Execution.
O. Cutting and patching.
P. Protecting installed construction.
Q. Final cleaning.

1.2 CLOSEOUT PROCEDURES

A. Prerequisites to Substantial Completion: Complete following items before requesting Certification of Substantial Completion, either for entire Work or for portions of Work:
   1. Submit maintenance manuals, Project record documents, digital images of construction photographs and other similar final record data in compliance with this Section.
   2. Complete facility startup, testing, adjusting, balancing of systems and equipment, demonstrations, and instructions to Owner's operating and maintenance personnel as specified in compliance with this Section.
   3. Conduct inspection to establish basis for request that Work is substantially complete. Create comprehensive list (initial punch list) indicating items to be completed or corrected, value of incomplete or nonconforming Work, reason for being incomplete, and date of anticipated completion for each item. Include copy of list with request for Certificate of Substantial Completion.
   4. Obtain and submit releases enabling Owner's full, unrestricted use of Project and access to services and utilities. Include certificate of occupancy, operating certificates, and similar releases from authorities having jurisdiction and utility companies.
   5. Deliver tools, spare parts, extra stocks of material, and similar physical items to Owner.

6. Discontinue or change over and remove temporary facilities and services from Project Site, along with construction tools, mockups, and similar elements.
7. Perform final cleaning according to this Section.

B. Substantial Completion Inspection:
   1. When Contractor considers Work to be substantially complete, submit to Engineer:
      a. Written certificate that Work, or designated portion, is substantially complete.
      b. List of items to be completed or corrected (initial punch list).
   2. Within seven days after receipt of request for Substantial Completion, Engineer will make inspection to determine whether Work or designated portion is substantially complete.
   3. Should Engineer determine that Work is not substantially complete:
      a. Engineer will promptly notify Contractor in writing, stating reasons for its opinion.
      b. Contractor shall remedy deficiencies in Work and send second written request for Substantial Completion to Engineer.
      c. Engineer will reinspect Work.
      d. Redo and Inspection of Deficient Work: Repeated until Work passes Engineer's inspection.
   4. When Engineer finds that Work is substantially complete, Engineer will:
      a. Prepare Certificate of Substantial Completion on EJCDC C-625 - Certificate of Substantial Completion, accompanied by Contractor's list of items to be completed or corrected as verified and amended by Architect/Engineer and Owner (final punch list).
      b. Submit Certificate to Owner and Contractor for their written acceptance of responsibilities assigned to them in Certificate.
   5. After Work is substantially complete, Contractor shall:
      a. Allow Owner occupancy of Project under provisions stated in Certificate of Substantial Completion.
      b. Complete Work listed for completion or correction within 30 working days.
   6. Owner will occupy all of building as specified in Section 01100 - Summary.

C. Prerequisites for Final Completion: Complete following items before requesting final acceptance and final payment.
   1. When Contractor considers Work to be complete, submit written certification that:
      a. Contract Documents have been reviewed.
      b. Work has been examined for compliance with Contract Documents.
      c. Work has been completed according to Contract Documents.
      d. Work is completed and ready for final inspection.
   2. Submittals: Submit following:
      a. Final punch list indicating all items have been completed or corrected.
      b. Final payment request with final releases and supporting documentation not previously submitted and accepted. Include certificates of insurance for products and completed operations where required.
      c. Specified warranties, workmanship/maintenance bonds, maintenance agreements, and other similar documents.
      d. Accounting statement for final changes to Contract Sum.
      e. Contractor's affidavit of payment of debts and claims on AIA G706 - Contractor's Affidavit of Payment of Debts and Claims.
      f. Contractor affidavit of release of liens.

g. Consent of surety to final payment on AIA G707 - Consent of Surety to Final Payment Form.

3. Perform final cleaning for Contractor-soiled areas according to this Section.

D. Final Completion Inspection:
1. Within seven days after receipt of request for final inspection, Engineer will make inspection to determine whether Work or designated portion is complete.
2. Should Engineer consider Work to be incomplete or defective:
a. Engineer will promptly notify Contractor in writing, listing incomplete or defective Work.
b. Contractor shall remedy stated deficiencies and send second written request to Engineer that Work is complete.
c. Engineer will reinspect Work.
d. Redo and Inspection of Deficient Work: Repeated until Work passes Engineer's inspection.

1.3 STARTING OF SYSTEMS

A. Coordinate schedule for startup of various equipment and systems.

B. Notify Engineer and Owner seven days prior to startup of each item.

C. Verify that each piece of equipment or system has been checked for proper lubrication, drive rotation, belt tension, control sequence, and for conditions which may cause damage.

D. Verify that tests, meter readings, and electrical characteristics agree with those required by equipment or system manufacturer.

E. Verify that wiring and support components for equipment are complete and tested.

F. Execute startup under supervision of manufacturer's representative or Contractors' personnel according to manufacturer's instructions.

G. When specified in individual Specification Sections, require manufacturer to provide authorized representative who will be present at Site to inspect, check, and approve equipment or system installation prior to startup and will supervise placing equipment or system in operation.

H. Submit a written report according to Section 01330 - Submittal Procedures that equipment or system has been properly installed and is functioning correctly.

1.4 DEMONSTRATION AND INSTRUCTIONS

A. Demonstrate operation and maintenance of products to Owner's personnel two weeks prior to date of Substantial Completion.

B. Demonstrate Project equipment and instructed by qualified representative who is knowledgeable about the Project.

C. Video Recordings: Provide high-quality color video recordings of demonstration and instructional sessions. Engage commercial videographer to record sessions. Include classroom instructions, demonstrations, board diagrams, and other visual aids. Include menu navigation.

D. For equipment or systems requiring seasonal operation, perform demonstration for other season within six months.

E. Use operation and maintenance manuals as basis for instruction. Review contents of manual with Owner's personnel in detail to explain all aspects of operation and maintenance.

F. Demonstrate startup, operation, control, adjustment, troubleshooting, servicing, maintenance, and shutdown of each item of equipment at scheduled time, at designated location.

G. Prepare and insert additional data in operations and maintenance manuals when need for additional data becomes apparent during instruction.

H. Required instruction time for each item of equipment and system is specified in individual Specification Sections.

1.5 PROJECT RECORD DOCUMENTS

A. Maintain on Site one set of the following record documents; record actual revisions to the Work:
1. Drawings.
2. Specifications.
3. Addenda.
4. Change Orders and other modifications to the Contract.
5. Reviewed Shop Drawings, product data, and Samples.
6. Manufacturer's instruction for assembly, installation, and adjusting.

B. Ensure entries are complete and accurate, enabling future reference by Owner.

C. Store record documents separate from documents used for construction.

D. Record information concurrent with construction progress, not less than weekly.

E. Specifications: Legibly mark and record, at each product Section, description of actual products installed, including the following:
1. Manufacturer's name and product model and number.
2. Product substitutions or alternates used.
3. Changes made by Addenda and modifications.

F. Record Drawings and Shop Drawings: Legibly mark each item to record actual construction as follows:
1. Include Contract modifications such as Addenda, supplementary instructions, change directives, field orders, minor changes in the Work, and change orders.
2. Include locations of concealed elements of the Work.
3. Identify depth of buried utility lines and provide dimensions showing distances from permanent facility components that are parallel to utilities.

4. Dimension ends, corners, and junctions of buried utilities to permanent facility components using triangulation.
5. Identify and locate existing buried or concealed items encountered during Project.
6. Measured depths of foundations in relation to finish [first] [main] floor datum.
7. Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.
8. Measured locations of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of the Work.
9. Field changes of dimension and detail.
10. Details not on original Drawings.

G. Submit marked-up paper copy documents to Engineer before Substantial Completion.

H. Submit PDF electronic files of marked-up documents to Engineer before Substantial Completion.

1.6 OPERATION AND MAINTENANCE DATA

A. Submit in PDF composite electronic indexed file.

B. Submit data bound in 8-1/2 x 11-inch text pages, three D side ring binders with durable plastic covers.

C. Prepare binder cover with printed title "OPERATION AND MAINTENANCE INSTRUCTIONS," title of Project.

D. Internally subdivide binder contents with permanent page dividers, logically organized as described below; with tab titling clearly printed under reinforced laminated plastic tabs.

E. Drawings: Provide with reinforced punched binder tab. Bind in with text; fold larger drawings to size of text pages.

F. Contents: Prepare table of contents for each volume, with each product or system description identified, typed on white paper, in three parts as follows:
1. Part 1: Directory, listing names, addresses, and telephone numbers of Architect/Engineer, Contractor, Subcontractors, and major equipment suppliers.
2. Part 2: Operation and maintenance instructions, arranged by system and subdivided by Specification Section. For each category, identify names, addresses, and telephone numbers of Subcontractors and suppliers. Include the following:
    a. Significant design criteria.
    b. List of equipment.
    c. Parts list for each component.
    d. Operating instructions.
    e. Maintenance instructions for equipment and systems.
    f. Maintenance instructions for special finishes, including recommended cleaning methods and materials, and special precautions identifying detrimental agents.
    g. Safety precautions to be taken when operating and maintaining or working near equipment.
3. Part 3: Project documents and certificates, including the following:

a. Shop Drawings and product data.
b. Air and water balance reports.
c. Certificates.
d. Photocopies of warranties and bonds.

1.7 MANUAL FOR MATERIALS AND FINISHES

A. Submit two copies of preliminary draft or proposed formats and outlines of contents before start of Work. Architect/Engineer will review draft and return one copy with comments.

B. For equipment or component parts of equipment put into service during construction and operated by Owner, submit documents within ten days after acceptance.

C. Submit one copy of completed volumes before Substantial Completion. Draft copy be reviewed and returned after Substantial Completion, with Architect/Engineer comments. Revise content of document sets as required prior to final submission.

D. Submit two sets of revised final volumes within ten days after final inspection.

E. Building Products, Applied Materials, and Finishes: Include product data, with catalog number, size, composition, and color and texture designations. Include information for re-ordering custom-manufactured products.

F. Instructions for Care and Maintenance: Include manufacturer's recommendations for cleaning agents and methods, precautions against detrimental agents and methods, and recommended schedule for cleaning and maintenance.

G. Moisture Protection and Weather Exposed Products: Include product data listing applicable reference standards, chemical composition, and details of installation. Include recommendations for inspections, maintenance, and repair.

H. Additional Requirements: As specified in individual product Specification Sections.

I. Include listing in table of contents for design data, with tabbed fly sheet and space for insertion of data.

1.8 MANUAL FOR EQUIPMENT AND SYSTEMS

A. Submit two copies of preliminary draft or proposed formats and outlines of contents before start of Work. Architect/Engineer will review draft and return one copy with comments.

B. For equipment, or component parts of equipment put into service during construction and operated by Owner, submit documents within ten days after acceptance.

C. Submit one copy of completed volumes before Substantial Completion. Draft copy will be reviewed and returned after Substantial Completion, with Architect/Engineer comments. Revise content of document sets as required prior to final submission.

D. Submit two sets of revised final volumes within ten days after final inspection.

E. Each Item of Equipment and Each System: Include description of unit or system and component parts. Identify function, normal operating characteristics, and limiting conditions. Include performance curves, with engineering data and tests, and complete nomenclature and model number of replaceable parts.

F. Include color-coded wiring diagrams as installed.

G. Operating Procedures: Include startup, break-in, and routine normal operating instructions and sequences. Include regulation, control, stopping, shutdown, and emergency instructions. Include summer, winter, and special operating instructions.

H. Maintenance Requirements: Include routine procedures and guide for preventative maintenance and troubleshooting; disassembly, repair, and reassembly instructions; and alignment, adjusting, balancing, and checking instructions.

I. Include servicing and lubrication schedule and list of lubricants required.

J. Include manufacturer's printed operation and maintenance instructions.

K. Include sequence of operation by controls manufacturer.

L. Include original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.

M. Include control diagrams by controls manufacturer as installed.

N. Include Contractor's coordination drawings with color-coded piping diagrams as installed.

O. Include charts of valve tag numbers, with location and function of each valve, keyed to flow and control diagrams.

P. Include list of original manufacturer's spare parts, current prices, and recommended quantities to be maintained in storage.

Q. Include test and balancing reports as specified in Section 01400 - Quality Requirements.

R. Additional Requirements: As specified in individual product Specification Sections.

S. Include listing in table of contents for design data with tabbed dividers and space for insertion of data.

1.9 SPARE PARTS AND MAINTENANCE PRODUCTS

A. Furnish spare parts, maintenance, and extra products in quantities specified in individual Specification Sections.

B. Deliver to Project Site and place in location as directed by Owner ; obtain receipt prior to final payment.

1.10 PRODUCT WARRANTIES AND PRODUCT BONDS

A. Obtain warranties and bonds executed in duplicate by responsible Subcontractors, suppliers, and manufacturers within ten days after completion of applicable item of Work.

B. Execute and assemble transferable warranty documents and bonds from Subcontractors, suppliers, and manufacturers.

C. Verify documents are in proper form, contain full information, and are notarized.

D. Co-execute submittals when required.

E. Include table of contents and assemble in three D side ring binder with durable plastic cover.

F. Submit prior to final Application for Payment.

G. Time of Submittals:
   1. For equipment or component parts of equipment put into service during construction with Owner's permission, submit documents within ten days after acceptance.
   2. Make other submittals within ten days after date of Substantial Completion, prior to final Application for Payment.
   3. For items of Work for which acceptance is delayed beyond Substantial Completion, submit within ten days after acceptance, listing date of acceptance as beginning of warranty or bond period.

1.11 MAINTENANCE SERVICE

A. Furnish service and maintenance of components indicated in Specification Sections during warranty period.

B. Examine system components at frequency consistent with reliable operation. Clean, adjust, and lubricate as required.

C. Include systematic examination, adjustment, and lubrication of components. Repair or replace parts whenever required. Use parts produced by manufacturer of original component.

D. Do not assign or transfer maintenance service to agent or Subcontractor without prior written consent of Owner.

PART 2 PRODUCTS - Not Used

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that existing Site conditions and substrate surfaces are acceptable for subsequent Work. Beginning new Work means acceptance of existing conditions.

B. Verify that existing substrate is capable of structural support or attachment of new Work being applied or attached.

C. Examine and verify specific conditions described in individual Specification Sections.

D. Verify that utility services are available with correct characteristics and in correct locations.

3.2 PREPARATION

A. Clean substrate surfaces prior to applying next material or substance according to manufacturer's instructions.

B. Seal cracks or openings of substrate prior to applying next material or substance.

C. Apply manufacturer-required or -recommended substrate primer, sealer, or conditioner prior to applying new material or substance in contact or bond.

3.3 EXECUTION

A. Comply with manufacturer's installation instructions, performing each step in sequence. Maintain one set of manufacturer's installation instructions at Project Site during installation and until completion of construction.

B. When manufacturer's installation instructions conflict with Contract Documents, request clarification from Architect/Engineer before proceeding.

C. Verify that field measurements are as indicated on approved Shop Drawings or as instructed by manufacturer.

D. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion, or disfigurement.
   1. Secure Work true to line and level and within specified tolerances, or if not specified, industry-recognized tolerances.
   2. Physically separate products in place, provide electrical insulation, or provide protective coatings to prevent galvanic action or corrosion between dissimilar metals.
   3. Exposed Joints: Provide uniform joint width and arrange to obtain best visual effect. Refer questionable visual-effect choices to Architect/Engineer for final decision.

E. Allow for expansion of materials and building movement.

F. Climatic Conditions and Project Status: Install each unit of Work under conditions to ensure best possible results in coordination with entire Project.
   1. Isolate each unit of Work from incompatible Work as necessary to prevent deterioration.
   2. Coordinate enclosure of Work with required inspections and tests to minimize necessity of uncovering Work for those purposes.

G. Mounting Heights: Where not indicated, mount individual units of Work at industry recognized standard mounting heights for particular application indicated.
   1. Refer questionable mounting heights choices to Architect/Engineer for final decision.
   2. Elements Identified as Accessible to Handicapped: Comply with applicable codes and regulations.

H. Adjust operating products and equipment to ensure smooth and unhindered operation.

I. Clean and perform maintenance on installed Work as frequently as necessary through remainder of construction period. Lubricate operable components as recommended by manufacturer.

3.4 CUTTING AND PATCHING

A. Employ skilled and experienced installers to perform cutting and patching.

B. Submit written request in advance of cutting or altering elements affecting:
   1. Structural integrity of element.
   2. Integrity of weather-exposed or moisture-resistant elements.
   3. Efficiency, maintenance, or safety of element.
   4. Visual qualities of sight-exposed elements.
   5. Work of Owner or separate contractor.

C. Execute cutting, fitting, and patching including excavation and fill to complete Work and to:
   1. Fit the several parts together, to integrate with other Work.
   2. Uncover Work to install or correct ill-timed Work.
   3. Remove and replace defective and nonconforming Work.
   4. Remove samples of installed Work for testing.
   5. Provide openings in elements of Work for penetrations of mechanical and electrical Work.

D. Execute Work by methods to avoid damage to other Work and to provide proper surfaces to receive patching and finishing.

E. Cut masonry and concrete materials using masonry saw or core drill.

F. Restore Work with new products according to requirements of Contract Documents.

G. Fit Work tight to pipes, sleeves, ducts, conduits, and other penetrations through surfaces.

H. Maintain integrity of wall, ceiling, or floor construction; completely seal voids.

I. At penetrations of fire-rated walls, partitions, ceiling, or floor construction, completely seal voids with fire-rated material, to full thickness of penetrated element.

J. Refinish surfaces to match adjacent finishes. For continuous surfaces, refinish to nearest intersection; for assembly, refinish entire unit.

K. Identify hazardous substances or conditions exposed during the Work to Architect/Engineer for decision or remedy.

3.5 PROTECTING INSTALLED CONSTRUCTION

A. Protect installed Work and provide special protection where specified in individual Specification Sections.

B. Provide temporary and removable protection for installed products. Control activity in immediate Work area to prevent damage.

C. Provide protective coverings at walls, projections, jambs, sills, and soffits of openings.

D. Use durable sheet materials to protect finished floors, stairs, and other surfaces from traffic, dirt, wear, damage, or movement of heavy objects.

E. Prohibit traffic or storage upon waterproofed or roofed surfaces. When traffic or activity is necessary, obtain recommendations for protection from waterproofing or roofing material manufacturer.

F. Prohibit traffic from landscaped areas.

3.6 FINAL CLEANING

A. Execute final cleaning prior to final Project assessment.
   1. Employ experienced personnel or professional cleaning firm.

B. Clean equipment and fixtures to sanitary condition with appropriate cleaning materials.

C. Replace filters of operating equipment.

D. Clean debris from roofs, gutters, downspouts, and drainage systems.

E. Clean Site; sweep paved areas, rake clean landscaped surfaces.

F. Remove waste and surplus materials, rubbish, and construction facilities from Site.

END OF SECTION

CONCRETE FORMS AND ACCESSORIES

SECTION 03100

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
1. Formwork for cast-in place concrete.
2. Shoring, bracing, and anchorage.
3. Architectural form liners.
4. Form accessories.
5. Form stripping.

B. Related Sections:
1. Section 03200 - Concrete Reinforcement.
2. Section 03300 - Cast-in-Place Concrete.

1.2 REFERENCES

A. American Concrete Institute:
1. ACI 117 - Standard Specifications for Tolerances for Concrete Construction and Materials.
2. ACI 301 - Specifications for Structural Concrete.
3. ACI 318 - Building Code Requirements for Structural Concrete.
4. ACI 347 - Guide to Formwork for Concrete.

B. American Forest and Paper Association:
1. AF&PA - National Design Specifications for Wood Construction.

C. The Engineered Wood Association:
1. APA/EWA PS 1 - Voluntary Product Standard for Construction and Industrial Plywood.

D. American Society of Mechanical Engineers:
1. ASME A17.1 - Safety Code for Elevators and Escalators.

E. ASTM International:
1. ASTM D1751 - Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types).
2. ASTM E96/E96M - Standard Test Methods for Water Vapor Transmission of Materials.

F. West Coast Lumber Inspection Bureau:
1. WCLIB - Standard Grading Rules for West Coast Lumber.

1.3 SUBMITTALS

A. Section 01330 - Submittal Procedures: Requirements for submittals.

B. Shop Drawings:
   1. Submit formwork, shoring, and reshoring shop drawings.
   2. Indicate the following:
      a. Pertinent dimensions, openings, methods of construction, types of connections, materials, joint arrangement and details, ties and shores, location of framing, studding and bracing, and temporary supports.
      b. Means of leakage prevention for concrete exposed to view in finished construction.
      c. Sequence and timing of erection and stripping assumed compressive strength at time of stripping, height of lift and height of drop during placement.
      d. Vertical, horizontal and special loads in accordance with ACI 347, Section 2.2 and camber diagrams, when applicable.
      e. Notes to formwork erector showing size and location of conduits and piping embedded in concrete in accordance with ACI 318, Section 6.3.
      f. Procedure and schedule for removal of shores and installation and removal of reshores.

1.4 QUALITY ASSURANCE

A. Perform Work in accordance with ACI 347, ACI 301, and ACI 318.

B. For wood products furnished for work of this Section, comply with AF&PA.

1.5 COORDINATION

A. Section 01300 - Administrative Requirements: Coordination and project conditions.

B. Coordinate this Section with other sections of work, requiring attachment of components to formwork.

PART 2 PRODUCTS

2.1 PREFABRICATED FORMS

A. Tubular Column Type: Round, spirally wound laminated fiber material, surface treated with release agent, as indicated on Drawings.

PART 3 EXECUTION

3.1 EXAMINATION

A. Section 01300 - Administrative Requirements: Coordination and project conditions.

B. Verify lines, levels, and centers before proceeding with formwork. Verify dimensions agree with Drawings.

C. When formwork is placed after reinforcement resulting in insufficient concrete cover over reinforcement before proceeding, request instructions from Engineer.

3.2 INSTALLATION

A. Earth Forms:
1. Trench earth forms neatly, accurately, and at least 2 inches wider than footing widths indicated on Drawings.
2. Trim sides and bottom of earth forms.
3. Construct wood edge strips at top of each side of trench to secure reinforcing and prevent trench from sloughing.
4. Form sides of footings where earth sloughs.
5. Tamp earth forms firm and clean forms of debris and loose material before depositing concrete.

B. Formwork - General:
1. Provide top form for sloped surfaces steeper than 1.5 horizontal to 1 vertical to hold shape of concrete during placement, unless it can be demonstrated that top forms can be omitted.
2. Construct forms to correct shape and dimensions, mortar-tight, braced, and of sufficient strength to maintain shape and position under imposed loads from construction operations.
3. Camber forms where necessary to produce level finished soffits unless otherwise shown on Drawings.
4. Carefully verify horizontal and vertical positions of forms. Correct misaligned or misplaced forms before placing concrete.
5. Complete wedging and bracing before placing concrete.

C. Forms for Smooth Finish Concrete:
1. Use steel, plywood or lined board forms.
2. Use clean and smooth plywood and form liners, uniform in size, and free from surface and edge damage capable of affecting resulting concrete finish.
3. Install form lining with close-fitting square joints between separate sheets without springing into place.
4. Use full size sheets of form lines and plywood wherever possible.
5. Tape joints to prevent protrusions in concrete.
6. Use care in forming and stripping wood forms to protect corners and edges.
7. Level and continue horizontal joints.
8. Keep wood forms wet until stripped.

D. Arrange and assemble formwork to permit dismantling and stripping. Do not damage concrete during stripping. Permit removal of remaining principal shores.

E. Obtain Engineer's approval before framing openings in structural members not indicated on Drawings.

F. Install fillet and chamfer strips on external corners of columns.

3.3 APPLICATION - FORM RELEASE AGENT

A. Apply form release agent on formwork in accordance with manufacturer's recommendations.

B. Apply prior to placement of reinforcing steel, anchoring devices, and embedded items.

C. Reuse and Coating of Forms: Thoroughly clean forms and reapply form coating before each reuse. For exposed work, do not reuse forms with damaged faces or edges. Apply form coating to forms in accordance with manufacturer's specifications. Do not coat forms for concrete indicated to receive "scored finish". Apply form coatings before placing reinforcing steel.

3.4 INSTALLATION - INSERTS, EMBEDDED PARTS, AND OPENINGS

A. Install formed openings for items to be embedded in or passing through concrete work.

B. Locate and set in place items required to be cast directly into concrete.

C. Install accessories straight, level, and plumb. Ensure items are not disturbed during concrete placement.

D. Arrangement: Arrange formwork to allow proper erection sequence and to permit form removal without damage to concrete.

E. Embedded Items:
1. Make provisions for pipes, sleeves, anchors, inserts, reglets, anchor slots, nailers, water stops, and other features.
2. Do not embed wood or uncoated aluminum in concrete.
3. Obtain installation and setting information for embedded items furnished under other Specification sections.
4. Securely anchor embedded items in correct location and alignment prior to placing concrete.
5. Verify conduits and pipes, including those made of coated aluminum, meet requirements of ACI 318 for size and location limitations.

F. Openings for Items Passing Through Concrete:
1. Frame openings in concrete where indicated on Drawings. Establish exact locations, sizes, and other conditions required for openings and attachment of work specified under other sections.
2. Coordinate work to avoid cutting and patching of concrete after placement.
3. Perform cutting and repairing of concrete required as result of failure to provide required openings.

3.5 FORM REMOVAL

A. Do not remove forms or bracing until concrete has gained sufficient strength to carry its own weight and imposed loads and removal has been approved by Engineer.

B. Loosen forms carefully. Do not wedge pry bars, hammers, or tools against finish concrete surfaces scheduled for exposure to view.

C. Store removed forms in manner that surfaces to be in contact with fresh concrete will not be damaged. Discard damaged forms.

D. Leave forms in place for minimum number of days as specified in ACI 347.

3.6 ERECTION TOLERANCES

A. Construct formwork to maintain tolerances required by ACI 301and ACI 318.

3.7 FIELD QUALITY CONTROL

A. Section 01400 - Quality Requirements: Field inspecting, testing, adjusting, and balancing.

B. Inspect erected formwork, shoring, and bracing to ensure that work is in accordance with formwork design, and that supports, fastenings, wedges, ties, and items are secure.

C. Notify Engineer after placement of reinforcing steel in forms, but prior to placing concrete.

D. Schedule concrete placement to permit formwork inspection before placing concrete.

END OF SECTION

CONCRETE REINFORCEMENT
SECTION 03200

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
1. Reinforcing bars.
2. Welded wire fabric.
3. Reinforcement accessories.

B. Related Sections:
1. Section 02470 - Drilled Concrete Piers and Shafts: Reinforcement for pile, drilled pier foundations.
2. Section 03100 - Concrete Forms and Accessories.
3. Section 03300 - Cast-in-Place Concrete.

1.2 REFERENCES

A. American Concrete Institute:
1. ACI 301 - Specifications for Structural Concrete.
2. ACI 318 - Building Code Requirements for Structural Concrete.
3. ACI 530.1 - Specifications for Masonry Structures.
4. ACI SP-66 - ACI Detailing Manual.

B. ASTM International:
1. ASTM A82/A82M - Standard Specification for Steel Wire, Plain, for Concrete Reinforcement.
2. ASTM A184/A184M - Standard Specification for Fabricated Deformed Steel Bar Mats for Concrete Reinforcement.
3. A185/A185M-07 Standard Specification for Steel Welded Wire Reinforcement, Plain, for Concrete.
4. ASTM A496/A496M - Standard Specification for Steel Wire, Deformed, for Concrete Reinforcement.
5. ASTM A497/A497M - Standard Specification for Steel Welded Wire Fabric, Deformed, for Concrete Reinforcement.
6. ASTM A615/A615M - Standard Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement.
7. ASTM A704/A704M - Standard Specification for Welded Steel Plain Bar or Rod Mats for Concrete Reinforcement.
8. ASTM A706/A706M - Standard Specification for Low-Alloy Steel Deformed and Plain Bars for Concrete Reinforcement.
9. ASTM A767/A767M - Standard Specification for Zinc-Coated (Galvanized) Steel Bars for Concrete Reinforcement.
10. ASTM A775/A775M - Standard Specification for Epoxy-Coated Steel Reinforcing Bars.

11. ASTM A884/A884M - Standard Specification for Epoxy-Coated Steel Wire and Welded Wire Reinforcement.
12. ASTM A934/A934M - Standard Specification for Epoxy-Coated Prefabricated Steel Reinforcing Bars.
13. ASTM A996/A996M - Standard Specification for Rail-Steel and Axle-Steel Deformed Bars for Concrete Reinforcement.

C. American Welding Society:
   1. AWS D1.4 - Structural Welding Code - Reinforcing Steel.

D. Concrete Reinforcing Steel Institute:
   1. CRSI - Manual of Standard Practice.
   2. CRSI - Placing Reinforcing Bars.

1.3 SUBMITTALS

A. Section 01330 - Submittal Procedures: Submittal procedures.

B. Shop Drawings: Indicate bar sizes, spacings, locations, and quantities of reinforcing steel bending and cutting schedules, and supporting and spacing devices

1.4 QUALITY ASSURANCE

A. Perform Work in accordance with CRSI - Manual of Standard Practice, ACI 301, and ACI 318.

B. Prepare shop drawings in accordance with ACI SP-66.

1.5 COORDINATION

A. Section 01300 - Administrative Requirements: Coordination and project conditions.

B. Coordinate with placement of formwork, formed openings and other Work.

PART 2 PRODUCTS

2.1 REINFORCEMENT

A. Reinforcing Steel: ASTM A615/A615M, 60 ksi yield grade, billet bars.

2.2 ACCESSORY MATERIALS

A. Tie Wire: Minimum 16 gage annealed type

B. Chairs, Bolsters, Bar Supports, Spacers: Sized and shaped for strength and support of reinforcement during concrete placement conditions

C. Special Chairs, Bolsters, Bar Supports, Spacers Adjacent to Weather Exposed Concrete Surfaces: Plastic-coated steel type; size and shape to meet Project conditions.

2.3 FABRICATION

A. Fabricate concrete reinforcement in accordance with CRSI Manual of Practice and ACI 318

B. Form standard hooks as indicated on Drawings.

C. Fabricate column reinforcement with offset bends at reinforcement splices.

D. Form spiral column reinforcement from minimum 3/8 inch diameter continuous bar or wire.

E. Locate reinforcement splices not indicated on Drawings, at point of minimum stress.

2.4 SOURCE QUALITY CONTROL

A. Section 01400 - Quality Requirements: Testing, inspection and analysis requirements.

B. Make completed reinforcement available for inspection at manufacturer's factory prior to packaging for shipment. Notify Architect/Engineer at least seven days before inspection is allowed.

PART 3 EXECUTION

3.1 PLACEMENT

A. Place, support and secure reinforcement against displacement. Do not deviate from required position beyond specified tolerance.
   1. Do not weld crossing reinforcement bars for assembly.

B. Do not displace or damage vapor retarder.

C. Accommodate placement of formed openings.

D. Space reinforcement bars with minimum clear spacing of one bar diameter, but not less than 1 inch .
   1. Where bars are indicated in multiple layers, place upper bars directly above lower bars.

Reinforcement Location		Minimum Concrete Cover
Footings and Concrete Formed Against Earth		3 inches (75 mm)
Concrete exposed to	No. 6 (19) bars and larger	2 inches (50 mm)

earth or weather	No. 5 (16) bars and smaller	1-1/2 inches (38 mm)
Supported Slabs, Walls, and Joists	No. 14 (43) bars and larger	1-1/2 inches (38 mm)
	No. 11 (36) bars and smaller	3/4 inches (19 mm)
Beams and Columns		1-1/2 inches (38 mm)
Shell and Folded Plate Members	No. 6 (19) bars and larger	3/4 inches (19 mm)
	No. 5 (16) bars and smaller	1/2 inches (13 mm)

3.2 ERECTION TOLERANCES

A. Section 01400 - Quality Requirements: Tolerances.

B. Install reinforcement within the following tolerances for flexural members, walls, and compression members:

Reinforcement Depth	Depth Tolerance	Concrete Cover Tolerance
Greater than 8 inches	plus or minus 3/8 inch	minus 3/8 inch
Less than 8 inches	plus or minus 1/2 inch	minus 1/2 inch

C. Install reinforcement within the tolerances specified in ACI 530.1 for foundation walls.

3.3 FIELD QUALITY CONTROL

A. Section 01400 - Quality Requirements: Field inspecting, testing, adjusting, and balancing.

B. Field inspection and testing will be performed by Owner's testing laboratory in accordance with ACI 318 .

C. Provide free access to Work and cooperate with appointed firm.

D. Reinforcement Inspection:
1. Placement Acceptance: Specified and ACI 318 material requirements and specified placement tolerances.
2. Welding: Inspect welds in accordance with AWS D1.1.
3. Periodic Placement Inspection: Inspect for correct materials, fabrication, sizes, locations, spacing, concrete cover, and splicing.

3.4 SCHEDULES

A. Reinforcement For Superstructure Framing Members: Deformed bars, unfinished.

B. Reinforcement For Foundation Wall Framing Members and Slab-on-Grade: Deformed bars and wire fabric, galvanized finish.

C. Reinforcement For Parking Structure Framing Members: Deformed bars, epoxy-coated finish.

END OF SECTION

HIDALGO COUNTY SHERIFF'S OFFICE
Hidalgo County Adult Detention Center and
Law Enforcement Facility Repairs and / or Replacement
Edinburg, TX

CAST-IN-PLACE CONCRETE

SECTION 03300

PART 1 GENERAL

1.1 SUMMARY

A. Section includes cast-in-place concrete for the following:
   1. Section 03100 - Concrete Forms and Accessories

1.2 REFERENCES

A. American Concrete Institute:
   1. ACI 301 - Specifications for Structural Concrete.
   2. ACI 305 - Hot Weather Concreting.
   3. ACI 306.1 - Standard Specification for Cold Weather Concreting.
   4. ACI 308.1 - Standard Specification for Curing Concrete.
   5. ACI 318 - Building Code Requirements for Structural Concrete.

B. ASTM International:
   1. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.
   2. ASTM C31/C31M - Standard Practice for Making and Curing Concrete Test Specimens in the Field.
   3. ASTM C33 - Standard Specification for Concrete Aggregates.
   4. ASTM C39/C39M - Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens.
   5. ASTM C42/C42M - Standard Test Method for Obtaining and Testing Drilled Cores and Sawed Beams of Concrete.
   6. ASTM C94/C94M - Standard Specification for Ready-Mixed Concrete.
   7. ASTM C143/C143M - Standard Test Method for Slump of Hydraulic Cement Concrete.
   8. ASTM C150 - Standard Specification for Portland Cement.
   9. ASTM C172 - Standard Practice for Sampling Freshly Mixed Concrete.
   10. ASTM C173/C173M - Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method.
   11. ASTM C231 - Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method.
   12. ASTM C260 - Standard Specification for Air-Entraining Admixtures for Concrete.
   13. ASTM C330 - Standard Specification for Lightweight Aggregates for Structural Concrete.
   14. ASTM C494/C494M - Standard Specification for Chemical Admixtures for Concrete.
   15. ASTM C595 - Standard Specification for Blended Hydraulic Cements.
   16. ASTM C618 - Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use as a Mineral Admixture in Concrete.

17. ASTM C685/C685M - Standard Specification for Concrete Made By Volumetric Batching and Continuous Mixing.
18. ASTM C845 - Standard Specification for Expansive Hydraulic Cement.
19. ASTM C989 - Standard Specification for Ground Granulated Blast-Furnace Slag for Use in Concrete and Mortars.
20. ASTM C1017/C1017M - Standard Specification for Chemical Admixtures for Use in Producing Flowing Concrete.
21. ASTM C1064/C1064M - Standard Test Method for Temperature of Freshly Mixed Hydraulic-Cement Concrete.
22. ASTM C1107/C1107M - Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Nonshrink).
23. ASTM C1116 - Standard Specification for Fiber-Reinforced Concrete and Shotcrete.
24. ASTM C1157 - Standard Performance Specification for Hydraulic Cement.
25. ASTM C1218/C1218M - Standard Test Method for Water-Soluble Chloride in Mortar and Concrete.
26. ASTM C1240 - Standard Specification for Silica Fume Used in Cementitious Mixtures.
27. ASTM D994 - Standard Specification for Preformed Expansion Joint Filler for Concrete (Bituminous Type).
28. ASTM D1751 - Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types).
29. ASTM D1752 - Standard Specification for Preformed Sponge Rubber and Cork Expansion Joint Fillers for Concrete Paving and Structural Construction.
30. ASTM D6690 - Standard Specification for Joint and Crack Sealants, Hot Applied, for Concrete and Asphalt Pavements.
31. ASTM E96/E96M - Standard Test Methods for Water Vapor Transmission of Materials.
32. ASTM E119 - Standard Test Methods for Fire Tests of Building Construction and Materials.
33. ASTM E1643 - Standard Practice for Installation of Water Vapor Retarders Used in Contact with Earth or Granular Fill under Concrete Slabs.
34. ASTM E1745 - Standard Specification for Plastic Water Vapor Retarders Used in Contact with Soil or Granular Fill under Concrete Slabs.

1.3 SUBMITTALS

A. Section 01330 - Submittal Procedures: Submittal procedures.

B. Design Data:
   1. Submit concrete mix design for each concrete strength. Submit separate mix designs when admixtures are required for the following:
      a. Hot and cold weather concrete work.
      b. Air entrained concrete work.
   2. Identify mix ingredients and proportions, including admixtures.
   3. Identify chloride content of admixtures and whether or not chloride was added during manufacture.

C. Manufacturer's Installation Instructions: Submit installation procedures and interface required with adjacent Work.

1.4 CLOSEOUT SUBMITTALS

A. Section 01700 - Execution Requirements: Closeout procedures.

B. Project Record Documents: Accurately record actual locations of embedded utilities and components concealed from view in finished construction.

1.5 QUALITY ASSURANCE

A. Perform Work in accordance with ACI 301 and ACI 318.

B. Conform to ACI 305 when concreting during hot weather.

C. Conform to ACI 306.1 when concreting during cold weather.

D. Acquire cement and aggregate from one source for Work.

1.6 ENVIRONMENTAL REQUIREMENTS

A. Section 01600 - Product Requirements: Environmental conditions affecting products on site.

B. Maintain concrete temperature after installation at minimum 50 degrees F for minimum 7 days.

1.7 COORDINATION

A. Section 01300 - Administrative Requirements: Coordination and project conditions.

B. Coordinate placement of joint devices with erection of concrete formwork and placement of form accessories.

PART 2 PRODUCTS

2.1 CONCRETE MATERIALS

A. Cement: ASTM C150, Type I - Normal

B. Normal Weight Aggregates: ASTM C33.
1. Coarse Aggregate Maximum Size: 1 inches In accordance with ACI 318.

C. Water: ACI 318; potable, without deleterious amounts of chloride ions.

2.2 ADMIXTURES

2.3 CONCRETE MIX

A. Select proportions for concrete in accordance with ACI 318 field experience.

B. Admixtures: Include admixture types and quantities indicated in concrete mix designs only when approved by Architect/Engineer.
   1. Use accelerating admixtures in cold weather. Use of admixtures will not relax cold weather placement requirements.
   2. Do not use calcium chloride nor admixtures containing calcium chloride.
   3. Use set retarding admixtures during hot weather.

C. Average Compressive Strength Reduction: Not permitted.

D. Ready Mixed Concrete: Mix and deliver concrete in accordance with ASTM C94/C94M.

E. Site Mixed Concrete: Mix concrete in accordance with ACI 318.

PART 3 EXECUTION

3.1 EXAMINATION

A. Section 01300 - Administrative Requirements: Coordination and project conditions.

B. Verify requirements for concrete cover over reinforcement.

C. Verify anchors, seats, plates, reinforcement and other items to be cast into concrete are accurately placed, positioned securely, and will not interfere with placing concrete.

3.2 PREPARATION

A. Prepare previously placed concrete by cleaning with steel brush and applying bonding agent. Remove laitance, coatings, and unsound materials.

B. In locations where new concrete is doweled to existing work, drill holes in existing concrete, insert steel dowels and pack solid with non-shrink grout.

C. Remove debris and ice from formwork, reinforcement, and concrete substrates.

D. Remove water from areas receiving concrete before concrete is placed.

3.3 PLACING CONCRETE

A. Place concrete in accordance with ACI 301.

B. Notify testing laboratory and Architect/Engineer minimum 24 hours prior to commencement of operations.

C. Deposit concrete at final position. Prevent segregation of mix.

D. Place concrete in continuous operation for each panel or section determined by predetermined joints.

E. Consolidate concrete.

F. Maintain records of concrete placement. Record date, location, quantity, air temperature, and test samples taken.

G. Place concrete continuously between predetermined expansion, control, and construction joints.

3.4 CURING AND PROTECTION

A. Immediately after placement, protect concrete from premature drying, excessively hot or cold temperatures, and mechanical injury.

B. Maintain concrete with minimal moisture loss at relatively constant temperature for period necessary for hydration of cement and hardening of concrete.

3.5 FIELD QUALITY CONTROL

A. Section 01400 – Quality Requirements, 01700 - Execution Requirements: Field inspecting, testing, adjusting, and balancing.

B. Perform field inspection and testing in accordance with ACI 318.

C. Provide free access to Work and cooperate with appointed firm.

D. Submit proposed mix design of each class of concrete to inspection and testing firm for review prior to commencement of Work.

E. Concrete Inspections:
   1. Continuous Placement Inspection: Inspect for proper installation procedures.
   2. Periodic Curing Inspection: Inspect for specified curing temperature and procedures.

F. Strength Test Samples:
   1. Sampling Procedures: ASTM C172.
   2. Cylinder Molding and Curing Procedures: ASTM C31/C31M, cylinder specimens, standard cured.
   3. Sample concrete and make one set of three cylinders for every 75 or less of each class of concrete placed each day and for every 5,000 sf of surface area for slabs and walls.
   4. When volume of concrete for any class of concrete would provide less than 5 sets of cylinders, take samples from five randomly selected batches, or from every batch when less than 5 batches are used.
   5. Make one additional cylinder during cold weather concreting, and field cure.

G. Field Testing:
   1. Slump Test Method: ASTM C143/C143M.

2. Air Content Test Method: ASTM C173/C173M.
3. Temperature Test Method: ASTM C1064/C1064M.
4. Measure slump and temperature for each compressive strength concrete sample.
5. Measure air content in air entrained concrete for each compressive strength concrete sample.

H. Cylinder Compressive Strength Testing:
1. Test Method: ASTM C39/C39M.
2. Test Acceptance: In accordance with ACI 318.
3. Test one cylinder at 7 days.
4. Test two cylinders at 28 days.
5. Retain one cylinder for 56 days for testing when requested by Architect/Engineer.
6. Dispose remaining cylinders when testing is not required.

I. Core Compressive Strength Testing:
1. Sampling and Testing Procedures: ASTM C42/C42M.
2. Test Acceptance: In accordance with ACI 318.
3. Drill three cores for each failed strength test from concrete represented by failed strength test.

J. Maintain records of concrete placement. Record date, location, quantity, air temperature and test samples taken.

3.6 PATCHING

A. Allow Architect/Engineer to inspect concrete surfaces immediately upon removal of forms.

B. Excessive honeycomb or embedded debris in concrete is not acceptable. Notify Architect/Engineer upon discovery.

C. Patch imperfections as directed by Architect/Engineer.

3.7 DEFECTIVE CONCRETE

A. Defective Concrete: Concrete not conforming to required lines, details, dimensions, tolerances or specified requirements.

B. Repair or replacement of defective concrete will be determined by Architect/Engineer.

C. Do not patch, fill, touch-up, repair, or replace exposed concrete except upon express direction of Architect/Engineer for each individual area.

END OF SECTION

STRUCTURAL STEEL

SECTION 05120

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
1. Structural shapes.
2. Channels and angles.
3. Hollow structural sections.
4. Structural pipe.
5. Structural plates.
6. Floor plates.
7. Bolts, connectors, and anchors.
8. Grout.

1.2 PRICE AND PAYMENT PROCEDURES

1.3 REFERENCE STANDARDS

A. American Institute of Steel Construction:
1. AISC 303 - Code of Standard Practice for Steel Buildings and Bridges.
2. AISC 341 - Seismic Provisions for Structural Steel Buildings.
3. AISC 360 - Specification for Structural Steel Buildings.

B. American Society of Civil Engineers:
1. ASCE 19 - Standard Applications of Steel Cables for Buildings.

C. ASTM International:
1. ASTM A36/A36M - Standard Specification for Carbon Structural Steel.
2. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.
3. ASTM A108 - Standard Specification for Steel Bar, Carbon and Alloy, Cold-Finished.
4. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
5. ASTM A193/A193M - Standard Specification for Alloy-Steel and Stainless Steel Bolting Materials for High-Temperature Service.
6. ASTM A307 - Standard Specification for Carbon Steel Bolts and Studs, 60 000 PSI Tensile Strength.
7. ASTM A325 - Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength.
8. ASTM A354 - Standard Specification for Quenched and Tempered Alloy Steel Bolts, Studs, and Other Externally Threaded Fasteners.
9. ASTM A449 - Standard Specification for Quenched and Tempered Steel Bolts and Studs.

10. ASTM A490 - Standard Specification for Structural Bolts, Alloy Steel, Heat Treated, 150 ksi Minimum Tensile Strength.
11. ASTM A500/A500M - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.
12. ASTM A501 - Standard Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing.
13. ASTM A514/A514M - Standard Specification for High-Yield-Strength, Quenched and Tempered Alloy Steel Plate, Suitable for Welding.
14. ASTM A529/A529M - Standard Specification for High-Strength Carbon-Manganese Steel of Structural Quality.
15. ASTM A563 - Standard Specification for Carbon and Alloy Steel Nuts.
16. ASTM A572/A572M - Standard Specification for High-Strength Low-Alloy Columbium-Vanadium Structural Steel.
17. ASTM A588/A588M - Standard Specification for High-Strength Low-Alloy Structural Steel with 50 ksi (345 MPa) Minimum Yield Point to 4-in. (100-mm) Thick.
18. ASTM A618/A618M - Standard Specification for Hot-Formed Welded and Seamless High-Strength Low-Alloy Structural Tubing.
19. ASTM A786/A786M - Standard Specification for Hot-Rolled Carbon, Low-Alloy, High-Strength Low-Alloy, and Alloy Steel Floor Plates.
20. ASTM A847/A847M - Standard Specification for Cold-Formed Welded and Seamless High Strength, Low Alloy Structural Tubing with Improved Atmospheric Corrosion Resistance.
21. ASTM A852/A852M - Standard Specification for Quenched and Tempered Low-Alloy Structural Steel Plate with 70 ksi (485 MPa) Minimum Yield Strength to 4 in. (100 mm) Thick.
22. ASTM A913/A913M - Standard Specification for High-Strength Low-Alloy Steel Shapes of Structural Quality, Produced by Quenching and Self-Tempering Process (QST).
23. ASTM A992/A992M - Standard Specification for Structural Steel Shapes.
24. ASTM B695 - Standard Specification for Coatings of Zinc Mechanically Deposited on Iron and Steel.
25. ASTM E94 - Standard Guide for Radiographic Examination.
26. ASTM E164 - Standard Practice for Ultrasonic Contact Examination of Weldments.
27. ASTM E165 - Standard Test Method for Liquid Penetrant Examination.
28. ASTM E709 - Standard Guide for Magnetic Particle Examination.
29. ASTM F436 - Standard Specification for Hardened Steel Washers.
30. ASTM F959 - Standard Specification for Compressible-Washer-Type Direct Tension Indicators for Use with Structural Fasteners.
31. ASTM F1554 - Standard Specification for Anchor Bolts, Steel, 36, 55, and 105-ksi Yield Strength.
32. ASTM F1852 - Standard Specification for Twist Off Type Tension Control Structural Bolt/Nut/Washer Assemblies, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength.
33. ASTM F2329 - Standard Specification for Zinc Coating, Hot-Dip, Requirements for Application to Carbon and Alloy Steel Bolts, Screws, Washers, Nuts, and Special Threaded Fasteners.

D. American Welding Society:
   1. AWS A2.4 - Standard Symbols for Welding, Brazing, and Nondestructive Examination.
   2. AWS D1.1 - Structural Welding Code - Steel.

E. California Department of Health Services:
   1. CA/DHS/EHLB/R-174 - Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers, including 2004 Addenda.

F. Green Seal:
   1. GC-03[**-2nd Edition, January 7, 1997**] - Anti-Corrosive Paints.

G. Research Council on Structural Connections:
   1. RCSC - Specification for Structural Joints Using ASTM A325 or Bolts.

H. SSPC: The Society for Protective Coatings:
   1. SSPC - Steel Structures Painting Manual.
   2. SSPC Paint 15 - Steel Joist Shop Paint.
   3. SSPC Paint 20 - Zinc-Rich Primers (Type I - Inorganic and Type II - Organic).
   4. SSPC SP 3 - Power Tool Cleaning.
   5. SSPC SP 6 - Commercial Blast Cleaning.
   6. SSPC SP 10 - Near-White Blast Cleaning.

1.4 COORDINATION

A. Section 01300 - Administrative Requirements: Requirements for coordination.

1.5 SUBMITTALS

A. Section 01330 - Submittal Procedures: Requirements for submittals.

B. Shop Drawings:
   1. Indicate profiles, sizes, spacing, locations of structural members, openings, attachments, and bolts.
   2. Indicate welded connections with AWS A2.4 welding symbols. Indicate net weld lengths.

C. Manufacturer's Mill Certificate: Certify products meet or exceed specified requirements.

D. Welders Certificates: Certify welders employed on the Work, verifying AWS qualification within previous 12 months.

1.6 QUALITY ASSURANCE

A. Perform Work in accordance with the following:
   1. Structural Steel: AISC 303.
   2. Architecturally Exposed Structural Steel: AISC 303, Section 10.
   3. High Strength Bolted Connections: RCSC Specification for Structural Joints Using ASTM A 325 or A 490 Bolts.
   4. Steel Cable Structures: ASCE 19.

1.7 QUALIFICATIONS

A. Fabricator: Company specializing in performing Work of this section with minimum 5 years documented experience with current AISC Certification.

B. Erector: Company specializing in performing Work of this section with minimum 5years documented experience with AISC Certification.

C. Welders and Welding Procedures: AWS D1.1 qualified within previous 12 months.

PART 2 PRODUCTS

2.1 STRUCTURAL STEEL

A. Channels and Angles: ASTM A36/A36M.

2.2 WELDING MATERIALS

A. Welding Materials: AWS D1.1; type required for materials being welded.

2.3 FINISHES

A. Shop prime structural steel members. Do not prime surfaces that will be field welded.

2.4 ACCESSORIES

2.5 SOURCE QUALITY CONTROL

A. Section 01400 - Quality Requirements: Testing, inspection and analysis requirements.

B. Shop test bolted and welded connections as specified for field quality control tests.

C. When fabricator is approved by authority having jurisdiction, submit certificate of compliance indicating Work performed at fabricator's facility conforms to Contract Documents.
   1. Specified shop tests are not required for Work performed by approved fabricator.

PART 3 EXECUTION

3.1 EXAMINATION

A. Section 01700 - Execution Requirements: Requirements for installation examination.

B. Verify bearing surfaces are at correct elevation.

C. Verify anchors rods are set in correct locations and arrangements with correct exposure for steel attachment.

3.2 PREPARATION

A. Section 01700 - Execution Requirements: Requirements for installation preparation.

B. Furnish templates for installation of anchor rods and embedments in concrete and masonry work.

3.3 ERECTION

A. Allow for erection loads, and for sufficient temporary bracing to maintain structure safe, plumb, and in alignment until completion of erection and installation of permanent bracing.

B. Field weld components indicated on Drawings.

C. Do not field cut or alter structural members without approval of Architect/Engineer.

D. After erection, touch up welds and abrasions to match shop finishes.

3.4 FIELD QUALITY CONTROL

A. Section 01400 - Quality Requirements: Requirements for inspecting, testing.

B. Bolted Connections: Inspect in accordance with AISC 303.
   1. Visually inspect all bolted connections.
   2. For Direct Tension Indicators, comply with requirements of ASTM F959. Verify that gaps are less than gaps specified in Table 2.

C. Welding: Inspect welds in accordance with AWS D1.1.
   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. Visually inspect all welds.
   3. Ultrasonic Inspection: ASTM E164; perform on all full penetration welds.
   4. Liquid Penetrant Inspection: ASTM E165.
   5. Magnetic Particle Inspection: ASTM E709; performed on <_____>.
   6. Radiographic Inspection: ASTM E94; performed on <_____>.

D. Correct defective bolted connections and welds.

END OF SECTION

SECTION 05310 - STEEL DECK REPAIR/REPLACEMENT (If Required)

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. Roof deck repair/replacement.

1.3 SUBMITTALS

A. Product Data: For each type of deck, accessory, and product indicated.

B. Product Certificates: For each type of steel deck, signed by product manufacturer.

C. Welding certificates.

D. Field quality-control test and inspection reports.

1.4 QUALITY ASSURANCE

A. Welding: Qualify procedures and personnel according to AWS D1.3, "Structural Welding Code - Sheet Steel."

B. AISI Specifications: Comply with calculated structural characteristics of steel deck according to AISI's "North American Specification for the Design of Cold-Formed Steel Structural Members."

C. FMG Listing: Provide steel roof deck evaluated by FMG and listed in its "Approval Guide, Building Materials" for Class 1 fire rating and Class 1-90 windstorm ratings.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Protect steel deck from corrosion, deformation, and other damage during delivery, storage, and handling.

B. Stack steel deck on platforms or pallets and slope to provide drainage. Protect with a waterproof covering and ventilate to avoid condensation.

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. Steel Deck:
      a. Nucor Corp.; Vulcraft Division.
      b. Roof Deck, Inc.
      c. United Steel Deck, Inc.
      d. Verco Manufacturing Co.
      e. Wheeling Corrugating Company; Div. of Wheeling-Pittsburgh Steel Corporation.

2.2 ROOF DECK

A. Steel Roof Deck: Fabricate panels, without top-flange stiffening grooves, to comply with "SDI Specifications and Commentary for Steel Roof Deck," in SDI Publication No. 30, and with the following:
   1. Galvanized Steel Sheet: ASTM A 653/A 653M, Structural Steel (SS), Grade, G90 zinc coating.
   2. Deck Profile: Match existing.
   3. Profile Depth: Match existing.
   4. Design Uncoated-Steel Thickness: Match existing.
   5. Span Condition: Double span.
   6. Side Laps: Overlapped or interlocking seam at Contractor's option.

2.3 ACCESSORIES

A. General: Provide manufacturer's standard accessory materials for deck that comply with requirements indicated.

B. Mechanical Fasteners: Corrosion-resistant, self-drilling, self-threading screws.

C. Side-Lap Fasteners: Corrosion-resistant, hexagonal washer head; self-drilling, carbon-steel screws, No. 10 minimum diameter.

D. Flexible Closure Strips: Vulcanized, closed-cell, synthetic rubber.

E. Miscellaneous Sheet Metal Deck Accessories: Steel sheet, minimum yield strength of 33,000 psi, not less than 0.0359-inch design uncoated thickness, of same material and finish as deck; of profile indicated or required for application.

F. Weld Washers: Uncoated steel sheet, shaped to fit deck rib, 0.0747 inch thick, with factory-punched hole of 3/8-inch minimum diameter.

G. Galvanizing Repair Paint: ASTM A 780.

H. Repair Paint: Manufacturer's standard rust-inhibitive primer of same color as primer.

PART 3 - EXECUTION

3.1 DEMOLITION AND DETERIORATED DECKING REPLACEMENT

A. Demolition and disposal of existing roof deck system.
   1. Remove and properly dispose of all damaged or deteriorated components of existing roof deck system down to existing structural supports.
   2. Exercise extreme caution over all areas of the occupied building. Provide a safety monitor inside building or under decking to be removed at all times during demolition and insure all building occupants are relocated prior to any demolition of the roof deck overhead.

3.2 EXAMINATION

A. Examine supporting frame and field conditions for compliance with requirements for installation tolerances and other conditions affecting performance.

3.3 INSTALLATION, GENERAL

A. Install deck panels and accessories according to applicable specifications and commentary in SDI Publication No. 30, manufacturer's written instructions, and requirements in this Section.

B. Install temporary shoring before placing deck panels, if required to meet deflection limitations.

C. Locate deck bundles to prevent overloading of supporting members.

D. Place deck panels on supporting frame and adjust to final position with ends accurately aligned and bearing on supporting frame before being permanently fastened. Do not stretch or contract side-lap interlocks.

E. Place deck panels flat and square and fasten to supporting frame without warp or deflection.

F. Cut and neatly fit deck panels and accessories around openings and other work projecting through or adjacent to deck.

G. Comply with AWS requirements and procedures for manual shielded metal arc welding, appearance and quality of welds, and methods used for correcting welding work.

H. Mechanical fasteners may be used in lieu of welding to fasten deck. Locate mechanical fasteners and install according to deck manufacturer's written instructions.

3.4 ROOF-DECK INSTALLATION

A. Fasten roof-deck panels to steel supporting members by arc spot (puddle) welds of the surface diameter indicated or arc seam welds with an equal perimeter that is not less than 1-1/2 inches long, and as follows:
   1. Weld Diameter: Match welds of existing deck to remain, but not less than 5/8 inch, nominal.
   2. Weld Spacing: Weld edge and interior ribs of deck units with a minimum of two welds per deck unit at each support. Space welds to match spacing of welds on existing deck units, but not less than 18 inches apart, maximum.
   3. Weld Washers: Install weld washers at each weld location.

B. Side-Lap and Perimeter Edge Fastening: Fasten side laps and perimeter edges of panels between supports, at intervals not exceeding the lesser of 1/2 of the span or 36 inches, and as selected from following to match existing deck unit installation :
   1. Mechanically fasten with self-drilling, No. 10 diameter or larger, carbon-steel screws.
   2. Mechanically clinch or button punch.
   3. Fasten with a minimum of 1-1/2-inch- long welds.

C. End Bearing: Install deck ends over supporting frame with a minimum end bearing of 1-1/2 inches, with end joints as follows:
   1. End Joints: Lapped 2 inches minimum.

D. Miscellaneous Roof-Deck Accessories: Install ridge and valley plates, finish strips, end closures, and reinforcing channels according to deck manufacturer's written instructions. Weld or mechanically fasten to substrate to provide a complete deck installation.
   1. Weld cover-plates at changes in direction of roof-deck panels, unless otherwise indicated.

3.5 REPAIRS AND PROTECTION

A. Galvanizing Repairs: Prepare and repair damaged galvanized coatings on both surfaces of deck with galvanized repair paint according to ASTM A 780 and manufacturer's written instructions.

B. Repair Painting: Wire brush and clean rust spots, welds, and abraded areas on both surfaces of prime-painted deck immediately after installation, and apply repair paint.
   1. Apply repair paint, of same color as adjacent shop-primed deck, to bottom surfaces of deck exposed to view.

C. Repair Painting: Wire brushing, cleaning, and repair painting of rust spots, welds, and abraded areas of both deck surfaces as required.

D. Provide final protection and maintain conditions to ensure that steel deck is without damage or deterioration at time of Substantial Completion.

END OF SECTION 05310

HIDALGO COUNTY SHERIFF'S OFFICE
Hidalgo County Adult Detention Center and
Law Enforcement Facility Repairs and / or Replacement
Edinburg, TX

SECTION 06105 - MISCELLANEOUS CARPENTRY

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. Rooftop equipment bases and support curbs.
   2. Wood blocking, cants, and nailers.
   3. Wood Structural panels.

1.3 DEFINITIONS

A. Lumber grading agencies, and the abbreviations used to reference them, include the following:
   1. NELMA - Northeastern Lumber Manufacturers Association.
   2. NLGA - National Lumber Grades Authority.
   3. SPIB - Southern Pine Inspection Bureau.
   4. WCLIB - West Coast Lumber Inspection Bureau.
   5. WWPA - Western Wood Products Association.

1.4 SUBMITTALS

A. Product Data: For each type of process and factory-fabricated product. Indicate component materials and dimensions and include construction and application details.
   1. Include data for wood-preservative treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements. Indicate type of preservative used, net amount of preservative retained, and chemical treatment manufacturer's written instructions for handling, storing, installing, and finishing treated material.

B. Research/Evaluation Reports: For the following, showing compliance with building code in effect for Project:
   1. Preservative-treated wood.

1.5 QUALITY ASSURANCE

A. Forest Certification: For the following wood products, provide materials produced from wood obtained from forests certified by an FSC-accredited certification body to comply with FSC 1.2, "Principles and Criteria":

1. Miscellaneous lumber.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Stack lumber, plywood, and other panels; place spacers between each bundle to provide air circulation. Provide for air circulation around stacks and under coverings.

PART 2 - PRODUCTS

2.1 WOOD PRODUCTS, GENERAL

A. Lumber: DOC PS 20 and applicable rules of lumber grading agencies certified by the American Lumber Standards Committee Board of Review.
   1. Factory mark each piece of lumber with grade stamp of grading agency.
   2. For exposed lumber indicated to receive a stained or natural finish, mark grade stamp on end or back of each piece.
   3. Where nominal sizes are indicated, provide actual sizes required by DOC PS 20 for moisture content specified. Where actual sizes are indicated, they are minimum dressed sizes for dry lumber.
   4. Provide dry lumber with 15 percent maximum moisture content at time of dressing for 2-inch nominal thickness or less, unless otherwise indicated.

B. Wood Structural Panels:
   1. Plywood: Either DOC PS 1 or DOC PS 2, unless otherwise indicated.
   2. Thickness: As needed to comply with requirements specified but not less than thickness indicated.
   3. Factory mark panels according to indicated standard.

2.2 WOOD-PRESERVATIVE-TREATED MATERIALS

A. Preservative Treatment by Pressure Process: AWPA C2 (lumber), except that lumber that is not in contact with the ground and is continuously protected from liquid water may be treated according to AWPA C31 with inorganic boron (SBX).
   1. Preservative Chemicals: Acceptable to authorities having jurisdiction and one of the following:
      a. Chromated copper arsenate (CCA).
      b. Ammoniacal copper zinc arsenate (ACZA).
      c. Ammoniacal, or amine, copper quat (ACQ).
      d. Copper bis (dimethyldithiocarbamate) (CDDC).
      e. Ammoniacal copper citrate (CC).
      f. Copper azole, Type A (CBA-A).
      g. Oxine copper (copper-8-quinolinolate) in a light petroleum solvent.
   2. For exposed items indicated to receive a stained or natural finish, use chemical formulations that do not require incising, contain colorants, bleed through, or otherwise adversely affect finishes.

B. Kiln-dry material after treatment to a maximum moisture content of 15 percent for plywood. Do not use material that is warped or does not comply with requirements for untreated material.

C. Mark each treated item with the treatment quality mark of an inspection agency approved by the American Lumber Standards Committee Board of Review.

D. Application: Treat items indicated on Drawings, and the following:
   1. Wood cants, nailers, curbs, equipment support bases, blocking, stripping, and similar members in connection with roofing, flashing, vapor barriers, and waterproofing.
   2. Wood sills, sleepers, blocking, furring, stripping, and similar concealed members in contact with masonry or concrete.
   3. Wood framing members less than 18 inches above grade.
   4. Wood floor plates that are installed over concrete slabs directly in contact with earth.

2.3 MISCELLANEOUS LUMBER

A. General: Provide lumber for support or attachment of other construction, including the following:
   1. Rooftop equipment bases and support curbs.
   2. Blocking.
   3. Cants.
   4. Nailers.

B. For concealed boards, provide lumber with 15 percent maximum moisture content and any of the following species and grades:
   1. Mixed southern pine, No. 2 grade; SPIB.
   2. Hem-fir or Hem-fir (north), Standard or 3 Common grade; NLGA, WCLIB, or WWPA.
   3. Spruce-pine-fir (south) or Spruce-pine-fir, Standard or 3 Common grade; NELMA, NLGA, WCLIB, or WWPA.
   4. Eastern softwoods, No. 3 Common grade; NELMA.
   5. Northern species, No. 3 Common grade; NLGA.
   6. Western woods, Standard or No. 3 Common grade; WCLIB or WWPA.

2.4 WOOD PANEL PRODUCTS

A. Miscellaneous Concealed Plywood: Exterior sheathing, span rating to suit framing in each location, and thickness as required to match existing but not less than 1/2 inch.

2.5 FASTENERS

A. General: Provide fasteners of size and type indicated that comply with requirements specified in this Article for material and manufacture.
   1. Type 316 Stainless Steel, flat head, ring shank, diamond point roofing nails as manufactured by Stainless Fasteners, or equal. (Galvanized nails are not permitted to fasten into treated lumber.)

2. Length: Sufficient to penetrate wood blocking or nailers 1-1/4 inches.

B. Wood Screws: ASME B18.6.1.

C. Lag Bolts: ASME B18.2.1.

D. Bolts: Steel bolts complying with ASTM A 307, Grade A; with ASTM A 563 hex nuts and, where indicated, flat washers.

E. Expansion Anchors: Anchor bolt and sleeve assembly of material indicated below with capability to sustain, without failure, a load equal to 6 times the load imposed when installed in unit masonry assemblies and equal to 4 times the load imposed when installed in concrete as determined by testing per ASTM E 488 conducted by a qualified independent testing and inspecting agency.
1. Material: Carbon-steel components, zinc plated to comply with ASTM B 633, Class Fe/Zn 5.
2. Material: Stainless steel with bolts and nuts complying with ASTM F 593 and ASTM F 594, Alloy Group 1 or 2.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Discard units of material with defects that impair quality of carpentry and that are too small to use with minimum number of joints or optimum joint arrangement.

B. Set carpentry to required levels and lines, with members plumb, true to line, cut, and fitted. Fit carpentry to other construction; scribe and cope as needed for accurate fit. Locate nailers, blocking, and similar supports to comply with requirements for attaching other construction.

C. Apply field treatment complying with AWPA M4 to cut surfaces of preservative-treated lumber and plywood.

D. Securely attach carpentry work as indicated and according to applicable codes and recognized standards.

E. Countersink fastener heads on exposed carpentry work and fill holes with wood filler.

F. Use fasteners of appropriate type and length. Pre-drill members when necessary to avoid splitting wood.

3.2 WOOD BLOCKING, AND NAILER INSTALLATION

A. Install where indicated and where required for screeding or attaching other work. Form to shapes indicated and cut as required for true line and level of attached work. Coordinate locations with other work involved.

B. Attach items to substrates to support applied loading. Recess bolts and nuts flush with surfaces, unless otherwise indicated.

3.3 WOOD PANEL PRODUCT INSTALLATION

A. Wood Structural Panels: Comply with applicable recommendations contained in APA Form No. E30K, "APA Design/Construction Guide: Residential & Commercial," for types of structural-use panels and applications indicated.

END OF SECTION 06105

SECTION 07210 - FOAMED-IN-PLACE INSULATION

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Spray-in-place semi-rigid open cell, ½ pound foam polyurethane foam insulation in various assemblies, to provide an air barrier and improved thermal resistance.

1.2 REFERENCES

A. American Society for Testing and Materials (ASTM):

1. ASTM C 518 - Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus.
2. ASTM E 84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
3. ASTM E 96 - Standard Test Methods for Water Vapor Transmission of Materials.

B. International Code Council – International Building Code:

1. Section 104.11 Alternative materials, design and methods of construction and equipment.
2. Section 2603 Foam Plastic Insulation.

1.3 SUBMITTALS

A. Submit under provisions of Section 01300.

B. Before commencing work, submit in accordance with local code.

1. Submit technical data sheets and samples as required by local code officials.
2. Submit the technical data sheet from the manufacturer showing the test results from the ASTM E84 (Surface Burning Characteristics).

C. 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. Installation methods.

1.4 QUALITY ASSURANCE

A. Installer Qualifications:

1. Contractor performing work under this section shall be trained by DEMILEC USA® in the art of applying spray polyurethane foam insulation.
2. Provide current DEMILEC USA® Authorized Contractor Certificate.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Materials shall be delivered in manufacturer's original containers clearly labelled with manufacturer's name, product identification, safety information, net weight of contents and expiration date.

B. Material shall be stored in a safe manner and where the temperatures are in the limits specified by the material manufacturer.

C. Empty containers shall be removed from site on a daily basis.

D. Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction.

1.6 PROJECT CONDITIONS

A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

B. Ventilate insulation application area in accordance with the Spray Foam Coalition's Guidance[1] on best practices for the installation of Spray Polyurethane Foam.

C. Protect workers as recommended by the Spray Foam Coalition's Guidance[2] on best practices for the installation of Spray Polyurethane Foam.

D. Protect adjacent surfaces, windows, equipment and site areas from damage of overspray.

1.7 WARRANTY

A. Manufacturer's Warranty: DEMILEC USA® warrants spray-in-place urethane foam insulation, when installed by certified contractors using factory-trained applicators and applied in accordance with the Product Application Guide[3], will perform as stated in the Product Technical Data Sheet.

1. This warranty is in effect throughout the life of the building provided the original purchaser registers with the Warranty Department of the Manufacturer within thirty days of occupancy.

2. Manufacturer's sole responsibility under this Limited Lifetime Warranty shall be to repair or replace any defective Product at the cost of the material only.

3. Manufacturer shall not be responsible for labor cost or any other costs whatsoever related to, or in connection with the removal or installation of either the original or replacement product.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturer: DEMILEC USA

B. Substitutions: Equivalent as judged by Architect

2.2 SPRAY FOAM INSULATION

A. Spray Applied Semi Rigid Polyurethane Foam Insulation System: (Open Cell Foam)

1. Product: DEMILEC APX Manufactured by DEMILEC USA®, Arlington, TX.

2. Product Approval:

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[1] http://www.spraypolyurethane.org/GoodPractices
[2] http://www.spraypolyurethane.org/WorkerProtection
[3] http://www.demilecusa.com/wp-content/uploads/2013/02/Demilec-APX-Product-Application-Guide.pdf

a. International Code Council Evaluation Services Report #3470.

b. Passed NFPA 286 in accordance with IBC 803.2. as an interior finish. Refer to section 3.b.1. of this specification for assembly details.

3. Installation:

a. Application without a Thermal or Ignition Barrier (exposed foam)

1) The prescriptive 15-minute thermal barrier or ignition barrier may be omitted when installation is in accordance with this section. DEMILEC APX Spray foam insulation and Blazelok TBX intumescent coating may be spray-applied to the interior facing of the walls and the underside of roof sheathing or roof rafters, and in crawl spaces, and may be left exposed as an interior finish without a prescribed 15-minute thermal barrier or ignition barrier. The foam plastic insulation thickness must not exceed 7 ½ inches (191 mm) in walls and 11 ½ inches (292 mm) in floors and ceilings. All foam surfaces must be covered with an 11-mil dry thickness (0.28 mm) [17 mils wet thickness (0.43 mm) of Blazelok TBX intumescent coating. The intumescent coating must be sprayed applied over the insulation in accordance with the coating manufacturer's instructions at a rate of 85 square feet per gallon (2.09m2/L).

b. Attics and Crawlspaces: Passed AC 377 Appendix X compliant NFPA 286.

1) The insulation may be spray-applied to the underside of the roof sheathing and/or rafters, to the underside of wood floors and to vertical surfaces as described in this section. The thickness of the foam plastic applied to the underside of the top of the space must not exceed 11 ¾" inches (298 mm), and the thickness when applied to vertical surfaces must not exceed 7 ¾" inches (197 mm). The insulation does not require an ignition barrier or coating.

4. Physical Properties:

a. Density (ASTM D 1622): 0.45 – 0.5 lb/cf (0.007 to 0.008 gm/cu. cm).

b. Thermal Resistance (ASTM C 518):

1) R-3.7 (sf.h degree F/BTU) @ 1 inch at 90 days at 76 degree F (24.4 degree C).

2) See ESR 3470 for R-value table.

c. Air Leakage (ASTM E 283-04):

1) 3.5 inches (89 mm) At 75 Pa (25 mph wind): 0.003 L/s•m².

d. Compressive Strength (ASTM D 1621): 1.1 psi.

e. Tensile Strength (ASTM D 1623): 3.7 lbf/sq. inch.

f. Water Vapor Transmission (ASTM E 96):

1) 1.008 inches (25 mm): 16.0 perms

g. Off Gassing Tests (VOC Emissions) Berkeley Analytical Certificate 130104-01: Pass or Compliant (No toxic vapors).

h. Surface Burning Characteristics (ASTM E 84) 4" inches (117 mm): Class I. Flame Spread Index 15, Smoke Developed Index 350.

5. Equipment used to apply the foam insulation shall have fixed ratio positive displacement pumps and approved by foam manufacturer.

6. Equipment used to apply the Water Based intumescing coating shall be an airless sprayer approved by the manufacturer.

   A. Water Based intumescing coating:
      1) Product: BLAZELOK™ TBX, Distributed by DEMILEC USA®, Manufactured by TPR^2.
      2) Approval: Complies with 2006 IRC 314.6, 2009 IRC 316.6, IBC 2603.9 and IBC 803.2 over *DEMILEC APX®* for use as an interior finish without a prescriptive thermal barrier.
      3) Application: Follow manufacturer's application recommendations.
      4) Physical Properties:
      5) Surface Burning Characteristics (ASTM E 84): Class I. Flame Spread Index <25, Smoke Developed Index <50.
      6) Expands up to 2000 percent.
      7) Flash Point: None
      8) Volatility/VOC: < 50 g/L
      9) Non-toxic, drain safe, water based, non-fuming.
      10) Can be latex or oil base top coated.
      11) Dull Flat White / Grey.

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.

C. Commencement of work outlined in this section shall be deemed as acceptance of existing work and conditions.

3.2 PREPARATION

A. Clean surfaces thoroughly prior to installation.

B. Apply only when surfaces and environmental conditions are within limits prescribed by the material manufacturer.

C. 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 in accordance with manufacturer's instructions. Apply as recommended by manufacturer to thickness as indicated on drawings.

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 OF 07210

HIDALGO COUNTY SHERIFF'S OFFICE
Hidalgo County Adult Detention Center and
Law Enforcement Facility Repairs and / or Replacement
Edinburg, TX

SECTION 07551 – MODIFIED BITUMEN MEMBRANE ROOFING (RE-COVER)

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 for roof re-cover over the existing built-up roof system at **The Hidalgo County Adult Detention Center and Law Enforcement Center**:
   1. Perform a Thermocore® Infrared Scan of the entire roof system to determine if any wet areas exist within the existing roof system.
   2. Remove all trash, dirt and debris from the roof surface.
   3. Remove ALL existing gravel from the roof surface as required to provide smooth clean roof surface to receive the new Re-cover Roof System. Repair all damaged roof membrane as required to maintain a leak-free roof system prior to installing the new Re-Cover Roof System.
   4. Remove existing roofing and insulation in ALL wet areas as identified by the Thermocore® Infrared Scan and provide roof repairs consisting of the following:
      a. One (1) layer of polyisocyanurate roof insulation (thickness as required to match existing) mechanically fastened to the metal roof deck.
      b. One (1) layer of perlite roof insulation (thickness as required to match existing) adhered to the base layer of roof insulation with the specified cold process adhesive.
      c. Two (2) plies of Coated Polyester/Glass/Polyester Trilaminate reinforced ply sheet adhered with cold process asphalt adhesive.
      d. Allowance: In the Base Proposal, allow for Wet Roof System replacement as follows:
         1) 1,000 square feet.
      e. Metal roof deck repairs, if required:
         1) Examine exposed metal deck and repair or replace if necessary using unit pricing.
   5. Install new treated wood nailers as required by the new roof system. See Section 06105 – Miscellaneous Carpentry.
   6. Replace deteriorated wood blocking and nailers as required.
      a. Allowance: In the Base proposal, allow for replacement and/or repair of the deteriorated existing wood blocking and nailers as follows:
         1) 300 board feet
   7. Install a new Roof Re-cover System as follows:
      a. One (1) layer of 1/2" glass mat faced gypsum with non-asphaltic, highly filled proprietary heat-cured coating on one side, mechanically attached through the existing roofing system to the existing metal deck in accordance with local wind resistance requirements.

b. One (1) ply of ASTM D 6223, Type II, Grade S, polyester and fiberglass reinforced, smooth surfaced, APP-modified asphalt sheet, heat-welded to the properly prepared substrate.
c. One (1) ply of ASTM D 6223, Type II, Grade G, polyester and fiberglass reinforced, granule surfaced, APP-modified asphalt sheet, heat-welded to the base ply.

8. Install new base flashings at all equipment curbs and roof transitions as follows:
   a. One (1) ply of ASTM D 6223, Type II, Grade S, polyester and fiberglass reinforced, smooth surfaced, APP-modified asphalt sheet, heat-welded to the properly prepared substrate.
   b. One (1) ply of ASTM D 6223, Type II, Grade G, polyester and fiberglass reinforced, granule surfaced, APP-modified asphalt sheet, heat-welded to the base ply.
9. Install new sheet metal flashings and trim as required, including but not limited to coping, fascia, counterflashing, pitch pans, scuppers, conductors, gutters and downspouts.
   a. Provide 24 gauge Galvalume coated with Kynar 500 / Hylar 5000 for all flashings visible to the general public.
   b. Provide 24 gauge Galvalume coated steel for all flashing not readily visible to the general public.
10. Remove existing conductors and downspouts as required to facilitate replacement of the existing primary drainage scupper sleeves with new stainless steel scupper sleeves. Re-use the existing conductors and downspouts. If re-installation is not possible, replace existing conductors and downspouts with new pre-finished sheet metal to match existing as required.
11. Install new over-flow scuppers as indicated on the roof plan. One over-flow scupper will be required for each existing primary scupper. Over-flow scuppers must be at least the same size as the existing primary scupper. The bottom of each new over-flow scupper must be placed at least two inches (2") but no more than four inches (4") above the bottom of the existing adjacent primary scuppers.
12. Replace all existing roof hatches with new roof hatches of similar design and construction.
13. Install parapet wall waterproofing above the new sheet metal counterflashing at the base of the wall wrapped over the top of the parapet wall under the new sheet metal coping consisting of two (2) layers of one-part, asbestos-free, non-fibrated, cold-applied, rubberized asphalt emulsion reinforced with one (1) ply of stitch-bonded polyester reinforcing fabric and coated with intumescent, fire-retardant, white reflective, elastomeric, acrylic latex roof coating.
14. Parapet and other walls above the roof system currently coated with tinted elastomeric coating will be re-coated with exterior grade fibrated elastomeric coating tinted to match the existing wall color.
15. Mechanical and Electrical work as required to facilitate re-cover roofing. Including disconnecting and re-connecting, raising or relocating mechanical equipment, vents, piping, conduit, curbs, or other roof top items. Some mechanical units on this roof will be replaced with new units and new curbs. Some units will remain. Co-ordinate all mechanical unit work so that ALL units and curbs are installed at the proper eight inch (8") height above the new roof system.
16. All existing and new piping including but not limited to gas lines, conduit, etc. must be disconnected and raised (if required) and placed on proper pipe supports. Reconnection and testing shall be included as required.
17. Provide a ten (10) year manufacturer's warranty.

B. Related Sections include the following:
   1. Division 06 Section "Miscellaneous Rough Carpentry" for wood nailers, curbs, and blocking.
   2. Division 07 Section "Flashing and Sheet Metal".

C. Allowances: Refer to Division 1 Section "Allowances" for description of Work in this Section affected by allowances.
   1. Wet Roof System Replacement: 1,000 square feet.
   2. Wood Blocking and Nailer Replacement: 300 board feet.

D. Unit Prices: Refer to Division 1 Section "Unit Prices" for description of Work in this Section affected by unit prices.
   1. Wet Roof System Replacement: $/square foot.
   2. Metal Roof Deck Repair/Replacement: $/square foot.
   3. Wood Blocking and Nailer Repair/Replacement: $/board foot.

E. Alternates: Refer to Division 1 Section "Alternates" for description of Work in this Section affected by alternates.
   1. Alternate No. 1: Provide a Fifteen (15) Year Manufacturer's Warranty
   2. Alternate No. 2: Provide a Ten (10) Year Manufacturer's Maintenance and Service Agreement including annual inspections with general maintenance and housing documented with photographs and recommendations.
   3. Alternate No. 3: Provide a Fifteen (15) Year Manufacturer's Maintenance and Service Agreement including annual inspections with general maintenance and housing documented with photographs and recommendations.

1.3 DEFINITIONS

A. Roofing Terminology: Refer to ASTM D 1079 and glossary of NRCA's "The NRCA Roofing and Waterproofing Manual" for definition of terms related to roofing work in this Section.

1.4 PERFORMANCE REQUIREMENTS

A. General: Provide installed roofing membrane and base flashings that remain watertight; do not permit the passage of water; and resist specified uplift pressures, thermally induced movement, and exposure to weather without failure.

B. Material Compatibility: Provide roofing materials that are compatible with one another under conditions of service and application required, as demonstrated by roofing manufacturer based on testing and field experience.

C. Roofing System Design: The Contractor will provide field verification of roof wind uplift resistance in accordance with FM Global Property Loss Prevention Data Sheet 1-52 as follows:
   1. Once a representative section of the new Roofing Re-cover System (approximately 1,000 square feet) has been installed, at least three (3) bonded uplift tests will be performed. One each in the field, perimeter and corner of the completed roof section.
   2. Test results will be provided to the Owner's representative for evaluation and recommendation before the roofing re-cover operation may be resumed.

3. Preparation for testing and all roof repairs will be provided by the contractor.

D. Roofing Membrane System Load-Strain Properties: Provide a roofing membrane identical to component systems that have been successfully tested by a qualified independent testing and inspecting agency to meet the following minimum load-strain properties at membrane failure when tested according to ASTM D 2523:
   1. Tensile strain at failure, at 0 deg. F: 203.46 lbf/in machine direction, minimum; 5.87 percent elongation, maximum.
   2. Tensile strain at failure, at 0 deg. F: 185.57lbf/in cross-machine direction, minimum; 5.73 percent elongation, maximum.

E. Flashings: Comply with requirements of Division 7 Section "Sheet Metal Flashing and Trim." Provide base flashings, perimeter flashings, detail flashings and component materials that comply with requirements and recommendations of the following:
   1. NRCA Roofing and Waterproofing Manual (Fifth Edition) for construction details and recommendations.
   2. SMACNA Architectural Sheet Metal Manual (Fifth Edition) for construction details.
   3. ANSI/SPRI ES-1, "Wind Design Standard for Edge Metal Systems Used with Low Slope Roof Systems".

1.5 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Installer Certificates: Signed by roofing system manufacturer certifying that Installer is approved, authorized, or licensed by manufacturer to install roofing systems.

C. Manufacturer Certificates: Signed by roofing manufacturer certifying that roofing system complies with requirements specified in "Performance Requirements" Article.
   1. Submit evidence of meeting performance requirements.

D. Maintenance Data: For roofing system to include in maintenance manuals.

E. Warranties: Special warranties specified in this Section.

1.6 SUBSTITUTIONS

A. General:
   1. Refer to Division 1, Section 01430 – Quality Assurance.
   2. ONLY Substitutions approved in writing by the architect/owner prior to the scheduled bid date will be considered.
   3. Notification of approvals will be issued at least five (5) days before the scheduled bid date.
   4. Architect/Owner reserves the right to be final authority on acceptance or rejection of any substitution request.

B. When a particular make or trade name is specified, it shall be indicative of standard required. Bidders proposing substitutes shall submit the following ten (10) days prior to bid date to the Architect; requests received after that time will not be considered.
   1. Written application with explanation of why it should be considered.
   2. Independent laboratory certification providing written confirmation that the physical and performance characteristics of the substitute material/system will meet the physical and performance characteristics of the specified materials and or system.

C. Submit five copies of request for substitution. Items to be included in the request:
   1. Complete data substantiating compliance of proposed substitution.
   2. Product identification, including manufacturer's literature and manufacturer's name.
   3. Current certificate from an accredited testing laboratory comparing the physical and performance attributes of the proposed material with those of the specified materials. Test results must be dated, notarized, and on testing laboratory stationary.
   4. A five gallon sample of any adhesive, coating, or mastic and a 3' x 5', sample of sheeting goods specified. Original labels must be on the containers; smaller containers may be submitted if original labels are attached. This sample should be wet applied in its final configuration. The Architect will review the installed sample.
   5. Material Safety Data Sheets providing all pertinent data as to flammability, combustibility.
   6. List of at least (5) five jobs as described under the requirements where the proposed alternate material was used under similar conditions. These jobs must be available for inspection by the Architect. Names and phone numbers are required for verification. Submit a minimum of 200,000 square feet for review. Submitted projects must be a minimum of (5) years old.
   7. Notarized statement from the Roof System Manufacturer, signed by a corporate officer of the corporation stating that:
      a. All Documents have been reviewed and are approved.
      b. The Project site has been inspected.
      c. The Roofing System Manufacturer will provide two (2) field inspections weekly; during, and until all construction work is complete and accepted by the owner. A full time employee of the manufacturer must perform inspections.
      d. Provide documentation of the proposed alternate system passing the specified regulatory requirements. Documentation must be on the specified regulatory requirements letterhead or approval guide. No third party testing will be accepted.

D. In making substitution request, Bidder/Contractor represents:
   1. He has personally investigated proposed product or method, and determined that it is equal or superior in all respects to that specified. Additionally, he will have a technical service representative of the proposed manufacturer attend the pre-bid meeting.
   2. He will provide the same guarantee for substitution as for those specified.
   3. He will coordinate installation of accepted substitution in work, making such changes as may be required for work to be completed in all respects.
   4. Advise the owner of any credit savings or additional costs as opposed to the system type specified.

E. Substitutions will <u>not</u> be considered if:
   1. Product or method to be considered does not have a minimum of (5) five years of successful performance in roofing and re-roofing of similar applications.
   2. Any discrepancies in the test data, or if the tests or submittals are incomplete.

3. They are indicated or implied on Shop Drawings or Project Data Submittals without formal request submitted in accordance with the specification document.
4. Acceptance requires significant revision of documents.
5. Only substitutes approved in writing by prior to scheduled cut off date will be considered.
6. Notification of approvals will be mailed at least 3 days before bid opening.
7. The owner will not incur any additional costs for design or construction costs.

1.7 QUALITY ASSURANCE

A. General: Refer to Division 1, Section "Quality Assurance".

B. Manufacturer Qualifications:
1. A qualified manufacturer that can meet the basis of design as established in Part 2 – Products.
2. Manufacturer shall provide inspections (2) times each week to verify accuracy of installation and provide a written report to the Contractor for submittal to the architect.

C. Installer Qualifications:
1. Have experience in processed built-up roofing for a minimum of five (5) years.
2. Contractors must be Certified/Approved by the specified Primary Material Manufacturer.

D. Approval of Roofing Contractors:
1. Roofing Contractors included in the following list are the only pre-approved installers that can install and provide the warranty for the specified roof system.
   a. American Contracting USA, Inc., Rio Hondo, Texas (956) 748-4030.
   b. Rio Roofing Inc., Harlingen, Texas (956) 423-3359.
   c. Sechrist-Hall Company, Inc., Harlingen, Texas (956) 423-7086.
   d. Haeber Roofing Company, Corpus Christi, Texas (361) 851-8142.
   e. Port Enterprises, Inc. Corpus Christi, Texas (361) 289-2944.
   f. Sechrist-Hall Company, Inc., Corpus Christi, Texas (361) 884-5264.
   g. Easley Construction, Inc., Victoria, Texas (361) 575-0294.
   h. Rain King, Victoria, Texas (361) 576-0606.
   i. Rain Seal Master Roofing and Sheet Metal, Inc., Victoria, Texas (361) 576-0926.
2. Roofing Contractors not on the list, that would like to bid on the proposed project, must complete the required qualification statement and must meet all requirements in the contract documents. Contractors, who are not approved by the Architect, will not be allowed to bid the project. Qualification statements may be requested from the technical roofing consultant and the local chapter of the American Institute of Architects.
3. Installer must provide (2) manufacturer inspections each week.
   a. Noncompliance may result in an $850 per day fee for missing inspections.

E. Source Limitations: Obtain components for roofing system from or approved by roofing system manufacturer.

F. Pre-installation Conference: Conduct conference at Project site. Comply with requirements in Division 1 Section "Project Management and Coordination." Review methods and procedures related to roofing system including, but not limited to, the following:
1. Meet with Owner, Architect, Owner's insurer if applicable, testing and inspecting agency representative, roofing Installer, roofing system manufacturer's representative, deck

installer, and installers whose work interfaces with or affects roofing including installers of roof accessories and roof-mounted equipment.

2. Review methods and procedures related to roofing installation, including manufacturer's written instructions.
3. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
4. Examine deck substrate conditions and finishes for compliance with requirements, including flatness and fastening.
5. Review structural loading limitations of roof deck during and after roofing.
6. Review base flashings, special roofing details, roof drainage, roof penetrations, equipment curbs, and condition of other construction that will affect roofing system.
7. Review governing regulations and requirements for insurance and certificates if applicable.
8. Review temporary protection requirements for roofing system during and after installation.
9. Review roof observation and repair procedures after roofing installation.

G. Random Sampling
1. During course of work, the Architect may secure samples according to ASTM D140-93 of materials being used from containers at job site and submit them to an independent laboratory for comparison to specified material.
2. Should test results prove that material is not equal to specified material:
   a. Contractor shall pay for all testing.
   b. Roofing installed and found not to comply with the specifications shall be removed and replaced with no change in the contract price.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Deliver roofing materials to Project site in original containers with seals unbroken and labeled with manufacturer's name, product brand name and type, date of manufacture, and directions for storage.

B. Storage of Materials
1. Store liquid materials in their original undamaged containers in a clean, dry, protected location and within the temperature range required by roofing system manufacturer. Protect stored liquid material from direct sunlight.
   a. Discard and legally dispose of liquid material that cannot be applied within its stated shelf life.
2. Store materials marked "keep from freezing" in areas where temperatures will remain above 40 deg F.
3. For insulation, remove plastic packaging shrouds. For felt rolls, slit the top of the plastic shrink-wrap only. Cover top and sides of all stored materials with tarpaulin. Secure tarpaulin. Store in a dry location. Comply with manufacturer's written instructions for handling, storing, and protecting during installation.
4. Store rolls of felt and other sheet materials on end on pallets or other raised surfaces.
5. Do not double-stack rolls.
6. Rooftop storage: Disperse material to avoid concentrated loading.
7. Materials may not be stored without a canvass tarpaulin, or on direct contact with the ground or roof surface. Do not leave unused felts and other sheet materials on the roof

overnight or when roofing work is not in progress unless protected from weather and moisture and unless maintained at a temperature exceeding 50 deg F.

8. Should Contractor be required to quickly cover material temporarily, such as during an unanticipated rain shower, all materials shall be stored on a raised platform covered with secured canvas tarpaulin, top to bottom.
9. Contractor is responsible for the safekeeping of materials stored onsite.

C. Protect roof insulation materials from physical damage and from deterioration by sunlight, moisture, soiling, and other sources. Store in a dry location. Comply with insulation manufacturer's written instructions for handling, storing, and protecting during installation.

D. Handle and store roofing materials and place equipment in a manner to avoid permanent deflection of deck.

1.9 PROJECT CONDITIONS

A. Weather Limitations:
1. Proceed with roofing work only when existing and forecasted weather conditions permit roofing to be installed according to manufacturers' written instructions and warranty requirements.
   a. Do not work in rain, snow, or in presence of water.
   b. Do not work in temperatures below 40 deg. F.
   c. Do not install materials marked "keep from freezing" when daily temperatures are scheduled to fall below 40 deg. F.
   d. Remove any work exposed to freezing.
   e. Advise the owner when volatile materials are to be used near air ventilation intakes so that they can be shut down or blocked, as the owner requires.

1.10 WARRANTY

A. Special Roofing Manufacturer's Warranty:
1. The warranties 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.
2. Upon project completion, Manufacturer acceptance, and once complete payment has been received; the contractor shall deliver to the Owner a Ten (10) year Quality Assurance Warranty and Owner's Manual. The Manufacturer must, during the second, fifth, and tenth year of the warranty, inspect and provide a written Executive Summary.
3. The Manufacturer's Warranty must include labor & material coverage against leakage on all components; including those manufactured by others. Included are the following:
   a. Base sheet and fasteners.
   b. Insulation materials and adhesives.
   c. All roof membrane components and adhesives.
   d. All wood blocking and fastening components.
   e. All perimeter flashing metal components.
   f. All tapered edge and cant strips.
   g. All existing or new counter flashing.

h. All surface mastics, coatings, stripping ply, etc.
i. All drain assemblies, scuppers, expansion joints, pitch pans and other components, excluding interior plumbing.
j. Any leaks or other problems caused by substrate movement, excluding decks.
k. Cover against damages from wind speeds up to hurricane force winds as outlined within the Beaufort Scale.

B. Special Roofing Manufacturer's Warranty **(Alternate #1):**
1. Same as above except with a Fifteen (15) year term.

C. Special Project Warranty:
1. Submit Roofing Installer's Warranty, on the warranty form at the end of this Section, signed by the Installer, covering the work of this Section, including membrane roofing, base flashing, roofing insulation, fasteners, sheet metal components, and vapor retarders, if any, for the following warranty period. Roofing contractor shall provide a letter to the architect stating that the roofing contractor will agree to participate in allowances and adjustments for 2 years of the warranty period. It must be determined by the architect and the roof system manufacturer that the defects in the roofing assembly are a result of application and workmanship errors. All defects noted during this time period will be corrected by the roof contractor at their expense.
2. Roof Installers Warranty Period: 2 years from the date of substantial completion.

D. Maintenance Service Agreement **(Alternate #2):**
1. Roof Management and Maintenance Specification: The following services will be provided to the building owner on an annual basis, for a period of Ten (10) years, utilizing employees under the direct supervision of Weatherproofing Technologies, Inc.
2. Roof Inspection Report: Provide report of roof conditions based upon roof inspections.
3. Storm Reports, Monitoring and Follow-up: Roof inspection at building owner request of roof areas after major storm activity.
4. Annual Roof Top Housekeeping:
   a. Inspect roof membrane, drains, gutters, and scuppers of debris.
   b. Remove, bag and properly dispose of all debris from the roof membrane, drains, gutters and scuppers.
5. Annual Roof Preventative Maintenance to Include the following:
   a. Metal Edge Flashing Components: Tears, splits, and breaks in the membrane flashings will be repaired with appropriate repair mastics and membranes. Open flashing strip-ins will be repaired with appropriate mastics and membranes. Metal edge cleats and clips will be re-secured. Exposed fasteners will be re-sealed.
   b. Parapet Wall and Counterflashing Systems: Tears, splits and breaks in the flashings will be repaired with the appropriate repair mastics and membranes. Breaks, tears and splits in flashing strip-ins will be repaired with appropriate repair mastics and membranes. Coat all exposed reinforcing membranes with approved mastics. Exposed fasteners will be re-sealed. Void in termination bars, counterflashings and parapet caps will be cleaned and re-sealed. Re-secure termination bars and counterflashings. Check and re-secure loose metal coping caps to cleats.
   c. Equipment/Projection Flashing Components: Tears, splits and breaks in the flashings will be repaired with appropriate mastics and membranes. Open or split flashing strip-ins will be repaired with appropriate mastic and membrane. Unsecured roof top equipment will be secured. Exposed fasteners will be

tightened and re-sealed. Termination bars and counterflashings will be sealed. All pitch pans will be refilled and topped off. Metal projections (hoods and clamps) will be checked and re-sealed.

d. Roof Membrane Preventative Maintenance and Repair: Tears, splits and breaks in the roof membrane will be repaired with the appropriate repair mastic and membranes. All membrane repairs will follow the Manufacturer's written repair and maintenance guidelines. Dress up reflective coatings on flashings. Coat all exposed reinforcing membranes with approved mastics.

e. Drains, Gutters and Scuppers: Check and re-secure drain bolts and clamping rings. Advise owner of missing drain dome strainers. Check strip-ins around drain leads, coat with approved mastic. Check gutter straps, joints and strip-ins. Check inside and exterior of scuppers for open solder or caulking seals.

6. Leak response responsibilities of the Manufacturer to Building Owner:
   a. In the event that a leak should occur:
      (1) Provide toll free 800 number for Owner to call in leak report. Number will be monitored twenty-four (24) hours a day, 365 days a year.
      (2) Provide a response to Owner on all leak calls within twenty-four (24) of when call is made.
      (3) Provide a repair crew, at the building site, within two (2) business days of the call.
      (4) Provide follow-up inspection to ensure that repairs were made properly.
7. Monitor all leak events and response and provide a written quarterly summary if leaks have occurred. Deliver to Owner at the end of each quarter when leaks have occurred.

E. Maintenance Service Agreement **(Alternate #3):**
   1. Same as above except with a Fifteen (15) year term.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. In Part 2 articles where titles below introduce lists, the following requirements apply for product selection:
   1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the products specified.
   2. Available Manufacturers: Any manufacturer properly submitting **all** required information in accordance with Section 1.06 and complying with **all** requirements of these specifications. Inclusion in the list below does not constitute prior approval. All manufacturers must submit verification of compliance with all of the performance and physical characteristics of the specified materials. All manufacturers must submit verification that all services and technical support indicated in the specifications and under the terms of the warranty will be provided.
      a. Basis of Design:
         1) Tremco Inc., Cleveland, OH (216) 292-5000.

B. The products listed within are used to establish a basis of design.
   1. Refer to section 01600 – Product Requirements within the General Conditions.

2.2 ROOFING MEMBRANE PLIES

A. Base Ply Sheet heat welded to new re-cover board: Provide one (1) ply of ASTM D 6223, Type II, Grade S, polyester and fiberglass reinforced, smooth surfaced, APP-modified asphalt sheet, heat-welded to the properly prepared substrate.
   1. Performance requirements:
      a. Thickness, 160 mils, ASTM D 6222-98
      b. Tensile Strength at 0 deg. F, 181 lbf/in (MD), 121 lbf/in (XMD), ASTM D 6222-98
      c. Tear Strength at 77 deg. F, 179 lbf /MD, 149 lbf /XMD, ASTM D 6222-98
      d. Elongation at 0 deg. F, 42% MD, 46% XMD, ASTM D 6222-98
      e. Low Temperature Flexibility, 10 deg. F, ASTM D 6222-98
      f. Dimensional Stability, 0.90% MD, 0.60% XMD, ASTM D 6222-98
   2. Basis of Design: Tremco POWERply APP Smooth.

B. Cap Sheet heat-welded to base ply sheet: Provide one (1) ply of ASTM D 6223, Type II, Grade G, polyester and fiberglass reinforced, granule surfaced, APP-modified asphalt sheet, heat-welded to the base ply.
   1. Performance requirements:
      a. Thickness, 180 mils, ASTM D 6222-98
      b. Tensile Strength at 0 deg. F, 151 lbf/in (MD), 105 lbf/in (XMD), ASTM D 6222-98
      c. Tear Strength at 77 deg. F, 175 lbf /MD, 143 lbf /XMD, ASTM D 6222-98
      d. Elongation at 0 deg. F, 38% MD, 42% XMD, ASTM D 6222-98
      e. Low Temperature Flexibility, 12 deg. F, ASTM D 6222-98
      f. Dimensional Stability, 0.90% MD, 0.60% XMD, ASTM D 6222-98
   2. Basis of Design: Tremco POWERply APP FR.

2.3 FLASHING MATERIALS

A. Backing Sheet heat-welded to properly prepared substrate: Provide one (1) ply of ASTM D 6223, Type II, Grade S, polyester and fiberglass reinforced, smooth surfaced, APP-modified asphalt sheet, heat-welded to the properly prepared substrate.
   1. Performance requirements:
      a. Thickness, 160 mils, ASTM D 6222-98
      b. Tensile Strength at 0 deg. F, 181 lbf/in (MD), 121 lbf/in (XMD), ASTM D 6222-98
      c. Tear Strength at 77 deg. F, 179 lbf /MD, 149 lbf /XMD, ASTM D 6222-98
      d. Elongation at 0 deg. F, 42% MD, 46% XMD, ASTM D 6222-98
      e. Low Temperature Flexibility, 10 deg. F, ASTM D 6222-98
      f. Dimensional Stability, 0.90% MD, 0.60% XMD, ASTM D 6222-98
   2. Basis of Design: Tremco POWERply APP Smooth.

B. Flashing Sheet heat-welded to backing sheet: Provide one (1) ply of ASTM D 6223, Type II, Grade G, polyester and fiberglass reinforced, granule surfaced, APP-modified asphalt sheet, heat-welded to the base ply.
   1. Performance requirements:
      a. Thickness, 180 mils, ASTM D 6222-98

b. Tensile Strength at 0 deg. F, 151 lbf/in (MD), 105 lbf/in (XMD), ASTM D 6222-98
c. Tear Strength at 77 deg. F, 175 lbf /MD, 143 lbf /XMD, ASTM D 6222-98
d. Elongation at 0 deg. F, 38% MD, 42% XMD, ASTM D 6222-98
e. Low Temperature Flexibility, 12 deg. F, ASTM D 6222-98
f. Dimensional Stability, 0.90% MD, 0.60% XMD, ASTM D 6222-98

2. Basis of Design: Tremco POWERply APP FR.

C. Glass-Fiber Seam Reinforcing Fabric: Woven glass reinforcement treated with organic resin complying with ASTM D 1668, Type III.
1. Basis of Design: Tremco Burmesh.

D. Flashing Sheet Coating Material: VOC compliant, asbestos free, reflective aluminum coating for all flashing joint stripping.
1. Performance Requirements:
a. VOC, 495 g/L, per ASTM D3960-93
b. Metallic Aluminum Content, 15% min, per ASTM D 2824-85
2. Basis of Design: Tremco Double-Duty Aluminum LV.

2.4 AUXILIARY MATERIALS

A. General: Auxiliary materials recommended by roofing system manufacturer for intended use and compatible with built-up roofing.

B. Asphalt primer:
1. An asbestos free, modified water-based asphalt primer
2. Basis of Design: Tremco Tremprime WB.

C. Elastomeric mastic for stripping joints at base flashing membrane and miscellaneous waterproofing:
1. A single component, weather resistant, asbestos free durable roof elastomer, suitable for use over both asphalt and tar roof membranes.
2. Basis of Design: Tremco POLYroof LV.

D. Reinforcement membrane:
1. A non-shrinking, non-rotting, vinyl coated, woven glass mesh.
2. Basis of Design: Tremco Burmesh - 6".

E. Flashing tape for top edge of base flashing:
1. A flexible, non-drying, butyl-based, gasket-forming sealant tape.
2. Basis of Design: Tremco TF-Tape.

F. Asphalt mastic for miscellaneous sealing and waterproofing:
1. An asphalt-based, heavily fibrated, asbestos free mastic.
2. Basis of Design: Tremco ELS.

G. Pitch pan cement:
1. ASTM C 928-89, rapid hardening non-shrink grout.

H. Pitch pan mastic:
   1. High performance single component roof elastomer.
   2. Basis of Design: Tremco POLYroof LV

I. Metal Joint Sealant:
   1. An asbestos free, one-part, low modulus moisture curing, silicone sealant.
   2. Basis of Design: Tremco TremSEAL S.

J. Reglet Joint Sealant.
   1. One-part, bituminous polyurethane sealant.
   2. Basis of Design: Tremco Reglet Joint Sealant.

K. Vents and/or stacks:
   1. Galvanized Steel: ASTM A 526-85, sheet steel with 1.25 oz./sq. galvanized coating.
      a. Gage: Twenty-four (24).
      b. Solder: ASTM B32-89, alloy grade 60A. Neutralize flux after soldering.

L. Termination Bar for top edge of all base flashings:
   1. Extruded aluminum, pre-punched 8" o.c.

M. Fasteners: Factory-coated steel fasteners and metal or plastic plates meeting corrosion-resistance provisions in FMG 4470, designed for fastening membrane to substrate, and acceptable to membrane roofing system manufacturer.

N. Miscellaneous Accessories: Provide pourable sealers, preformed cone and vent sheet flashings, preformed inside and outside corner sheet flashings, T-joint covers, termination reglets, cover strips, and other accessories.

O. Metal Flashings:
   1. Provide Metal Flashings as specified in Division 7 Section "Sheet Metal Flashing and Trim".
   2. Metal flashings, counter flashings, pitch pans, scuppers, and like applications shall be fabricated and installed in accordance with:
      a. National Roofing Contractors Association Manual (NRCA).
   3. Fascia and other edge flashing details shall be fabricated and installed in accordance with:
      a. National Roofing Contractors Association Manual (NRCA).
      b. SMACNA Architectural Sheet Metal Manual (Fifth Edition) for construction details.
      c. ANSI/SPRI ES-1, "Wind Design Standard for Edge Metal Systems Used with Low Slope Roof Systems".
   4. Coping, fascia, gutters, conductor heads, downspouts and other visible sheet metal flashing:
      a. Galvanized, pre-painted: Twenty-four (24) gage minimum, galvanized steel; commercial quality, Fed. Spec. QQ-S-775, Type I, Class D or ASTM A 526 or lock forming quality ASTM A 527, G90 coating in accordance with ASTM A 525. All sheet metal to be pre-painted.
         1) Paint finish at exposed side: Factory applied baked-on two (2) coat system comprised of one (1) coat of full 70% resin fluorocarbon by Kynar 500 or

accepted substitute over a smooth coat of corrosion-resistant epoxy-based primer. Color as selected by owner.

2) Finish at underside shall be a wash coat over a coat of corrosion-resistant epoxy-based primer.

5. Counter flashing, slip flashing, pitch pans with hoods and other sheet metal flashings not visible to the general public:
   a. Galvanized Steel: ASTM A 526-85, sheet steel with 1.25 oz./sq. galvanized coating.
      1) Gage: Twenty-four (24).
      2) Solder: ASTM B32-89, alloy grade 50A. Neutralize flux after soldering.
6. Primary Scuppers and Over-flow Scuppers:
   a. Stainless Steel, Type 304: Twenty-four (24) gauge minimum, stainless steel; commercial quality, Fed. Spec. QQ-S-775, Type I, Class D or ASTM A 526 or lock forming quality ASTM A 527, G90 coating in accordance with ASTM A 525.
7. Lead Flashings:
   a. ASTM B 29-79 (1984), 4 lb. (1.82 kg) sheet lead.
   b. Use prefabricated plumbing vent flashings with factory welded and sealed joints at all plumbing vents.
      1) Flange: 4" minimum.

2.5 ROOF COVER BOARD

A. General: Provide preformed roof cover boards that comply with requirements and referenced standards, selected from manufacturer's standard sizes and of thicknesses indicated.

B. Cover Board: ASTM C 1177/C 1177M, glass-mat, water-resistant gypsum substrate, Type X, minimum 1/2 inch thick, factory primed.
   1. Basis of Design: Provide Tremco / GP Gypsum Dens-Deck Prime Roof Board by Tremco Inc.
   2. Fasteners: Factory-coated steel fasteners and metal or plastic plates meeting corrosion-resistance provisions in FMG 4470, designed for fastening cover board panel to roof deck.
      a. Fastener density requirements:
         1) Field: 1 each per 2 square feet / 16 each per 4' x 8' board.
         2) Perimeters: 1 each per 1.33 square feet / 24 each per 4' x 8' board.
         3) Corners: 1 each per 1 square feet / 32 each per 4' x 8' board.

C. Tapered Perlite Insulation: ASTM C 728; composed of expanded perlite, cellulosic fibers, binders, and waterproofing agents with top surface seal-coated. Minimum board thickness: 1/2".
   1. Provide factory-tapered insulation boards fabricated to slope as follows: Tapered roof insulation, crickets and saddles: 1/2 inch per foot; and drain or scupper sumps: 1/2 inch per foot.

2.6 INSULATION ACCESSORIES

A. General: Roof insulation accessories recommended by insulation manufacturer for intended use and compatible with membrane roofing.

B. Fasteners: Factory-coated steel fasteners and metal or plastic plates meeting corrosion-resistance provisions in FMG 4470, designed for fastening roof insulation to substrate, and acceptable to roofing system manufacturer.

C. Wood Cant and Nailer Strips:
   1. Refer to Division 6, Section 06100 "Wood Blocking and Curbing".

D. Provide preformed saddles, crickets, tapered edge strips, and other insulation shapes where indicated for sloping to drain or scupper. Fabricate to slopes indicated.
   1. ASTM C 728, perlite insulation board.

E. Tapered Edge Strips: ASTM C 728, perlite insulation board.

2.7 WALL TREATMENT AND COATING MATERIALS

A. Primer for membrane waterproofing at parapet walls:
   1. An asbestos free, modified water-based asphalt primer
   2. Basis of Design: Tremco Tremprime WB.

B. Elastomeric membrane waterproofing at parapet walls:
   1. One-part, asbestos-free, non-fibrated, cold-applied, rubberized asphalt emulsion.
   2. Basis of Design: Tremco TremLastic S.

C. Reinforcement for membrane waterproofing at parapet walls:
   1. One (1) ply of stitch-bonded polyester reinforcing fabric.
   2. Basis of Design: Tremco Polyester Mat CP.

D. Coating for membrane waterproofing at parapet walls:
   1. Intumescent, fire-retardant, white reflective, elastomeric, styrenated acrylic latex roof coating.
   2. Basis of Design: Tremco Polarcote FR.

E. Primer for previously coated walls above roof membrane:
   1. Acrylic polymer emulsion, stain resistant, fast drying, flexible base primer for elastomeric latex coatings.
   2. Basis of Design: Tremco Wall-Tite Primer.

F. Coating for previously coated walls above roof membrane:
   1. Acrylic polymer emulsion wall coating with fiber reinforcement.
   2. Tinted to match existing.
   3. Basis of Design: Tremco Wall-Tite F.

2.8 MECHANICAL FASTENERS

A. Insulation/Cover Board to Steel Deck:
   1. Length: Use the shortest fastener which will penetrate the top flange of the steel deck 3/4".

a. ITW Buildex: Accutrac or Hextra with Recessed or Accutrace Plates OR #12, 1/4", #14-10 or #15 Roofgrip with Recessed or Flat Bottom Plates.
b. Olympic Fasteners: Olympic #10, Olympic Standard, Olympic Heavy Duty, Stainless #12, Hex Head #12, #14, Iron-Lok or Strap Toggle with Standard or G-2 Plates OR Olympic Standard or Olympic Heavy Duty with LGP.
c. SFS Stadler Inc: #12 or #14 Insul-Fixx with IF-3-S.

B. Wood to Steel Deck:
1. Length: Use the shortest fastener which will penetrate the top flange of the steel deck 3/4".
a. Tremco/Olympic No. 12-11 Standard Roofing Fastener, with CR-10 fluorocarbon coating by Tremco.
b. Deckfast #12 screw by Construction Fasteners Inc., Wyomissing PA
c. Olympic Fastener #12-10 by Olympic Manufacturing Group, Agawam MA
d. Rawl Deck #12 Deck screw by The Rawlplug Company Inc., New Rochelle NY

C. Wood to wood:
1. Type 316 Stainless Steel, flat head, ring shank, diamond point roofing nails as manufactured by Stainless Fasteners, or equal. (Galvanized nails are not permitted to fasten into treated lumber.)
2. Length: Sufficient to penetrate wood blocking or nailers 1-1/4 inches.

D. Sheet steel to wood blocking:
1. Type 316 Stainless Steel, flat head, ring shank, diamond point roofing nails as manufactured by Stainless Fasteners, or equal. (Galvanized nails are not permitted to fasten into treated lumber.)
2. Length: Sufficient to penetrate wood blocking or nailers 1-1/4 inches.

E. Termination bar to masonry or concrete:
1. Lead masonry anchors.
2. Length: Sufficient to provide 1 ¼" embedment minimum.

F. Drawband:
1. Gold Seal stainless worm gear clamp by Murray Corporation, Cockeysville MD.

G. Power-Seal stainless steel worm drive clamps by Breeze Clamp Co, Saltsburg PA.

2.9 WOOD BLOCKING, NAILERS & CURBS

A. Lumber:
1. See Division 6 Section "Miscellaneous Carpentry" for wood blocking, curbs, cants, and nailers.

2.10 WET ROOF REPLACEMENT MATERIALS

A. Metal Roof Deck:
1. See Division 5 Section "Steel Deck Repair/Replacement" for metal roof deck.

B. Base Insulation Layer: Polyisocyanurate Board Insulation; ASTM C 1289, Type II, felt or glass-fiber mat facer on both major surfaces. Minimum board thickness: 2.0" or as required to match existing.

C. Cover Board Insulation: Perlite Board Insulation; ASTM C 728; composed of expanded perlite, cellulosic fibers, binders, and waterproofing agents with top surface seal-coated. Minimum board thickness: 1/2" or as required to match existing.

D. Optional Cover Board: Wood Fiber Board Insulation; ASTM C 208, Type II, Grade 2, Cellulosic-fiber and water-resistant binders, asphalt coated on ALL six (6) sides and chemically treated for deterioration. Minimum board thickness to be 1/2".

E. Roof Membrane Plies: Provide two (2) plies of asphalt coated polyester/glass/polyester trilaminate reinforced ply sheet. Exceeding ASTM D 4601-86, Type II.
   1. Performance requirements:
      a. Weight, 31.0 lb/100 sq. ft. , ASTM D 228-90a
      b. Tensile Strength, 161 lbf/in (MD), 137 lbf/in (XMD), ASTM D 5147
      c. Elongation, 5.4% MD, 6.56%XMD, ASTM D 5147
      d. Tear Strength, 265 lbf MD, 212 lbf XMD, ASTM D 5147
      e. Asphalt, 10.0 lb/100 sq. ft. , ASTM D 228-90a
   2. Basis of Design: Tremco BURmastic Composite Ply HT.

F. Roof Membrane Adhesive: Cold-Applied Membrane Adhesive; One-part, asbestos-free, cold-applied adhesive specially formulated for compatibility and use with specified roofing membranes and flashings, with the following physical properties:
   1. Performance requirements:
      a. Asbestos Content, EPA 600 R-93/116: None.
      b. Volatile Organic Compounds (VOC), maximum, ASTM D 6511: 340 g/L.
      c. Nonvolatile Content, minimum, ASTM D 6511: 67 percent.
      d. Flash Point, minimum, ASTM D 93: 100 deg F.
      e. Density at 77 deg F ASTM D 6511: 8.4 lb/gal.
      f. Uniformity and Consistency, ASTM D 6511: Pass.
      g. Asphalt Content, minimum, ASTM D 6511: 42 percent.
   2. Basis of Design: Tremco, BURmastic Adhesive.

2.11 MISCELLANEOUS

A. Roof hatches: New roof hatches shall be Type S-50, 3'-0" x 2'-6", aluminum as manufactured by The Bilco Company, PO Box 1203, New Haven, CT 06505. Telephone (203) 934-6363 (or approved substitution). Verify size to match existing opening. Provide ladder safety post and type 316 stainless steel hardware.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with the following requirements and other conditions affecting performance of roofing system:
   1. Verify that roof openings and penetrations are in place and set and braced and that roof drains are securely clamped in place.
   2. Verify that wood blocking, curbs, and nailers are securely anchored to roof deck at penetrations and terminations and, that nailers match thicknesses of insulation.
   3. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 ROOF TESTING

A. Moisture detection:
   1. Thermocore® non-destructive moisture detection and analysis survey as provided Tremco Incorporated / Weatherproofing Technologies, Inc.
      a. Visually survey all roof area to be investigated and note all abnormalities.
      b. Perform an infrared thermographic scan of the designated roof areas.
      c. Identify and verify all areas where moisture retention is suspected.

B. Wind Uplift Resistance testing:
   1. The Contractor will provide field verification of roof wind uplift resistance in accordance with FM Global Property Loss Prevention Data Sheet 1-52 as follows:
      a. Once a representative section of the new Roofing Re-cover System (approximately 1,000 square feet) has been installed, at least three (3) bonded uplift tests will be performed. One each in the field, perimeter and corner of the completed roof section.
      b. Test results will be provided to the Owner's representative for evaluation and recommendation before the roofing re-cover operation may be resumed.

3.3 PREPARATION

A. Clean substrate of dust, debris, moisture, and other substances detrimental to roofing installation according to roofing system manufacturer's written instructions. Remove sharp projections.

B. Prevent materials from entering and clogging roof drains or gutters and conductors and from spilling or migrating onto surfaces of other construction. Remove roof-drain plugs when no work is taking place or when rain is forecast.

C. Complete terminations and base flashings and provide temporary seals to prevent water from entering completed sections of roofing system at the end of the workday or when rain is forecast. Remove and discard temporary seals before beginning work on adjoining roofing.

D. Surface preparation:
   1. Clean roof of loose and embedded gravel, dirt, and dust by spudding and power brooming. Note: Several broomings may be necessary to properly clean the roof surface.

2. Optional method: Clean roof of loose and embedded gravel, dirt, and dust by spudding and vacuuming.
3. Repair damaged roof membrane as required to maintain the existing roof membrane in a water-tight condition until the new roof re-cover system can be installed.
4. Remove existing roofing and insulation in ALL wet areas as identified by the Thermocore® Infrared Scan and provide roof repairs consisting of the following:
    a. One (1) layer of polyisocyanurate roof insulation (thickness as required to match existing) mechanically fastened to the metal roof deck.
    b. One (1) layer of perlite roof insulation (thickness as required to match existing) adhered to the base layer of roof insulation with the specified cold process adhesive.
    c. Two (2) plies of Coated Polyester/Glass/Polyester Trilaminate reinforced ply sheet adhered with cold process asphalt adhesive.
    d. Allowance: In the Base Proposal, allow for Wet Roof System replacement as follows:
        1) 1,000 square feet.
5. Metal roof deck repairs, if required:
    a. Examine exposed metal decking and repair or replace if necessary using unit pricing.
6. Remove flashings to substrate.
7. Remove as directed by Owner:
    a. Unused equipment, vents, and piping.

3.4 ROOF COVER BOARD INSTALLATION

A. Coordinate installing membrane roofing system components so roof cover board is not exposed to precipitation or left exposed at the end of the workday.

B. Comply with membrane roofing system manufacturer's written instructions for installing roof cover board.

C. Install tapered insulation under area of roofing to conform to slopes indicated.

D. Install roof cover board over the properly prepared roof membrane with long joints in continuous straight lines with end joints staggered between rows. Loosely butt cover boards together and fasten through the existing roof system to the existing metal roof deck.
1. Fasten according to requirements in FMG's "Approval Guide" for specified Windstorm Resistance Classification.
2. Fasten to resist uplift pressure at corners, perimeter, and field of roof.

3.5 ROOFING MEMBRANE INSTALLATION, GENERAL

A. Install built-up roofing membrane system according to roofing system manufacturer's written instructions and applicable recommendations of ARMA/NRCA's "Quality Control Guidelines for the Application of Built-up Roofing."

B. Start installation of built-up roofing membrane in presence of roofing system manufacturer's technical personnel.

C. Cooperate with testing and inspecting agencies engaged or required to perform services for installing built-up roofing system.

D. Coordinate installing roofing system components so insulation and roofing membrane sheets are not exposed to precipitation or left exposed at the end of the workday or when rain is forecast.
   1. Provide tie-offs at end of each day's work to cover exposed roofing membrane sheets and insulation with a course of coated felt set in roofing cement with joints and edges sealed.
   2. Complete terminations and base flashings and provide temporary seals to prevent water from entering completed sections of roofing system.
   3. Remove and discard temporary seals before beginning work on adjoining roofing.

E. Substrate-Joint Penetrations: Prevent roofing asphalt from penetrating substrate joints, entering building, or damaging roofing system components or adjacent building construction.

F. Substrate: Free of foreign particles prior to laying roof membrane.

G. Phased application: Not permitted. All plies shall be completed each day.

H. Traffic and equipment: Kept off completed plies until adhesive has set.

I. Wrapper and packaging materials: Not to be included in roofing system.

J. Ply shall never touch ply, even at roof edges, laps, tapered edge strips, and cants.

K. Extend roofing membrane to top edge of cant at wall and projection bases.

L. Cut out fish mouths/side laps, which are not completely sealed; patch. Replace all sheets, which are not fully and continuously bonded.

3.6 ROOFING MEMBRANE INSTALLATION

A. Install modified bituminous roofing membrane base sheet and cap sheet according to roofing manufacturer's written instructions, starting at low point of roofing system. Extend roofing membrane sheets over and terminate beyond cants, installing as follows:
   1. Unroll roofing membrane sheets and allow them to relax for minimum time period required by manufacturer.
   2. Heat-weld to substrate.

B. Laps: Accurately align roofing membrane sheets, without stretching, and maintain uniform side and end laps. Stagger end laps. Completely bond and seal laps, leaving no voids.
   1. Repair tears and voids in laps and lapped seams not completely sealed.
   2. Apply roofing granules to cover exuded bead at laps while bead is hot.

C. Install roofing membrane sheets so side and end laps shed water.

D. Avoid walking on plies until adhesive has set.

3.7 DAILY WATER-STOP/TIE-INS

A. Remove dust, dirt or debris from the top of the existing membrane.

B. Width: 18 inches.

C. Adhere 12 and 18-inch wide ply sheets from exposed deck to existing roofing with a continuous 1/16-inch thick application of tie-off mastic. Glaze cut-off with surfacing mastic. Extend 18 inch wide felt 3 inches either side 12-inch felt.

D. Install "dead-man" insulation filler at insulation staggers.

E. Extend roofing system at least 12 inches onto prepared area of adjacent roofing. Seal edge with 6 inch wide reinforcing membrane embedded between alternate courses of tie-off mastic.
   1. At beginning of next day's work remove temporary connection by cutting felts evenly along edge of existing roof system. Remove "dead-man" insulation fillers.

3.8 FLASHING AND STRIPPING INSTALLATION

A. Install base flashing over cant strips and other sloping and vertical surfaces, at roof edges, and at penetrations through roof, and secure to substrates according to roofing system manufacturer's written instructions and as follows:
   1. Prime substrates with asphalt primer as required by roofing system manufacturer.
   2. Backer Sheet Application: Heat-weld backer sheet to substrate.
   3. Flashing Sheet Application:
      a. Cut flashing membrane in lengths not to exceed (10) feet.
      b. Heat-weld flashing sheet to substrate per manufacturer's instructions.
      c. Lap flashing membrane ends 4 inches, extend membrane 6 inches beyond toe of cant; press sheet firmly in place. Ensure complete bond and continuity without wrinkles or voids.
      d. Heat-weld all laps.
      e. Seal vertical laps of flashing membrane with reinforcing membrane embedded between alternate continuous courses of elastomeric flashing bitumen.
      f. Coat reinforced stripping membrane with specified coating. Apply additional coats as required to completely cover stripping membrane.

B. Base flashing height:
   a. Not less than 8 inches, not higher than 12 inches above finished roofing surface.

C. Extend flashing up walls or parapets a minimum of 8 inches above roofing membrane and 4 inches onto field of roofing membrane.

D. Mechanically fasten top of flashing securely at terminations and perimeter of roofing.
   1. Seal top termination of base flashing.

E. Install stripping, according to roofing system manufacturer's written instructions, where metal flanges and edgings are set on built-up roofing.
   1. Two-Ply Stripping:

a. Prime and set the base of the flange in asphaltic mastic. Prime the top of the flange and seal the flange with two (2) plies embedded in alternate applications of stripping adhesive. Extend first ply 4 inches beyond flange; second ply 2 inches beyond first ply.

F. Metal Parapet Cap (Coping) and Base Flashing: Refer to NRCA Construction Detail MB-1 and MB-1S.

G. Surface Mounted counterflashing for Concrete Walls: Refer to NRCA Construction Detail MB-4 and MB-4S.

H. Base Flashing for Wall-supported Deck: Refer to NRCA Construction Detail MB-5 and MB-5S.

I. Base Flashing for Non-wall-supported Deck: Refer to NRCA Construction Detail MB-6 and MB-6S.

J. Expansion Joint with Metal Cover: Refer to NRCA Construction Detail MB-7 and MB-7S.

K. Expansion Joint with Pre-manufactured Cover: Refer to NRCA Construction Detail MB-7A and MB-7AS.

L. Equipment Support Curb: Refer to NRCA Construction Detail MB-9 and MB-9S.

M. Raised Curb Detail for Rooftop Air Handling Units and Ducts (Prefabricated Metal Curb): Refer to NRCA Construction Detail MB-12 and MB-12S.

N. Raised Curb Detail for Rooftop Air Handling Units and Ducts (Job Site Constructed Wood Curb): Refer to NRCA Construction Detail MB-13 and MB-13S.

O. Sheet Metal Enclosure for Piping Through Roof Deck: Refer to NRCA Construction Detail MB-16 and MB-16S.

P. Isolated Stack Flashing (Hot or Cold): Refer to NRCA Construction Detail MB-17 and MB-17S.

Q. Isolated Stack Flashing – Sheet Metal (Hot or Cold): Refer to NRCA Construction Detail MB-17A and MB-17AS.

R. Plumbing Vent: Refer to NRCA Construction Detail MB-18 and MB-18S.

S. Penetration Pocket: Refer to NRCA Construction Detail MB-19 and MB-19S.

T. Gutter: Refer to NRCA Construction Detail MB-22 and MB-22S.

3.9 COATING INSTALLATION

A. Apply reflective coating material to stripping membrane at base flashings according to manufacturer's written instructions, by spray, roller, or other suitable application method.

Apply additional coats as required to completely cover stripping membrane and reinforcing mesh.

3.10 WALL TREATMENT AND COATING INSTALLATION

A. Membrane waterproofing at parapet walls:
   1. Clean parapet wall sections above new surface mounted counterflashing and prime with specified primer.
   2. Pre-cast wall panel joint treatment:
      a. Remove existing sealant.
      b. Install new backer rod and new sealant.
      c. Fill void with rigid insulation to provide a level surface and heat-weld a strip of smooth surface APP modified bitumen membrane over the joint.
   3. Apply two coats of specified elastomeric membrane waterproofing reinforced with one ply of specified reinforcing mat. Allow to cure.
   4. Apply one coat of specified white reflective coating.

B. Wall coating at previously coated walls above the roof membrane:
   1. Clean previously coated wall sections above new surface mounted counterflashing and prime with specified primer.
   2. Apply two coats of the specified elastomeric wall coating as recommended by the manufacturer.

3.11 MISCELLANEOUS INSTALLATION

A. New Over-flow Scupper Installation:
   1. Locate one new over-flow scuppers adjacent to each existing primary scupper
   2. Saw-cut scupper opening so that the bottom of the new opening is no more than four inches (4") nor less than two inches (2") above the bottom of the existing primary scupper.
   3. Install new sheet metal scupper sleeve and base flashing as required.
   4. Provide pre-finished metal escutcheon plates around the new over-flow scuppers on the exterior side of the pre-cast wall panels. Finish to match existing conductor heads and down spouts.

B. Roof Hatches:
   1. Coordinate roof hatch installation with installation of substrates, vapor retarders, roof insulation, roofing, and flashing as required to ensure that each element of the Work performs properly and that combined elements are waterproof and weather-tight.
   2. Unless otherwise indicated, install roof hatches according to construction details of NRCA's "The NRCA Roofing and Waterproofing Manual."
   3. Where metal surfaces of units will contact incompatible metal or corrosive substrates, including wood, apply bituminous coating on concealed metal surfaces, or provide other permanent separation recommended in writing by unit skylight manufacturer.
   4. Anchor roof hatches securely to supporting substrates.
   5. Set roof hatch flanges in thick bed of roofing cement to form a seal, unless otherwise indicated.

6. Where cap flashing is indicated, install to produce waterproof overlap with roofing or roof flashing. Seal with thick bead of mastic sealant except where overlap is indicated to be left open for ventilation.
7. Clean exposed surfaces according to manufacturer's written instructions. Touch up damaged metal coatings.

3.12 FIELD QUALITY CONTROL

A. Testing Agency: Owner will engage a qualified independent testing and inspecting agency to perform roof tests and inspections and to prepare test reports.

B. Final Roof Inspection: Arrange for roofing system manufacturer's technical personnel to inspect roofing installation on completion and submit report to Architect.
   1. Notify Architect or Owner 48 hours in advance of date and time of inspection.

C. Repair or remove and replace components of membrane roofing system where test results or inspections indicate that they do 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.

3.13 PROTECTING AND CLEANING

A. Protect membrane roofing system from damage and wear during remainder of construction period. When remaining construction will not affect or endanger roofing, inspect roofing for deterioration and damage, describing its nature and extent in a written report, with copies to Architect and Owner.

B. Correct deficiencies in or remove membrane roofing system that does not comply with requirements, repair substrates, and repair or reinstall membrane roofing system to a condition free of damage and deterioration at time of Substantial Completion and according to warranty requirements.

C. Clean overspray and spillage from adjacent construction using cleaning agents and procedures recommended by manufacturer of affected construction.

END OF SECTION 07551

HIDALGO COUNTY SHERIFF'S OFFICE
Hidalgo County Adult Detention Center and
Law Enforcement Facility Repairs and / or Replacement
Edinburg, TX

SECTION 07592 - MEMBRANE RE-COVER ROOFING PREPARATION

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. Roof surface preparation.
   2. Removal of base flashings.

B. Allowances: Refer to Division 1 Section "Allowances" for description of Work in this Section affected by allowances.

C. Unit Prices: Refer to Division 1 Section "Unit Prices" for description of Work in this Section affected by unit prices.

1.3 MATERIALS OWNERSHIP

A. Except for items or materials indicated to be reused, reinstalled, or otherwise indicated to remain Owner's property, demolished materials shall become Contractor's property and shall be removed from Project site and disposed of legally.

1.4 DEFINITIONS

A. Roofing Terminology: Refer to ASTM D 1079 and glossary in NRCA's "The NRCA Roofing and Waterproofing Manual" for definition of terms related to roofing work in this Section.

B. Substrate Board: Rigid board or panel products placed over the roof deck that serve as thermal barriers, provide a smooth substrate, or serve as a component of a fire-resistance-rated roofing system.

C. Remove: Detach items from existing construction and legally dispose of them off-site unless indicated to be removed and reinstalled.

D. Existing to Remain: Existing items of construction that are not indicated to be removed.

1.5 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Photographs or Videotape: Show existing conditions of adjoining construction and site improvements, including exterior and interior finish surfaces, that might be misconstrued as having been damaged by reroofing operations. Submit before Work begins.

C. Qualification Data: For Installer including certificate indicating Installer is approved by warrantor of existing roofing system.

1.6 QUALITY ASSURANCE

A. Regulatory Requirements: Comply with governing EPA notification regulations before beginning membrane roofing removal. Comply with hauling and disposal regulations of authorities having jurisdiction.

B. Re-roofing Conference: Conduct conference at Project site to comply with requirements in Division 1 Section "Project Management and Coordination." Review methods and procedures related to roofing system including, but not limited to, the following:
   1. Meet with Owner; Architect; Owner's insurer if applicable; testing and inspecting agency representative; roofing system manufacturer's representative; roofing Installer including project manager, superintendent, and foreman; and installers whose work interfaces with or affects reroofing including installers of roof accessories and roof-mounted equipment.
   2. Review methods and procedures related to reroofing preparation, including membrane roofing system manufacturer's written instructions.
   3. Review temporary protection requirements for existing roofing system that is to remain, during and after installation.
   4. Review roof drainage during each stage of reroofing and review roof drain plugging and plug removal procedures.
   5. Review and finalize construction schedule, and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
   6. Review existing deck removal procedures and Owner notifications.
   7. Review procedures to determine condition and acceptance of existing deck for reuse.
   8. Review structural loading limitations of deck during reroofing.
   9. Review base flashings, special roofing details, drainage, penetrations, equipment curbs, and condition of other construction that will affect reroofing.
   10. Review HVAC shutdown and sealing of air intakes.
   11. Review shutdown of fire-suppression, -protection, and -alarm and -detection systems.
   12. Review procedures for asbestos removal or unexpected discovery of asbestos-containing materials.
   13. Review governing regulations and requirements for insurance and certificates if applicable.
   14. Review existing conditions that may require notification of Architect and Owner before proceeding.

1.7 PROJECT CONDITIONS

A. Owner will occupy portions of building immediately below reroofing area. Conduct reroofing so Owner's operations will not be disrupted. Provide Owner with not less than 72 hours' notice of activities that may affect Owner's operations.

1. Coordinate work activities daily with Owner so Owner can place protective dust or water leakage covers over sensitive equipment or furnishings, shut down HVAC and fire-alarm or -detection equipment if needed, and evacuate occupants from below the work area if desired.
2. Before working over structurally impaired areas of deck, notify Owner to evacuate occupants from below the affected area. Verify that occupants below the work area have been evacuated prior to proceeding with work over the impaired deck area.

B. Protect building to be re-roofed, adjacent buildings, walkways, site improvements, exterior plantings, and landscaping from damage or soiling from reroofing operations.

C. Maintain access to existing walkways, corridors, and other adjacent occupied or used facilities. Do not block required exits or path from required exit to public right-of-way. Coordinate with requirements of authorities having jurisdiction.

D. Owner assumes no responsibility for condition of areas to be re-roofed.

E. Weather Limitations: Proceed with reroofing preparation only when existing and forecasted weather conditions permit Work to proceed without water entering into existing roofing system or building.

F. Hazardous Materials: It is not expected that hazardous materials such as asbestos-containing materials will be encountered in the Work.
1. If materials suspected of containing hazardous materials are encountered, do not disturb; immediately notify Architect and Owner. Hazardous materials will be removed by Owner under a separate contract.

PART 2 - PRODUCTS

2.1 AUXILIARY REROOFING MATERIALS

A. General: Auxiliary reroofing preparation materials recommended by roofing system manufacturer for intended use and compatible with components of new membrane roofing system.

B. Base Sheet Fasteners: Capped head, factory-coated steel fasteners, listed in FMG's "Approval Guide."

C. Metal Flashing Sheet: Metal flashing sheet is specified in Division 7 Section "Sheet Metal Flashing and Trim."

PART 3 - EXECUTION

3.1 PREPARATION

A. Coordinate with Owner to shut down air intake equipment in the vicinity of the Work. Cover air intake louvers before proceeding with reroofing work that could affect indoor air quality or activate smoke detectors in the ductwork.

B. During removal operations, have sufficient and suitable materials on-site to facilitate rapid installation of temporary protection in the event of unexpected rain.

C. Maintain roof drains in functioning condition to ensure roof drainage at end of each workday. Prevent debris from entering or blocking roof drains and conductors. Use roof-drain plugs specifically designed for this purpose. Remove roof-drain plugs at end of each workday, when no work is taking place, or when rain is forecast.
   1. If roof drains will be temporarily blocked or unserviceable due to roofing system removal or partial installation of new membrane roofing system, provide alternative drainage method to remove water and eliminate ponding. Do not permit water to enter into or under existing membrane roofing system components that are to remain.

D. Verify that rooftop utilities and service piping have been shut off before commencing Work.

3.2 ROOF MEMBRANE SURFACE PREPARATION

A. General: Notify Owner each day of extent of roof preparation proposed.

B. Surface preparation:
   1. Clean roof of loose and embedded gravel, dirt, and dust by spudding and power brooming. Note: Several broomings may be necessary to properly clean the roof surface.
   2. Optional method: Clean roof of loose and embedded gravel, dirt, and dust by spudding and vacuuming.
   3. Repair damaged roof membrane as required to maintain the existing roof membrane in a water-tight condition until the new roof re-cover system can be installed.
   4. Remove existing roofing and insulation in ALL wet areas as identified by the Thermocore® Infrared Scan and provide roof repairs consisting of the following:
      a. Metal roof deck repairs, if required.
      b. One (1) layer of polyisocyanurate roof insulation (thickness as required to match existing) mechanically fastened to the metal roof deck.
      c. One (1) layer of perlite roof insulation (thickness as required to match existing) adhered to the base layer of roof insulation with the specified cold process adhesive.
      d. Two (2) plies of Coated Polyester/Glass/Polyester Trilaminate reinforced ply sheet adhered with cold process asphalt adhesive.
      e. Allowance: In the Base Proposal, allow for Wet Roof System replacement as follows:
         1) 1,000 square feet.
   5. Remove as directed by Owner:
      a. Unused equipment, vents, and piping.

3.3 EXISTING BASE FLASHINGS

A. Remove existing base flashings around parapets, curbs, walls, and penetrations.
   1. Clean substrates of contaminants such as asphalt, sheet materials, dirt, and debris.

B. Do not damage metal counterflashings that are to remain. Replace metal counterflashings damaged during removal with counterflashings of same metal, weight or thickness, and finish.

3.4 MISCELLANEOUS DEMOLITION

A. Remove as directed by Owner:
   1. a. Unused equipment, vents, and piping.

3.5 DISPOSAL

A. Coordinate disposal with requirements of Division 1 Section "Construction Waste Disposal."

B. Collect and place demolished materials in containers. Promptly dispose of demolished materials. Do not allow demolished materials to accumulate on-site.
   1. Storage or sale of demolished items or materials on-site will not be permitted.

C. Transport demolished materials off Owner's property and legally dispose of them.

END OF SECTION 07592

HIDALGO COUNTY SHERIFF'S OFFICE
Hidalgo County Adult Detention Center and
Law Enforcement Facility Repairs and / or Replacement
Edinburg, TX

SECTION 07620 - SHEET METAL FLASHING AND TRIM

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 sheet metal flashing and trim:
   1. Formed roof drainage system.
   2. Formed low-slope roof flashing and trim.
   3. Formed wall flashing and trim.
   4. Formed equipment support and curb flashing.

B. Related Sections include the following:
   1. Division 6 Section "Rough Carpentry" for wood nailers, curbs, and blocking.
   2. Division 7 Section "Membrane Roofing" for installing sheet metal flashing and trim integral with roofing membrane.

1.3 PERFORMANCE REQUIREMENTS

A. General: Install sheet metal flashing and trim to withstand wind loads, structural movement, thermally induced movement, and exposure to weather without failing, rattling, leaking, and fastener disengagement.

B. Thermal Movements: Provide sheet metal flashing and trim that allow for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures by preventing buckling, opening of joints, hole elongation, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Provide clips that resist rotation and avoid shear stress as a result of sheet metal and trim thermal movements. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
   1. Temperature Change (Range): 120 deg. F, ambient; 180 deg. F, material surfaces.

C. Water Infiltration: Provide sheet metal flashing and trim that do not allow water infiltration to building interior.

1.4 SUBMITTALS

A. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.

B. Shop Drawings: Show layouts of sheet metal flashing and trim, including plans and elevations. Distinguish between shop- and field-assembled work. Include the following:
   1. Identify material, thickness, weight, and finish for each item and location in Project.
   2. Details for forming sheet metal flashing and trim, including profiles, shapes, seams, and dimensions.
   3. Details for fastening, joining, supporting, and anchoring sheet metal flashing and trim, including fasteners, clips, cleats, and attachments to adjoining work.
   4. Details of expansion-joint covers, including direction of expansion and contraction.

C. Samples for Initial Selection: For each type of sheet metal flashing and trim indicated with factory-applied color finishes.
   1. Include similar Samples of trim and accessories involving color selection.

1.5 QUALITY ASSURANCE

A. Sheet Metal Flashing and Trim Standard: Comply with the following. Conform to dimensions and profiles shown unless more stringent requirements are indicated.
   1. NRCA Roofing and Waterproofing Manual (Fifth Edition) for construction details and recommendations.
   2. SMACNA Architectural Sheet Metal Manual (Fifth Edition) for construction details.
   3. ANSI/SPRI ES-1, "Wind Design Standard for Edge Metal Systems Used with Low Slope Roof Systems".

B. Pre-installation Conference: Conduct conference at Project site to comply with requirements in Division 1 Section "Project Management and Coordination."
   1. Meet with Owner, Architect, Owner's insurer if applicable, Installer, and installers whose work interfaces with or affects sheet metal flashing and trim including installers of roofing materials, roof accessories, unit skylights, and roof-mounted equipment.
   2. Review methods and procedures related to sheet metal flashing and trim.
   3. Examine substrate conditions for compliance with requirements, including flatness and attachment to structural members.
   4. Document proceedings, including corrective measures and actions required, and furnish copy of record to each participant.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver sheet metal flashing materials and fabrications undamaged. Protect sheet metal flashing and trim materials and fabrications during transportation and handling.

B. Unload, store, and install sheet metal flashing materials and fabrications in a manner to prevent bending, warping, twisting, and surface damage.

C. Stack materials on platforms or pallets, covered with suitable weather-tight and ventilated covering. Do not store sheet metal flashing and trim materials in contact with other materials that might cause staining, denting, or other surface damage.

1.7 COORDINATION

A. Coordinate installation of sheet metal flashing and trim with interfacing and adjoining construction to provide a leak-proof, secure, and non-corrosive installation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:
   1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, products specified.
   2. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, manufacturers specified.

2.2 SHEET METALS

A. Zinc-Coated (Galvanized) Steel Sheet: ASTM A 653/A 653M, G90 coating designation; structural quality.

B. Pre-painted, Metallic-Coated Steel Sheet: Steel sheet metallic coated by the hot-dip process and pre-painted by the coil-coating process to comply with ASTM A 755/A 755M.
   1. Zinc-Coated (Galvanized) Steel Sheet: ASTM A 653/A 653M, G90 coating designation; structural quality.
   2. Exposed Finishes: Apply the following coil coating:
      a. Factory Prime Coating: Where painting after installation is indicated, provide pretreatment and white or light-colored, factory-applied, baked-on epoxy primer coat; with a minimum dry film thickness of 0.2 mil.
      b. High-Performance Organic Finish: Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
         1) Fluoropolymer 2-Coat System: Manufacturer's standard 2-coat, thermo-cured system consisting of specially formulated inhibitive primer and fluoropolymer color topcoat containing not less than 70 percent polyvinylidene fluoride resin by weight; complying with physical properties and coating performance requirements of AAMA 2604, except as modified below:
            a) Humidity Resistance: 1000 hours.
            b) Salt-Spray Resistance: 1000 hours.
         2) Color: As selected by Architect from manufacturer's full range.

C. Lead Sheet: ASTM B 749, Type L51121, copper-bearing lead sheet.
   1. Use prefabricated plumbing vent flashings with factory welded and sealed joints at all plumbing vents.
      a. Flange: 4" minimum
      b. Four (4) pounds per square foot minimum.

2.3 UNDERLAYMENT MATERIALS

A. Underlayment Material: Cold applied, self-adhering membrane composed of a high strength polyethylene film coated on one side with a layer of rubberized asphalt adhesive and inter-wound with a disposable release sheet.
   1. Performance Requirements:
      a. Thickness membrane, Method A, ASTM D3767, 40 mil.
      b. Tensile strength, membrane ASTM D412, (Die C Modified), 250 psi.
      c. Elongation, membrane ASTM D412, (Die C Modified), 250%.
      d. Low temperature flexibility, ASTM D1970, Unaffected at -20°F.
      e. Adhesion to plywood, ASTM D903, 3 lb/in width.
      f. Permeance (max), ASTM E96, 0.05 perms max.
   2. Basis of Design: Grace Ice & Water Shield.
   3. Pre-approved substitution, subject to compliance with all requirements indicated in Section 2.1 above.

B. Slip Sheet: Rosin-sized paper, minimum 3 lb/100 sq. ft.

2.4 MISCELLANEOUS MATERIALS

A. General: Provide materials and types of fasteners, solder, welding rods, protective coatings, separators, sealants, and other miscellaneous items as required for complete sheet metal flashing and trim installation.

B. Fasteners: Wood screws, annular threaded nails, self-tapping screws, self-locking rivets and bolts, and other suitable fasteners designed to withstand design loads.
   1. Exposed Fasteners: Heads matching color of sheet metal by means of plastic caps or factory-applied coating.
   2. Fasteners for Flashing and Trim: Blind fasteners or self-drilling screws, gasketed, with hex washer head.
   3. Blind Fasteners: High-strength aluminum or stainless-steel rivets.

C. Solder for Lead: ASTM B 32, Grade Sn50, 50 percent tin and 50 percent lead.

D. Solder for Zinc: ASTM B 32, 60 percent lead and 40 percent tin with low antimony, as recommended by manufacturer.

E. Burning Rod for Lead: Same composition as lead sheet.

F. Elastomeric Sealant: ASTM C 920, elastomeric polyurethane polymer sealant; of type, grade, class, and use classifications required to seal joints in sheet metal flashing and trim and remain watertight.

G. Bituminous Coating: Cold-applied asphalt mastic, SSPC-Paint 12, compounded for 15-mil dry film thickness per coat. Provide inert-type non-corrosive compound free of asbestos fibers, sulfur components, and other deleterious impurities.

H. Asphalt Roofing Cement: ASTM D 4586, asbestos free, of consistency required for application.

2.5 FABRICATION, GENERAL

A. General: Custom fabricate sheet metal flashing and trim to comply with the following recommendations that apply to design, dimensions, metal, and other characteristics of item indicated. Shop-fabricate items where practicable. Obtain field measurements for accurate fit before shop fabrication.
   1. NRCA Roofing and Waterproofing Manual (Fifth Edition) for construction details and recommendations.
   2. SMACNA Architectural Sheet Metal Manual (Fifth Edition) for construction details.
   3. ANSI/SPRI ES-1, "Wind Design Standard for Edge Metal Systems Used with Low Slope Roof Systems".

B. Fabricate sheet metal flashing and trim in thickness or weight needed to comply with performance requirements, but not less than that specified for each application and metal.

C. Fabricate sheet metal flashing and trim without excessive oil canning, buckling, and tool marks and true to line and levels indicated, with exposed edges folded back to form hems.
   1. Seams for Other Than Aluminum: Fabricate nonmoving seams in accessories with flat-lock seams. Tin edges to be seamed, form seams, and solder.

D. Sealed Joints: Form non-expansion but movable joints in metal to accommodate elastomeric sealant to comply with NRCA and/or SMACNA recommendations.

E. Expansion Provisions: Where lapped or bayonet-type expansion provisions in the Work cannot be used, form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with elastomeric sealant concealed within joints.

F. Conceal fasteners and expansion provisions where possible on exposed-to-view sheet metal flashing and trim, unless otherwise indicated.

G. Fabricate cleats and attachment devices from same material as accessory being anchored or from compatible, non-corrosive metal.
   1. Thickness: As recommended by the following for application but not less than thickness of metal being secured.
      a. NRCA Roofing and Waterproofing Manual (Fifth Edition) for construction details and recommendations.
      b. SMACNA Architectural Sheet Metal Manual (Fifth Edition) for construction details.
      c. ANSI/SPRI ES-1, "Wind Design Standard for Edge Metal Systems Used with Low Slope Roof Systems".

2.6 ROOF DRAINAGE SHEET METAL FABRICATIONS

A. Hanging Gutters: Fabricate to cross section indicated, complete with end pieces, outlet tubes, and other accessories as required. Fabricate in minimum 96-inch- long sections. Furnish flat-stock gutter spacers and gutter brackets fabricated from same metal as gutters, of size recommended by NRCA and/or SMACNA but not less than twice the gutter thickness. Fabricate expansion joints, expansion-joint covers, and gutter accessories from same metal as gutters.
   1. Gutter Style: "A" or as shown on plans.

2. Expansion Joints: Lap type.
3. Fabricate from the following material:
    a. Pre-painted, Metallic-Coated Steel: 24 gauge.

B. Downspouts: Fabricate rectangular downspouts complete with mitered elbows. Furnish with metal hangers, from same material as downspouts, and anchors.
1. Fabricate downspouts from the following material:
    a. Pre-painted, Metallic-Coated Steel: 24 gauge.

2.7 LOW-SLOPE ROOF SHEET METAL FABRICATIONS

A. Copings: Fabricate in minimum 96-inch- long, but not exceeding 10-foot- long, sections. Fabricate joint plates of same thickness as copings. Furnish with continuous cleats to support edge of external leg and drill elongated holes for fasteners on interior leg. Miter corners, seal, and solder or weld watertight.
1. Joint Style: Butt, with 6-inch- wide exposed cover plates.
2. Fabricate copings from the following material:
    a. Pre-painted, Metallic-Coated Steel: 24 gauge.

B. Roof to Roof and Roof to Wall Transition Expansion-Joint Cover: Fabricate from the following material:
1. Galvanized Steel: 24 gauge.

C. Counterflashing: Fabricate from the following material:
1. Galvanized Steel: 24 gauge.

D. Flashing Receivers: Fabricate from the following material:
1. Galvanized Steel: 24 gauge.

E. Roof-Penetration Flashing: Fabricate from the following material:
1. Galvanized Steel: 24 gauge.

2.8 FINISHES

A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

B. Protect mechanical and painted 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.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, to verify actual locations, dimensions and other conditions affecting performance of work.
   1. Verify that substrate is sound, dry, smooth, clean, sloped for drainage, and securely anchored.
   2. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION, GENERAL

A. General: Anchor sheet metal flashing and trim and other components of the Work securely in place, with provisions for thermal and structural movement. Use fasteners, solder, welding rods, protective coatings, separators, sealants, and other miscellaneous items as required to complete sheet metal flashing and trim system.
   1. Torch cutting of sheet metal flashing and trim is not permitted.

B. Metal Protection: Where dissimilar metals will contact each other or corrosive substrates, protect against galvanic action by painting contact surfaces with bituminous coating or by other permanent separation as recommended by fabricator or manufacturers of dissimilar metals.
   1. Coat underside of sheet metal flashing and trim with bituminous coating where flashing and trim will contact wood, ferrous metal, or cementitious construction.
   2. Underlayment: Where installing metal flashing directly on cementitious or wood substrates, install a course of felt underlayment and cover with a slip sheet or install a course of polyethylene underlayment.
   3. Bed flanges in thick coat of asphalt roofing cement where required for waterproof performance.

C. Install exposed sheet metal flashing and trim without excessive oil canning, buckling, and tool marks.

D. Install sheet metal flashing and trim true to line and levels indicated. Provide uniform, neat seams with minimum exposure of solder, welds, and elastomeric sealant.

E. Install sheet metal flashing and trim to fit substrates and to result in watertight performance. Verify shapes and dimensions of surfaces to be covered before fabricating sheet metal.
   1. Space cleats not more than 12 inches apart. Anchor each cleat with two fasteners. Bend tabs over fasteners.

F. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at a maximum of 10 feet with no joints allowed within 24 inches of corner or intersection. Where lapped or bayonet-type expansion provisions cannot be used or would not be sufficiently watertight, form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with elastomeric sealant concealed within joints.

G. Fasteners: Use fasteners of sizes that will penetrate substrate not less than 1-1/4 inches for nails and not less than 3/4 inch for wood screws.
   1. Galvanized or Pre-painted, Metallic-Coated Steel: Use stainless-steel fasteners.

2. Stainless Steel: Use stainless-steel fasteners.

H. Seal joints with elastomeric sealant as required for watertight construction.
1. Where sealant-filled joints are used, embed hooked flanges of joint members not less than 1 inch into sealant. Form joints to completely conceal sealant. When ambient temperature at time of installation is moderate, between 40 and 70 deg F, set joint members for 50 percent movement either way. Adjust setting proportionately for installation at higher ambient temperatures. Do not install sealant-type joints at temperatures below 40 deg F.
2. Prepare joints and apply sealants to comply with requirements in Division 7 Section "Joint Sealants."

I. Soldered Joints: Clean surfaces to be soldered, removing oils and foreign matter. Pre-tin edges of sheets to be soldered to a width of 1-1/2 inches except where pre-tinned surface would show in finished Work.
1. Do not solder pre-painted, metallic-coated steel sheet.
2. Stainless-Steel Soldering: Pre-tin edges of uncoated sheets to be soldered using solder recommended for stainless steel and phosphoric acid flux. Promptly wash off acid flux residue from metal after soldering.
3. Do not use open-flame torches for soldering. Heat surfaces to receive solder and flow solder into joints. Fill joints completely. Completely remove flux and spatter from exposed surfaces.

3.3 ROOF DRAINAGE SYSTEM INSTALLATION

A. General: Install sheet metal roof drainage items to produce complete roof drainage system according to the following and as indicated. Coordinate installation of roof perimeter flashing with installation of roof drainage system.
1. NRCA Roofing and Waterproofing Manual (Fifth Edition) for construction details and recommendations.
2. ANSI/SPRI ES-1, "Wind Design Standard for Edge Metal Systems Used with Low Slope Roof Systems".
3. SMACNA Architectural Sheet Metal Manual (Fifth Edition) for construction details.

B. Hanging Gutters: Join sections with riveted and soldered joints or with lapped joints sealed with elastomeric sealant. Provide for thermal expansion. Attach gutters at eave or fascia to firmly anchored gutter brackets and straps spaced not more than 36 inches apart. Provide end closures and seal watertight with sealant. Slope to downspouts.
1. Fasten gutter spacers to front and back of gutter.
2. Loosely lock straps to front gutter bead and anchor to roof deck.
3. Anchor and loosely lock back edge of gutter to continuous cleat.
4. Anchor back of gutter that extends onto roof deck with cleats spaced not more than 24 inches apart.
5. Install gutter with expansion joints at locations indicated but not exceeding 50 feet apart. Install expansion joint caps.

C. Downspouts: Join sections with 1-1/2-inch telescoping joints. Provide fasteners designed to hold downspouts securely 1 inch away from walls; locate fasteners at top and bottom and at approximately 60 inches o.c. in between.
1. Provide elbows at base of downspout to direct water away from building.

2. Connect downspouts to underground drainage system indicated.

D. Expansion-Joint Covers: Install expansion-joint covers at locations and of configuration indicated. Lap joints a minimum of 4 inches in direction of water flow.

3.4 ROOF FLASHING INSTALLATION

A. General: Install sheet metal roof flashing and trim to comply with performance requirements and the following. Provide concealed fasteners where possible, set units true to line, and level as indicated. Install work with laps, joints, and seams that will be permanently watertight.
1. NRCA Roofing and Waterproofing Manual (Fifth Edition) for construction details and recommendations.
2. ANSI/SPRI ES-1, "Wind Design Standard for Edge Metal Systems Used with Low Slope Roof Systems".
3. SMACNA Architectural Sheet Metal Manual (Fifth Edition) for construction details.

B. Copings: Anchor to resist uplift and outward forces according to recommendations in FMG Loss Prevention Data Sheet 1-49 for specified wind zone and as indicated.
1. Interlock exterior bottom edge of coping with continuous cleats anchored to substrate at 16-inch centers.
2. Anchor interior leg of coping with screw fasteners and washers at 18-inch centers.

C. Pipe or Post Counterflashing: Install counterflashing umbrella with close-fitting collar with top edge flared for elastomeric sealant, extending a minimum of 4 inches over base flashing. Install stainless-steel draw band and tighten.

D. Counterflashing: Coordinate installation of counterflashing with installation of base flashing. Insert counterflashing in reglet or receivers and fit tightly to base flashing. Extend counterflashing 4 inches over base flashing. Lap counterflashing joints a minimum of 4 inches and bed with elastomeric sealant.
1. Secure in a waterproof manner by means of interlocking folded seam or blind rivets and sealant.

E. Roof-Penetration Flashing: Coordinate installation of roof-penetration flashing with installation of roofing and other items penetrating roof. Install flashing as follows:
1. Turn lead flashing down inside vent piping, being careful not to block vent piping with flashing.
2. Seal with elastomeric sealant and clamp flashing to pipes penetrating roof except for lead flashing on vent piping.

3.5 MISCELLANEOUS FLASHING INSTALLATION

A. Equipment Support Flashing: Coordinate installation of equipment support flashing with installation of roofing and equipment. Weld or seal flashing with elastomeric sealant to equipment support member.

3.6 CLEANING AND PROTECTION

A. Clean exposed metal surfaces of substances that interfere with uniform oxidation and weathering.

B. Clean and neutralize flux materials. Clean off excess solder and sealants.

C. Remove temporary protective coverings and strippable films as sheet metal flashing and trim are installed. On completion of installation, clean finished surfaces, including removing unused fasteners, metal filings, pop rivet stems, and pieces of flashing. Maintain in a clean condition during construction.

D. Replace sheet metal flashing and trim that have been damaged or that have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION 07620

SECTION 09300 - TILE

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Tile and Accessories:
   1. Quarry Tile.
   2. Trim and Accessories.
   3. Setting Materials.

1.2 REFERENCES

A. American National Standards Institute (ANSI):
   1. ANSI A108.1C - Specifications for Contractors Option: Installation of Ceramic Tile in the Wet-Set Method with Portland Cement Mortar -or- Installation of Ceramic Tile on a Cured Portland Cement Mortar Setting Bed with Dry-Set or Latex Portland Cement Mortar.
   2. ANSI A118.7 - Polymer Modified Cement Grouts
   3. ANSI A137.1 - Specifications for Ceramic Tile.

B. Tile Council of North America (TCNA): TCA Handbook for Ceramic Tile Installation, 2007.

1.3 PERFORMANCE REQUIREMENTS

A. Static Coefficient of Friction: Tile on walkway surfaces shall be provided with the following values as determined by testing in conformance with ASTM C 1028.
   1. Level Surfaces: Minimum of 0.6 (Wet).
   2. Step Treads: Minimum of 0.6 (Wet).
   3. Ramp Surfaces: Minimum of 0.8 (Wet).

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. Installation methods.

C. Selection Samples: Samples of actual tiles for selection.

D. Manufacturer's Certificate:

   1. Certify that products meet or exceed specified requirements.
   2. For each shipment, type and composition of tile provide a Master Grade Certificate signed by the manufacturer and the installer certifying that products meet or exceed the specified requirements of ANSI A137.1.

E. Maintenance Data: Include recommended cleaning methods, cleaning materials, stain removal methods, and polishes and waxes.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: Company specializing in performing the work of this section with minimum two years experience.

B. Single Source Responsibility: Obtain each type and color of tile from a single source. Obtain each type and color of mortar, adhesive and grout from the same source.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver and store products in manufacturer's unopened packaging until ready for installation.

B. Protect adhesives and liquid additives from freezing or overheating in accordance with manufacturer's instructions.

C. Store tile and setting materials on elevated platforms, under cover and in a dry location and protect from contamination, dampness, freezing or overheating.

1.7 ENVIRONMENTAL REQUIREMENTS

A. Do not install adhesives in an unventilated environment.

B. Maintain ambient and substrate temperature of 50 degrees F (10 degrees C) during tiling and for a minimum of 7 days after completion.

1.8 EXTRA MATERIALS

A. Provide for Owner's use a minimum of 2 percent of the primary sizes and colors of tile specified, boxed and clearly labeled.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturer:
1. DalTile Corporation
2. American Olean
3. Texas Quarries

B. Requests for substitutions will be considered in accordance with provisions of Section 01600.

2.2 TILE

A. General: Provide tile that complies with ANSI A137.1 for types, compositions and other characteristics indicated. Provide tile in the locations and of the types colors

and pattern indicated on the Drawings. Tile shall also be provided in accordance with the following:

1. Factory Blending: For tile exhibiting color variations within the ranges selected under Submittal of samples, blend tile in the factory and package so tile taken from one package shows the same range of colors as those taken from other packages.
2. Mounting: For factory mounted tile, provide back or edge mounted tile assemblies as standard with the manufacturer, unless otherwise specified.
3. Factory Applied Temporary Protective Coatings: Where indicated under tile type, protect exposed surfaces of tile against adherence of mortar and grout by precoating with a continuous film of petroleum paraffin wax applied hot. Do not coat unexposed tile surfaces.

B. Quarry Tile:
1. Product: Quarry Tile.
2. Moisture Absorption: Less than .07 percent to less than 20 percent.
3. Size and Shape: 8 inches by 8 inches, nominal.
4. Surface Finish: Textured.
5. Colors: To be selected from manufacturer's standard range.
6. Trim Units: Matching bullnose, bullnose corner, cove/inside finger cove, radius cap, sink rail, sink rail incorner/outcorner, cove base, outside cove corner shapes in sizes coordinated with field tile shapes.

2.3 TRIM AND ACCESSORIES

A. Non-Ceramic Trim: Satin natural anodized extruded aluminum, stainless steel, brass, etc, style and dimensions to suit application, for setting using tile mortar or adhesive; use in the following locations:

1. Open edges of floor tile.
2. Transition between floor finishes of different heights.
3. Thresholds at door openings.
4. Expansion and control joints, floor and wall.

2.4 SETTING MATERIALS

A. Epoxy Adhesive: ANSI A118.3, thinset bond type.

B. Mortar Bed Materials:
1. Portland cement: ASTM C150, type 1, gray or white.
2. Hydrated Lime: ASTM C207, Type S.
3. Sand: ASTM C144, fine.
4. Latex additive: As approved.
5. Water: Clean and potable.

C. Mortar Bond Coat Materials:
1. Dry-Set Portland Cement type: ANSI A118.1.
2. Latex-Portland Cement type: ANSI A118.4.
3. Epoxy: ANSI A118.3, 100 percent solids.

D. Polymer modified cement grout, sanded or unsanded, as specified in ANSI A118.7; color as selected.

E. Epoxy Grout: ANSI A118.8, 100 percent solids epoxy grout; color as selected.

F. Waterproofing Membrane at Floors: Membrane in accordance with ANSI A118.10 and as follows:

1. Chlorinated Polyethylene Sheet with polyester fabric reinforcing.
2. Fabric Reinforced, Fluid-Applied elastomeric membrane.
3. Un-Reinforced, Fluid-Applied elastomeric membrane.
4. Polyethylene Sheet Product.
5. Fabric-Reinforced, Modified-Bituminous Sheet Product.
6. Urethane Waterproofing and Tile-Setting Adhesive Product.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that wall surfaces are free of substances which would impair bonding of setting materials, smooth and flat within tolerances specified in ANSI A137.1, and are ready to receive tile.

B. Verify that sub-floor surfaces are dust-free, and free of substances which would impair bonding of setting materials to sub-floor surfaces, and are smooth and flat within tolerances specified in ANSI A137.1.

C. Verify that concrete sub-floor surfaces are ready for tile installation by testing for moisture emission rate and alkalinity; obtain instructions if test results are not within limits recommended by tile manufacturer and setting materials manufacturer.

D. Verify that required floor-mounted utilities are in correct location.

3.2 PREPARATION

A. Protect surrounding work from damage.

B. Remove any curing compounds or other contaminates.

C. Vacuum clean surfaces and damp clean.

D. Seal substrate surface cracks with filler. Level existing substrate surfaces to acceptable flatness tolerances.

E. Install cementitious backer board in accordance with ANSI A108.11 and board manufacturer's instructions. Tape joints and corners, cover with skim coat of dry-set mortar to a feather edge.

F. Prepare substrate surfaces for adhesive installation in accordance with adhesive manufacturer's instructions.

3.3 INSTALLATION – GENERAL

A. Install tile and grout in accordance with applicable requirements of ANSI A108.1 through A108.13, manufacturer's instructions, and TCA Handbook recommendations.

B. Lay tile to pattern indicated. Arrange pattern so that a full tile or joint is centered on each wall and that no tile less than 1/2 width is used. Do not interrupt tile pattern through openings.

C. Cut and fit tile to penetrations through tile, leaving sealant joint space. Form corners and bases neatly. Align floor joints.

D. Place tile joints uniform in width, subject to variance in tolerance allowed in tile size. Make joints watertight, without voids, cracks, excess mortar, or excess grout.

E. Form internal angles square and external angles bullnosed.

F. Install non-ceramic trim in accordance with manufacturer's instructions.

G. Sound tile after setting. Replace hollow sounding units.

H. Keep expansion joints free of adhesive or grout. Apply sealant to joints.

I. Allow tile to set for a minimum of 48 hours prior to grouting.

J. Grout tile joints. Use standard grout unless otherwise indicated.

K. Apply sealant to junction of tile & dissimilar materials & junction of dissimilar planes.

3.4 INSTALLATION - FLOORS - THIN-SET METHODS

A. Over exterior concrete substrates, install in accordance with TCA Handbook Method F102, with standard grout.

B. Over interior concrete substrates, install in accordance with TCA Handbook Method F113, dry-set or latex-portland cement bond coat, with standard grout, unless otherwise indicated.

1. Where waterproofing membrane is indicated, install in accordance with TCA Handbook Method F122, with latex-portland cement grout.
2. Where epoxy bond coat and grout are indicated, install in accordance with TCA Handbook Method F131.

C. Over wood substrates, install in accordance with TCA Handbook Method F142, with standard grout, unless otherwise indicated.

1. Where epoxy bond coat and grout are indicated, install in accordance with TCA Handbook Method F143.

3.5 INSTALLATION - FLOORS - MORTAR BED METHODS

A. Over exterior concrete substrates, install in accordance with TCA F101, bonded, with standard grout.

B. Over interior concrete substrates, install in accordance with TCA Handbook Method F111, with cleavage membrane, unless otherwise indicated.

1. Where waterproofing membrane is indicated, with standard grout or no mention of grout type, install in accordance with TCA Handbook Method F121.
2. Where epoxy bond coat and grout are indicated, install in accordance with TCA Handbook Method F132, bonded.
3. Where epoxy or furan grout is indicated, but not epoxy or furan bond coat, install in accordance with TCA Handbook Method F114, with cleavage membrane.

C. Over wood substrates, install in accordance with TCA Handbook method F141, with standard grout, unless otherwise indicated.

D. Cleavage Membrane: Lap edges and ends.

E. Waterproofing Membrane: Install as specified in ANSI A108.13.

F. Mortar Bed Thickness: 1-1/4 to 2 inch (32 to 51 mm) maximum, unless otherwise indicated.

3.6 PROTECTION OF FINISHED WORK

A. Do not permit traffic over finished floor surface for 72 hours after installation.

B. Cover floors with kraft paper and protect from dirt and residue from other trades.

C. Where floor will be exposed for prolonged periods cover with plywood or other similar type walkways

END OF SECTION

SECTION 09510 - ACOUSTICAL PANEL CEILINGS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Acoustical ceiling panels.
2. Exposed grid suspension system.
3. Wire hangers, fasteners, main runners, cross tees, and wall angle moldings.

B. Related Sections:

1. Division 15 Sections - Mechanical Work
2. Division 16 Sections - Electrical Work

C. Alternates

1. Prior Approval: Unless otherwise provided for in the Contract documents, proposed product substitutions may be submitted no later than TEN (10) working days prior to the date established for receipt of bids. Acceptability of a proposed substitution is contingent upon the Architect's review of the proposal for acceptability and approved products will be set forth by the Addenda. If included in a Bid are substitute products, which have not been approved by Addenda, the specified products shall be provided without additional compensation.
2. Submittals that do not provide adequate data for the product evaluation will not be considered. The proposed substitution must meet all requirements of this section, including but not necessarily limited to, the following: Single source materials suppliers (if specified in Section 1.5); Underwriters' Laboratories Classified Acoustical performance; Panel design, size, composition, color, and finish; Suspension system component profiles and sizes; Compliance with the referenced standards.

1.2 REFERENCES

A. American Society for Testing and Materials (ASTM):

1. ASTM A 1008 Standard Specification for Steel, Sheet, Cold Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability.
2. ASTM A 641 Standard Specification for Zinc-Coated (Galvanized) Carbon Steel Wire.
3. ASTM A 653 Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process.
4. ASTM C 423 Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method.
5. ASTM C 635 Standard Specification for Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings.

6. ASTM C 636 Recommended Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels.
7. ASTM E 84 Standard Test Method for Surface Burning Characteristics of Building Materials.
8. ASTM E 1264 Classification for Acoustical Ceiling Products.
9. ASTM E 1477 Standard Test Method for Luminous Reflectance Factor of Acoustical Materials by Use of Integrating-Sphere Reflectometers.
10. ASTM D 3273 Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber.
11. ASTM E 119 Standard Test Methods for Fire Tests of Building Construction and Material.

B. ASHRAE Standard 62.1-2004, "Ventilation for Acceptable Indoor Air Quality"

1.3 SUBMITTALS

A. Product Data: Submit manufacturer's technical data for each type of acoustical ceiling unit and suspension system required.

B. Samples: Minimum 6 inch x 6 inch samples of specified acoustical panel; 8 inch long samples of exposed wall molding and suspension system, including main runner and 4 foot cross tees.

C. Shop Drawings: Layout and details of acoustical ceilings. Show locations of items, which are to be coordinated with, or supported by the ceilings.

D. Certifications: Manufacturer's certifications that products comply with specified requirements, including laboratory reports showing compliance with specified tests and standards. For acoustical performance, each carton of material must carry an approved independent laboratory classification of NRC, CAC, and AC.

E. If the material supplied by the acoustical subcontractor does not have an Underwriter's Laboratory classification of acoustical performance on every carton, subcontractor shall be required to send material from every production run appearing on the job to an independent or NVLAP approved laboratory for testing, at the architect's or owner's discretion. All products not conforming to manufacturer's current published values must be removed, disposed of and replaced with complying product at the expense of the Contractor performing the work.

1.4 QUALITY ASSURANCE

A. Single-Source Responsibility: Provide acoustical panel units and grid components by a single manufacturer.

B. Fire Performance Characteristics: Identify acoustical ceiling components with appropriate markings of applicable testing and inspecting organization.

1. Surface Burning Characteristics: As follows, tested per ASTM E 84 and complying with ASTM E 1264 for Class A products.

a. Flame Spread: 25 or less
b. Smoke Developed: 50 or less

2. Fire Resistance Ratings: As indicated by reference to design designations in UL Fire Resistance Directory, for types of assemblies in which acoustical ceilings function as a fire protective membrane and tested per ASTM E 119.
    a. Protect lighting fixtures and air ducts to comply with requirements indicated for rated assembly.

C. Handle acoustical ceiling units carefully to avoid chipping edges or damaged units in any way.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver acoustical ceiling units 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.

B. Before installing acoustical ceiling units, permit them to reach room temperature and a stabilized moisture content.

C. Handle acoustical ceiling units carefully to avoid chipping edges or damaged units in any way.

1.6 PROJECT CONDITIONS

A. Space Enclosure:

All ceiling products and suspension systems must be installed and maintained in accordance with Armstrong written installation instructions for that product in effect at the time of installation and best industry practice. Prior to installation, the ceiling product must be kept clean and dry, in an environment that is between 32°F (0°C) and 120°F (49°C) and not subject to Abnormal Conditions.
Abnormal conditions include exposure to chemical fumes, vibrations, and moisture from conditions such as building leaks or condensation, excessive humidity, or excessive dirt or dust buildup.

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 MANUFACTURERS

A. Ceiling Panels:

1. Armstrong World Industries, Inc.

2.2 ACOUSTICAL CEILING UNITS

A. Acoustical Panels Type ACT-1:

1. Surface Texture: Medium
2. Composition: Mineral Fiber
3. Color: White
4. Size: 48in X 24in X 5/8in
5. Edge Profile: Square Lay-In for interface with Prelude Plus XL Fire Guard 15/16" Exposed Tee.
6. Noise Reduction Coefficient (NRC): ASTM C 423; Classified with UL label on product carton, N/A.
7. Ceiling Attenuation Class (CAC): ASTM C 1414; Classified with UL label on product carton, 40
8. Emissions Testing: Section 01350 Protocol, < 13.5 ppb of formaldehyde when used under typical conditions required by ASHRAE Standard 62.1-2004, "Ventilation for Acceptable Indoor Air Quality"
9. Flame Spread: ASTM E 1264; Fire Resistive
10. Light Reflectance (LR): ASTM E 1477; White Panel: Light Reflectance: 0.88.
11. Dimensional Stability: HumiGuard Max - Temperature is between 32°F (0° C) and 120°F (49° C). It is not necessary for the area to be enclosed or for HVAC systems to be functioning.
12. Antimicrobial Protection: Inherent - Resists the growth of mold/mildew and bacterial growth.
13. Acceptable Product: Ceramaguard, 605 as manufactured by Armstrong World Industries.

2.3 SUSPENSION SYSTEMS

A. Components: All main beams and cross tees shall be commercial quality hot-dipped galvanized (galvanized steel, aluminum, or stainless steel) as per ASTM A 653. Main beams and cross tees are double-web steel construction with 15/16 IN type exposed flange design. Exposed surfaces chemically cleansed, capping pre-finished galvanized steel (aluminum or stainless steel) in baked polyester paint. Main beams and cross tees shall have rotary stitching (exception: extruded aluminum or stainless steel).

1. Structural Classification: ASTM C 635 HD.
2. Color: White and match the actual color of the selected ceiling tile, unless noted otherwise.
3. Acceptable Product: Prelude Plus XL Fire Guard 15/16" Exposed Tee as manufactured by Armstrong World Industries, Inc.

B. Attachment Devices: Size for five times design load indicated in ASTM C 635, Table 1, Direct Hung unless otherwise indicated.

C. Wire for Hangers and Ties: ASTM A 641, Class 1 zinc coating, soft temper, pre-stretched, with a yield stress load of at least time three design load, but not less than 12 gauge.

D. Edge Moldings and Trim: Metal or extruded aluminum of types and profiles indicated or, if not indicated, manufacturer's standard moldings for edges and penetrations, including light fixtures, that fit type of edge detail and suspension system indicated. Provide moldings with exposed flange of the same width as exposed runner.

E. Accessories

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. (Exception: HumiGuard Max Ceilings)

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.

3.3 INSTALLATION

A. Install suspension system and panels in accordance with the manufacturer's instructions, and in compliance with ASTM C 636 and with the authorities having jurisdiction.
B. 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.

C. Install wall moldings at intersection of suspended ceiling and vertical surfaces. Miter corners where wall moldings intersect or install corner caps.
D. For reveal edge panels: Cut and reveal or rabbet edges of ceiling panels at border areas and vertical surfaces.
E. 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

SECTION 13852 - DIGITAL, ADDRESSABLE FIRE-ALARM SYSTEM

PART 1 GENERAL

1.1. DESCRIPTION:

A. This section of the specification includes the furnishing, installation, and connection of an intelligent reporting, microprocessor controlled, addressable, fire detection. It shall include, but not be limited to, alarm initiating devices, alarm notification appliances, control panels, auxiliary control devices, annunciators, power supplies, and wiring as shown on the drawings and specified herein.

B. The fire alarm system shall comply with requirements of NFPA Standard 72 for Protected Premises Signaling Systems except as modified and supplemented by this specification. The system shall be electrically supervised and monitor the integrity of all conductors.

C. The system shall be an active/interrogative type system where each addressable device is repetitively scanned, causing a signal to be transmitted to the main fire alarm control panel (FACP) indicating that the device and its associated circuit wiring is functional. Loss of this signal at the main FACP shall result in a trouble indication as specified hereinafter for the particular input.

D. Each designated zone shall transmit separate and different alarm, supervisory and trouble signals to the Fire Command Center (FCC) and designated personnel in other buildings at the site via a multiplex communication network.

E. The fire alarm system shall be manufactured by an ISO 9001 certified company and meet the requirements of BS EN9001: ANSI/ASQC Q9001-1994.

F. The system and its components shall be Underwriters Laboratories, Inc. listed under the appropriate UL testing standard as listed herein for fire alarm applications and the installation shall be in compliance with the UL listing.

G. The installing company shall employ NICET (minimum Level II Fire Alarm Technology) technicians on site to guide the final check-out and to ensure the systems integrity.

1.2. SCOPE:

A. A new intelligent reporting, microprocessor controlled fire detection system shall be installed in accordance with the specifications and drawings.

B. The system shall be designed such that each signaling line circuit (SLC) is limited to only 80% of its total capacity at initial installation.

C. Basic Performance:

1. Alarm, trouble and supervisory signals from all intelligent reporting devices shall be encoded on NFPA Style 4 (Class B) Signaling Line Circuits (SLC).

2. Initiation Device Circuits (IDC) shall be wired Class B (NFPA Style A) as part of an addressable device connected by the SLC Circuit.

3. Notification Appliance Circuits (NAC) shall be wired Class B (NFPA Style Y) as part of an addressable device connected by the SLC Circuit.

4. On Style 6 or 7 (Class A) configurations a single ground fault or open circuit on the system Signaling Line Circuit shall not cause system malfunction, loss of operating power or the ability to report an alarm.

5. Alarm signals arriving at the FACP shall not be lost following a primary power failure (or outage) until the alarm signal is processed and recorded.

D. Basic System Functional Operation

1. When a fire alarm condition is detected and reported by one of the system initiating devices, the following functions shall immediately occur:

   a. The System Alarm LED shall flash.
   b. A local piezo electric signal in the control panel shall sound.
   c. The 640-character LCD display shall indicate all information associated with the fire alarm condition, including the type of alarm point and its location within the protected premises.
   d. Printing and history storage equipment shall log the information associated each new fire alarm control panel condition, along with time and date of occurrence.
   e. All system output programs assigned via control-by-event interlock programming to be activated by the particular point in alarm shall be executed, and the associated system outputs (notification appliances and/or relays) shall be activated.

1.3. SUBMITTALS

A. General:

1. Two copies of all submittals shall be submitted to the Architect/Engineer for review.
2. All references to manufacturer's model numbers and other pertinent information herein is intended to establish minimum standards of performance, function and quality. Equivalent compatible UL-listed equipment from other manufacturers may be substituted for the specified equipment as long as the minimum standards are met.
3. All substitute equipment proposed as equal to the equipment specified herein, shall meet or exceed the following standards. For equipment other than that specified, the contractor shall supply proof that such substitute equipment equals or exceeds the features, functions, performance, and quality of the specified equipment.

B. Shop Drawings:

1. Sufficient information, clearly presented, shall be included to determine compliance with drawings and specifications.
2. Include manufacturer's name(s), model numbers, ratings, power requirements, equipment layout, device arrangement, complete wiring point-to-point diagrams, and conduit layouts.
3. Show annunciator layout, configurations, and terminations.

C. Manuals:

1. Submit simultaneously with the shop drawings, complete operating and maintenance ma-

nuals listing the manufacturer's name(s), including technical data sheets.
2. Wiring diagrams shall indicate internal wiring for each device and the interconnections between the items of equipment.
3. Provide a clear and concise description of operation that gives, in detail, the information required to properly operate the equipment and system.
4. Approvals will be based on complete submissions of manuals together with shop drawings.

D. Software Modifications

1. Provide the services of a factory trained and authorized technician to perform all system software modifications, upgrades or changes. Response time of the technician to the site shall not exceed 4 hours.
2. Provide all hardware, software, programming tools and documentation necessary to modify the fire alarm system on site. Modification includes addition and deletion of devices, circuits, zones and changes to system operation and custom label changes for devices or zones. The system structure and software shall place no limit on the type or extent of software modifications on-site. Modification of software shall not require power-down of the system or loss of system fire protection while modifications are being made.

E. Certifications:

Together with the shop drawing submittal, submit a certification from the major equipment manufacturer indicating that the proposed supervisor of the installation and the proposed performer of contract maintenance is an authorized representative of the major equipment manufacturer. Include names and addresses in the certification.

1.4. GUARANTY:

A. All work performed and all material and equipment furnished under this contract shall be free from defects and shall remain so for a period of at least one (1) year from the date of acceptance. The full cost of maintenance, labor and materials required to correct any defect during this one year period shall be included in the submittal bid.

1.5. POST CONTRACT MAINTENANCE:

A. Complete maintenance and repair service for the fire alarm system shall be available from a factory trained authorized representative of the manufacturer of the major equipment for a period of five (5) years after expiration of the guaranty.

B. As part of the bid/proposal, include a quote for a maintenance contract to provide all maintenance, tests, and repairs described below. Include also a quote for unscheduled maintenance/repairs, including hourly rates for technicians trained on this equipment, and response travel costs for each year of the maintenance period. Submittals that do not identify all post contract maintenance costs will not be accepted. Rates and costs shall be valid for the period of five (5) years after expiration of the guaranty.

C. Maintenance and testing shall be on a semiannual basis or as required by the AHJ. A preventive maintenance schedule shall be provided by the contractor describing the protocol for preventive maintenance. The schedule shall include:

1. Systematic examination, adjustment and cleaning of all detectors, manual fire alarm sta-

tions, control panels, power supplies, relays, waterflow switches and all accessories of the fire alarm system.

2. Each circuit in the fire alarm system shall be tested semiannually.
3. Each smoke detector shall be tested in accordance with the requirements of NFPA 72 Chapter 7.

1.6. POST CONTRACT EXPANSIONS:

A. The contractor shall have the ability to provide parts and labor to expand the system specified, if so requested, for a period of five (5) years from the date of acceptance.

B. As part of the submittal, include a quotation for all parts and material, and all installation and test labor as needed to increase the number of intelligent or addressable devices by ten percent (10%). This quotation shall include intelligent smoke detectors, intelligent heat detectors, addressable manual stations, addressable monitor modules and addressable modules equal in number to one tenth of the number required to meet this specification (list actual quantity of each type).

C. The quotation shall include installation, test labor, and labor to reprogram the system for this 10% expansion. If additional FACP hardware is required, include the material and labor necessary to install this hardware.

D. Do not include cost of conduit or wire or the cost to install conduit or wire.

E. Submittals that do not include this estimate of post contract expansion cost will not be accepted.

1.7. APPLICABLE PUBLICATIONS:

The publications listed below form a part of this specification. The publications are referenced in text by the basic designation only.

A. National Fire Protection Association (NFPA) - USA:

No. 12A Halon 1301 Extinguishing Systems
No. 13 Sprinkler Systems
No. 15 Water Spray Systems
No. 16 Foam/Water Deluge and Foam/Water Spray Systems
No. 17 Dry Chemical Extinguishing Systems
No. 17A Wet Chemical Extinguishing Systems
No. 70 National Electric Code (NEC)
No. 72-1996 National Fire Alarm Code
No. 90A Air Conditioning Systems
No. 92A Smoke Control Systems
No. 92B Smoke Management Systems in Malls, Atria, Large Areas
No. 101 Life Safety Code

B. Underwriters Laboratories Inc. (UL) - USA:

No. 50 Cabinets and Boxes
No. 268 Smoke Detectors for Fire Protective Signaling Systems
No. 864 Control Units for Fire Protective Signaling Systems
No. 268A Smoke Detectors for Duct Applications.

No. 521 Heat Detectors for Fire Protective
No. 228 Door Closers-Holders for Fire Protective Signaling Systems.
No. 464 Audible Signaling Appliances.
No. 38 Manually Actuated Signaling Boxes.
No. 346 Waterflow Indicators for Fire Protective Signaling Systems.
No. 1481 Power supplies for Fire Protective Signaling Systems.
No. 1076 Control Units for Burglar Alarm Proprietary Protective Signaling Systems.
No. 1971 Visual Notification Appliances.

C. Local and State Building Codes.

D. All requirements of the Authority Having Jurisdiction (AHJ).

1.8. APPROVALS:

A. The system shall have proper listing and/or approval from the following nationally recognized agencies:
UL Underwriters Laboratories Inc
ULC Underwriters Laboratories Canada
FM Factory Mutual
FM6320 Approved for Gas Detection

B. The Fire Alarm Control Panel and all transponders shall meet the modular listing requirements of the ninth edition UL Standard 864 (Control Units). Each subassembly, including all printed circuits, shall include the appropriate UL modular label. This includes all printed circuit board assemblies, power supplies, and enclosure parts. Systems that do not include modular labels may require return to the factory for system upgrades, and are not acceptable.

C. The system shall be listed by the national agencies as suitable for extinguishing release applications. The system shall support release of high and low pressure CO2.

PART 2.0 PRODUCTS

2.1. EQUIPMENT AND MATERIAL, GENERAL:

A. All equipment and components shall be new, and the manufacturer's current model. The materials, appliances, equipment and devices shall be tested and listed by a nationally recognized approvals agency for use as part of a protected premises protective signaling (fire alarm) system. The authorized representative of the manufacturer of the major equipment, such as control panels, shall be responsible for the satisfactory installation of the complete system.

B. All equipment and components shall be installed in strict compliance with each manufacturer's recommendations. Consult the manufacturer's installation manuals for all wiring diagrams, schematics, physical equipment sizes, etc. before beginning system installation. Refer to the riser/connection diagram for all specific system installation/termination/wiring data.

C. All equipment shall be attached to walls and ceiling/floor assemblies and shall be held firmly in place (e.g., detectors shall not be supported solely by suspended ceilings). Fasteners and supports shall be adequate to support the required load.

2.2. CONDUIT AND WIRE:

A. Conduit:

1. Conduit shall be in accordance with The National Electrical Code (NEC), local and state requirements.
2. Where possible, all wiring shall be installed in conduit or raceway. Conduit fill shall not exceed 40 percent of interior cross sectional area where three or more cables are contained within a single conduit.
3. Cable must be separated from any open conductors of Power, or Class 1 circuits, and shall not be placed in any conduit, junction box or raceway containing these conductors, as per NEC Article 760.
4. Wiring for 24 volt control, alarm notification, emergency communication and similar power-limited auxiliary functions may be run in the same conduit as initiating and signaling line circuits. All circuits shall be provided with transient suppression devices and the system shall be designed to permit simultaneous operation of all circuits without interference or loss of signals.
5. Conduit shall not enter the fire alarm control panel, or any other remotely mounted control panel equipment or backboxes, except where conduit entry is specified by the FACP manufacturer.
6. Conduit shall be 3/4 inch (19.1 mm) minimum.

B. Wire

1. All fire alarm system wiring must be new.
2. Wiring shall be in accordance with local, state and national codes (e.g., NEC Article 760) and as recommended by the manufacturer of the fire alarm system. Number and size of conductors shall be as recommended by the fire alarm system manufacturer, but not less than 18 AWG (1.02 mm) for initiating device circuits, signaling line circuits, and notification appliance circuits.
3. All wire and cable shall be listed and/or approved by a recognized testing agency for use with a protective signaling system.
4. Wire and cable not installed in conduit shall have a fire resistance rating suitable for the installation as indicated in NFPA 70 (e.g., FPLR).
5. The system shall permit the use of IDC and NAC wiring in the same conduit with the multiplex communication loop.
6. All field wiring shall be completely supervised. In the event of a primary power failure, disconnected standby battery, removal of any internal modules, or any open circuits in the field wiring; a trouble signal will be activated until the system and its associated field wiring are restored to normal condition.
7. All analog voice speaker and analog telephone circuits shall use twisted/shielded pair to eliminate cross talk.

C. Terminal Boxes, Junction Boxes and Cabinets:

1. All boxes and cabinets shall be UL listed for their intended purpose.

D. Initiating circuits shall be arranged to serve like categories (manual, smoke, waterflow). Mixed category circuitry shall not be permitted except on signaling line circuits connected to intelligent reporting devices.

E. The fire alarm control panel shall be connected to a separate dedicated branch circuit, maximum

20 amperes. This circuit shall be labeled at the main power distribution panel as FIRE ALARM. Fire alarm control panel primary power wiring shall be 12 AWG. The control panel cabinet shall be grounded securely to either a cold water pipe or grounding rod.

2.3. MAIN FIRE ALARM CONTROL PANEL OR NETWORK NODE:

A. The main FACP Central Console shall be a NOTIFIER Model NFS2-3030 and shall contain a microprocessor based Central Processing Unit (CPU). The CPU shall communicate with and control the following types of equipment used to make up the system: intelligent addressable smoke and thermal (heat) detectors, addressable modules, control circuits, and notification appliance circuits, local and remote operator terminals, printers, annunciators, and other system controlled devices. Subject to compliance with requirements, provide products by Notifier, Edwards, Siemens.

B. In conjunction with intelligent Loop Control Modules and Loop Expander Modules, the main FACP shall perform the following functions:

1. Supervise and monitor all intelligent addressable detectors and monitor modules connected to the system for normal, trouble and alarm conditions.
2. Supervise all initiating signaling and notification circuits throughout the facility by way of connection to addressable monitor and control modules.
3. Detect the activation of any initiating device and the location of the alarm condition. Operate all notification appliances and auxiliary devices as programmed. In the event of CPU failure, all SLC loop modules shall fallback to degrade mode. Such degrade mode shall treat the corresponding SLC loop control modules and associated detection devices as conventional two-wire operation. Any activation of a detector in this mode shall automatically activate associated Notification Appliance Circuits.
4. Visually and audibly annunciate any trouble, supervisory, security or alarm condition on operator's terminals, panel display, and annunciators.
5. When a fire alarm condition is detected and reported by one of the system initiating devices or appliances, the following functions shall immediately occur:

    a. The system alarm LED shall flash.
    b. A local piezo-electric audible device in the control panel shall sound a distinctive signal.
    c. The 640-character backlit LCD display shall indicate all information associated with the fire alarm condition, including the type of alarm point and its location within the protected premises.
    d. Printing and history storage equipment shall log and print the event information along with a time and date stamp.
    e. All system outputs assigned via preprogrammed equations for a particular point in alarm shall be executed, and the associated system outputs (alarm notification appliances and/or relays) shall be activated.
    f. When a trouble condition is detected and reported by one of the system initiating devices or appliances, the following functions shall immediately occur:
    g. The system trouble LED shall flash.
    h. A local piezo-electric audible device in the control panel shall sound a distinctive signal.
    i. The 640-character backlit LCD display shall indicate all information associated with the trouble condition, including the type of trouble point and its location within the protected premises.
    j. Printing and history storage equipment shall log and print the event information

along with a time and date stamp.

k. All system outputs assigned via preprogrammed equations for a particular point in trouble shall be executed, and the associated system outputs (trouble notification appliances and/or relays) shall be activated.

6. When a supervisory condition is detected and reported by one of the system initiating devices or appliances, the following functions shall immediately occur:

a. The system trouble LED shall flash.
b. A local piezo-electric audible device in the control panel shall sound a distinctive signal.
c. The 640-character backlit LCD display shall indicate all information associated with the supervisory condition, including the type of trouble point and its location within the protected premises.
d. Printing and history storage equipment shall log and print the event information along with a time and date stamp.
e. All system outputs assigned via preprogrammed equations for a particular point in trouble shall be executed, and the associated system outputs (notification appliances and/or relays) shall be activated.

7. When a security alarm condition is detected and reported by one of the system initiating devices or appliances, the following functions shall immediately occur:

a. The system security LED shall flash.
b. A local piezo-electric audible device in the control panel shall sound a distinctive signal.
c. The 640-character backlit LCD display shall indicate all information associated with the fire alarm condition, including the type of alarm point and its location within the protected premises.
d. Printing and history storage equipment shall log and print the event information along with a time and date stamp.
e. All system outputs assigned via preprogrammed equations for a particular point in alarm shall be executed, and the associated system outputs (alarm notification appliances and/or relays) shall be activated.

8. When a pre-alarm condition is detected and reported by one of the system initiating devices or appliances, the following functions shall immediately occur:

a. The system pre-alarm LED shall flash.
b. A local piezo-electric audible device in the control panel shall sound a distinctive signal.
c. The 640-character backlit LCD display shall indicate all information associated with the fire alarm condition, including the type of alarm point and its location within the protected premises.
d. Printing and history storage equipment shall log and print the event information along with a time and date stamp.
e. All system outputs assigned via preprogrammed equations for a particular point in alarm shall be executed, and the associated system outputs (alarm notification appliances and/or relays) shall be activated.

C. Operator Control

1. Acknowledge Switch:

    a. Activation of the control panel acknowledge switch in response to new alarms and/or troubles shall silence the local panel piezo electric signal and change the alarm and trouble LEDs from flashing mode to steady-ON mode. If multiple alarm or trouble conditions exist, depression of this switch shall advance the LCD display to the next alarm or trouble condition. In addition, the FACP shall support Block Acknowledge to allow multiple trouble conditions to be acknowledged with a single depression of this switch.
    b. Depression of the Acknowledge switch shall also silence all remote annunciator piezo sounders.

2. Signal Silence Switch:

    a. Depression of the Signal Silence switch shall cause all programmed alarm notification appliances and relays to return to the normal condition. The selection of notification circuits and relays that are silence able by this switch shall be fully field programmable within the confines of all applicable standards. The FACP software shall include silence inhibit and auto-silence timers.

3. Drill Switch:

    a. Depression of the Drill switch shall activate all programmed notification appliance circuits. The drill function shall latch until the panel is silenced or reset.

4. System Reset Switch:

    a. Depression of the System Reset switch shall cause all electronically latched initiating devices to return to their normal condition. Initiating devices shall re-report if active. Active notification appliance circuits shall not silence upon Reset. Systems that deactivate and subsequently re-activate notification appliance circuits shall not be considered equal. All programmed Control-By-Event equations shall be re-evaluated after the reset sequence is complete if the initiating condition has cleared. Non-latching trouble conditions shall not clear and re-report upon reset.

5. Lamp Test:

    a. The Lamp Test switch shall activate all local system LEDs, light each segment of the liquid crystal display and display the panel software revision for service personal.

6. Scroll Display Keys:

    a. There shall be Scroll Display keys for FIRE ALARM, SECURITY, SUPERVISORY, TROUBLE, and OTHER EVENTS. Depression of the Scroll Display key shall display the next event in the selected queue allowing the operator to view events by type.

7. Print Screen:

    a. Depression of the PRINT SCREEN switch shall send the information currently dis-

played on the 640-character display to the printer.

D. System Capacity and General Operation

1. The control panel shall be capable of expansion via up to 10 SLC modules. Each module shall support a maximum of 318 analog/addressable devices for a maximum system capacity of 3180 points. The system shall be capable of 3072 annunciation points per system regardless of the number of addressable devices.
2. The Fire Alarm Control Panel shall include a full featured operator interface control and annunciation panel that shall include a backlit 640-character liquid crystal display, individual, color coded system status LEDs, and a QWERTY style alphanumeric keypad for the field programming and control of the fire alarm system. Said LCD shall also support graphic bit maps capable of displaying the company name and logo of either the owner or installing company.
3. All programming or editing of the existing program in the system shall be achieved without special equipment and without interrupting the alarm monitoring functions of the fire alarm control panel.
4. The FACP shall be able to provide the following software and hardware features:

    a. Pre-signal and Positive Alarm Sequence: The system shall provide means to cause alarm signals to only sound in specific areas with a delay of the alarm from 60 to up to 180 seconds after start of alarm processing. In addition, a Positive Alarm Sequence selection shall be available that allows a 15-second time period for acknowledging an alarm signal from a fire detection/initiating device. If the alarm is not acknowledged within 15 seconds, all local and remote outputs shall automatically activate immediately.
    b. Smoke Detector Pre-alarm Indication at Control Panel: To obtain early warning of incipient or potential fire conditions, the system shall support a programmable option to determine system response to real-time detector sensing values above the programmed setting. Two levels of Pre-alarm indication shall be available at the control panel: alert and action.
    c. Alert: It shall be possible to set individual smoke detectors for pre-programmed pre-alarm thresholds. If the individual threshold is reached, the pre-alarm condition shall be activated.
    d. Action: If programmed for Action and the detector reaches a level exceeding the pre-programmed level, the control panel shall indicate an action condition. Sounder bases installed with either heat or smoke detectors shall automatically activate on action Pre-Alarm level, with general evacuation on Alarm level.
    e. The system shall support a detector response time to meet world annunciation requirements of less than 3 seconds.
    f. Device Blink Control: Means shall be provided to turn off detector/module LED strobes for special areas.
    g. NFPA 72 Smoke Detector Sensitivity Test: The system shall provide an automatic smoke detector test function that meet the requirements of NFPA 72.
    h. Programmable Trouble Reminder: The system shall provide means to automatically initiate a reminder that troubles exist in the system. The reminder will appear on the system display and (if enabled) will sound a piezo alarm.
    i. On-line or Off-line programming: The system shall provide means to allow panel programming either through an off-line software utility program away from the panel or while connected and on-line. The system shall also support upload and download of programmed database and panel executive system program to a Personal Comput-

er/laptop.

j. History Events: The panel shall maintain a history file of the last 4000 events, each with a time and date stamp. History events shall include all alarms, troubles, operator actions, and programming entries. The control panels shall also maintain a 1000 event Alarm History buffer, which consists of the 1000 most recent alarm events from the 4000 event history file.

k. Smoke Control Modes: The system shall provide means to perform FSCS mode Smoke Control to meet NFPA-92A and 90B and HVAC mode to meet NFPA 90A.

l. The system shall provide means for all SLC devices on any SLC loop to be auto programmed into the system by specific address. The system shall recognize specific device type ID's and associate that ID with the corresponding address of the device.

m. Drill: The system shall support means to activate all silenceable fire output circuits in the event of a practice evacuation or "drill". If enabled for local control, the front panel switch shall be held for a minimum of 2 seconds prior to activating the drill function.

n. Passwords and Users: The system shall support two password levels, master and user. Up to 9 user passwords shall be available, each of which may be assigned access to the programming change menus, the alter status menus, or both. Only the master password shall allow access to password change screens.

o. Two Wire Detection: The system shall support standard two wire detection devices specifically all models of System Sensor devices, Fenwal PDS-7125/7126 and CPD-7021, Hochiki model SLK-24F/24FH, Edwards 6250B/6270B and 6264B and Simplex models 2098-9201/9202 and 9576.

p. Block Acknowledge: The system shall support a block Acknowledge for Trouble Conditions

q. Sensitivity Adjust: The system shall provide Automatic Detector Sensitivity Adjust based on Occupancy schedules including a Holiday list of up to 15 days.

r. Environmental Drift Control: The system shall provide means for setting Environmental Drift Compensation by device. When a detector accumulates dust in the chamber and reaches an unacceptable level but yet still below the allowed limit, the control panel shall indicate a maintenance alert warning. When the detector accumulates dust in the chamber above the allowed limit, the control panel shall indicate a maintenance urgent warning.

s. Custom Action Messages: The system shall provide means to enter up to 100 custom action messages of up to 160 characters each. It shall be possible to assign any of the 100 messages to any point.

t. Print Functions: The system shall provide means to obtain a variety of reports listing all event, alarm, trouble, supervisory, or security history. Additional reports shall be available for point activation for the last Walk Test performed, detector maintenance report containing the detector maintenance status of each installed addressable detector, all network parameters, all panel settings including broad cast time, event ordering, and block acknowledge, panel timer values for Auto Silence, Silence Inhibit, AC Fail Delay time and if enabled, Proprietary Reminder, and Remote Reminder timers, supervision settings for power supply and printers, all programmed logic equations, all custom action messages, all non-fire and output activations (if pre-programmed for logging) all active points filtered by alarms only, troubles only, supervisory alarms, prealarms, disabled points and activated points, all installed points filtered by SLC points, logic zones, annunciators, releasing zones, special zones, and trouble zones.

u. Local Mode: If communication is lost to the central processor the system shall provide added survivability through the intelligent loop control modules. Inputs from

devices connected to the SLC and loop control modules shall activate outputs on the same loop when the inputs and outputs have been set with point programming to participate in local mode or when the type codes are of the same type: that is, an input with a fire alarm type code shall activate an output with a fire alarm type code.

v. Resound based on type for security or supervisory: The system shall indicate a Security alarm when a monitor module point programmed with a security Type Code activates. If silenced alarms exist, a Security alarm will Resound the panel sounder. The system shall indicate a Supervisory alarm when a monitor module point programmed with a supervisory Type Code activates. If there are silenced alarms, a Supervisory alarm will Resound the panel sounder.

w. Read status preview - enabled and disabled points: Prior to re-enabling points, the system shall inform the user that a disabled device is in the alarm state. This shall provide notice that the device must be reset before the device is enabled thereby avoiding activation of the notification circuits.

x. Custom Graphics: When fitted with an LCD display, the panel shall permit uploading of a custom bit-mapped graphic to the display screen.

y. Multi-Detector and Cooperating Detectors: The system shall provide means to link one detector to up to two detectors at other addresses on the same loop in cooperative multi-detector sensing. There shall be no requirement for sequential addresses on the detectors and the alarm event shall be a result or product of all cooperating detectors chamber readings.

z. Tracking/Latching Duct (ion and photo): The system shall support both tracking and latching duct detectors either ion or photo types.

aa. ACTIVE EVENT: The system shall provide a Type ID called FIRE CONTROL for purposes of air-handling shutdown, which shall be intended to override normal operating automatic functions. Activation of a FIRE CONTROL point shall cause the control panel to (1) initiate the monitor module Control-by-Event, (2) send a message to the panel display, history buffer, installed printer and annunciators, (3) shall not light an indicator at the control panel, (4) Shall display ACTIVE on the LCD as well a display a FIRE CONTROL Type Code and other information specific to the device.

bb. NON-FIRE Alarm Module Reporting: A point with a type ID of NON-FIRE shall be available for use for energy management or other non-fire situations. NON-FIRE point operation shall not affect control panel operation nor shall it display a message at the panel LDC. Activation of a NON-FIRE point shall activate control by event logic but shall not cause any indication on the control panel.

cc. Security Monitor Points: The system shall provide means to monitor any point as a type security.

dd. One-Man Walk Test: The system shall provide both a basic and advanced walk test for testing the entire fire alarm system. The basic walk test shall allow a single operator to run audible tests on the panel. All logic equation automation shall be suspended during the test and while annunciators can be enabled for the test, all shall default to the disabled state. During an advanced walk test, field-supplied output point programming will react to input stimuli such as CBE and logic equations. When points are activated in advanced test mode, each initiating event shall latch the input. The advanced test shall be audible and shall be used for pull station verification, magnet activated tests on input devices, input and output device and wiring operation/verification.

ee. Control By Event Functions: CBE software functions shall provide means to program a variety of output responses based on various initiating events. The control panel shall operate CBE through lists of zones. A zone shall become listed when it is added to a point's zone map through point programming. Each input point such as detec-

tor, monitor module or panel circuit module shall support listing of up to 10 zones into its programmed zone map.

ff. Permitted zone types shall be general zone, releasing zone and special zone. Each output point (control module, panel circuit module) can support a list of up to 10 zones including general zone, logic zone, releasing zone and trouble zone. It shall be possible for output points to be assigned to list general alarm. Non-Alarm or Supervisory points shall not activate the general alarm zone.

gg. 1000 General Zones: The system shall support up to 1000 general purpose software zones for linking inputs to outputs. When an input device activates, any general zone programmed into that device's zone map will be active and any output device that has an active general zone in its map will be active. It shall also be possible to use general zone as arguments in logic equations.

hh. 1000 Logic Equations: The system shall support up to 1000 logic equations for AND, OR, NOT, ONLY1, ANYX, XZONE or RANGE operators that allow conditional I/O linking. When any logic equation becomes true, all output points mapped to the logic zone shall activate.

ii. 10 trouble equations per device: The system shall provide support for up to 10 trouble equations for each device, which shall permit programming parameters to be altered, based on specific fault conditions. If the trouble equation becomes true, all output points mapped to the trouble zone shall activate.

jj. Control-By-Time: A time based logic function shall be available to delay an action for a specific period of time based upon a logic input with tracking feature. A latched version shall also be available. Another version of this shall permit activation on specific days of the week or year with ability to set and restore based on a 24 hour time schedule on any day of the week or year.

kk. Multiple agent releasing zones: The system shall support up to 10 releasing zones to protect against 10 independent hazards. Releasing zones shall provide up to three cross-zone and four abort options to satisfy any local jurisdiction requirements.

ll. Alarm Verification, by device, with timer and tally: The system shall provide a user-defined global software timer function that can be set for a specific detector. The timer function shall delay an alarm signal for a user-specified time period and the control panel shall ignore the alarm verification timer if another alarm is detected during the verification period. It shall also be possible to set a maximum verification count between 0 and 20 with the "0" setting producing no alarm verification. When the counter exceeds the threshold value entered, a trouble shall be generated to the panel.

E. Central Processing Unit

1. The Central Processing Unit shall communicate with, monitor, and control all other modules within the control panel. Removal, disconnection or failure of any control panel module shall be detected and reported to the system display by the Central Processing Unit.
2. The Central Processing Unit shall contain and execute all control-by-event (including Boolean functions including but not limited to AND, OR, NOT, ANYx, and CROSSZONE) programs for specific action to be taken if an alarm condition is detected by the system. Such control-by-event programs shall be held in non-volatile programmable memory, and shall not be lost with system primary and secondary power failure.
3. The Central Processing Unit shall also provide a real-time clock for time annotation, to the second, of all system events. The time-of-day and date shall not be lost if system primary and secondary power supplies fail.
4. The CPU shall be capable of being programmed on site without requiring the use of any external programming equipment. Systems that require the use of external programmers or

change of EPROMs are not acceptable.

5. Consistent with UL864 standards, the CPU and associated equipment are to be protected so that voltage surges or line transients will not affect them.
6. Each peripheral device connected to the CPU shall be continuously scanned for proper operation. Data transmissions between the CPU and peripheral devices shall be reliable and error free. The transmission scheme used shall employ dual transmission or other equivalent error checking techniques.
7. The CPU shall provide an EIA-232 interface between the fire alarm control panel and the UL Listed Electronic Data Processing (EDP) peripherals.
8. The CPU shall provide two EIA-485 ports for the serial connection to annunciation and control subsystem components.
9. The EIA-232 serial output circuit shall be optically isolated to assure protection from earth ground.
10. The CPU shall provide one high-speed serial connection for support of network communication modules.
11. The CPU shall provide double pole relays for FIRE ALARM, SYSTEM TROUBLE, SUPERVISORY, and SECURITY. The SUPERVISORY and SECURITY relays shall provide selection for additional FIRE ALARM contacts.

12. The EIA-485 interface may be used for network connection to a proprietary-receiving unit.

F. System Display

1. The system display shall provide all the controls and indicators used by the system operator and may also be used to program all system operational parameters.
2. The display assembly shall contain, and display as required, custom alphanumeric labels for all intelligent detectors, addressable modules, and software zones.
3. The system display shall provide a 640-character backlit alphanumeric Liquid Crystal Display (LCD). It shall also provide ten Light-Emitting-Diodes (LEDs), that indicate the status of the following system parameters: AC POWER, FIRE ALARM, PREALARM, SECURITY, SUPERVISORY, SYSTEM TROUBLE, OTHER EVENT, SIGNALS SILENCED, POINT DISABLED, and CPU FAILURE.
4. The system display shall provide a QWERTY style keypad with control capability to command all system functions, entry of any alphabetic or numeric information, and field programming. Two different password levels with up to ten (one Master and nine User) passwords shall be accessible through the display interface assembly to prevent unauthorized system control or programming.
5. The system display shall include the following operator control switches: ACKNOWLEDGE, SIGNAL SILENCE, RESET, DRILL, and LAMP TEST. Additionally, the display interface shall allow scrolling of events by event type including, FIRE ALARM, SECURITY, SUPERVISORY, TROUBLE, and OTHER EVENTS. A PRINT SCREEN button shall be provided for printing the event currently displayed on the 640-character LCD.

G. Loop (Signaling Line Circuit) Control Module:

1. The Loop Control Module shall monitor and control a minimum of 318 intelligent addressable devices. This includes 159 intelligent detectors (Ionization, Photoelectric, or Thermal) and 159 monitor or control modules.
2. The Loop Control Module shall contain its own microprocessor and shall be capable of operating in a local/degrade mode (any addressable device input shall be capable of activating

any or all addressable device outputs) in the unlikely event of a failure in the main CPU.

3. The Loop Control Module shall provide power and communicate with all intelligent addressable detectors and modules on a single pair of wires. This SLC Loop shall be capable of operating as a NFPA Style 6 (Class B) circuit.
4. The SLC interface board shall be able to drive an NFPA Style 6 twisted unshielded circuit up to 12,500 feet in length. The SLC Interface shall also be capable of driving an NFPA Style 6, no twist, no shield circuit for limited distances determined by the manufacturer. In addition, SLC wiring shall meet the listing requirements for it to exit the building or structure. "T"-tapping shall be allowed in either case.
5. The SLC interface board shall receive analog or digital information from all intelligent detectors and shall process this information to determine whether normal, alarm, or trouble conditions exist for that particular device. Each SLC Loop shall be isolated and equipped to annunciate an Earth Fault condition. The SLC interface board software shall include software to automatically maintain the detector's desired sensitivity level by adjusting for the effects of environmental factors, including the accumulation of dust in each detector. The analog information may also be used for automatic detector testing and the automatic determination of detector maintenance requirements.

H. Enclosures:

1. The control panel shall be housed in a UL-listed cabinet suitable for surface or semi-flush mounting. The cabinet and front shall be corrosion protected, given a rust-resistant prime coat, and manufacturer's standard finish.
2. The back box and door shall be constructed of 0.060 steel with provisions for electrical conduit connections into the sides and top.
3. The door shall provide a key lock and include a transparent opening for viewing all indicators. For convenience, the door shall have the ability to be hinged on either the right or left-hand side.
4. The control unit shall be modular in structure for ease of installation, maintenance, and future expansion.

I. Power Supply:

1. The Addressable Main Power Supply shall operate on 120/240 VAC, 50/60 Hz, and shall provide all necessary power for the FACP.
2. The Addressable Main Power Supply shall provide the required power to the CPU using a switching 24 VDC regulator and shall incorporate a battery charger for 24 hours of standby power using dual-rate charging techniques for fast battery recharge.
3. The Addressable Main Power Supply shall provide a battery charger for 24 hours of standby using dual-rate charging techniques for fast battery recharge. The supply shall be capable of charging batteries ranging in capacity from 7-200 amp-hours within a 48-hour period.
4. The Addressable Main Power Supply shall provide a very low frequency sweep earth detect circuit, capable of detecting earth faults.
5. The Addressable Main Power Supply shall be power-limited per UL864 requirements.

J. Auxiliary Field Power Supply - Addressable

1. The auxiliary addressable power supply is a remote 24 VDC power supply used to power Notification Devices and field devices that require regulated 24VDC power. The power supply shall also include and charge backup batteries.

2. The addressable power supply for the fire alarm system shall provide up a minimum of 6.0 amps of 24 volt DC regulated power for Notification Appliance Circuit (NAC) power or 5 amps of 24 volt DC general power. The power supply shall have an additional .5 amp of 24 VDC auxiliary power for use within the same cabinet as the power supply. It shall include an integral charger designed to charge 7.0 - 25.0 amp hour batteries.
3. The addressable power supply shall provide four individually addressable Notification Appliance Circuits that may be configured as two Class "A" and two Class "B" or four Class "B" only circuits. All circuits shall be power-limited per UL 864 requirements.
4. The addressable power supply shall provide built-in synchronization for certain Notification Appliances on each circuit without the need for additional synchronization modules. The power supply's output circuits shall be individually selected for synchronization. A single addressable power supply shall be capable of supporting both synchronized and non-synchronized Notification Devices at the same time.
5. The addressable power supply shall operate on 120 or 240 VAC, 50/60 Hz.
6. The interface to the power supply from the Fire Alarm Control Panel (FACP) shall be via the Signaling Line Circuit (SLC) or other multiplexed means Power supplies that do not use an intelligent interface are not suitable substitutes. The required wiring from the FACP to the addressable power supply shall be a single unshielded twisted pair wire. Data on the SLC shall be transmitted between 24 VDC, 5 VDC and 0 VDC at approximately 3.33k baud.
7. The addressable power supply shall supervise for battery charging failure, AC power loss, power brownout, battery failure, NAC loss, and optional ground fault detection. In the event of a trouble condition, the addressable power supply shall report the incident and the applicable address to the FACP via the SLC.
8. The addressable power supply shall have an AC Power Loss Delay option. If this option is utilized and the addressable power supply experiences an AC power loss, reporting of the incident to the FACP will be delayed. A delay time of eight or sixteen hours shall be Dip-switch selected.
9. The addressable power supply shall have an option for Canadian Trouble Reporting and this option shall be Dip-switch selectable.
10. The addressable power supply mounts in either the FACP backbox or its own dedicated surface mounted backbox with cover.
11. Each of the power supply's four output circuits shall be DIP-switch selected for Notification Appliance Circuit or General Purpose 24 VDC power. Any output circuit shall be able to provide up to 2.5 amps of 24 VDC power.
12. The addressable power supply's output circuits shall be individually supervised when they are selected to be either a Notification Appliance Circuit when wired Class "A" or by the use of and end-of-line resistor. When the power supply's output circuit is selected as General 24VDC power, the circuit shall be individually supervised when an end-of-line relay is used.
13. When selected for Notification Appliance Circuits, the output circuits shall be individually DIP-switch selectable for Steady, March Time, Dual Stage or Temporal.
14. When selected as a Notification Appliance Circuit, the output circuits of the addressable power supply shall have the option to be coded by the use of a universal zone coder.
15. The addressable power supply shall interface and synchronize with other power supplies of the same type. The required wiring to interface multiple addressable power supplies shall be a single unshielded, twisted pair wire.
16. An individual or multiple interfaced addressable power supplies shall have the option to use an external charger for battery charging. Interfaced power supplies shall have the option to share backup battery power.

K. Field Charging Power Supply (FCPS)

The FCPS is a device designed for use as either a remote 24 volt power supply or used to power Notification Appliances.

1. The FCPS shall offer up to 6.0 amps (4.0 amps continuous) of regulated 24 volt power. It shall include an integral charger designed to charge 7.0 amp hour batteries and to support 60 hour standby.
2. The Field Charging Power Supply shall have two input triggers. The input trigger shall be a Notification Appliance Circuit (from the fire alarm control panel) or a relay. Four outputs (two Style Y or Z and two style Y) shall be available for connection to the Notification devices.
3. The FCPS shall include an attractive surface mount backbox.
4. The Field Charging Power Supply shall include the ability to delay the AC fail delay per NFPA requirements.
5. The FCPS include power limited circuitry, per 1995 UL standards.

L. System Circuit Supervision

1. The FACP shall supervise all circuits to intelligent devices, transponders, annunciators and peripheral equipment and annunciate loss of communication with these devices. The CPU shall continuously scan above devices for proper system operation and upon loss of response from a device shall sound an audible trouble, indicate which device or devices are not responding and print the information in the history buffer and on the printer.
2. Transponders that lose communication with the CPU shall sound an audible trouble and light an LED indicating loss of communications.
3. Sprinkler system valves, standpipe control valves, PIV, and main gate valves shall be supervised for off-normal position.
4. All speaker and emergency phone circuits shall be supervised for opens and shorts. Each transponder speaker and emergency phone circuit shall have an individual ON/OFF indication (green LED).

M. Field Wiring Terminal Blocks

1. All wiring terminal blocks shall be the plug-in/removable type and shall be capable of terminating up to 12 AWG wire. Terminal blocks that are permanently fixed to the PC board are not acceptable.

N. Controls with associated LED Indicators:

1. Speaker Switches/Indicators

    a. The speaker circuit control switches/indicators shall include visual indication of active and trouble status for each speaker circuit in the system.
    b. The speaker circuit control panel shall include switches to manually activate or deactivate each speaker circuit in the system.

2. Emergency Two-Way Telephone Control Switches/Indicators

    a. The emergency telephone circuit control panel shall include visual indication of active and trouble status for each telephone circuit in the system.

b. The telephone circuit control panel shall include switches to manually activate or deactivate each telephone circuit in the system.

O. Remote Transmissions:

1. Provide local energy or polarity reversal or trip circuits as required.
2. The system shall be capable of operating a polarity reversal or local energy or fire alarm transmitter for automatically transmitting fire information to the fire department.
3. Provide capability and equipment for transmission of zone alarm and trouble signals to remote operator's terminals, system printers and annunciators.
4. Transmitters shall be compatible with the systems and equipment they are connected to such as timing, operation and other required features.

P. System Expansion:

Design the main FACP and required components so that the system can be expanded in the future (to include the addition of twenty percent more circuits or zones) without disruption or replacement of the existing control panel. This shall include hardware capacity, software capacity and cabinet space.

Q. Field Programming

1. The system shall be programmable, configurable and expandable in the field without the need for special tools, laptop computers, or other electronic interface equipment. There shall be no firmware changes required to field modify the system time, point information, equations, or annunciator programming/information.
2. It shall be possible to program through the standard FACP keyboard all system functions.
3. All field defined programs shall be stored in non-volatile memory.
4. Two levels of password protection shall be provided in addition to a key-lock cabinet. One level shall be used for status level changes such as point/zone disable or manual on/off commands (Building Manager). A second (higher-level) shall be used for actual change of the life safety program (installer). These passwords shall be five (5) digits at a minimum. Upon entry of an invalid password for the third time within a one minute time period an encrypted number shall be displayed. This number can be used as a reference for determining a forgotten password.
5. The system programming shall be "backed" up via an upload/download program, and stored on compatible removable media. A system back-up disk shall be completed and given in duplicate to the building owner and/or operator upon completion of the final inspection. The program that performs this function shall be "non-proprietary", in that, it shall be possible to forward it to the building owner/operator upon his or her request.
6. The installer's field programming and hardware shall be functionally tested on a computer against known parameters/norms which are established by the FACP manufacturer. A software program shall test Input-to-Output correlations, device Type ID associations, point associations, time equations, etc. This test shall be performed on an IBM-compatible PC with a verification software package. A report shall be generated of the test results and two copies turned in to the engineer(s) on record.

R. Specific System Operations

1. Smoke Detector Sensitivity Adjust: Means shall be provided for adjusting the sensitivity of any or all analog intelligent smoke detectors in the system from the system keypad or from

the keyboard of the video terminal. Sensitivity range shall be within the allowed UL window.

2. Alarm Verification: Each of the Intelligent Addressable Smoke Detectors in the system may be independently selected and enabled to be an alarm verified detector. The alarm verification function shall be programmable from 0 to 60 seconds and each detector shall be able to be selected for verification during the field programming of the system or anytime after system turn-on. Alarm verification shall not require any additional hardware to be added to the control panel. The FACP shall keep a count of the number of times that each detector has entered the verification cycle. These counters may be displayed and reset by the proper operator commands.

S. System Point Operations:

1. Any addressable device in the system shall have the capability to be enabled or disabled through the system keypad or video terminal.
2. System output points shall be capable of being turned on or off from the system keypad or the video terminal.
3. Point Read: The system shall be able to display the following point status diagnostic functions without the need for peripheral equipment. Each point shall be annunciated for the parameters listed:

    a. Device Status.
    b. Device Type.
    c. Custom Device Label.
    d. Software Zone Label.
    e. Device Zone Assignments.
    f. Analog Detector Sensitivity.
    g. All Program Parameters.

4. System Status Reports: Upon command from an operator of the system, a status report will be generated and printed, listing all system statuses:
5. System History Recording and Reporting: The fire alarm control panel shall contain a history buffer that will be capable of storing up to 4000 system events. Each of these events will be stored, with time and date stamp, until an operator requests that the contents be either displayed or printed. The contents of the history buffer may be manually reviewed; one event at a time, and the actual number of activations may also be displayed and or printed. History events shall include all alarms, troubles, operator actions, and programming entries.
6. The history buffer shall use non-volatile memory. Systems which use volatile memory for history storage are not acceptable.
7. Automatic Detector Maintenance Alert: The fire alarm control panel shall automatically interrogate each intelligent system detector and shall analyze the detector responses over a period of time.
8. If any intelligent detector in the system responds with a reading that is below or above normal limits, then the system will enter the trouble mode, and the particular Intelligent Detector will be annunciated on the system display, and printed on the optional system printer. This feature shall in no way inhibit the receipt of alarm conditions in the system, nor shall it require any special hardware, special tools or computer expertise to perform.
9. The system shall include the ability (programmable) to indicate a "pre-alarm" condition. This will be used to alert maintenance personal when a detector is at 80% of its alarm threshold in a 60 second period.

2.4. SYSTEM COMPONENTS:

A. Speakers:

1. All speakers shall operate on 25 VRMS or with field selectable output taps from 0.5 to 2.0 Watts.
2. Speakers in corridors and public spaces shall produce a nominal sound output of 84 dBA at 10 feet (3m).
3. Frequency response shall be a minimum of 400 HZ to 4000 HZ.
4. The back of each speaker shall be sealed to protect the speaker cone from damage and dust.

B. Audible/Visual Combination Devices:

1. Shall meet the applicable requirements of Section A listed above for audibility.
2. Shall meet the requirements of Section B listed above for visibility.

C. Programmable Electronic Sounders:

1. Electronic sounders shall operate on 24 VDC nominal.
2. Electronic sounders shall be field programmable without the use of special tools, at a sound level of at least 90 dBA measured at 10 feet from the device.
3. Shall be flush or surface mounted as shown on plans.

D. Strobe lights shall meet the requirements of the ADA, UL Standard 1971, be fully synchronized, and shall meet the following criteria:

1. The maximum pulse duration shall be 2/10 of one second
2. Strobe intensity shall meet the requirements of UL 1971.
3. The flash rate shall meet the requirements of UL 1971.

E. Horn/Strobes:
1. Operate on 24 VDC
2. Have two selectable tone options of temporal 3 and non-temporal continuous pattern.
3. Have at least 2 audibility options
4. Maximum Pulse Duration: 0.2 second.
5. Strobe Intensity: UL 1971.
6. Flash Rate: UL 1971.
7. Strobe Candela Rating: Determine by positioning selector switch on back of device.

F. Manual Fire Alarm Stations

1. Manual fire alarm stations shall be non-code, non-breakglass type, equipped with key lock so that they may be tested without operating the handle.
2. Stations must be designed such that after an actual activation, they cannot be restored to normal except by key reset.
3. An operated station shall automatically condition itself so as to be visually detected, as operated, at a minimum distance of 100 feet (30.5 m) front or side.
4. Manual stations shall be constructed of high impact Lexan, with operating instructions provided on the cover. The word FIRE shall appear on the manual station in letters one half inch (12.7 mm) in size or larger.

G. Conventional Photoelectric Area Smoke Detectors

1. Photoelectric smoke detectors shall be a 24 VDC, two wire, ceiling-mounted, light scattering type using an LED light source.
2. Each detector shall contain a remote LED output and a built-in test switch.
3. Detector shall be provided on a twist-lock base.
4. It shall be possible to perform a calibrated sensitivity and performance test on the detector without the need for the generation of smoke. The test method shall test all detector circuits.
5. A visual indication of an alarm shall be provided by dual latching Light Emitting Diodes (LEDs), on the detector, which may be seen from ground level over 360 degrees. These LEDs shall flash at least every 10 seconds, indicating that power is applied to the detector.
6. The detector shall not go into alarm when exposed to air velocities of up to 3000 feet (914.4 m) per minute.
7. The detector screen and cover assembly shall be easily removable for field cleaning of the detector chamber.
8. All field wire connections shall be made to the base through the use of a clamping plate and screw.

H. Conventional Ionization Type Area Smoke Detectors

1. Ionization type smoke detectors shall be a two wire, 24 VDC type using a dual unipolar chamber.
2. Each detector shall contain a remote LED output and a built-in test switch.
3. Detector shall be provided on a twist-lock base.
4. It shall be possible to perform a calibration sensitivity and performance test on the detector without the need for the generation of smoke.
5. A visual indication of an alarm shall be provided by dual latching Light Emitting Diodes (LEDs) over 360 degrees, on the detector, which may be seen from ground level. This LED shall flash every 10 seconds, indicating that power is applied to the detector.
6. The detector shall not alarm when exposed to air velocities of up to 1,200 feet (365.76 m) per minute. The detector screen and cover assembly shall be easily removable for field cleaning of the detector chamber.
7. All field wire connections shall be made to the base through the use of a clamping plate and screw.

I. Duct Smoke Detectors

Duct smoke detectors shall be a 24 VDC type with visual alarm and power indicators, and a reset switch. Each detector shall be installed upon the composite supply/return air ducts(s), with properly sized air sampling tubes.

J. Projected Beam Detectors

1. The projected beam type shall be a 4-wire 24 VDC device.
2. The detector shall be listed to UL 268 and shall consist of a separate transmitter and receiver capable of being powered separately or together.
3. The detector shall operate in either a short range (30' - 100') or long range (100' - 330') mode.
4. The temperature range of the device shall be -22 degrees F to 131 degrees F.
5. The detector shall feature a bank of four alignment LEDs on both the receiver and the

transmitter that are used to ensure proper alignment of unit without special tools.
6. Beam detectors shall feature automatic gain control which will compensate for gradual signal deterioration from dirt accumulation on lenses.
7. The unit shall be both ceiling and wall mountable.
8. The detector shall have the ability to be tested using calibrated test filters or magnet activated remote test station.

K. Automatic Conventional Heat Detectors

1. Automatic heat detectors shall have a combination rate of rise and fixed temperature rated at 135 degrees Fahrenheit (57.2 Celsius) for areas where ambient temperatures do not exceed 100 degrees (37.7 Celsius), and 200 degrees (93.33 Celsius) for areas where the temperature does not exceed 150 degrees (65.5 Celsius).
2. Automatic heat detectors shall be a low profile, ceiling mount type with positive indication of activation.
3. The rate of rise element shall consist of an air chamber, a flexible metal diaphragm, and a factory calibrated, moisture-proof, trouble free vent, and shall operate when the rate of temperature rise exceeds 15 degrees F (9.4 degrees C) per minute.
4. The fixed temperature element shall consist of a fusible alloy retainer and actuator shaft.
5. Automatic heat detectors shall have a smooth ceiling rating of 2500 square feet (762 square meters).

L. Waterflow Indicator:

1. Waterflow Switches shall be an integral, mechanical, non-coded, non-accumulative retard type.
2. Waterflow Switches shall have an alarm transmission delay time which is conveniently adjustable from 0 to 60 seconds. Initial settings shall be 30-45 seconds.
3. All waterflow switches shall come from a single manufacturer and series.
4. Waterflow switches shall be provided and connected under this section but installed by the mechanical contractor.
5. Where possible, locate waterflow switches a minimum of one (1) foot from a fitting which changes the direction of the flow and a minimum of three (3) feet from a valve.

M. Sprinkler and Standpipe Valve Supervisory Switches:

1. Each sprinkler system water supply control valve riser, zone control valve, and standpipe system riser control valve shall be equipped with a supervisory switch. Standpipe hose valves, and test and drain valves shall not be equipped with supervisory switches.
2. PIV (post indicator valve) or main gate valves shall be equipped with a supervisory switch.
3. The switch shall be mounted so as not to interfere with the normal operation of the valve and adjusted to operate within two revolutions toward the closed position of the valve control, or when the stem has moved no more than one-fifth of the distance from its normal position.
4. The supervisory switch shall be contained in a weatherproof aluminum housing, which shall provide a 3/4 inch (19 mm) conduit entrance and incorporate the necessary facilities for attachment to the valves.
5. The switch housing shall be finished in red baked enamel.
6. The entire installed assembly shall be tamper proof and arranged to cause a switch operation if the housing cover is removed, or if the unit is removed from its mounting.
7. Valve supervisory switches shall be provided and connected under this section and installed

by mechanical contractor.

a. This unit shall provide for each zone: alarm indications, using a red alarm and yellow trouble long-life LEDs and control switches for the control of fire alarm control panel functions. The annunciator will also have an ON-LINE LED, local piezo electric signal, local acknowledge/lamp test switch, and custom slide-in zone/function identification labels.
b. Switches shall be available for remote annunciation and control of output points in the system, system acknowledge, telephone zone select, speaker select, global signal silence, and global system reset within the confines of all applicable standards.

N. Alphanumeric LCD Type Annunciator:

1. The alphanumeric display annunciator shall be a supervised, remotely located back-lit LCD display containing a minimum of eighty (80) characters for alarm annunciation in clear English text.
2. The LCD annunciator shall display all alarm and trouble conditions in the system.
3. An audible indication of alarm shall be integral to the alphanumeric display.
4. The display shall be UL listed for fire alarm application.
5. It shall be possible to connect up to 32 LCD displays and be capable of wiring distances up to 6,000 feet from the control panel.
6. The annunciator shall connect to a separate, dedicated "terminal mode" EIA-485 interface. This is a two-wire loop connection and shall be capable of distances to 6,000 feet. Each terminal mode LCD display shall mimic the main control panel.
7. The system shall allow a minimum of 32 terminal mode LCD annunciators. Up to 10 LCD annunciators shall be capable of the following system functions: Acknowledge, Signal Silence and Reset, which shall be protected from unauthorized use by a key switch or password.
8. The LED annunciator shall offer an interface to a graphic style annunciator and provide each of the features listed above.

O. Interactive Display

1. The system shall be an ONYX FirstVision™.
2. The system shall operate on an UL listed Embedded platform operating at no less than 700 MHz on the Microsoft® Windows® XP Embedded platform.
3. The Embedded platform shall have: no less than 256 megabytes of RAM, a flash drive with no less than 1 Gigabytes of storage space, 100 Base-T Ethernet NIC card, and USB ports.
4. The Embedded platform shall have a minimum 17" touch screen display.
5. The Embedded platform shall come equipped with all necessary gateway modules to allow connection to the network it monitors as standard equipment.

a. A UL listed Ethernet Hub shall be provided for connection of multiple interactive displays and/or gateways.

P. Portable Emergency Telephone Handset Jack

1. Portable emergency telephone handset jacks shall be flush mounted on stainless steel plates as indicated on the plans. Jacks shall be approved for emergency telephone system application.
2. Insertion of a portable handset plug into a jack shall send a signal to the fire command cen-

ter, which shall audibly and visually indicate the on-line condition, and shall sound a "ring" indication in the handset.

3. The two-way emergency telephone system shall support a minimum of seven (7) handsets on line without degradation of the signal.

Q. Fixed Emergency Telephone Handset

1. The telephone cabinet shall be painted red and clearly labeled as "Emergency Telephone." The cabinets shall be located where shown on drawings.
2. The handset cradle shall have a switch connection so that lifting the handset off of the cradle shall send a signal to the fire command center, which shall audibly and visually indicate its on-line (off-hook) condition.
3. On activating the remote phone, the phone earpiece shall sound a telephone ring signal until the master handset is lifted.
4. The two-way emergency telephone system shall support a minimum of seven (7) handsets on line without degradation of the signal.

R. Universal Digital Alarm Communicator Transmitter (UDACT). The UDACT is an interface for communicating digital information between a fire alarm control panel and an UL-Listed central station.

1. The UDACT shall be compact in size, mounting in a standard module position of the fire alarm control cabinet. Optionally, the UDACT shall have the ability for remote mounting, up to 6,000 feet from the fire alarm control panel. The wire connections between the UDACT and the control panel shall be supervised with one pair for power and one pair for multiplexed communication of overall system status. Systems that utilize relay contact closures are not acceptable.
2. The UDACT shall include connections for dual telephone lines (with voltage detect), per UL/NFPA/FCC requirements. It shall include the ability for split reporting of panel events up to three different telephone numbers.
3. The UDACT shall be completely field programmable from a built-in keypad and 4 character red, seven segment display.
4. The UDACT shall be capable of transmitting events in at least 15 different formats. This ensures compatibility with existing and future transmission formats.
5. Communication shall include vital system status such as:

- Independent Zone (Alarm, trouble, non-alarm, supervisory)
- Independent Addressable Device Status
- AC (Mains) Power Loss
- Low Battery and Earth Fault
- System Off Normal
- 12 and 24 Hour Test Signal
- Abnormal Test Signal (per UL requirements)
- EIA-485 Communications Failure
- Phone Line Failure

6. The UDACT shall support independent zone/point reporting when used in the Contact ID format. In this format the UDACT shall support transmission of up to 2,040 points. This enables the central station to have exact details concerning the origin of the fire or response emergency.
7. AN IP Communicator option shall be available to interface to the UDACT and be capable of

transmitting signals over the internet/intranet to a compatible receiver.

2.5. SYSTEM COMPONENTS - ADDRESSABLE DEVICES

A. Addressable Devices - General

1. Addressable devices shall provide an address-setting means using rotary decimal switches. Addressable devices that require the address be programmed using a programming utility are not an allowable substitute.
2. Addressable devices shall use simple to install and maintain decade (numbered 0 to 15) type address switches. Devices which use a binary address or special tools for setting the device address, such as a dip switch are not an allowable substitute.
3. Detectors shall be Analog and Addressable, and shall connect to the fire alarm control panel's Signaling Line Circuits.
4. Addressable smoke and thermal detectors shall provide dual (2) status LEDs. Both LEDs shall flash under normal conditions, indicating that the detector is operational and in regular communication with the control panel, and both LEDs shall be placed into steady illumination by the control panel, indicating that an alarm condition has been detected. If required, the flashing mode operation of the detector LEDs can be programmed off via the fire control panel program.
5. The fire alarm control panel shall permit detector sensitivity adjustment through field programming of the system. Sensitivity can be automatically adjusted by the panel on a time-of-day basis.
6. Using software in the FACP, detectors shall automatically compensate for dust accumulation and other slow environmental changes that may affect their performance. The detectors shall be listed by UL as meeting the calibrated sensitivity test requirements of NFPA Standard 72, Chapter 7.
7. The detectors shall be ceiling-mount and shall include a separate twist-lock base which includes a tamper proof feature.
8. The following bases and auxiliary functions shall be available:

    a. Sounder base rated at 85 DBA minimum.
    b. Form-C Relay base rated 30VDC, 2.0A
    c. isolator base

9. The detectors shall provide a test means whereby they will simulate an alarm condition and report that condition to the control panel. Such a test may be initiated at the detector itself (by activating a magnetic switch) or initiated remotely on command from the control panel.
10. Detectors shall also store an internal identifying type code that the control panel shall use to identify the type of device (example: ION, PHOTO, THERMAL).

B. Addressable Manual Fire Alarm Box (manual station)

1. Addressable manual fire alarm boxes shall, on command from the control panel, send data to the panel representing the state of the manual switch and the addressable communication module status. They shall use a key operated test-reset lock, and shall be designed so that after actual emergency operation, they cannot be restored to normal use except by the use of a key.
2. All operated stations shall have a positive, visual indication of operation and utilize a key type reset.
3. Manual fire alarm boxes shall be constructed of Lexan with clearly visible operating in-

structions provided on the cover. The word FIRE shall appear on the front of the stations in raised letters, 1.75 inches (44 mm) or larger.

C. Intelligent Photoelectric Smoke Detector

1. The detectors shall use the photoelectric (light-scattering) principal to measure smoke density and shall, on command from the control panel, send data to the panel representing the analog level of smoke density.

D. Intelligent Laser Photo Smoke Detector

1. The intelligent laser photo smoke detector shall be a spot type detector that incorporates an extremely bright laser diode and an integral lens that focuses the light beam to a very small volume near a receiving photo sensor. The scattering of smoke particles shall activate the photo sensor.
2. The laser detector shall have conductive plastic so that dust accumulation is reduced significantly.
3. The intelligent laser photo detector shall have nine sensitivity levels and be sensitive to a minimum obscuration of 0.03 percent per foot.
4. The laser detector shall not require expensive conduit, special fittings or PVC pipe.
5. The intelligent laser photo detector shall support standard, relay, isolator and sounder detector bases.
6. The laser photo detector shall not require other cleaning requirements than those listed in NFPA 72. Replacement, refurbishment or specialized cleaning of the detector head shall not be required.
7. The laser photo detector shall include two bicolor LEDs that flash green in normal operation and turn on steady red in alarm.

E. Intelligent Ionization Smoke Detector

1. The detectors shall use the dual-chamber ionization principal to measure products of combustion and shall, on command from the control panel, send data to the panel representing the analog level of products of combustion.

F. Intelligent Multi Criteria Acclimating Detector

1. The intelligent multi criteria Acclimate detector shall be an addressable device that is designed to monitor a minimum of photoelectric and thermal technologies in a single sensing device. The design shall include the ability to adapt to its environment by utilizing a built-in microprocessor to determine its environment and choose the appropriate sensing settings. The detector design shall allow a wide sensitivity window, no less than 1 to 4% per foot obscuration. This detector shall utilize advanced electronics that react to slow smoldering fires and thermal properties all within a single sensing device.
2. The microprocessor design shall be capable of selecting the appropriate sensitivity levels based on the environment type it is in (office, manufacturing, kitchen etc.) and then have the ability to automatically change the setting as the environment changes (as walls are moved or as the occupancy changes).
3. The intelligent multi criteria detection device shall include the ability to combine the signal of the thermal sensor with the signal of the photoelectric signal in an effort to react hastily in the event of a fire situation. It shall also include the inherent ability to distinguish between a fire condition and a false alarm condition by examining the characteristics of the

thermal and smoke sensing chambers and comparing them to a database of actual fire and deceptive phenomena.

G. Intelligent Thermal Detectors

1. Thermal detectors shall be intelligent addressable devices rated at 135 degrees Fahrenheit (58 degrees Celsius) and have a rate-of-rise element rated at 15 degrees F (9.4 degrees C) per minute. It shall connect via two wires to the fire alarm control panel signaling line circuit.

H. Intelligent Duct Smoke Detector

1. The smoke detector housing shall accommodate either an intelligent ionization detector or an intelligent photoelectric detector, of that provides continuous analog monitoring and alarm verification from the panel.
2. When sufficient smoke is sensed, an alarm signal is initiated at the FACP, and appropriate action taken to change over air handling systems to help prevent the rapid distribution of toxic smoke and fire gases throughout the areas served by the duct system.

I. Advanced Multi-Criteria Intelligent Detector

1. The intelligent multi criteria IntelliQuad detector shall be an addressable device combining four sensing elements in a single sensing device providing the ability to detect all four major elements of a fire. The detector design shall allow sensitivity setting between 1% to 4% per foot obscuration.
2. The detector shall include a photoelectric sensing element, thermal sensing element, IR (Infrared) sensing element and CO (carbon monoxide) sensor.

J. Addressable Dry Contact Monitor Module

1. Addressable monitor modules shall be provided to connect one supervised IDC zone of conventional alarm initiating devices (any N.O. dry contact device) to one of the fire alarm control panel SLCs.
2. The IDC zone shall be suitable for Style D or Style B operation. An LED shall be provided that shall flash under normal conditions, indicating that the monitor module is operational and in regular communication with the control panel.
3. For difficult to reach areas, the monitor module shall be available in a miniature package and shall be no larger than 2-3/4 inch (70 mm) x 1-1/4 inch (31.7 mm) x 1/2 inch (12.7 mm). This version need not include Style D or an LED.
4. For multiple dry contact monitoring a module shall be available that provides 10 Style B or 5 Style D input circuits.

K. Two Wire Detector Monitor Module

1. Addressable monitor modules shall be provided to connect one supervised IDC zone of conventional 2-wire smoke detectors or alarm initiating devices (any N.O. dry contact device).
2. The IDC zone may be wired for Class A or B (Style D or Style B) operation. An LED shall be provided that shall flash under normal conditions, indicating that the monitor module is operational and in regular communication with the control panel.
3. For multiple 2-wire smoke detector circuit monitoring a module shall be available that pro-

vides 6 Style B or 3 Style D input circuits.

L. Addressable Control Module

1. Addressable control modules shall be provided to supervise and control the operation of one conventional NACs of compatible, 24 VDC powered, polarized audio/visual notification appliances.
2. The control module NAC may be wired for Style Z or Style Y (Class A/B) with a current rating of 2 Amps for Style Z and 3 Amps for Style Y. For speaker applications the module is rated for 50 watts at 25 or 70.7.
3. Audio/visual power shall be provided by a separate supervised power circuit from the main fire alarm control panel or from a supervised UL listed remote power supply.
4. The control module shall be suitable for pilot duty applications and rated for a minimum of 0.6 amps at 30 VDC.
5. For multiple circuit control a module shall be available that provides 6 Style B or 3 Style D control circuits.

M. Addressable Relay Module

1. Addressable Relay Modules shall be available for HVAC control and other building functions. The module shall provide two form C relays rated at up to 3 Amps resistive and up to 2.0 Amps inductive. The relay coil shall be magnetically latched to reduce wiring connection requirements, and to insure that 100% of all auxiliary devices energize at the same time on the same pair of wires.
2. For multiple relay control a module shall be available that provides 6 programmable Form-C relays.

N. Addressable Releasing Control Module

1. An addressable FlashScan releasing module shall be available to supervise and control compatible releasing agent solenoids.
2. The module shall operate on a redundant protocol for added protection.
3. The module shall be configurable for Style Z or Style Y (Class A/B) and support one 24 volt or two 12 volt solenoids.

O. Isolator Module

1. Isolator modules shall be provided to automatically isolate wire-to-wire short circuits on an SLC Class A or Class B branch. The isolator module shall limit the number of modules or detectors that may be rendered inoperative by a short circuit fault on the SLC loop segment or branch. At least one isolator module shall be provided for each floor or protected zone of the building.
2. If a wire-to-wire short occurs, the isolator module shall automatically open-circuit (disconnect) the SLC. When the short circuit condition is corrected, the isolator module shall automatically reconnect the isolated section.
3. The isolator module shall not require address-setting, and its operations shall be totally automatic. It shall not be necessary to replace or reset an isolator module after its normal operation.
4. The isolator module shall provide a single LED that shall flash to indicate that the isolator is operational and shall illuminate steadily to indicate that a short circuit condition has been detected and isolated.

P. Smoke Control Annunciator

1. On/Auto/Off switches and status indicators (LEDS) shall be provided for monitoring and manual control of each fan, damper, HVAC control unit, stairwell pressurization fan, and smoke exhaust fan. To ensure compliance the units supplied shall meet the following UL categories: UUKL, PAZX, UDTZ, QVAX as well as the requirements of NFPA 90A, HVAC, and NFPA 92A & 92B, Smoke Control. The control System shall be field programmable for either 90A operation or 92A/B operation to allow for future use and system expansion.
2. The OFF LED shall be Yellow, the ON LED shall be green, the Trouble/Fault LED shall be Amber/Orange for each switch. The Trouble/Fault indicator shall indicate a trouble in the control and/or monitor points associated with that switch. In addition, each group of eight switches shall have two LEDS and one momentary switch which allow the following functions: An Amber LED to indicate an OFF-NORMAL switch position, in the ON or OFF position; A Green LED to indicate ALL AUTO switch position; A Local Acknowledge/Lamp Test momentary switch.
3. Each switch shall have the capability to monitor and control two addressable inputs and two addressable outputs. In all modes, the ON and OFF indicators shall continuously follow the device status not the switch position. Positive feedback shall be employed to verify correct operation of the device being controlled. Systems that indicate on/off/auto by physical switch position only are not acceptable.
4. All HVAC switches (i.e., limit switches, vane switches, etc.) shall be provided and installed by the HVAC contractor.
5. It shall be possible to meet the requirements mentioned above utilizing wall mounted custom graphic.

Q. Serially Connected Annunciator Requirements

1. The annunciator shall communicate to the fire alarm control panel via an EIA 485 (multi-drop) two-wire communications loop. The system shall support two 6,000 ft. EIA-485 wire runs. Up to 32 annunciators, each configured up to 96 points, may be connected to the connection, for a system capacity of 3,072 points of annunciation.
2. An EIA-485 repeater shall be available to extend the EIA-485 wire distance in 3,000 ft. increments. An optional version shall allow the EIA-485 circuit to be transmitted over Fiber optics. The repeater shall be UL864 approved.
3. Each annunciator shall provide up to 96 alarm and 97 trouble indications using a long-life programmable color LED's. Up to 96 control switches shall also be available for the control of Fire Alarm Control Panel functions. The annunciator will also have an "ON-LINE" LED, local piezo sounder, local acknowledge and lamp test switch, and custom zone/function identification labels.
4. The annunciator may be field configured to operate as a "Fan Control Annunciator". When configured as "Fan Control," the annunciator may be used to manually control fan or damper operation and can be set to override automatic commands to all fans/dampers programmed to the annunciator.
5. Annunciator switches may be programmed for System control such as, Global Acknowledge, Global Signal Silence, Global System Reset, and on/off control of any control point in the system.
6. An optional module shall be available to utilize annunciator points to drive EIA-485 driven relays. This shall extend the system point capacity by 3,072 remote contacts.
7. The LED annunciator shall offer an interface to a graphic style annunciator and provide

each of the features listed above.

2.6. BATTERIES AND EXTERNAL CHARGER:

A. Battery:

1. Shall be 12 volt, Gell-Cell type.
2. Battery shall have sufficient capacity to power the fire alarm system for not less than twenty-four hours plus 5 minutes of alarm upon a normal AC power failure.
3. The batteries are to be completely maintenance free. No liquids are required. Fluid level checks refilling, spills and leakage shall not be required.

B. External Battery Charger:

1. Shall be completely automatic, with constant potential charger maintaining the battery fully charged under all service conditions. Charger shall operate from a 120/240-volt 50/60 hertz source.
2. Shall be rated for fully charging a completely discharged battery within 48 hours while simultaneously supplying any loads connected to the battery.
3. Shall have protection to prevent discharge through the charger.
4. Shall have protection for overloads and short circuits on both AC and DC sides.

PART 3.0 - EXECUTION

3.1. INSTALLATION:

A. Installation shall be in accordance with the NEC, NFPA 72, local and state codes, as shown on the drawings, and as recommended by the major equipment manufacturer.

B. All conduit, junction boxes, conduit supports and hangers shall be concealed in finished areas and may be exposed in unfinished areas. Smoke detectors shall not be installed prior to the system programming and test period. If construction is ongoing during this period, measures shall be taken to protect smoke detectors from contamination and physical damage.

C. All fire detection and alarm system devices, control panels and remote annunciators shall be flush mounted when located in finished areas and may be surface mounted when located in unfinished areas.

D. Manual Pull Stations shall be suitable for surface mounting or semi-flush mounting as shown on the plans, and shall be installed not less than 42 inches, nor more than 48 inches above the finished floor.

3.2. TYPICAL OPERATION:

A. Actuation of any manual station, smoke detector heat detector or water flow switch shall cause the following operations to occur unless otherwise specified:

1. Activate all programmed speaker circuits.
2. Actuate all strobe units until the panel is reset.
3. Light the associated indicators corresponding to active speaker circuits.
4. Release all magnetic door holders to doors to adjacent zones on the floor from that the

alarm was initiated.

5. Return all elevators to the primary or alternate floor of egress.
6. A smoke detector in any elevator lobby shall, in addition to the above functions, return all elevators to the primary or alternate floor of egress.
7. Smoke detectors in the elevator machine room or top of hoistway shall return all elevators in to the primary or alternate floor. Smoke detectors or heat detectors installed to shut down elevator power shall do so in accordance with ANSI A17.1 requirements and be coordinated with the electrical contractor.
8. Duct type smoke detectors shall, in addition to the above functions shut down the ventilation system or close associated control dampers as appropriate.
9. Activation of any sprinkler system low pressure switch or valve tamper switch shall cause a system supervisory alarm indication.

3.3. TEST:

A. Provide the service of a competent, factory-trained engineer or technician authorized by the manufacturer of the fire alarm equipment to technically supervise and participate during all of the adjustments and tests for the system.

B. Before energizing the cables and wires, check for correct connections and test for short circuits, ground faults, continuity, and insulation.

C. Close each sprinkler system flow valve and verify proper supervisory alarm at the FACP.

D. Verify activation of all flow switches.

E. Open initiating device circuits and verify that the trouble signal actuates.

F. Open signaling line circuits and verify that the trouble signal actuates.

G. Open and short notification appliance circuits and verify that trouble signal actuates.

H. Ground initiating device circuits and verify response of trouble signals.

I. Ground signaling line circuits and verify response of trouble signals.

J. Ground notification appliance circuits and verify response of trouble signals.

K. Check presence and audibility of tone at all alarm notification devices.

L. Check installation, supervision, and operation of all intelligent smoke detectors during a walk test.

M. Each of the alarm conditions that the system is required to detect should be introduced on the system. Verify the proper receipt and the proper processing of the signal at the FACP and the correct activation of the control points.

N. When the system is equipped with optional features, the manufacturer's manual should be consulted to determine the proper testing procedures. This is intended to address such items as verifying controls performed by individually addressed or grouped devices, sensitivity monitoring, verification functionality and similar.

3.4. FINAL INSPECTION:

A. At the final inspection a factory trained representative of the manufacturer of the major equipment shall demonstrate that the systems function properly in every respect.

3.5. INSTRUCTION:

A. Provide instruction as required for operating the system. Hands-on demonstrations of the operation of all system components and the entire system including program changes and functions shall be provided.

B. The contractor and/or the systems manufacturer's representatives shall provide a typewritten "Sequence of Operation."

PART 1 GENERAL

1.1. DESCRIPTION

A. This specification includes the furnishing, installation, connection, and testing of a PC based graphical facilities monitoring system; including Underwriters Laboratories (UL) listed application software and hardware complete and ready for operation.

B. The basic system shall be Underwriters Laboratories (UL) listed for the following:

1. No. 294 Access Control System Units, Fifth edition
2. No. 864 Control Units for Fire Protective Signaling Systems, Ninth edition
3. No. 1076 Proprietary Burglar Alarm Units and Systems, Fifth edition
4. No. 2017 General-Purpose Signaling Devices and Systems, first edition.

C. The system shall comply with requirements of NFPA Standard No. 72 for Proprietary Signaling System Receiving Unit except as modified and supplemented by this specification.

D. The system and associated equipment as specified herein shall be manufactured 100% by a single U.S. manufacturer (or division thereof).

1. The manufacturer shall be of the highest caliber and quality.

2. An ISO 9001 certified company shall manufacture the system.

1.2. SCOPE

A. A PC based graphical facilities monitoring system shall be installed in accordance to the project specifications and drawings.

B. The PC based graphical facilities monitoring system shall include, but not be limited to, optional touch screen or LCD wide screen monitor, one or more PC based graphical workstations, all input/output devices, network communications media, control equipment, auxiliary control devices, power supplies, and wire / fiber optic media as shown on the drawings and specified herein.

C. A supervised interface to NOTIFIER fire alarm control panels and NOTI-FIRE-NET shall be

made available.

D. The system shall employ an advanced technology network to monitor and control various fire, security, CCTV, and other facility information over an Echelon network.

E. The system shall include an interface to digital alarm communicator receivers for wide area network monitoring.

F. The system shall include an interface to card access systems for Access Control System monitoring.

G. The system shall include a device that allows remote viewing of the ONYXWorks system via the Internet or an intranet.

H. The system shall include a redundant interface for NOTI-FIRE-NET and Echelon networks for survivability.

I. The system shall allow a mixture of different technologies and manufacturers' equipment to operate on the same network and provide the operator with a consistent look and operation for all monitored equipment.

J. The system shall support a variety of topologies and media and shall provide an industry standard open architecture transport layer protocol.

K. Using standard RS-232 ports on existing and future monitoring and control systems used by the facility, the system shall connect to and interpret status change data transmitted from the ports and provide graphic annunciation, control, history logging and reporting as specified herein.

L. Proprietary network systems that cannot interface to existing addressable fire alarm systems at the facility or systems requiring the use of a "dry contact" or "voltage monitoring" interface shall be accepted.

M. The system shall be electrically supervised and monitor the integrity of all conductors.

N. The system shall include a Pager/Modem function that will provide the capability to send system information via a modem that is connected to a Workstations COMM port to a person's pager.

O. The system shall provide E-Mail functions capability to send system information via an email server to an email account.

P. The system shall utilize Boolean logic for automatic event response.

Q. The system shall have the facility to page directly from the workstation to any DVC installed on the network.

1.3. SUBMITTALS

A. General

1. Ten copies of all submittals shall be submitted to the architect, engineer, and owner for re-

view.
2. All references to manufacturer's model numbers and other pertinent information herein are intended to establish minimum standards of performance, function and quality.
3. Equivalent compatible equipment (UL listed) from other manufacturers may be considered as a substitution for the specified equipment as long as the minimum standards are met.
4. Substitute equipment proposed as equal to the equipment specified herein shall meet or exceed the minimum specified standard. For equipment other than that specified, the contractor shall supply proof that such substitute equipment equals or exceeds the features, functions, performance, and quality of the specified equipment.

B. Shop Drawings

1. Sufficient information, clearly presented, shall be included to determine compliance with drawings and specifications.
2. Wiring diagrams shall indicate all wiring for each item of equipment and the interconnections between the items of equipment.
3. Include manufacturer's name(s), model numbers, ratings, power requirements, equipment layout, device arrangement, complete wiring point-to-point diagrams, and conduit layouts.

C. Manuals

1. Submit simultaneously with the shop drawings & submittals; complete operating manuals and technical data sheets.
2. Provide a clear and concise description of operation that gives, in detail, the information required to properly operate the equipment and system.
3. Approvals shall be based on complete submissions of manuals together with shop drawings.
4. Provide a list of monitoring systems by model number including Fire Alarm, Security, CCTV, and Access Control systems currently UL listed to standard to operate with the proposed Facilities Monitoring System.

D. Certifications

1. Together with the shop drawing submittal, submit a certification from the major equipment manufacturer indicating that the proposed supervisor of installation and the proposed performer of contract maintenance is an authorized representative of the major equipment manufacturer and factory trained on all equipment contained in the submittal. Include names and addresses in the certification.
2. Provide NICET Certification documentation for factory authorized field technicians performing field final connections and system programming.

E. Applicable Publications

The publications listed below form a part of this specification. The publications are referenced in text by the basic designation only.

1. NFPA No. 70 - National Electric Code (NEC).
2. NFPA No. 72-2002 - National Fire Alarm Code.

3. UL No. 50 - Cabinets and Boxes.
4. UL No. 294 - Access Control System Units.

5. UL No. 864 - Control Units for Fire Protective Signaling Systems.
6. UL No. 1076 - Proprietary Burglar Alarm Units and Systems.
7. UL No. 1481 - Power Supplies for Fire Protective Signaling Systems.

8. Local and State Building Codes.
9. All requirements of the Authority Having Jurisdiction (AHJ).

F. Approvals. The system shall have the following listings:

1. UL No. 864 Control Units for Fire Protective Signaling Systems, Ninth edition
2. UL No. 1076 Proprietary Burglar Alarm Units and Systems, Fifth edition
3. UL No. 294 Access Control System Units, Fifth edition

4. ULC Control Units for Fire Alarm Systems

5. California State Fire Marshal (CSFM)

1.4. GUARANTY

A. All work performed and all material and equipment furnished under this contract shall be free from defects and shall remain so for a period of at least one (1) year from the date of acceptance. The full cost of maintenance, labor, and materials required to correct any defect during this one-year period shall be included in the submittal bid.

1.5. WORKSTATION PERFORMANCE

A. The network will interface and report the individually monitored system's status via a user-friendly Graphical User Interface (GUI) based software workstation.

B. The software shall operate under Microsoft® Windows® XP Professional as manufactured by Microsoft Corporation.

C. The GUI based software must be capable of graphically representing each facility being monitored with floor plans and icons depicting the actual locations of the various systems; and / or sensors' locations as well as view the system events in text mode.

D. The software shall use a 1024 pixels X 768 pixels GUI display capable of showing a large primary floor plan display, a key map representative of a larger view of the primary display and its relationship to the facility being monitored, the current operator, number of fire, supervisory, pre-alarms, troubles, and security events within the network as well as outstanding events and acknowledged events.

E. The software shall have the capacity of at least 1,000 screens / floor plans or as dictated by hard drive space and installed VIDEO and RAM memory for efficient operation.

F. The workstation shall have the ability to support graphic printing of all data including graphical floor plans, system activity, history, and guidance text. A Windows® compatible printer shall be supported for the graphics and report printer options.

G. The workstation software shall permit automatic navigation to the screen containing an icon that

represents the system or sensor in the event of an off-normal condition.

H. The system/sensor icon shall indicate the type of off-normal condition, flash, and change to the color associated with the off-normal condition (e.g., RED for ALARM and YELLOW for TROUBLE).

I. The software shall allow the attachment of text (TXT) files, sound (WAV) files, image (BMP) files, and video (AVI) files to each system or sensor icon allowing additional information to be provided to the system operator for responding to the off-normal condition. The software must have the ability for an attachment for each major event type per device.

J. The software shall allow the importation of externally developed floor plans in Windows Metafile (WMF), JPEG (JPG), Graphics Interchange Format (GIF) and Bitmap (BMP) format.

K. The software shall provide automatic navigation to the screen containing the icon of any system or sensor when an event is initially annunciated. In addition, operator navigation to screens containing outstanding events shall be accomplished by "clicking on" the event from either the acknowledged or unacknowledged event.

L. History Manager. The software shall contain a History Manager, which shall record all system events with a time and date stamp as well as the current system operator's name.

1. The system shall provide the ability to store all off-normal events experienced by the various sub-systems that are monitored by the system.
2. All events shall be recorded with a time and date stamp and the system operator shall be provided with the ability to log a pre-defined response or a custom comment for each off-normal event and have that comment stored in the history file with the time, date and operator name.
3. Provide for the ability to conduct searches and generate subsequent reports, based on all events for a single system / device address, a specific node, a specific type of off-normal condition and date range (mm/dd/yy to mm/dd/yy) or combinations of these search parameters. The number of entries in the history file that match the determined search criteria will be displayed.
4. The History Manager shall signal a need to back-up the history file at 100,000 events and then remind the operator at intervals of 100 events thereafter.
5. It shall be possible to pre-select data fields for reporting and then saving the report as a template. It shall also be possible to schedule the pre-defined report to print at a designated time.
6. The History Manager shall provide the operator the ability to select the number of days to back-up history.

M. Alarm Monitoring. The system shall provide for continuous monitoring of all off-normal conditions regardless of the current activity displayed on the screen.

1. If an operator is viewing the history of a sub-system and an alarm condition should occur, the system shall automatically navigate to the graphic screen showing the area where the off-normal event is occurring.
2. The system shall prioritize all off-normal events as defined by National Fire Alarm Code® 72 into the following categories: fire alarms, troubles, supervisory alarms, pre-alarms and security alarms.
3. The system shall display a running count of all events by type in an alarm summary win-

dow. The alarm summary window shall include at least five counters, defaulted to Alarm, Pre-Alarm, Trouble, Security, and Supervisory events.

4. The system shall show a running list of all unacknowledged events and acknowledged events and allow the system operator to acknowledge an event by "double-clicking" on that event in the Unacknowledged Events box. The Unacknowledged and Acknowledged Events boxes shall contain an abbreviated description of the off-normal condition.
5. The details of the condition may be viewed by selecting event in the unacknowledged events box.
6. The system shall allow the attachment of user-definable text files, image files, video files, and sound files to each device / system monitored (for every event state) in order to facilitate the operators and response personnel's response to the off-normal condition.
7. The system shall record all events to the system's hard drive. A minimum of 100,000 events may be stored.

N. Reports & Logs:

1. The system shall provide for the ability to generate reports based on system history.
2. The system shall allow the system operator to enter custom comments up to 255 characters for each event and have those comments recorded in the system's history file.

O. Boolean Logic

1. An automated event response application shall be provided to automatically perform actions across the entire system based on network activity.
2. The event response application shall allow event responses (actions) based on predefined user conditions using simplified Boolean logic.
3. Actions shall be configured to be executed immediately or timed as required.

P. Control Aspects of System Software

1. The system shall have the ability to monitor and control the following NOTIFIER® Fire Alarm Panels using the Echelon Gateway, NFN Gateway, or Embedded Gateway interfaces: AFP-1010, AM2020, AFP-200, AFP-300/400, and ONYX® series control panels.
2. The Gateway interfaces shall have the ability to be constructed in a redundant configuration with either two Echelon Gateway computers monitoring the same nodes, two NFN Gateway computers monitoring the same nodes, or by having multiple Embedded Gateways on the same network, monitored by multiple workstation clients.
3. The system shall provide for the direct control of all outputs associated with Input / Output dry contact relay points on Network Input/Output Nodes (NIONs). In addition, the system shall have the ability to control and program a sub-system of Notifier AFP-1010, AM2020, or AFP-400 Fire Alarm Panel through a terminal mode window (ASCII terminal type connection) interface to microprocessor-based sub-systems via an RS 232 serial NION if available as an ancillary feature.
4. Discrete I/O NION interfaces allow the system operator to initiate a change of state for the associated dry contacts.
5. A scheduling utility shall be included with the workstation to configure the I/O points on these NIONs for automated activate/deactivate, and Arm/Disarm (depending on device type) status.
6. The system shall provide an NFN Gateway interface for direct connections to the Notifier Network containing the following panels: AFP-1010, AM2020, AFP-200, and the AFP-300/400 as well as ONYX® series control panels.

7. The system shall provide an Embedded Gateway interface for remote connections of the Notifier Network containing the following panels via Ethernet (TCP/IP infrastructure): AFP-1010, AM2020, AFP-200, and the AFP-300/400 as well as ONYX® series control panels.
8. The NFN Gateway and the Embedded Gateway will:

    a. Serves as a bridge between an ONYXWorks® Workstation and a NFN network, and it uses that Workstation as the primary reporting station for the NFN network.
    b. Translates a NFN network's panel and device data into data that can be interpreted by the ONYXWorks® Workstation software application
    c. Monitors NFN networks using ARCNET network architecture.

9. The workstation shall provide configuration utilities for monitoring and control profiles. These profiles shall be user definable for distribution of monitoring and control allowances for operators per workstation.
10. Under no condition shall any sub-system be required to rely on the network for any data processing required to perform its particular function. Each individual sub-system shall be in effect "stand-alone" as to insure its continued operation should a disruption in communication with the system be experienced.

Q. The software shall be password protected and provide for the definition of security profiles for operator access control.

R. The software shall contain provision for defining monitoring profiles of pre-selected NIONs for monitoring. This shall include provision for status types within the selected NODES.

S. The software shall contain provision for defining control profiles of pre-selected NIONs for control.

1. The system administrator shall be provided means to select which signals can be controlled by selected Workstation.

T. The software shall support sending real-time off-normal event notifications to designated alphanumeric pagers.

U. The software shall support sending real-time off-normal event notifications to designated email addresses.

V. The software shall support live voice paging for mass notification to NOTIFIER voice evacuation system over Internet Protocol (IP).

W. The PC based graphical facilities monitoring system shall include a Configuration Tool that provides the following features:

1. Allows operators the ability to create and edit graphics
2. Set up Gateway Connections and define their nodes
3. Set system operating mode
4. Add and edit objects on screens
5. Configure colors and sounds for the status classes

PART 2 PRODUCTS

2.1. GENERAL

A. The product(s) shall be manufactured by as provided by NOTIFIER®. Model numbers specified are those of NOTIFIER® and are to establish the minimum standard of operating characteristics and quality.

B. Substitute equipment proposed as equal to the equipment specified herein shall meet or exceed the minimum specified standard. For equipment other than that specified, the contractor shall supply proof that such substitute equipment equals or exceeds the features, functions, performance, and quality of the specified equipment.

C. All equipment and components shall be new, and the manufacturer's current model. The materials, equipment and devices shall be tested and listed by a nationally recognized approval agency.

2.2. WORKSTATION

A. The system shall be an ONYXWorks™ Facilities Monitoring System.

B. The system shall operate on no less than an IBM compatible UL listed Intel Dual Core processor operating at 2.16 GHz on the Microsoft® Windows® XP Professional platform.

C. The workstation shall have: no less than 3.2 Gigabytes of RAM, two hard drives with no less than 160 Gigabytes of storage space, a minimum of 64 megabytes of video RAM, a CD-R/W for system backup, internal supervisory CPU watchdog board with audible annunciator, 100 Base-T Ethernet NIC card, a 104 key keyboard, and a mouse type pointing device with a center wheel.

D. The workstation shall come equipped with all necessary gateway modules to allow connection to the network(s) it monitors as standard equipment. All workstations shall support Ethernet communications when multiple workstations are required.

E. The workstation shall support an SVGA monitor and be supplied with a 19" flat screen LCD monitor with integrated speakers or an optional touch screen monitor.

F. The computer shall be capable of networking to additional computers and these computers shall be capable of operating as workstations and/or gateways for local area or wide area networks.

G. Alarm annunciation shall appear on all workstations and may be silenced at each local workstation.

1. Only one workstation and operator shall be in command of the system for global alarm acknowledgement at any time.

2.3. PRINTER

A. Support one or more Windows® compatible printers to be located and connected each workstation for graphics and report printing.

B. Support one model PRN-6, 80-column dot matrix tractor feed industrial grade printer for event

and date-stamped printouts of off-normal events and status changes per workstation.

2.4. NOTIFIER® MONITORING NETWORK

A. The NOTIFIER® monitoring network shall consist of a network based on proven peer-to-peer technology and support standard NCM cards and High Speed NCM cards.

B. The network consisting of the standard NCM cards shall have the ability to use multi-mode fiber optic cable, wire (twisted pair copper media in a style 4 or style 7 configuration), or combination wire/fiber communications with support of up to 103 nodes with a data communications rate of 312,500 BPS.

1. Wire networks shall support 12 AWG, 1 Pair Shielded to 24 AWG, 4 Pair Unshielded following the manufacturer's guidelines.
2. Fiber optic networks shall support 62.5/125µm cable (8dB limit) or 50/125µm cable (4.2dB limit).
3. Wire to fiber conversions cards.

C. The network consisting of the High Speed NCM cards shall have the ability to use fiber optic cable (both multi-mode and single-mode), wire (twisted pair copper media in a style 4 or style 7 configuration), or combination wire/fiber communications with support of up to 200 nodes with a data communications rate of 12MB (wire) or 100MB (fiber).

1. Wire networks shall support 12 AWG, 1 Pair Shielded to 24 AWG, 4 Pair Unshielded following the manufacturer's guidelines.
2. Fiber optic networks shall support 62.5/125µm cable (10dB limit), 50/125µm cable (6.5dB limit), or 9/125 µm cable (30dB limit).
3. Wire to fiber conversions cards.

2.5. INTEGRATION NETWORK

A. The integration network shall be capable of monitoring a minimum of 100 nodes (NIONs and routers) on an Echelon Gateway consisting of, but not limited to:

1. Intelligent or conventional fire alarm control panels.
2. Competitor's intelligent or conventional fire alarm control panels.

B. Local area networks shall consist of a free topology network using twisted pair copper media in a bus, star, or T-tap at 78 Kilo baud. Transmit/receive twin fiber (multi-mode 62.5/125 µm) strand FT-10 point-to-point shall be available. Wide area networks shall be supported by the use of network expansion routers.

1. Free topology (FT-10 style) wire network run allows multiple T-taps within a 1,500-foot (457.2 m) radius; 8,000 foot (2438.4 m) point-to-point using twisted pair; or 6,000-foot (1828.8 m) bus topology.
2. Free topology (FT-10 style) fiber network can also use fiber-optic cabling that operates at 78.5 Kbaud.

C. Provide routers, repeaters or bridges where required to increase distance, alter network configuration or change media or to extend to remote facilities over alternate communications media including UL listed dial-up PSTN telephone, leased line, multi-mode fiber or Ethernet connectivity.

1. Dial-up units shall dial a local number and stay connected. Upon loss of carrier, a supervisory alarm shall be indicated at the workstation and the units shall automatically dial the number to re-connect.
2. Network expansion routers shall support public switched telephone circuits, two-wire or four-wire leased lines, and CAT5 Ethernet networks.

D. Network interface software shall be by the same manufacturer as the hardware portion of this specification.

E. The integration network shall utilize Network Input / Output Nodes (NIONs) to interface between the individual panels' systems to be monitored by the integration network. The NIONs shall act as a translator from the panel communications protocol to the integration network protocol as well as serve as a transceiver from the building system panel to the integration network.

1. NIONs shall be available in configurations that will allow transparent communications via RS-232 serial data ports with intelligent fire alarm control panels, security systems, and CCTV systems.
2. NIONs shall be available in configurations that will allow monitoring of dry contacts, switched voltages, conventional security devices, access control panels, and conventional fire alarm control panels using scheduled, automated, and manual control.
3. NIONs shall be UL listed to Standard 864 and 1076 and be provided with their own enclosure or be available in chassis mount configurations.
4. NIONs shall operate at 24 VDC and obtain their power from the monitored control panel or a UL listed battery backed auxiliary power supply. All terminals shall be transient protected to 2400V and LEDs shall be provided for status, service and diagnostics.

F. Digital Alarm Communicator Receiver Network

1. The system shall provide a digital alarm communicator receiver (DACR) gateway with a RS-232 interface to the following digital alarm communicator receivers for wide area event reporting: Ademco 685, Silent Knight 9500 and 9800, Radionics D6600, and Teldat Visor Alarm.
2. Each gateway shall support up to 10 digital alarm communicator receivers for alarm and trouble information from reporting devices.

G. Access Control System Network

1. The system shall provide a WIN-PAK PRO 2005 and WIN-PAK PRO SE/PE gateway with a TCP/IP interface to the WIN-PAK PRO 2005 and WIN-PAK PRO SE/PE Access Control System. The gateway shall permit monitoring and control of N-1000 and PRO-2200 panels over a WIN-PAK PRO 2005 and WIN-PAK PRO SE/PE Access Control System.
2. The software shall display access control related events and general events as they appear in the system. Through the software, it shall be possible for any event to be selected for viewing extended information. If the event relates to a specific cardholder, that cardholder's information can be viewed as well.
3. It shall be possible to provide control of any door or output point configured on N-1000 and PRO-2200, allowing locking and unlocking, activation of outputs, or pulse/momentary unlock operations.

H. Remote Access System Network

1. The ONYXWorks Web Server shall be a web-based device that allows remote viewing of the ONYXWorks system via the Internet or intranet.
2. The interface will allow users to view the history of FACP, event status, device properties, and other information based on access permission defined by the system administrator.
3. The Web Server will utilize an IP-based wire Ethernet connection when interfacing to the Internet/intranet.
4. The ONYXWorks Web Server shall be compatible with the following types of networks:

    a. NOTI-FIRE-NET
    b. Echelon
    c. DACR
    d. Card Access

5. The ONYXWorks Web Server shall provide the following features:

    a. Support 10 simultaneous users
    b. Employee standard IP over an Ethernet connection
    c. Support up to 128 user accounts
    d. Provide built-in password security and user access records
    e. Send up to 50 e-mails in response to any system event

I. Workstation Network:

1. Computers shall be networked using Ethernet supporting the use of TCP/IP protocol for local area systems.
2. The network shall be capable of supporting multiple clients (e.g., workstations, configuration applications, and automated response applications), Echelon Gateway, NFN Gateway, High Speed NFN Gateway, and ninety-nine (50) Embedded Gateways.
3. A UL listed Ethernet Hub must be supplied for connection of multiple workstations, gateways, clients, and/or network printers.
4. System shall be UL listed to communicate between clients and gateways over a business computer network (shared IP).

J. System Expansion. Additional software and hardware modules shall be currently available by the system manufacturer to provide for:

1. CCTV with on-screen Pan/Tilt/Zoom and live video on-screen.
2. Supported systems shall include the following CCTV switch manufacturers, Pelco, Burle/Phillips, and Vicon. The ability to support all listed CCTV switch units simultaneously on the same system shall be supported.

PART 3 EXECUTION

3.1. GENERAL

A. All equipment and components shall be installed in strict compliance with manufacturers' recommendations. Consult the manufacturer's installation manuals for all wiring & fiber optic diagrams, schematics, physical equipment sizes, etc., before beginning system installation. Refer to the riser/connection diagram for all specific system installation / termination / wiring data.

3.2. CONDUIT AND WIRE

A. Conduit shall be in accordance with the National Electrical Code (NEC), local and state requirements.

B. Where possible, all wiring & fiber optics shall be installed in conduit or raceway.

C. Cable must be separated from any open conductors of power, or class 1 circuits, and shall not be placed in any conduit, junction box or raceway containing these conductors, as per NEC Article 760-29.

D. All circuits shall be provided with transient suppression devices and the system shall be designed to permit simultaneous operation of all circuits without interference or loss of signals.

E. Conduit shall not enter the control equipment, or any other remotely mounted control panel equipment or back-boxes, except where conduit entry is specified by the FACP manufacturer.

F. All system wiring shall be new except as allowed herein and approved by the manufacturer for intended communications using NOTI-FIRE-NET or Echelon's LonWorks.

G. Wiring & fiber optics shall be in accordance with local, state and national codes (e.g., NEC Article 760) and as recommended by the manufacturer of the fire alarm system. Number and size of conductors & fiber optics shall be as recommended by the fire alarm system manufacturer.

H. All wire and cable shall be listed and/or approved by a recognized testing agency for use with a protective signaling system except as specified herein.

I. All communication wire to nodes or to computers shall consist of minimum manufacturer's recommendations and approved wire specification supporting speeds of 78Kps to 10mB/sec communications.

3.3. TERMINAL BOXES, JUNCTION BOXES, AND CABINETS

A. All boxes and cabinets shall be UL listed for their use and purpose.

B. The PC based workstations shall be connected to a separate dedicated branch circuit, maximum 20 amperes. This circuit shall be labeled at the main power distribution panel as FACILITIES MONITORING SYSTEM. PC workstation power wiring shall be 12 AWG and grounded securely to either a cold water pipe or grounding rod. Where required, a UL 864 listed UPS system shall be provided.

3.4. SYSTEM SETUP & CONFIGURATION

A. Provide the services of a factory trained and authorized technician to perform all system software modifications, upgrades or changes. Field technicians shall be NICET Level 1 (minimum) certified.

B. The factory trained technician shall install initial data and artwork at each workstation including:

C. Distribution of monitoring, control and security profiles as requested by owner.

D. Area diagrams, floor plans, key maps and screen titles.

E. Auto-navigation criteria.

F. Guidance text as provided by owner.

3.5. FINAL INSPECTION

A. At the final inspection a factory trained representative of the manufacturer of the major equipment shall demonstrate that the system function properly in every respect.

3.6. INSTRUCTION/TRAINING

A. Provide instruction as required for operating the system. Hands on demonstrations of the operation of all system components and the entire system including user-level program changes and functions shall be provided. A factory trained and certified representative shall provide instruction.

END OF SECTION 13852

SECTION 15000 - MECHANICAL GENERAL REQUIREMENTS

PART 1 - GENERAL

1.1 GENERAL

A. Drawings and general provisions of contract, including General and Supplementary Conditions, and Division 1 Specification Section apply to this and other sections of Division 15.

B. Before submitting his proposal, each bidder shall examine all plans and specifications relating to the work, visit the site(s) of the proposed project, and become fully informed of the extent and character of the work required.

1.2 REFERENCE STANDARDS

A. Perform all Division 15 work in strict accordance with the Laws and Regulations of the State of Texas, and County and City codes/ordinances having jurisdiction over the project.

1.3 COORDINATION

A. Coordinate work under this Division to avoid conflicts and to attain satisfactory and complementary systems.

B. Coordinate work under this Division with work under other Divisions to avoid conflicts and to allow for adequate installation, maintenance, and operating space. Obtain the Architect's approval for penetrations of other parts of the Work prior to affecting them.

C. Prepare coordination drawings in accordance with Division 1 to a scale of ¼"=1'-0" or larger; detailing major elements, components, and systems of mechanical equipment and materials in relationship with other systems, installations, and building components. Indicate locations where space is limited for installation and access and where sequencing and coordination of installations are of importance to the efficient flow if the work.

1.4 DEFINITIONS

Specific meanings used in Division 15 (variant forms are inferred):

A. Work: This project, or the reference part.

B. Provide:

1. Furnish and install, complete with necessary appurtenances.
2. "Provide" is implied throughout this Division unless language is specific.

C. Required: Required by the contract Documents.

D. Necessary: Necessary in order to obtain a finished system in satisfactory operating condition, and meeting all requirements.

E. Furnish: Procure and deliver, ready for installation, necessary and/or required.

F. Install: Receive, place securely, ready for connection to work specified elsewhere, and bring into satisfactory operating condition, as necessary and/or required.

G. Connect: Connect properly to mechanical work. This includes non-physical “connections” such as indirect waste drains.

H. Architect, Project Architect or Architect/Engineer Team.

1.5 SCOPE OF WORK

A. The work under this Division includes providing complete mechanical systems for the project.

B. All items of labor, material or equipment not required in detail by the specifications or plans, but incidental to, or necessary for the complete installation and proper operation of all phases of work described herein, or reasonably implied in connection therewith, shall be furnished as if called for in detail by the Contract Documents.

1.6 WORKMANSHIP

A. All labor shall be performed in a workmanlike manner by mechanics skilled in their particular trades. All installations shall be complete in both effectiveness and appearance whether finally enclosed or left exposed. The architect reserves the right to direct the removal or replacement of any item which in his opinion shall not present a reasonable neat or workmanlike appearance, providing that same can be properly installed in an orderly way.

1.7 MANUFACTURER’S INSTRUCTIONS

A. All equipment and devices shall be installed in accordance with the plans and specifications, manufacturer’s instructions and applicable codes. Contractor shall obtain written recommendations of installation and start-up instructions from material vendors and comply, unless otherwise required. Bring discrepancies between these instructions and project requirements to the attention of the Architect, and resolve prior to construction. Provide signed inspection report by manufacturer’s representative at system start-up to verify all is in compliant for product warranty.

1.8 WARRANTY

A. The contractor shall warranty his work against defective materials and workmanship for a period of 1-year from date of acceptance of the job.

1.9 TRAINING

A. Upon completion of the work and at a time designated by the Owner’s representative, provide a formal training session for the Owner’s operating personnel to include location, operation, and maintenance of all mechanical equipment and systems.

1.10 PERMITS AND FEES

A. Permits: Obtain special permits necessary for this portion of the Work.

B. Fees: Pay any fees associated with permits, required inspections, and permanent utility connections to this part of the work.

1.11 LICENSES

A. Work under this Division shall be performed by organizations and individuals holding a current license to perform such type of work by the authority having jurisdiction. “License” in this sense means any process, regardless of its appellation, which is normally mandated by the authority in order to perform such type of work within its jurisdiction. The stipulation of this paragraph applies even if the work is located physically on property owned or controlled by a higher authority. E.G., to work within the city limits of Corpus Christi, Texas, on a Federal project, State of Texas and City of Corpus Christi licenses which would be mandated to work on a private project shall be required even though the City and State may have no jurisdiction over the higher government.

B. In the event that the licensed organization loses its license or is unable to obtain one, or the licensed individual performing the work becomes unlicensed or deports the organization, notify Architect immediately in writing.

1.12 UTILITY COORDINATION

A. Permanent: Provide all ancillary work necessary to obtain utility connections. Pay connection fees. Arrange for connection in a timely manner. Coordinate time and arrangement of other work with the serving utility, and comply with utility standards.

B. Temporary: Refer to Division 1.

C. General: The contractor shall verify to his own satisfaction the location, elevation and availability of all utilities and services required, and shall adequately inform himself as to their relation to the work. The contractor shall also verify location, conduct all necessary tests, inspections, coordinate with owner’s representatives and utilities, and check or existing underground utilities and lines before ditching. Repair of any cut or damaged lines or utilities shall be the sole responsibility of the contractor.

1.13 LISTING AND LABELING

Materials required to be listed shall be listed and labeled for the particular service if a listing is available. Obtain and comply with the terms of listings. Listed material include.

A. NSF: Potable water and sanitary waste systems components.

B. UL: Electrical materials.

C. AMCA: Air moving devices and related accessory items.

D. ARI: HVAC equipment.

E. FM or UL: Hazardous fluid and fire protection system components.

F. FIA, FM or AGA: Fuel gas system components.

1.14 MATERIALS AND EQUIPMENT

A. All materials and equipment shall be new. Products shall be currently manufactured.

B. All materials and equipment shall be clearly marked, stamped or labeled for identification. Do not obscure nameplates. Where manufactures nameplates do not meet the requirements of the mechanical identification specification provide nameplates in accordance with the specification.

C. All products of similar type shall be provided by a single manufacturer throughout the project.

1.15 SUBMITTALS AND REVIEW

A. Contractor shall furnish to the Architect, within a reasonable time after award of contract, and prior to commencing any work, complete brochures in quadruplicate (plus quantity required by the Contractor) of all materials and equipment which the contractor proposes to furnish on the project. Data shall include descriptive literature, performance data, diagrams, capacity information, etc., to substantiate that proposed equipment will meet all of the requirements of the plans and specifications.

B. All data must be checked and any required changes noted thereon by the contractor, signed and dated prior to furnishing same to the Architect for approval. Contractor’s attention is directed that it is mandatory that he thoroughly review data prior to furnishing same to assure that equipment is in accordance with plans and specifications and to assure prompt return of the data.

C. Deviations: Specifically call to the attention of the Architect every proposed deviation from the Contract Document requirements. Failure to identify deviations as such constitutes a representation that all requirements are not met.

D. Review: Review of submittals shall not be constructed as releasing the Contractor from responsibility, but rather as a means to facilitate coordination of the work and the proper selection and installation of the products. All work shall be subject to final acceptance by the Architect at the completion of the project.

E. If above information is not provided complete as specified above and within the allocated time, all equipment shall be furnished exactly as specified without any substitutions.

1.16 SUBSTITUTIONS

A. Refer to the Conditions of the Contract.

B. Where one vendor is indicated for a product, it is to establish a level of quality and performance; provide a product equal to that product in all respects from a vendor of equivalent performance.

C. Where multiple vendors are indicated for a product, any of those vendors meeting the requirements may be submitted.

D. Some product specifications in this Division are of the Acceptable Manufacturer type. Vendors listed as Acceptable Manufacturers are acceptable as vendors. However, the product submitted is subject to review as being fully equivalent in detail to the basis of design.

E. Where multiple vendors are listed with product model numbers, each model and vendor is acceptable, provide all requirements are met. Model numbers are indicated to the extent believe necessary to identify a type and are not necessary completely.

F. The architectural/engineering team has designed the facility using requirements of the Basis of Design equipment. Any substitutions from the basis of design, which will require additional A/E design and/or coordination, shall include the cost of necessary redesign by professionals licensed in the respective disciplines and the approval of the professional of record.

1.17 DRAWINGS AND SPECIFICATIONS

A. These specifications are accompanied by Drawings. The Drawings and Specifications are complementary each to the other, and what is called for by one shall be as binding as if called for by both.

B. The Drawings are generally diagrammatic. Lay out work at the site to conform to existing conditions; architectural, structural, mechanical, and electrical conditions; to avoid all obstructions; and to conform to details of installation as required. Provide an integrated satisfactorily operating installation. All necessary offsets in piping, fittings, duct, etc., required to avoid interferences between piping, equipment, architectural, and structural elements shall be provided by the Contractor. Provide all necessary routing and offsets to avoid conflict.

C. Verify and arrange that sufficient space is provided for the installation of proposed products and that adequate access will exist for service and maintenance of equipment. For this work, adequate access shall be defined as meaning that service personnel can access and maintain a piece of equipment without having to alter permanent construction. Further, for equipment located above ceilings, access shall be available within 3 feet pf ceiling opening or lay-in ceiling.

1.18 COMPLEMENTARY DOCUMENTS

A. Contract documents are complementary; requirements are not necessarily repetitively stated at each possible subject; consider that a requirement applies wherever applicable.

B. In the event of conflicting requirements in different parts of the Documents, the more expensive shall be presumed to apply, unless the Architect clarifies the requirement in a less expensive manner and waives the more expensive requirement in writing.

Since codes and standards are incorporated by reference, a particular conflict may appear in that a reference may use language that implies that a particular requirement in the Construction Documents is waived under the reference. This is not the case, unless specifically so clarified by the Architect. Generally, the specific Drawings and Specifications take precedence over waivers in multi-purpose reference documents.

C. Because of licensure and workmanship requirements, persons performing the work are presumed to be familiar with applicable codes, ordinances, laws, regulations and standards. Therefore, details of materials, methods, arrangements and size contained in such publications are not necessarily replicated in the Contract Documents. This in no way deletes the requirement of the Contractor to comply. In the event of an apparent conflict between such publications and the Contract Documents, request clarification from the Architect prior to construction.

1.19 PROTECTION

A. All work, equipment and materials shall be protected at all times to prevent damage or breakage either in transit, storage, installation or testing. All openings shall be closed with caps or plugs during installation. All materials and equipment shall be covered and protected against dirt, water, chemicals or mechanical injury.

1.20 CUTTING AND PATCHING

A. All subcontractors shall notify the General Contractor sufficiently ahead of construction of any floor, walls, ceiling, roof, etc., of any openings that will be required for his work. All necessary cutting of walls, floors, partitions, ceilings, etc., as required for the proper installation of the work under this Contract shall be done at the Subcontractor’s expense in a neat and workmanlike manner.

1.21 DEMOLITION

A. It shall be the responsibility of the contractor to see that all demolition and remodeling work involving his trade is accomplished in a manner and completeness to provide the appearance of new construction work.

B. Coordinate with other divisions before commencing work.

C. Abandoned air conditioning units shall be removed and disposed of off site in a legal manner.

D. All abandoned and/or otherwise unused piping shall be securely capped using materials of the same composition as the original piping.

1.22 RECORD DOCUMENTS

A. Drawings: The Contractor shall maintain and update daily a set of “blueline” prints in the Field Office for the sole purpose of recording “installed” conditions. Revise the drawings to reflect

as-built conditions, including all addenda, change orders, final shop drawing reviews, and field routing. Underground utilities shall be dimensionally located relative to readily accessible and identifiable permanent reference points, with accurate slope and elevation indicated. Submit prints for review. Revise, certify accuracy, and provide two final sets to the Architect.

B. Owner's Manual: Prior to final acceptance, provide two bound volumes to the Architect. Index by subject. Include corrected submittals and shop drawings that reflect final review comments; installation, operation and maintenance instructions, parts lists, wiring diagrams, and piping diagrams; warranties.

1.23 INSPECTION, OBSERVATION, AND TESTING

A. Cooperate with Architect's representative and authorities having jurisdiction. Provide complete access to the work at reasonable times.

B. Cover-up: Prior to covering up work, or conducting observed tests, request observation as appropriate. Provide adequate advance notice defined as a minimum of five working days. In some cases the Architect's representative may waive observation; otherwise arrange for observed construction and testing prior to cover-up. Should minimize required notice not to be provided and the contractor covers up work requiring observation, such work shall be uncovered at contractor's expense.

C. Pre-Testing: Self-inspect, pre-test, and remedy work prior to performing observed test.

D. Sectional Work: In circumstances where a requirement for phased construction or other considerations dictate sectional construction and/or testing, notify the Architect when construction begins on the first section of a system, and when the first section will be ready for observed testing, as well as subsequent sections. Test in the largest practical sections.

1.24 WORK PERFORMED UNDER OTHER DIVISIONS

A. Refer to Division 2 for piped utilities beyond 5 feet from the building.

B. Refer to Division 16 for power wiring systems external to equipment and control panels; starters in motor centers; safety switches not integral to equipment or starters provided under Division 15.

C. Refer to Division 14 for kitchen, laboratory, medical and like equipment.

1.25 REFERENCE TO OTHER DIVISIONS

A. Refer to Division 16 for additional material requirements of electrical components provided under Division 15, such as loose starters, wiring and devices integral to equipment.

B. Refer to Division 2 for additional requirements governing excavation and backfill, supplemental to the requirements stated in this Division 15.

C. Comply with all requirements applicable to work required under this Division.

1.26 TESTING SERVICES

A. Additional Testing: In addition to any specified testing, the Architect may cause additional testing to be performed by an independent testing laboratory or any other qualified party. If such testing reveals deficient work by the Contractor, the Contractor shall pay for both the testing and remedial work. If such testing does not reveal deficient work by the Contractor, the Owner shall pay for the testing and the cost of repairing any damage caused by such testing.

B. Specified Testing Services: If independent testing services are specified regarding work under this Division, cooperate fully with the testing agency. Provide access to the work. Provide test holes and taps necessary. Remove work that is not tested on site, deliver to testing agency, and reinstall if undamaged; replace if damaged. Provide utilities, operational capability, and facilities for on-site testing as necessary.

1.27 WORK BY OWNER

A. The owner will award contracts on work which includes:

1. None.

1.28 OWNER FURNISHED PRODUCTS

A. Products furnished to the site and paid for by the Owner.

1. None.

END OF SECTION 15010

SECTION 15050 - MECHANICAL 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 basic mechanical materials and methods to complement other Division 15 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. Labeling and identifying mechanical systems and equipment is specified in Division 15 Section "Mechanical Identification."
9. Nonshrink grout for equipment installations.
10. Field-fabricated metal and wood equipment supports.
11. Installation requirements common to equipment specification sections.
12. Mechanical demolition.
13. Cutting and patching.
14. Touchup painting and finishing.

B. Pipe and pipe fitting materials are specified in Division 15 piping system Sections.

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. ABS: Acrylonitrile-butadiene-styrene plastic.
2. CPVC: Chlorinated polyvinyl chloride plastic.
3. NP: Nylon plastic.
4. PE: Polyethylene plastic.
5. PVC: Polyvinyl chloride plastic.

G. The following are industry abbreviations for rubber materials:

1. CR: Chlorosulfonated polyethylene synthetic rubber.
2. EPDM: Ethylene propylene diene terpolymer rubber.

1.4 SUBMITTALS

A. Product Data Book: Submit product data for all Division 15 items in a single reinforced 3-ring binder. Organize product data by specification section number. Provide table of contents showing the following:
1. Specification Section
2. Description of item
3. Submission number (1st submission, 2nd submission, etc.)
4. Submittal status (Approved, Revise and Resubmit, etc.)

B. Product Data: For dielectric fittings, flexible connectors, mechanical sleeve seals, and identification materials and devices.

C. Shop Drawings: Detail fabrication and installation for metal and wood supports and anchorage for mechanical materials and equipment.

D. Coordination Drawings: For access panel and door locations.

E. 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 installing and maintaining insulation.
3. Clearances for servicing and maintaining equipment, accessories, and specialties, including space for disassembly required for periodic maintenance.
4. Equipment and accessory service connections and support details.
5. Exterior wall and foundation penetrations.
6. Fire-rated wall and floor penetrations.
7. Sizes and location of required concrete pads and bases.
8. Scheduling, sequencing, movement, and positioning of large equipment into building during construction.

9. Floor plans, elevations, and details to indicate penetrations in floors, walls, and ceilings and their relationship to other penetrations and installations.
10. Reflected ceiling plans to coordinate and integrate installation of air outlets and inlets, light fixtures, communication system components, sprinklers, and other ceiling-mounted items.

F. Samples: Of color, lettering style, and other graphic representation required for each identification material and device.

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 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 Division 8 Section "Access Doors."

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.

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. Dielectric Unions:

    a. Capitol Manufacturing Co.
    b. Central Plastics Co.
    c. Eclipse, Inc.; Rockford-Eclipse Div.
    d. Epco Sales Inc.
    e. Hart Industries International, Inc.
    f. Watts Industries, Inc.; Water Products Div.
    g. Zurn Industries, Inc.; Wilkins Div.

2. Dielectric Flanges:

    a. Capitol Manufacturing Co.
    b. Central Plastics Co.
    c. Epco Sales Inc.
    d. Watts Industries, Inc.; Water Products Div.

3. Dielectric-Flange Insulating Kits:

    a. Calpico, Inc.
    b. Central Plastics Co.

4. Dielectric Couplings:

    a. Calpico, Inc.
    b. Lochinvar Corp.

5. Dielectric Nipples:

a. Grinnell Corp.; Grinnell Supply Sales Co.
b. Perfection Corp.
c. Victaulic Co. of America.

6. Metal, Flexible Connectors:

a. ANAMET Industrial, Inc.
b. Central Sprink, Inc.
c. Flexicraft Industries.
d. Flex-Weld, Inc.
e. Grinnell Corp.; Grinnell Supply Sales Co.
f. Hyspan Precision Products, Inc.
g. McWane, Inc.; Tyler Pipe; Gustin-Bacon Div.
h. Mercer Rubber Co.
i. Metraflex Co.
j. Proco Products, Inc.
k. Uniflex, Inc.

7. Rubber, Flexible Connectors:

a. General Rubber Corp.
b. Mercer Rubber Co.
c. Metraflex Co.
d. Proco Products, Inc.
e. Red Valve Co., Inc.
f. Uniflex, Inc.

8. Mechanical Sleeve Seals:

a. Calpico, Inc.
b. Metraflex Co.
c. Thunderline/Link-Seal.

2.2 PIPE AND PIPE FITTINGS

A. Refer to individual Division 15 piping Sections for pipe and fitting materials and joining methods.

B. Pipe Threads: ASME B1.20.1 for factory-threaded pipe and pipe fittings.

2.3 JOINING MATERIALS

A. Refer to individual Division 15 piping Sections for special joining materials not listed below.

B. Pipe-Flange Gasket Materials: Suitable for chemical and thermal conditions of piping system contents.

1. ASME B16.21, nonmetallic, flat, asbestos-free, 1/8-inch maximum thickness, unless thickness or specific material is indicated.

a. Full-Face Type: For flat-face, Class 125, cast-iron and cast-bronze flanges.
b. Narrow-Face Type: For raised-face, Class 250, cast-iron and steel flanges.

2. AWWA C110, rubber, flat face, 1/8 inch thick, unless otherwise indicated; and full-face or ring type, unless otherwise indicated.

C. Flange Bolts and Nuts: ASME B18.2.1, carbon steel, unless otherwise indicated.

D. Plastic, Pipe-Flange Gasket, Bolts, and Nuts: Type and material recommended by piping system manufacturer, unless otherwise indicated.

E. Solder Filler Metals: ASTM B 32.

1. Alloy Sn95 or Alloy Sn94: Approximately 95 percent tin and 5 percent silver, with 0.10 percent lead content.
2. Alloy E: Approximately 95 percent tin and 5 percent copper, with 0.10 percent maximum lead content.
3. Alloy HA: Tin-antimony-silver-copper zinc, with 0.10 percent maximum lead content.
4. Alloy HB: Tin-antimony-silver-copper nickel, with 0.10 percent maximum lead content.
5. Alloy Sb5: 95 percent tin and 5 percent antimony, with 0.20 percent maximum lead content.

F. Brazing Filler Metals: AWS A5.8.

1. BCuP Series: Copper-phosphorus alloys.
2. BAg1: Silver alloy.

G. Welding Filler Metals: Comply with AWS D10.12 for welding materials appropriate for wall thickness and chemical analysis of steel pipe being welded.

H. Solvent Cements: Manufacturer's standard solvent cements for the following:

1. ABS Piping: ASTM D 2235.
2. CPVC Piping: ASTM F 493.
3. PVC Piping: ASTM D 2564. Include primer according to ASTM F 656.
4. PVC to ABS Piping Transition: ASTM D 3138.

I. Plastic Pipe Seals: ASTM F 477, elastomeric gasket.

J. Flanged, Ductile-Iron Pipe Gasket, Bolts, and Nuts: AWWA C110, rubber gasket, carbon-steel bolts and nuts.

K. Couplings: Iron-body sleeve assembly, fabricated to match OD of plain-end, pressure pipes.

1. Sleeve: ASTM A 126, Class B, gray iron.
2. Followers: ASTM A 47 malleable iron or ASTM A 536 ductile iron.
3. Gaskets: Rubber.
4. Bolts and Nuts: AWWA C111.
5. Finish: Enamel paint.

2.4 DIELECTRIC FITTINGS

A. General: Assembly or fitting with insulating material isolating joined dissimilar metals, to prevent galvanic action and stop corrosion.

B. Description: Combination of copper alloy and ferrous; threaded, solder, plain, and weld-neck end types and matching piping system materials.

C. Insulating Material: Suitable for system fluid, pressure, and temperature.

D. Dielectric Unions: Factory-fabricated, union assembly, for 250-psig minimum working pressure at 180 deg F.

E. Dielectric Flanges: Factory-fabricated, companion-flange assembly, for 150- or 300-psig minimum working pressure as required to suit system pressures.

F. Dielectric-Flange Insulation Kits: Field-assembled, companion-flange assembly, full-face or ring type. Components include neoprene or phenolic gasket, phenolic or polyethylene bolt sleeves, phenolic washers, and steel backing washers.

1. Provide separate companion flanges and steel bolts and nuts for 150- or 300-psig minimum working pressure as required to suit system pressures.

G. Dielectric Couplings: Galvanized-steel coupling with inert and noncorrosive, thermoplastic lining; threaded ends; and 300-psig minimum working pressure at 225 deg F.

H. Dielectric Nipples: Electroplated steel nipple with inert and noncorrosive, thermoplastic lining; plain, threaded, or grooved ends; and 300-psig minimum working pressure at 225 deg F.

2.5 FLEXIBLE CONNECTORS

A. General: Fabricated from materials suitable for system fluid and that will provide flexible pipe connections. Include 125-psig minimum working-pressure rating, unless higher working pressure is indicated, and ends according to the following:

1. 2-Inch NPS and Smaller: Threaded.
2. 2-1/2-Inch NPS and Larger: Flanged.
3. Option for 2-1/2-Inch NPS and Larger: Grooved for use with keyed couplings.

B. Bronze-Hose, Flexible Connectors: Corrugated, bronze, inner tubing covered with bronze wire braid. Include copper-tube ends or bronze flanged ends, braze welded to hose.

C. Stainless-Steel-Hose/Steel Pipe, Flexible Connectors: Corrugated, stainless-steel, inner tubing covered with stainless-steel wire braid. Include steel nipples or flanges, welded to hose.

D. Stainless-Steel-Hose/Stainless-Steel Pipe, Flexible Connectors: Corrugated, stainless-steel, inner tubing covered with stainless-steel wire braid. Include stainless-steel nipples or flanges, welded to hose.

E. Rubber, Flexible Connectors: CR or EPDM elastomer rubber construction, with multiple plies of NP fabric, molded and cured in hydraulic presses. Include 125-psig minimum working-pressure rating at 220 deg F. Units may be straight or elbow type, unless otherwise indicated.

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.

5. PVC: Manufactured, permanent, with nailing flange for attaching to wooden forms.
6. PVC Pipe: ASTM D 1785, Schedule 40.
7. PE: Manufactured, reusable, tapered, cup shaped, smooth outer surface, with nailing flange for attaching to wooden forms.

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 Brass: Split casting, with concealed hinge and set screw.

    a. Finish: Rough brass.
    b. Finish: Polished chrome-plate.

5. Stamped Steel: One piece, with set screw and chrome-plated finish.
6. Stamped Steel: One piece, with spring clips and chrome-plated finish.
7. Stamped Steel: Split plate, with concealed hinge, set screw, and chrome-plated finish.
8. Stamped Steel: Split plate, with concealed hinge, spring clips, and chrome-plated finish.
9. Stamped Steel: Split plate, with exposed-rivet hinge, set screw, and chrome-plated finish.
10. Stamped Steel: Split plate, with exposed-rivet hinge, spring clips, and chrome-plated finish.
11. Cast-Iron Floor Plate: One-piece casting.

2.8 IDENTIFYING DEVICES AND LABELS

A. General: Manufacturer's standard products of categories and types required for each application as referenced in other Division 15 Sections. If more than one type is specified for application, selection is Installer's option, but provide one selection for each product category.

B. Equipment Nameplates: Metal nameplate with operational data engraved or stamped; permanently fastened to equipment.

1. Data: Manufacturer, product name, model number, serial number, capacity, operating and power characteristics, labels of tested compliances, and similar essential data.
2. Location: Accessible and visible location.

C. Stencils: Standard stencils, prepared for required applications with letter sizes complying with recommendations of ASME A13.1 for piping and similar applications, but not less than 1-1/4-inch- high letters for ductwork and not less than 3/4-inch- high letters for access door signs and similar operational instructions.

1. Material: Fiberboard.
2. Material: Brass.
3. Stencil Paint: Standard exterior-type stenciling enamel; black, unless otherwise indicated; either brushing grade or pressurized spray-can form and grade.
4. Identification Paint: Standard identification enamel of colors indicated or, if not otherwise indicated for piping systems, comply with ASME A13.1 for colors.

D. Snap-on Plastic Pipe Markers: Manufacturer's standard preprinted, semirigid, snap on, color-coded, complying with ASME A13.1.

E. Pressure-Sensitive Pipe Markers: Manufacturer's standard preprinted, permanent adhesive, color-coded, pressure-sensitive vinyl, complying with ASME A13.1.

F. Plastic Duct Markers: Manufacturer's standard color-coded, laminated plastic. Comply with the following color code:

1. Green: Cold air.
2. Yellow: Hot air.
3. Yellow/Green or Green: Supply air.
4. Blue: Exhaust, outside, return, and mixed air.
5. For hazardous exhausts, use colors and designs recommended by ASME A13.1.
6. Nomenclature: Include the following:

    a. Direction of airflow.
    b. Duct service.
    c. Duct origin.
    d. Duct destination.
    e. Design cubic feet per meter.

G. Engraved Plastic-Laminate Signs: ASTM D 709, Type I, cellulose, paper-base, phenolic-resin-laminate engraving stock; Grade ES-2, black surface, black phenolic core, with white melamine subcore, unless otherwise indicated.

1. Fabricate in sizes required for message.

2. Engraved with engraver's standard letter style, of sizes and with wording to match equipment identification.
3. Punch for mechanical fastening.
4. Thickness: 1/16 inch, unless otherwise indicated.
5. Thickness: 1/8 inch, unless otherwise indicated.
6. Thickness: 1/16 inch, for units up to 20 sq. in. or 8 inches long; 1/8 inch for larger units.
7. Fasteners: Self-tapping stainless-steel screws or contact-type permanent adhesive.

H. Plastic Equipment Markers: Color-coded, laminated plastic. Comply with the following color code:

1. Green: Cooling equipment and components.
2. Yellow: Heating equipment and components.
3. Yellow/Green: Combination cooling and heating equipment and components.
4. Brown: Energy reclamation equipment and components.
5. Blue: Equipment and components that do not meet any criteria above.
6. For hazardous equipment, use colors and designs recommended by ASME A13.1.
7. Nomenclature: Include the following, matching terminology on schedules as closely as possible:

    a. Name and plan number.
    b. Equipment service.
    c. Design capacity.
    d. Other design parameters such as pressure drop, entering and leaving conditions, and rpm.

8. Size: Approximate 2-1/2 by 4 inches for control devices, dampers, and valves; and 4-1/2 by 6 inches for equipment.

I. Lettering and Graphics: Coordinate names, abbreviations, and other designations used in mechanical identification, with corresponding designations indicated. Use numbers, lettering, and wording indicated for proper identification and operation/maintenance of mechanical systems and equipment.

1. Multiple Systems: If multiple systems of same generic name are indicated, provide identification that indicates individual system number and service such as "Boiler No. 3," "Air Supply No. 1H," or "Standpipe F12."

2.9 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-psig, 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 Division 15 piping 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. Use split-casting escutcheons if required, for existing piping.
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. Permanent sleeves are not required for holes formed by PE removable sleeves.

P. Install sleeves for pipes passing through concrete and masonry walls, and concrete floor and roof slabs.

Q. 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:

    a. PVC Pipe Sleeves: For pipes smaller than 6-inch NPS.
    b. Steel Pipe Sleeves: For pipes smaller than 6-inch NPS.
    c. Steel, Sheet-Metal Sleeves: For pipes 6-inch NPS and larger, penetrating gypsum-board partitions.
    d. Stack Sleeve Fittings: For pipes penetrating floors with membrane waterproofing. Secure flashing between clamping flanges. Install section of cast-iron soil pipe to extend sleeve to 2 inches above finished floor level. Refer to Division 7 Section "Sheet Metal Flashing and Trim" for flashing.

        1) Seal space outside of sleeve fittings with nonshrink, nonmetallic grout.

4. Except for underground wall penetrations, seal annular space between sleeve and pipe or pipe insulation, using elastomeric joint sealants. Refer to Division 7 Section "Joint Sealants" for materials.
5. Use Type S, Grade NS, Class 25, Use O, neutral-curing silicone sealant, unless otherwise indicated.

R. Aboveground, Exterior-Wall, Pipe Penetrations: Seal penetrations using sleeves and mechanical sleeve seals. Size sleeve for 1-inch annular clear space between pipe 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.

S. 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.

T. Fire-Barrier Penetrations: Maintain indicated fire rating of walls, partitions, ceilings, and floors at pipe penetrations. Seal pipe penetrations with firestopping materials. Refer to Division 7 Section "Firestopping" for materials.

U. Verify final equipment locations for roughing-in.

V. Refer to equipment specifications in other Sections of these Specifications for roughing-in requirements.

W. 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. Soldered Joints: Construct joints according to AWS's "Soldering Manual," Chapter "The Soldering of Pipe and Tube."
5. Soldered Joints: Construct joints according to CDA's "Copper Tube Handbook."
6. Brazed Joints: Construct joints according to AWS's "Brazing Handbook," Chapter "Pipe and Tube."
7. 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.

8. 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.
9. 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.
10. 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. ABS Piping: ASTM D 2235 and ASTM D 2661.
    c. CPVC Piping: ASTM D 2846 and ASTM F 493.
    d. PVC Pressure Piping: ASTM D 2672.
    e. PVC Nonpressure Piping: ASTM D 2855.
    f. PVC to ABS Nonpressure Transition Fittings: Procedure and solvent cement according to ASTM D 3138.

11. 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.

X. 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 INSTALLATION - COMMON REQUIREMENTS

A. Install equipment 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 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 LABELING AND IDENTIFYING

A. Piping Systems: Install pipe markers on each system. Include arrows showing normal direction of flow.

1. Stenciled Markers: According to ASME A13.1.
2. Plastic markers, with application systems. Install on insulation segment if required for hot, uninsulated piping.

3. Locate pipe markers as follows if piping is exposed in finished spaces, machine rooms, and accessible maintenance spaces, such as shafts, tunnels, plenums, and exterior nonconcealed locations:

    a. Near each valve and control device.
    b. Near each branch, excluding short takeoffs for fixtures and terminal units. Mark each pipe at branch, if flow pattern is not obvious.
    c. Near locations if pipes pass through walls, floors, ceilings, or enter nonaccessible enclosures.
    d. At access doors, manholes, and similar access points that permit view of concealed piping.
    e. Near major equipment items and other points of origination and termination.
    f. Spaced at maximum of 50-foot intervals along each run. Reduce intervals to 25 feet in congested areas of piping and equipment.
    g. On piping above removable acoustical ceilings, except omit intermediately spaced markers.

B. Equipment: Install engraved plastic-laminate sign or equipment marker on or near each major item of mechanical equipment.

1. Lettering Size: Minimum 1/4-inch- high lettering for name of unit if viewing distance is less than 24 inches, 1/2-inch- high lettering for distances up to 72 inches, and proportionately larger lettering for greater distances. Provide secondary lettering two-thirds to three-fourths of size of principal lettering.
2. Text of Signs: Provide name of identified unit. Include text to distinguish between multiple units, inform user of operational requirements, indicate safety and emergency precautions, and warn of hazards and improper operations.

C. Duct Systems: Identify air supply, return, exhaust, intake, and relief ducts with duct markers; or provide stenciled signs and arrows, showing duct system service and direction of flow.

1. Location: In each space, if ducts are exposed or concealed by removable ceiling system, locate signs near points where ducts enter into space and at maximum intervals of 50 feet.

D. Adjusting: Relocate identifying devices as necessary for unobstructed view in finished construction.

3.4 PAINTING AND FINISHING

A. Refer to Division 9 Section "Painting" for paint materials, surface preparation, and application of paint.

B. Apply paint to exposed piping according to the following, unless otherwise indicated:

1. Interior, Ferrous Piping: Use semigloss, acrylic-enamel finish. Include finish coat over enamel undercoat and primer.
2. Interior, Galvanized-Steel Piping: Use semigloss, acrylic-enamel finish. Include two finish coats over galvanized metal primer.
3. Interior, Ferrous Supports: Use semigloss, acrylic-enamel finish. Include finish coat over enamel undercoat and primer.

4. Exterior, Ferrous Piping: Use semigloss, acrylic-enamel finish. Include two finish coats over rust-inhibitive metal primer.
5. Exterior, Galvanized-Steel Piping: Use semigloss, acrylic-enamel finish. Include two finish coats over galvanized metal primer.
6. Exterior, Ferrous Supports: Use semigloss, acrylic-enamel finish. Include two finish coats over rust-inhibitive metal primer.

C. Do not paint piping specialties with factory-applied finish.

D. Damage and Touchup: Repair marred and damaged factory-painted finishes with materials and procedures to match original factory finish.

3.5 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-psig, 28-day compressive-strength concrete and reinforcement as specified in Division 3 Section "Cast-in-Place Concrete."

3.6 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."

3.7 ERECTION OF WOOD SUPPORTS AND ANCHORAGE

A. Cut, fit, and place wood grounds, nailers, blocking, and anchorage to support and anchor mechanical materials and equipment.

B. Select fastener sizes that will not penetrate members if opposite side will be exposed to view or will receive finish materials. Tighten connections between members. Install fasteners without splitting wood members.

C. Attach to substrates as required to support applied loads.

3.8 DEMOLITION

A. Disconnect, demolish, and remove Work specified in Division 15 Sections.

B. If pipe, ductwork, insulation, or equipment to remain is damaged or disturbed, remove damaged portions and install new products of equal capacity and quality.

C. Accessible Work: Remove indicated exposed pipe and ductwork in its entirety.

D. Work Abandoned in Place: Cut and remove underground pipe a minimum of 2 inches beyond face of adjacent construction. Cap and patch surface to match existing finish.

E. Removal: Remove indicated equipment from Project site.

F. Temporary Disconnection: Remove, store, clean, reinstall, reconnect, and make operational equipment indicated for relocation.

3.9 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.

3.10 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 15050

SECTION 15067 - HANGERS AND SUPPORTS

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 hangers and supports for HVAC system piping and equipment:

1. Steel pipe hangers and supports.
2. Trapeze pipe hangers.
3. Fiberglass pipe hangers.
4. Metal framing systems.
5. Fiberglass strut systems.
6. Thermal-hanger shield inserts.
7. Fastener systems.
8. Pipe stands.
9. Equipment supports.

B. Related Sections include the following:

1. Division 5 Section "Metal Fabrications" for structural-steel shapes and plates for trapeze hangers for pipe and equipment supports.
2. Division 13 Section "Fire-Suppression Piping" for pipe hangers for fire-protection piping.
3. Division 15 Section "Vibration and Seismic Controls for HVAC Piping and Equipment" for vibration isolation devices.
4. Division 15 Section "Expansion Fittings and Loops for HVAC Piping" for pipe guides and anchors.
5. Division 15 Section(s) "Metal Ducts” for duct hangers and supports.

1.3 DEFINITIONS

A. MSS: Manufacturers Standardization Society for The Valve and Fittings Industry Inc.

B. Terminology: As defined in MSS SP-90, "Guidelines on Terminology for Pipe Hangers and Supports."

1.4 PERFORMANCE REQUIREMENTS

A. Design supports for multiple pipes, including pipe stands, capable of supporting combined weight of supported systems, system contents, and test water.

B. Design equipment supports capable of supporting combined operating weight of supported equipment and connected systems and components.

C. Design seismic-restraint hangers and supports for piping and equipment.

1.5 SUBMITTALS

A. Product Data: For the following:

1. Steel pipe hangers and supports.
2. Fiberglass pipe hangers.
3. Thermal-hanger shield inserts.
4. Powder-actuated fastener systems.

B. Shop Drawings: Show fabrication and installation details and include calculations for the following:

1. Trapeze pipe hangers. Include Product Data for components.
2. Metal framing systems. Include Product Data for components.
3. Fiberglass strut systems. Include Product Data for components.
4. Pipe stands. Include Product Data for components.
5. Equipment supports.

C. Welding certificates.

1.6 QUALITY ASSURANCE

A. Welding: Qualify procedures and personnel according to AWS D1.1**,** "Structural Welding Code—Steel**”**

B. Welding: Qualify procedures and personnel according to the following:

1. AWS D1.1, "Structural Welding Code--Steel."

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, manufacturers specified.
2. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers specified.

2.2 STEEL PIPE HANGERS AND SUPPORTS

A. Description: MSS SP-58, Types 1 through 58, factory-fabricated components. Refer to Part 3 "Hanger and Support Applications" Article for where to use specific hanger and support types.

B. Available Manufacturers:

1. AAA Technology & Specialties Co., Inc.
2. Bergen-Power Pipe Supports.
3. B-Line Systems, Inc.; a division of Cooper Industries.
4. Carpenter & Paterson, Inc.
5. Empire Industries, Inc.
6. ERICO/Michigan Hanger Co.
7. Globe Pipe Hanger Products, Inc.
8. Grinnell Corp.
9. GS Metals Corp.
10. National Pipe Hanger Corporation.
11. PHD Manufacturing, Inc.
12. PHS Industries, Inc.
13. Piping Technology & Products, Inc.
14. Tolco Inc.

C. Galvanized, Metallic Coatings: Pregalvanized or hot dipped.

D. Nonmetallic Coatings: Plastic coating, jacket, or liner.

E. Padded Hangers: Hanger with fiberglass or other pipe insulation pad or cushion for support of bearing surface of piping.

2.3 TRAPEZE PIPE HANGERS

A. Description: MSS SP-69, Type 59, shop- or field-fabricated pipe-support assembly made from structural-steel shapes with MSS SP-58 hanger rods, nuts, saddles, and U-bolts.

2.4 FIBERGLASS PIPE HANGERS

A. Clevis-Type, Fiberglass Pipe Hangers: Similar to MSS Type 1, steel pipe hanger except hanger is made of fiberglass and continuous-thread rod and nuts are made of polyurethane or stainless steel.

1. Available Manufacturers:

a. B-Line Systems, Inc.; a division of Cooper Industries.
b. Champion Fiberglass, Inc.
c. Cope, T. J., Inc.; Tyco International, Ltd.
d. Seasafe, Inc.
e. Unistrut Corp.; Tyco International, Ltd.
f. Wesanco, Inc.

B. Strap-Type, Fiberglass Pipe Hangers: Made of fiberglass loop with stainless-steel continuous-thread rod, nuts, and support hook.

1. Available Manufacturers:

a. Plasti-Fab, Inc.

2.5 METAL FRAMING SYSTEMS

A. Description: MFMA-3, shop- or field-fabricated pipe-support assembly made of steel channels and other components.

B. Available Manufacturers:

1. B-Line Systems, Inc.; a division of Cooper Industries.
2. ERICO/Michigan Hanger Co.; ERISTRUT Div.
3. GS Metals Corp.
4. Power-Strut Div.; Tyco International, Ltd.
5. Thomas & Betts Corporation.
6. Tolco Inc.
7. Unistrut Corp.; Tyco International, Ltd.

C. Coatings: Manufacturer's standard finish, unless bare metal surfaces are indicated.

D. Nonmetallic Coatings: Plastic coating, jacket, or liner.

2.6 FIBERGLASS STRUT SYSTEMS

A. Description: Shop- or field-fabricated pipe-support assembly, similar to MFMA-3, made of fiberglass channels and other components.

B. Available Manufacturers:

1. B-Line Systems, Inc.; a division of Cooper Industries.
2. Champion Fiberglass, Inc.
3. Cope, T. J., Inc.; Tyco International Ltd.
4. Seasafe, Inc.

2.7 THERMAL-HANGER SHIELD INSERTS

A. Description: 100-psig- (690-kPa-) minimum, compressive-strength insulation insert encased in sheet metal shield.

B. Available Manufacturers:

1. Carpenter & Paterson, Inc.
2. ERICO/Michigan Hanger Co.
3. PHS Industries, Inc.
4. Pipe Shields, Inc.

5. Rilco Manufacturing Company, Inc.
6. Value Engineered Products, Inc.

C. Insulation-Insert Material for Cold Piping: ASTM C 552, Type II cellular glass with vapor barrier.

D. Insulation-Insert Material for Hot Piping: ASTM C 552, Type II cellular glass.

E. For Trapeze or Clamped Systems: Insert and shield shall cover entire circumference of pipe.

F. For Clevis or Band Hangers: Insert and shield shall cover lower 180 degrees of pipe.

G. Insert Length: Extend 2 inches (50 mm) beyond sheet metal shield for piping operating below ambient air temperature.

2.8 FASTENER SYSTEMS

A. Powder-Actuated Fasteners: Threaded-steel stud, for use in hardened portland cement concrete with pull-out, tension, and shear capacities appropriate for supported loads and building materials where used.

1. Available Manufacturers:

a. Hilti, Inc.
b. ITW Ramset/Red Head.
c. Masterset Fastening Systems, Inc.
d. MKT Fastening, LLC.
e. Powers Fasteners.

B. Mechanical-Expansion Anchors: Insert-wedge-type stainless steel, for use in hardened portland cement concrete with pull-out, tension, and shear capacities appropriate for supported loads and building materials where used.

1. Available Manufacturers:

a. B-Line Systems, Inc.; a division of Cooper Industries.
b. Empire Industries, Inc.
c. Hilti, Inc.
d. ITW Ramset/Red Head.
e. MKT Fastening, LLC.
f. Powers Fasteners.

2.9 PIPE STAND FABRICATION

A. Pipe Stands, General: Shop or field-fabricated assemblies made of manufactured corrosion-resistant components to support roof-mounted piping.

B. Compact Pipe Stand: One-piece plastic unit with integral-rod-roller, pipe clamps, or V-shaped cradle to support pipe, for roof installation without membrane penetration.

1. Available Manufacturers:

    a. ERICO/Michigan Hanger Co.
    b. MIRO Industries.

C. Low-Type, Single-Pipe Stand: One-piece stainless-steel base unit with plastic roller, for roof installation without membrane penetration.

1. Available Manufacturers:

    a. MIRO Industries.

D. High-Type, Single-Pipe Stand: Assembly of base, vertical and horizontal members, and pipe support, for roof installation without membrane penetration.

1. Available Manufacturers:

    a. ERICO/Michigan Hanger Co.
    b. MIRO Industries.
    c. Portable Pipe Hangers.

2. Base: Stainless steel.
3. Vertical Members: Two or more cadmium-plated-steel or stainless-steel, continuous-thread rods.
4. Horizontal Member: Cadmium-plated-steel or stainless-steel rod with plastic or stainless-steel, roller-type pipe support.

E. High-Type, Multiple-Pipe Stand: Assembly of bases, vertical and horizontal members, and pipe supports, for roof installation without membrane penetration.

1. Available Manufacturers:

    a. Portable Pipe Hangers.

2. Bases: One or more plastic.
3. Vertical Members: Two or more protective-coated-steel channels.
4. Horizontal Member: Protective-coated-steel channel.
5. Pipe Supports: Galvanized-steel, clevis-type pipe hangers.

F. Curb-Mounting-Type Pipe Stands: Shop- or field-fabricated pipe support made from structural-steel shape, continuous-thread rods, and rollers for mounting on permanent stationary roof curb.

2.10 EQUIPMENT SUPPORTS

A. Description: Welded, shop- or field-fabricated equipment support made from structural-steel shapes.

2.11 MISCELLANEOUS MATERIALS

A. Structural Steel: ASTM A 36/A 36M, steel plates, shapes, and bars; black and galvanized.

B. Grout: ASTM C 1107, factory-mixed and -packaged, dry, hydraulic-cement, nonshrink and nonmetallic grout; suitable for interior and exterior applications.

1. Properties: Nonstaining, noncorrosive, and nongaseous.
2. Design Mix: 5000-psi (34.5-MPa), 28-day compressive strength.

PART 3 - EXECUTION

3.1 HANGER AND SUPPORT APPLICATIONS

A. Specific hanger and support requirements are specified in Sections specifying piping systems and equipment.

B. Comply with MSS SP-69 for pipe hanger selections and applications that are not specified in piping system Sections.

C. Use hangers and supports with galvanized, metallic coatings for piping and equipment that will not have field-applied finish.

D. Use nonmetallic coatings on attachments for electrolytic protection where attachments are in direct contact with copper tubing.

E. Use padded hangers for piping that is subject to scratching.

F. Horizontal-Piping Hangers and Supports: Unless otherwise indicated and except as specified in piping system 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 (DN 15 to DN 750).
2. Yoke-Type Pipe Clamps (MSS Type 2): For suspension of 120 to 450 deg F (49 to 232 deg C) pipes, NPS 4 to NPS 16 (DN 100 to DN 400), requiring up to 4 inches (100 mm) of insulation.
3. Carbon- or Alloy-Steel, Double-Bolt Pipe Clamps (MSS Type 3): For suspension of pipes, NPS 3/4 to NPS 24 (DN 20 to DN 600), requiring clamp flexibility and up to 4 inches (100 mm) of insulation.
4. Steel Pipe Clamps (MSS Type 4): For suspension of cold and hot pipes, NPS 1/2 to NPS 24 (DN 15 to DN 600), if little or no insulation is required.
5. Pipe Hangers (MSS Type 5): For suspension of pipes, NPS 1/2 to NPS 4 (DN 15 to DN 100), to allow off-center closure for hanger installation before pipe erection.
6. Adjustable, Swivel Split- or Solid-Ring Hangers (MSS Type 6): For suspension of noninsulated stationary pipes, NPS 3/4 to NPS 8 (DN 20 to DN 200).
7. Adjustable, Steel Band Hangers (MSS Type 7): For suspension of noninsulated stationary pipes, NPS 1/2 to NPS 8 (DN 15 to DN 200).
8. Adjustable Band Hangers (MSS Type 9): For suspension of noninsulated stationary pipes, NPS 1/2 to NPS 8 (DN 15 to DN 200).
9. Adjustable, Swivel-Ring Band Hangers (MSS Type 10): For suspension of noninsulated stationary pipes, NPS 1/2 to NPS 2 (DN 15 to DN 50).
10. Split Pipe-Ring with or without Turnbuckle-Adjustment Hangers (MSS Type 11): For suspension of noninsulated stationary pipes, NPS 3/8 to NPS 8 (DN 10 to DN 200).

11. Extension Hinged or 2-Bolt Split Pipe Clamps (MSS Type 12): For suspension of noninsulated stationary pipes, NPS 3/8 to NPS 3 (DN 10 to DN 80).
12. U-Bolts (MSS Type 24): For support of heavy pipes, NPS 1/2 to NPS 30 (DN 15 to DN 750).
13. Clips (MSS Type 26): For support of insulated pipes not subject to expansion or contraction.
14. Pipe Saddle Supports (MSS Type 36): For support of pipes, NPS 4 to NPS 36 (DN 100 to DN 900), with steel pipe base stanchion support and cast-iron floor flange.
15. Pipe Stanchion Saddles (MSS Type 37): For support of pipes, NPS 4 to NPS 36 (DN 100 to DN 900), with steel pipe base stanchion support and cast-iron floor flange and with U-bolt to retain pipe.
16. Adjustable, Pipe Saddle Supports (MSS Type 38): For stanchion-type support for pipes, NPS 2-1/2 to NPS 36 (DN 65 to DN 900), if vertical adjustment is required, with steel pipe base stanchion support and cast-iron floor flange.
17. Single Pipe Rolls (MSS Type 41): For suspension of pipes, NPS 1 to NPS 30 (DN 25 to DN 750), from 2 rods if longitudinal movement caused by expansion and contraction might occur.
18. Adjustable Roller Hangers (MSS Type 43): For suspension of pipes, NPS 2-1/2 to NPS 20 (DN 65 to DN 500), from single rod if horizontal movement caused by expansion and contraction might occur.
19. Complete Pipe Rolls (MSS Type 44): For support of pipes, NPS 2 to NPS 42 (DN 50 to DN 1050), if longitudinal movement caused by expansion and contraction might occur but vertical adjustment is not necessary.
20. Pipe Roll and Plate Units (MSS Type 45): For support of pipes, NPS 2 to NPS 24 (DN 50 to DN 600), if small horizontal movement caused by expansion and contraction might occur and vertical adjustment is not necessary.
21. Adjustable Pipe Roll and Base Units (MSS Type 46): For support of pipes, NPS 2 to NPS 30 (DN 50 to DN 750), if vertical and lateral adjustment during installation might be required in addition to expansion and contraction.

G. Vertical-Piping Clamps: Unless otherwise indicated and except as specified in piping system 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 (DN 20 to DN 500).
2. Carbon- or Alloy-Steel Riser Clamps (MSS Type 42): For support of pipe risers, NPS 3/4 to NPS 20 (DN 20 to DN 500), if longer ends are required for riser clamps.

H. Hanger-Rod Attachments: Unless otherwise indicated and except as specified in piping system Sections, install the following types:

1. Steel Turnbuckles (MSS Type 13): For adjustment up to 6 inches (150 mm) for heavy loads.
2. Steel Clevises (MSS Type 14): For 120 to 450 deg F (49 to 232 deg C) piping installations.
3. Swivel Turnbuckles (MSS Type 15): For use with MSS Type 11, split pipe rings.
4. Malleable-Iron Sockets (MSS Type 16): For attaching hanger rods to various types of building attachments.
5. Steel Weldless Eye Nuts (MSS Type 17): For 120 to 450 deg F (49 to 232 deg C) piping installations.

I. Building Attachments: Unless otherwise indicated and except as specified in piping system Sections, install the following types:

1. Steel or Malleable Concrete Inserts (MSS Type 18): For upper attachment to suspend pipe hangers from concrete ceiling.
2. Top-Beam C-Clamps (MSS Type 19): For use under roof installations with bar-joist construction to attach to top flange of structural shape.
3. Side-Beam or Channel Clamps (MSS Type 20): For attaching to bottom flange of beams, channels, or angles.
4. Center-Beam Clamps (MSS Type 21): For attaching to center of bottom flange of beams.
5. Welded Beam Attachments (MSS Type 22): For attaching to bottom of beams if loads are considerable and rod sizes are large.
6. C-Clamps (MSS Type 23): For structural shapes.
7. Top-Beam Clamps (MSS Type 25): For top of beams if hanger rod is required tangent to flange edge.
8. Side-Beam Clamps (MSS Type 27): For bottom of steel I-beams.
9. Steel-Beam Clamps with Eye Nuts (MSS Type 28): For attaching to bottom of steel I-beams for heavy loads.
10. Linked-Steel Clamps with Eye Nuts (MSS Type 29): For attaching to bottom of steel I-beams for heavy loads, with link extensions.
11. Malleable Beam Clamps with Extension Pieces (MSS Type 30): For attaching to structural steel.
12. Welded-Steel Brackets: For support of pipes from below, or for suspending from above by using clip and rod. Use one of the following for indicated loads:

    a. Light (MSS Type 31): 750 lb (340 kg).
    b. Medium (MSS Type 32): 1500 lb (680 kg).
    c. Heavy (MSS Type 33): 3000 lb (1360 kg).

13. Side-Beam Brackets (MSS Type 34): For sides of steel or wooden beams.
14. Plate Lugs (MSS Type 57): For attaching to steel beams if flexibility at beam is required.
15. Horizontal Travelers (MSS Type 58): For supporting piping systems subject to linear horizontal movement where headroom is limited.

J. Saddles and Shields: Unless otherwise indicated and except as specified in piping system 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 in writing by manufacturer to prevent crushing insulation.
3. Thermal-Hanger Shield Inserts: For supporting insulated pipe.

K. Spring Hangers and Supports: Unless otherwise indicated and except as specified in piping system 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. Spring-Cushion Roll Hangers (MSS Type 49): For equipping Type 41 roll hanger with springs.

4. Spring Sway Braces (MSS Type 50): To retard sway, shock, vibration, or thermal expansion in piping systems.
5. Variable-Spring Hangers (MSS Type 51): Preset to indicated load and limit variability factor to 25 percent to absorb expansion and contraction of piping system from hanger.
6. Variable-Spring Base Supports (MSS Type 52): Preset to indicated load and limit variability factor to 25 percent to absorb expansion and contraction of piping system from base support.
7. Variable-Spring Trapeze Hangers (MSS Type 53): Preset to indicated load and limit variability factor to 25 percent to absorb expansion and contraction of piping system from trapeze support.
8. Constant Supports: For critical piping stress and if necessary to avoid transfer of stress from one support to another support, critical terminal, or connected equipment. Include auxiliary stops for erection, hydrostatic test, and load-adjustment capability. These supports include the following types:

    a. Horizontal (MSS Type 54): Mounted horizontally.
    b. Vertical (MSS Type 55): Mounted vertically.
    c. Trapeze (MSS Type 56): Two vertical-type supports and one trapeze member.

L. Comply with MSS SP-69 for trapeze pipe hanger selections and applications that are not specified in piping system Sections.

M. Comply with MFMA-102 for metal framing system selections and applications that are not specified in piping system Sections.

N. Use powder-actuated fasteners or mechanical-expansion anchors instead of building attachments where required in concrete construction.

3.2 HANGER AND SUPPORT INSTALLATION

A. Steel Pipe Hanger 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. Trapeze Pipe Hanger Installation: Comply with MSS SP-69 and MSS SP-89. Arrange for grouping of parallel runs of horizontal piping and support together on field-fabricated trapeze pipe hangers.

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 D1.1.

C. Fiberglass Pipe Hanger Installation: Comply with applicable portions of MSS SP-69 and MSS SP-89. Install hangers and attachments as required to properly support piping from building structure.

D. Metal Framing System Installation: Arrange for grouping of parallel runs of piping and support together on field-assembled metal framing systems.

E. Fiberglass Strut System Installation: Arrange for grouping of parallel runs of piping and support together on field-assembled fiberglass struts.

F. Thermal-Hanger Shield Installation: Install in pipe hanger or shield for insulated piping.

G. Fastener System Installation:

1. Install powder-actuated fasteners for use in lightweight concrete or concrete slabs less than 4 inches (100 mm) thick in concrete after concrete is placed and completely cured. Use operators that are licensed by powder-actuated tool manufacturer. Install fasteners according to powder-actuated tool manufacturer's operating manual.
2. Install mechanical-expansion anchors in concrete after concrete is placed and completely cured. Install fasteners according to manufacturer's written instructions.

H. Pipe Stand Installation:

1. Pipe Stand Types except Curb-Mounting Type: Assemble components and mount on smooth roof surface. Do not penetrate roof membrane.
2. Curb-Mounting-Type Pipe Stands: Assemble components or fabricate pipe stand and mount on permanent, stationary roof curb. Refer to Division 7 Section "Roof Accessories" for curbs.

I. Install hangers and supports complete with necessary inserts, bolts, rods, nuts, washers, and other accessories.

J. Equipment Support Installation: Fabricate from welded-structural-steel shapes.

K. 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.

L. Install lateral bracing with pipe hangers and supports to prevent swaying.

M. Install building attachments within concrete slabs or attach to structural steel. Install additional attachments at concentrated loads, including valves, flanges, and strainers, **NPS 2-1/2 (DN 65)**] and larger 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.

N. Load Distribution: Install hangers and supports so piping live and dead loads and stresses from movement will not be transmitted to connected equipment.

O. Pipe Slopes: Install hangers and supports to provide indicated pipe slopes and so maximum pipe deflections allowed by ASME B31.1 (for power piping) and ASME B31.9 (for building services piping) are not exceeded.

P. 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 B31.1 for power piping and ASME B31.9 for building services piping.

2. Install MSS SP-58, Type 39, protection saddles if insulation without vapor barrier is indicated. Fill interior voids with insulation that matches adjoining insulation.

a. Option: Thermal-hanger shield inserts may be used. Include steel weight-distribution plate for pipe NPS 4 (DN 100) and larger if pipe is installed on rollers.

3. Install MSS SP-58, Type 40, protective shields on cold piping with vapor barrier. Shields shall span an arc of 180 degrees.

a. Option: Thermal-hanger shield inserts may be used. Include steel weight-distribution plate for pipe NPS 4 (DN 100) and larger if pipe is installed on rollers.

4. Shield Dimensions for Pipe: Not less than the following:

a. NPS 1/4 to NPS 3-1/2 (DN 8 to DN 90): 12 inches (305 mm) long and 0.048 inch (1.22 mm) thick.
b. NPS 4 (DN 100): 12 inches (305 mm) long and 0.06 inch (1.52 mm) thick.
c. NPS 5 and NPS 6 (DN 125 and DN 150): 18 inches (457 mm) long and 0.06 inch (1.52 mm) thick.
d. NPS 8 to NPS 14 (DN 200 to DN 350): 24 inches (610 mm) long and 0.075 inch (1.91 mm) thick.
e. NPS 16 to NPS 24 (DN 400 to DN 600): 24 inches (610 mm) long and 0.105 inch (2.67 mm) thick.

5. Pipes NPS 8 (DN 200) and Larger: Include wood inserts.
6. Insert Material: Length at least as long as protective shield.
7. Thermal-Hanger Shields: Install with insulation same thickness as piping insulation.

3.3 EQUIPMENT SUPPORTS

A. Fabricate structural-steel stands to suspend equipment from structure overhead or to support equipment above floor.

B. Grouting: Place grout under supports for equipment and make smooth bearing surface.

C. Provide lateral bracing, to prevent swaying, for equipment supports.

3.4 METAL FABRICATIONS

A. Cut, drill, and fit miscellaneous metal fabrications for trapeze pipe hangers and equipment supports.

B. Fit exposed connections together to form hairline joints. Field weld connections that cannot be shop welded because of shipping size limitations.

C. Field Welding: Comply with AWS D1.1 procedures for shielded metal arc welding, appearance and quality of welds, and methods used in correcting welding work, and with 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. Finish welds at exposed connections so no roughness shows after finishing and contours of welded surfaces match adjacent contours.

3.5 ADJUSTING

A. Hanger Adjustments: Adjust hangers to distribute loads equally on attachments and to achieve indicated slope of pipe.

B. Trim excess length of continuous-thread hanger and support rods to 1-1/2 inches.

3.6 PAINTING

A. Touch Up: Clean field welds and abraded areas of shop paint. Paint exposed areas immediately after erecting hangers and supports. Use same materials as used for shop painting. Comply with SSPC-PA 1 requirements for touching up field-painted surfaces.

1. Apply paint by brush or spray to provide minimum dry film thickness of 2.0 mils (0.05 mm).

B. Galvanized Surfaces: Clean welds, bolted connections, and abraded areas and apply galvanizing-repair paint to comply with ASTM A 780.

END OF SECTION 15062

SECTION 15077 – MECHANICAL IDENTIFICATION

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. Section Includes:

1. Equipment labels.
2. Pipe labels.
3. Duct labels.
4. Stencils.
5. Valve tags.

1.3 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Samples: For color, letter style, and graphic representation required for each identification material and device.

C. Equipment Label Schedule: Include a listing of all equipment to be labeled with the proposed content for each label.

D. Valve numbering scheme.

E. Valve Schedules: For each piping system to include in maintenance manuals.

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 locations of access panels and doors.

C. Install identifying devices before installing acoustical ceilings and similar concealment.

PART 2 - PRODUCTS

2.1 EQUIPMENT LABELS

A. Metal Labels for Equipment:

1. Material and Thickness: Stainless steel, 0.025-inch (0.64-mm) minimum thickness, and having predrilled or stamped holes for attachment hardware.
2. Minimum Label Size: Length and width vary for required label content, but not less than 2-1/2 by 3/4 inch (64 by 19 mm).
3. Minimum Letter Size: 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.
4. Fasteners: Stainless-steel rivets or self-tapping screws.
5. Adhesive: Contact-type permanent adhesive, compatible with label and with substrate.

B. Plastic Labels for Equipment:

1. Material and Thickness: Multilayer, multicolor, plastic labels for mechanical engraving, 1/8 inch (3.2 mm) thick, and having predrilled holes for attachment hardware.
2. Letter Color: Black.
3. Background Color: White.
4. Maximum Temperature: Able to withstand temperatures up to 160 deg F (71 deg C).
5. Minimum Label Size: Length and width vary for required label content, but not less than 2-1/2 by 3/4 inch (64 by 19 mm).
6. Minimum Letter Size: 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.
7. Fasteners: Stainless-steel rivets or self-tapping screws.
8. Adhesive: Contact-type permanent adhesive, compatible with label and with substrate.

C. Label Content: Include equipment's Drawing designation or unique equipment number, Drawing numbers where equipment is indicated (plans, details, and schedules), plus the Specification Section number and title where equipment is specified.

D. Equipment Label Schedule: For each item of equipment to be labeled, on 8-1/2-by-11-inch (A4) bond paper. Tabulate equipment identification number and identify Drawing numbers where equipment is indicated (plans, details, and schedules), plus the Specification Section number and title where equipment is specified. Equipment schedule shall be included in operation and maintenance data.

2.2 PIPE LABELS

A. General Requirements for Manufactured Pipe Labels: Preprinted, color-coded, with lettering indicating service, and showing flow direction.

B. Pretensioned Pipe Labels: Precoiled, semirigid plastic formed to partially cover circumference of pipe and to attach to pipe without fasteners or adhesive.

C. Self-Adhesive Pipe Labels: Printed plastic with contact-type, permanent-adhesive backing.

D. Pipe Label Contents: Include identification of piping service using same designations or abbreviations as used on Drawings, pipe size, and an arrow indicating flow direction.

1. Flow-Direction Arrows: Integral with piping system service lettering to accommodate both directions, or as separate unit on each pipe label to indicate flow direction.
2. Lettering Size: At least 1-1/2 inches (38 mm) high.

2.3 DUCT LABELS

A. Material and Thickness: Multilayer, multicolor, plastic labels for mechanical engraving, 1/16 inch (1.6 mm) thick, and having predrilled holes for attachment hardware.

B. Letter Color: Black.

C. Background Color: White.

D. Maximum Temperature: Able to withstand temperatures up to 160 deg F (71 deg C).

E. Minimum Label Size: Length and width vary for required label content, but not less than 2-1/2 by 3/4 inch (64 by 19 mm).

F. Minimum Letter Size: 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.

G. Fasteners: Stainless-steel rivets or self-tapping screws.

H. Adhesive: Contact-type permanent adhesive, compatible with label and with substrate.

I. Duct Label Contents: Include identification of duct service using same designations or abbreviations as used on Drawings, duct size, and an arrow indicating flow direction.

1. Flow-Direction Arrows: Integral with duct system service lettering to accommodate both directions, or as separate unit on each duct label to indicate flow direction.
2. Lettering Size: At least 1-1/2 inches (38 mm) high.

2.4 STENCILS

A. Stencils: Prepared with letter sizes according to ASME A13.1 for piping; minimum letter height of 1-1/4 inches (32 mm) for ducts; and minimum letter height of 3/4 inch (19 mm) for access panel and door labels, equipment labels, and similar operational instructions.

1. Stencil Material: Fiberboard or metal.

2. Stencil Paint: Exterior, gloss, acrylic enamel black unless otherwise indicated. Paint may be in pressurized spray-can form.
3. Identification Paint: Exterior, acrylic enamel in colors according to ASME A13.1 unless otherwise indicated.

2.5 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.

1. Tag Material: Stainless steel, 0.025-inch (0.64-mm) minimum thickness, and having predrilled or stamped holes for attachment hardware.
2. Fasteners: Brass wire-link or beaded chain; or S-hook.

B. Valve Schedules: For each piping system, on 8-1/2-by-11-inch (A4) bond paper. Tabulate valve number, piping system, system abbreviation (as shown on valve tag), location of valve (room or space), normal-operating position (open, closed, or modulating), and variations for identification. Mark valves for emergency shutoff and similar special uses.

1. Valve-tag schedule shall be included in operation and maintenance data.

PART 3 - EXECUTION

3.1 PREPARATION

A. Clean piping and equipment surfaces of substances that could impair bond of identification devices, including dirt, oil, grease, release agents, and incompatible primers, paints, and encapsulants.

3.2 EQUIPMENT LABEL INSTALLATION

A. Install or permanently fasten labels on each major item of mechanical equipment.

B. Locate equipment labels where accessible and visible.

3.3 PIPE LABEL INSTALLATION

A. Locate pipe labels where piping is exposed or above accessible ceilings in finished spaces; machine rooms; accessible maintenance spaces such as shafts, tunnels, and plenums; and exterior exposed 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 inaccessible 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 labels.

3.4 DUCT LABEL INSTALLATION

A. Install self-adhesive duct labels with permanent adhesive on air ducts in the following color codes:

B. Stenciled Duct Label Option: Stenciled labels, showing service and flow direction, may be provided instead of plastic-laminated duct labels, at Installer's option, if lettering larger than 1 inch (25 mm) high is needed for proper identification because of distance from normal location of required identification.

C. Locate labels 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; 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 subparagraphs:

END OF SECTION 15077

SECTION 15080 - MECHANICAL INSULATION

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 mechanical insulation for duct, equipment, and pipe, including the following:

1. Insulation Materials:

    a. Phenolic Foam.
    b. Cellular glass.
    c. Flexible elastomeric.
    d. Mineral fiber.

2. Fire-rated insulation systems.
3. Insulating cements.
4. Adhesives.
5. Mastics.
6. Lagging adhesives.
7. Sealants.
8. Factory-applied jackets.
9. Field-applied fabric-reinforcing mesh.
10. Field-applied cloths.
11. Field-applied jackets.
12. Tapes.
13. Securements.
14. Corner angles.

B. Related Sections include the following:

1. Division 2 Section "Hydronic Distribution" for loose-fill pipe insulation in underground piping outside the building.

1.3 DEFINITIONS

A. ASJ: All-service jacket.

B. FSK: Foil, scrim, kraft paper.

C. FSP: Foil, scrim, polyethylene.

D. PVDC: Polyvinylidene chloride.

E. SSL: Self-sealing lap.

1.4 SUBMITTALS

A. Product Data: For each type of product indicated, identify thermal conductivity, thickness, and jackets (both factory and field applied, if any).

B. Shop Drawings: Show details for the following:

1. Application of protective shields, saddles, and inserts at hangers for each type of insulation and hanger.
2. Insulation application at pipe expansion joints for each type of insulation.
3. Insulation application at elbows, fittings, flanges, valves, and specialties for each type of insulation.
4. Removable insulation at piping specialties, equipment connections, and access panels.
5. Application of field-applied jackets.
6. Application at linkages of control devices.
7. Field application for each equipment type.

C. Installer Certificates: Signed by Contractor certifying that installers comply with requirements.

D. Material Test Reports: From a qualified testing agency acceptable to authorities having jurisdiction indicating, interpreting, and certifying test results for compliance of insulation materials, sealers, attachments, cements, and jackets, with requirements indicated. Include dates of tests and test methods employed.

E. Field quality-control inspection reports.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: Skilled mechanics who have successfully completed an apprenticeship program or another craft training program certified by the Department of Labor, Bureau of Apprenticeship and Training.

B. Fire-Test-Response Characteristics: Insulation and related materials shall have fire-test-response characteristics indicated, as determined by testing identical products per ASTM E 84, by a testing and inspecting agency acceptable to authorities having jurisdiction. Factory label insulation and jacket materials and adhesive, mastic, and cement material containers, with appropriate markings of applicable testing and inspecting agency.

1. Insulation Installed Indoors: Flame-spread index of 25 or less, and smoke-developed index of 50 or less.
2. Insulation Installed Outdoors: Flame-spread index of 75 or less, and smoke-developed index of 150 or less.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Packaging: Insulation material containers shall be marked by manufacturer with appropriate ASTM standard designation, type and grade, and maximum use temperature.

1.7 COORDINATION

A. Coordinate size and location of supports, hangers, and insulation shields specified in Division 15 Section "Hangers and Supports."

B. Coordinate clearance requirements with piping Installer for piping insulation application, duct Installer for duct insulation application, and equipment Installer for equipment insulation application. Before preparing piping and ductwork Shop Drawings, establish and maintain clearance requirements for installation of insulation and field-applied jackets and finishes and for space required for maintenance.

1.8 SCHEDULING

A. Schedule insulation application after pressure testing systems. Insulation application may begin on segments that have satisfactory test results.

B. Complete installation and concealment of plastic materials as rapidly as possible in each area of construction.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:

1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, products specified.
2. Products: Subject to compliance with requirements, provide one of the products specified.
3. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, manufacturers specified.
4. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers specified.

2.2 INSULATION MATERIALS

A. Refer to Part 3 schedule articles for requirements about where insulating materials shall be applied.

B. Products shall not contain asbestos, lead, mercury, or mercury compounds.

C. Products that come in contact with stainless steel shall have a leachable chloride content of less than 50 ppm when tested according to ASTM C 871.

D. Insulation materials for use on austenitic stainless steel shall be qualified as acceptable according to ASTM C 795.

E. Foam insulation materials shall not use CFC or HCFC blowing agents in the manufacturing process.

F. Cellular Glass: Inorganic, incombustible, foamed or cellulated glass with annealed, rigid, hermetically sealed cells. Factory-applied jacket requirements are specified in Part 2 "Factory-Applied Jackets" Article.

1. Available Products:

    a. ACS.
    b. Pittsburgh Corning Corporation; Foamglas Super K.
2. Preformed Pipe Insulation without Jacket: Comply with ASTM C 552, Type II, Class 1.
3. Preformed Pipe Insulation with Factory-Applied ASJ: Comply with ASTM C 552, Type II, Class 2.
4. Factory fabricate shapes according to ASTM C 450 and ASTM C 585.

G. Flexible Elastomeric: Closed-cell, sponge- or expanded-rubber materials. Comply with ASTM C 534, Type I for tubular materials and Type II for sheet materials.

1. Available Products:

    a. Aeroflex USA Inc.; Aerocel.
    b. Armacell LLC; AP Armaflex.
    c. RBX Corporation; Insul-Sheet 1800 and Insul-Tube 180.

H. Mineral-Fiber Blanket Insulation: Mineral or glass fibers bonded with a thermosetting resin. Comply with ASTM C 553, Type II and ASTM C 1290, Type III with factory-applied FSK jacket. Factory-applied jacket requirements are specified in Part 2 "Factory-Applied Jackets" Article.

1. Available Products:

    a. CertainTeed Corp.; Duct Wrap.
    b. Johns Manville; Microlite.
    c. Knauf Insulation; Duct Wrap.
    d. Owens Corning; All-Service Duct Wrap.

I. Mineral-Fiber Board Insulation: Mineral or glass fibers bonded with a thermosetting resin. Comply with ASTM C 612, Type IA or Type IB. For equipment applications, provide insulation with factory-applied ASJ. Factory-applied jacket requirements are specified in Part 2 "Factory-Applied Jackets" Article.

1. Available Products:

    a. CertainTeed Corp.; Commercial Board.

b. Johns Manville; 800 Series Spin-Glas.
c. Knauf Insulation; Insulation Board.
d. Owens Corning; Fiberglas 700 Series.

J. Mineral-Fiber, Preformed Pipe Insulation:

1. Available Products:
   a. Johns Manville; Micro-Lok.
   b. Knauf Insulation; 1000(Pipe Insulation.
   c. Owens Corning; Fiberglas Pipe Insulation.

2. Type I, 850 deg F (454 deg C) Materials: Mineral or glass fibers bonded with a thermosetting resin. Comply with ASTM C 547, Type I, Grade A, with factory-applied ASJ. Factory-applied jacket requirements are specified in Part 2 "Factory-Applied Jackets" Article.

2.3 FIRE-RATED INSULATION SYSTEMS

A. Fire-Rated Blanket: High-temperature, flexible, blanket insulation with FSK jacket that is UL tested and certified to provide a 1 or 2-hour fire rating, as required.

1. Products:

   a. CertainTeed Corp.; FlameChek.
   b. Johns Manville; Firetemp Wrap.
   c. Thermal Ceramics; FireMaster Duct Wrap.
   d. 3M; Fire Barrier Wrap Products.

2.4 INSULATING CEMENTS

A. Mineral-Fiber Insulating Cement: Comply with ASTM C 195.

B. Expanded or Exfoliated Vermiculite Insulating Cement: Comply with ASTM C 196.

C. Mineral-Fiber, Hydraulic-Setting Insulating and Finishing Cement: Comply with ASTM C 449/C 449M.

2.5 ADHESIVES

A. Materials shall be compatible with insulation materials, jackets, and substrates and for bonding insulation to itself and to surfaces to be insulated, unless otherwise indicated.

B. Cellular-Glass Adhesive: Solvent-based resin adhesive, with a service temperature range of minus 75 to plus 300 deg F (minus 59 to plus 149 deg C).

C. Flexible Elastomeric Adhesive: Comply with MIL-A-24179A, Type II, Class I.

D. Mineral-Fiber Adhesive: Comply with MIL-A-3316C, Class 2, Grade A.

E. ASJ Adhesive, and FSK Jacket Adhesive: Comply with MIL-A-3316C, Class 2, Grade A for bonding insulation jacket lap seams and joints.

F. PVC Jacket Adhesive: Compatible with PVC jacket.

1. Products:

2.6 MASTICS

A. Materials shall be compatible with insulation materials, jackets, and substrates; comply with MIL-C-19565C, Type II.

B. Vapor-Barrier Mastic: Solvent based; suitable for indoor use on below ambient services.

1. Products:

a. Childers Products, Division of ITW; CP-30.
b. Foster Products Corporation, H. B. Fuller Company; 30-35.
c. ITW TACC, Division of Illinois Tool Works; CB-25.
d. Marathon Industries, Inc.; 501.
e. Mon-Eco Industries, Inc.; 55-10.

2. Water-Vapor Permeance: ASTM F 1249, 0.05 perm (0.03 metric perm) at 35-mil (0.9-mm) dry film thickness.
3. Service Temperature Range: 0 to 180 deg F (Minus 18 to plus 82 deg C).
4. Solids Content: ASTM D 1644, 44 percent by volume and 62 percent by weight.
5. Color: White.

2.7 LAGGING ADHESIVES

A. Description: Comply with MIL-A-3316C Class I, Grade A and shall be compatible with insulation materials, jackets, and substrates.

1. Fire-resistant, water-based lagging adhesive and coating for use indoors to adhere fire-resistant lagging cloths over duct, equipment, and pipe insulation.
2. Service Temperature Range: Minus 50 to plus 180 deg F (Minus 46 to plus 82 deg C).
3. Color: White.

2.8 SEALANTS

A. Joint Sealants:

1. Joint Sealants for Cellular-Glass, Products:

a. Childers Products, Division of ITW; CP-76.
b. Pittsburgh Corning Corporation; Pittseal 444.

2. Materials shall be compatible with insulation materials, jackets, and substrates.
3. Permanently flexible, elastomeric sealant.

4. Service Temperature Range: Minus 100 to plus 300 deg F (Minus 73 to plus 149 deg C).
5. Color: White or gray.

B. FSK and Metal Jacket Flashing Sealants:

1. Materials shall be compatible with insulation materials, jackets, and substrates.
2. Fire- and water-resistant, flexible, elastomeric sealant.
3. Service Temperature Range: Minus 40 to plus 250 deg F (Minus 40 to plus 121 deg C).
4. Color: Aluminum.

C. ASJ Flashing Sealants, and Vinyl, PVDC, and PVC Jacket Flashing Sealants:

1. Materials shall be compatible with insulation materials, jackets, and substrates.
2. Fire- and water-resistant, flexible, elastomeric sealant.
3. Service Temperature Range: Minus 40 to plus 250 deg F (Minus 40 to plus 121 deg C).
4. Color: White.

2.9 FACTORY-APPLIED JACKETS

A. Insulation system schedules indicate factory-applied jackets on various applications. When factory-applied jackets are indicated, comply with the following:

1. ASJ: White, kraft-paper, fiberglass-reinforced scrim with aluminum-foil backing; complying with ASTM C 1136, Type I.
2. ASJ-SSL: ASJ with self-sealing, pressure-sensitive, acrylic-based adhesive covered by a removable protective strip; complying with ASTM C 1136, Type I.
3. FSK Jacket: Aluminum-foil, fiberglass-reinforced scrim with kraft-paper backing; complying with ASTM C 1136, Type II.
4. FSP Jacket: Aluminum-foil, fiberglass-reinforced scrim with polyethylene backing; complying with ASTM C 1136, Type II.

2.10 FIELD-APPLIED FABRIC-REINFORCING MESH

A. Woven Glass-Fiber Fabric for Pipe Insulation: Approximately 2 oz./sq. yd. (68 g/sq. m) with a thread count of 10 strands by 10 strands/sq. inch (4 strands by 4 strands/sq. mm) for covering pipe and pipe fittings.

B. Woven Glass-Fiber Fabric for Duct and Equipment Insulation: Approximately 6 oz./sq. yd. (203 g/sq. m) with a thread count of 5 strands by 5 strands/sq. inch (2 strands by 2 strands/sq. mm) for covering equipment.

2.11 FIELD-APPLIED CLOTHS

A. Woven Glass-Fiber Fabric: Comply with MIL-C-20079H, Type I, plain weave, and presized a minimum of 8 oz./sq. yd. (271 g/sq. m).

2.12 FIELD-APPLIED JACKETS

A. Field-applied jackets shall comply with ASTM C 921, Type I, unless otherwise indicated.

B. FSK Jacket: Aluminum-foil-face, fiberglass-reinforced scrim with kraft-paper backing.

C. PVC Jacket: High-impact-resistant, UV-resistant PVC complying with ASTM D 1784, Class 16354-C; thickness 20 mil; roll stock ready for shop or field cutting and forming. Thickness is indicated in field-applied jacket schedules.

1. Adhesive: As recommended by jacket material manufacturer.
2. Color: White.
3. Factory-fabricated fitting covers to match jacket if available; otherwise, field fabricate.

    a. Shapes: 45- and 90-degree, short- and long-radius elbows, tees, valves, flanges, unions, reducers, end caps, soil-pipe hubs, traps, mechanical joints, and P-trap and supply covers for lavatories.

4. Factory-fabricated tank heads and tank side panels.

D. Metal Jacket:

1. Aluminum Jacket: Comply with ASTM B 209 (ASTM B 209M), Alloy 3003, 3005, 3105 or 5005, Temper H-14.

    a. Sheet and roll stock ready for shop or field sizing.
    b. Thickness: 0.020” Smooth.
    c. Moisture Barrier for Indoor Applications: 1-mil- thick, heat-bonded polyethylene and kraft paper.
    d. Moisture Barrier for Outdoor Applications: 3-mil- thick, heat-bonded polyethylene and kraft paper.
    e. Factory-Fabricated Fitting Covers:

        1) Same material, finish, and thickness as jacket.
        2) Preformed 2-piece or gore, 45- and 90-degree, short- and long-radius elbows.
        3) Tee covers.
        4) Flange and union covers.
        5) End caps.
        6) Beveled collars.
        7) Valve covers.
        8) Field fabricate fitting covers only if factory-fabricated fitting covers are not available.

2.13 TAPES

A. ASJ Tape: White vapor-retarder tape matching factory-applied jacket with acrylic adhesive, complying with ASTM C 1136 and UL listed.

1. Width: 3 inches.

2. Thickness: 11.5 mils.
3. Adhesion: 90 ounces force/inch in width.
4. Elongation: 2 percent.
5. Tensile Strength: 40 lbf/inch in width.
6. ASJ Tape Disks and Squares: Precut disks or squares of ASJ tape.

B. FSK Tape: Foil-face, vapor-retarder tape matching factory-applied jacket with acrylic adhesive; complying with ASTM C 1136 and UL listed.

1. Width: 3 inches.
2. Thickness: 6.5 mils.
3. Adhesion: 90 ounces force/inch in width.
4. Elongation: 2 percent.
5. Tensile Strength: 40 lbf/inch in width.
6. FSK Tape Disks and Squares: Precut disks or squares of FSK tape.

C. PVC Tape: White vapor-retarder tape matching field-applied PVC jacket with acrylic adhesive. Suitable for indoor and outdoor applications.

1. Width: 2 inches.
2. Thickness: 6 mils.
3. Adhesion: 64 ounces force/inch in width.
4. Elongation: 500 percent.
5. Tensile Strength: 18 lbf/inch in width.

D. Aluminum-Foil Tape: Vapor-retarder tape with acrylic adhesive and UL listed.

1. Width: 2 inches.
2. Thickness: 3.7 mils.
3. Adhesion: 100 ounces force/inch in width.
4. Elongation: 5 percent.
5. Tensile Strength: 34 lbf/inch in width.

2.14 SECUREMENTS

A. Bands:
1. Aluminum: ASTM B 209, Alloy 3003, 3005, 3105, or 5005; Temper H-14, 0.020 inch thick, 3/4 inch wide with wing or closed seal.
2. Springs: Twin spring set constructed of stainless steel with ends flat and slotted to accept metal bands. Spring size determined by manufacturer for application.

B. Insulation Pins and Hangers:

1. Capacitor-Discharge-Weld Pins: Copper- or zinc-coated steel pin, fully annealed for capacitor-discharge welding, 0.106-inch- diameter shank, length to suit depth of insulation indicated.

2. Insulation-Retaining Washers: Self-locking washers formed from 0.016-inch- thick, galvanized-steel sheet, with beveled edge sized as required to hold insulation securely in place but not less than 1-1/2 inches in diameter.

a. Protect ends with capped self-locking washers incorporating a spring steel insert to ensure permanent retention of cap in exposed locations.

C. Staples: Outward-clinching insulation staples, nominal 3/4-inch- wide, stainless steel or Monel.

D. Wire: 0.080-inch nickel-copper alloy.

2.15 CORNER ANGLES

A. PVC Corner Angles: 30 mils thick, minimum 1 by 1 inch, PVC according to ASTM D 1784, Class 16354-C. White or color-coded to match adjacent surface.

B. Aluminum Corner Angles: 0.040 inch thick, minimum 1 by 1 inch, aluminum according to ASTM B 209, Alloy 3003, 3005, 3105 or 5005; Temper H-14.

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.

1. Verify that systems and equipment to be insulated have been tested and are free of defects.
2. Verify that surfaces to be insulated are clean and dry.
3. 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.

B. Mix insulating cements with clean potable water; if insulating cements are to be in contact with stainless-steel surfaces, use demineralized water.

3.3 COMMON INSTALLATION REQUIREMENTS

A. Install insulation materials, accessories, and finishes with smooth, straight, and even surfaces; free of voids throughout the length of equipment, ducts and fittings, and piping including fittings, valves, and specialties.

B. Install insulation materials, forms, vapor barriers or retarders, jackets, and thicknesses required for each item of equipment, duct system, and pipe system as specified in insulation system schedules.

C. Install accessories compatible with insulation materials and suitable for the service. Install accessories that do not corrode, soften, or otherwise attack insulation or jacket in either wet or dry state.

D. Install insulation with longitudinal seams at top and bottom of horizontal runs.

E. Install multiple layers of insulation with longitudinal and end seams staggered.

F. Do not weld brackets, clips, or other attachment devices to piping, fittings, and specialties.

G. Keep insulation materials dry during application and finishing.

H. Install insulation with tight longitudinal seams and end joints. Bond seams and joints with adhesive recommended by insulation material manufacturer.

I. Install insulation with least number of joints practical.

J. Where vapor barrier is indicated, seal joints, seams, and penetrations in insulation at hangers, supports, anchors, and other projections with vapor-barrier mastic.

1. Install insulation continuously through hangers and around anchor attachments.
2. For insulation application where vapor barriers are indicated, extend insulation on anchor legs from point of attachment to supported item to point of attachment to structure. Taper and seal ends at attachment to structure with vapor-barrier mastic.
3. Install insert materials and install insulation to tightly join the insert. Seal insulation to insulation inserts with adhesive or sealing compound recommended by insulation material manufacturer.
4. Cover inserts with jacket material matching adjacent pipe insulation. Install shields over jacket, arranged to protect jacket from tear or puncture by hanger, support, and shield.

K. Apply adhesives, mastics, and sealants at manufacturer's recommended coverage rate and wet and dry film thicknesses.

L. Install insulation with factory-applied jackets as follows:

1. Draw jacket tight and smooth.
2. Cover circumferential joints with 3-inch- wide strips, of same material as insulation jacket. Secure strips with adhesive and outward clinching staples along both edges of strip, spaced 4 inches o.c.
3. Overlap jacket longitudinal seams at least 1-1/2 inches. Install 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 o.c.

    a. For below ambient services, apply vapor-barrier mastic over staples.

4. Cover joints and seams with tape as recommended by insulation material manufacturer to maintain vapor seal.
5. Where vapor barriers are indicated, apply vapor-barrier mastic on seams and joints and at ends adjacent to duct and pipe flanges and fittings.

M. Cut insulation in a manner to avoid compressing insulation more than 75 percent of its nominal thickness.

N. Finish installation with systems at operating conditions. Repair joint separations and cracking due to thermal movement.

O. Repair damaged insulation facings by applying same facing material over damaged areas. Extend patches at least 4 inches beyond damaged areas. Adhere, staple, and seal patches similar to butt joints.

P. For above ambient services, do not install insulation to the following:

1. Vibration-control devices.
2. Testing agency labels and stamps.
3. Nameplates and data plates.
4. Manholes.
5. Handholes.
6. Cleanouts.

3.4 PENETRATIONS

A. Insulation Installation at Roof Penetrations: Install insulation continuously through roof penetrations.

1. Seal penetrations with flashing sealant.
2. For applications requiring only indoor insulation, terminate insulation above roof surface and seal with joint sealant. For applications requiring indoor and outdoor insulation, install insulation for outdoor applications tightly joined to indoor insulation ends. Seal joint with joint sealant.
3. Extend jacket of outdoor insulation outside roof flashing at least 2 inches below top of roof flashing.
4. Seal jacket to roof flashing with flashing sealant.

B. Insulation Installation at Below-Grade Exterior Wall Penetrations: Terminate insulation flush with sleeve seal. Seal terminations with flashing sealant.

C. Insulation Installation at Aboveground Exterior Wall Penetrations: Install insulation continuously through wall penetrations.

1. Seal penetrations with flashing sealant.
2. For applications requiring only indoor insulation, terminate insulation inside wall surface and seal with joint sealant. For applications requiring indoor and outdoor insulation, install insulation for outdoor applications tightly joined to indoor insulation ends. Seal joint with joint sealant.
3. Extend jacket of outdoor insulation outside wall flashing and overlap wall flashing at least 2 inches.
4. Seal jacket to wall flashing with flashing sealant.

D. Insulation Installation at Interior Wall and Partition Penetrations (That Are Not Fire Rated): Install insulation continuously through walls and partitions.

E. Insulation Installation at Fire-Rated Wall and Partition Penetrations: Install insulation continuously through penetrations of fire-rated walls and partitions. Terminate insulation at fire damper sleeves for fire-rated wall and partition penetrations. Externally insulate damper sleeves to match adjacent insulation and overlap duct insulation at least 2 inches.

1. Firestopping and fire-resistive joint sealers are specified in Division 7 Section "Through-Penetration Firestop Systems."

F. Insulation Installation at Floor Penetrations:

1. Duct: Install insulation continuously through floor penetrations that are not fire rated. For penetrations through fire-rated assemblies, terminate insulation at fire damper sleeves and externally insulate damper sleeve beyond floor to match adjacent duct insulation. Overlap damper sleeve and duct insulation at least 2 inches.
2. Pipe: Install insulation continuously through floor penetrations.
3. Seal penetrations through fire-rated assemblies according to Division 7 Section "Through-Penetration Firestop Systems."

3.5 DUCT AND PLENUM INSULATION INSTALLATION

A. Blanket Insulation Installation on Ducts and Plenums: Secure with adhesive and insulation pins.

1. Apply adhesives according to manufacturer's recommended coverage rates per unit area, for 50 percent coverage of duct and plenum surfaces.
2. Apply adhesive to entire circumference of ducts and to all surfaces of fittings and transitions.
3. Install capacitor-discharge-weld pins and speed washers on sides and bottom of horizontal ducts and sides of vertical ducts as follows:

    a. On duct sides with dimensions 18 inches and smaller, place pins along longitudinal centerline of duct. Space 3 inches maximum from insulation end joints, and 16 inches o.c.
    b. On duct sides with dimensions larger than 18 inches, place pins 16 inches o.c. each way, and 3 inches maximum from insulation joints. Install additional pins to hold insulation tightly against surface at cross bracing.

3.6 EQUIPMENT, TANK, AND VESSEL INSULATION INSTALLATION

A. Secure insulation with adhesive and anchor pins and speed washers.

1. Apply adhesives according to manufacturer's recommended coverage rates per unit area, for 50 percent coverage of tank and vessel surfaces.
2. Groove and score insulation materials to fit as closely as possible to equipment, including contours. Bevel insulation edges for cylindrical surfaces for tight joints. Stagger end joints.
3. Protect exposed corners with secured corner angles.
4. Install adhesively attached or self-sticking insulation hangers and speed washers on sides of tanks and vessels as follows:

a. Do not weld anchor pins to ASME-labeled pressure vessels.
b. Select insulation hangers and adhesive that are compatible with service temperature and with substrate.
c. On tanks and vessels, maximum anchor-pin spacing is 3 inches from insulation end joints, and 16 inches o.c. in both directions.
d. Do not overcompress insulation during installation.
e. Cut and miter insulation segments to fit curved sides and domed heads of tanks and vessels.
f. Impale insulation over anchor pins and attach speed washers.
g. 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. Secure each layer of insulation with stainless-steel or aluminum bands. Select band material compatible with insulation materials.
6. Where insulation hangers on equipment and vessels are not permitted or practical and where insulation support rings are not provided, install a girdle network for securing insulation. Stretch prestressed aircraft cable around the diameter of vessel and make taut with clamps, turnbuckles, or breather springs. Place one circumferential girdle around equipment approximately 6 inches from each end. Install wire or cable between two circumferential girdles 12 inches o.c. Install a wire ring around each end and around outer periphery of center openings, and stretch prestressed aircraft cable radially from the wire ring to nearest circumferential girdle. Install additional circumferential girdles along the body of equipment or tank at a minimum spacing of 48 inches o.c. Use this network for securing insulation with tie wire or bands.
7. Stagger joints between insulation layers at least 3 inches.
8. Install insulation in removable segments on equipment access doors, manholes, handholes, and other elements that require frequent removal for service and inspection.
9. Bevel and seal insulation ends around manholes, handholes, ASME stamps, and nameplates.
10. For equipment with surface temperatures below ambient, apply mastic to open ends, joints, seams, breaks, and punctures in insulation.

B. Flexible Elastomeric Thermal Insulation Installation for Tanks and Vessels: Install insulation over entire surface of tanks and vessels.

1. Apply 100 percent coverage of adhesive to surface with manufacturer's recommended adhesive.
2. Seal longitudinal seams and end joints.

C. Insulation Installation on Pumps:

1. Fabricate metal boxes lined with insulation. Fit boxes around pumps and coincide box joints with splits in pump casings. Fabricate joints with outward bolted flanges. Bolt flanges on 6-inch centers, starting at corners. Install 3/8-inch- diameter fasteners with wing nuts. Alternatively, secure the box sections together using a latching mechanism.
2. Fabricate boxes from galvanized steel, at least 0.040 inch thick.
3. For below ambient services, install a vapor barrier at seams, joints, and penetrations. Seal between flanges with replaceable gasket material to form a vapor barrier.

3.7 GENERAL PIPE INSULATION INSTALLATION

A. Requirements in this Article generally apply to all insulation materials except where more specific requirements are specified in various pipe insulation material installation articles.

B. Insulation Installation on Fittings, Valves, Strainers, Flanges, and Unions:

1. Install insulation over fittings, valves, strainers, flanges, unions, and other specialties with continuous thermal and vapor-retarder integrity, unless otherwise indicated.
2. Insulate pipe elbows using preformed fitting insulation or mitered fittings made from same material and density as adjacent pipe insulation. Each piece shall be butted tightly against adjoining piece and bonded with adhesive. Fill joints, seams, voids, and irregular surfaces with insulating cement finished to a smooth, hard, and uniform contour that is uniform with adjoining pipe insulation.
3. Insulate tee fittings with preformed fitting insulation or sectional pipe insulation of same material and thickness as used for adjacent pipe. Cut sectional pipe insulation to fit. Butt each section closely to the next and hold in place with tie wire. Bond pieces with adhesive.
4. Insulate valves using preformed fitting insulation or sectional pipe insulation of same material, density, and thickness as used for adjacent pipe. Overlap adjoining pipe insulation by not less than two times the thickness of pipe insulation, or one pipe diameter, whichever is thicker. For valves, insulate up to and including the bonnets, valve stuffing-box studs, bolts, and nuts. Fill joints, seams, and irregular surfaces with insulating cement.
5. Insulate strainers using preformed fitting insulation or sectional pipe insulation of same material, density, and thickness as used for adjacent pipe. Overlap adjoining pipe insulation by not less than two times the thickness of pipe insulation, or one pipe diameter, whichever is thicker. Fill joints, seams, and irregular surfaces with insulating cement. Insulate strainers so strainer basket flange or plug can be easily removed and replaced without damaging the insulation and jacket. Provide a removable reusable insulation cover. For below ambient services, provide a design that maintains vapor barrier.
6. Insulate flanges and unions using a section of oversized preformed pipe insulation. Overlap adjoining pipe insulation by not less than two times the thickness of pipe insulation, or one pipe diameter, whichever is thicker.
7. Cover segmented insulated surfaces with a layer of finishing cement and coat with a mastic. Install vapor-barrier mastic for below ambient services and a breather mastic for above ambient services. Reinforce the mastic with fabric-reinforcing mesh. Trowel the mastic to a smooth and well-shaped contour.
8. For services not specified to receive a field-applied jacket except for flexible elastomeric, install fitted PVC cover over elbows, tees, strainers, valves, flanges, and unions. Terminate ends with PVC end caps. Tape PVC covers to adjoining insulation facing using PVC tape.
9. Stencil or label the outside insulation jacket of each union with the word "UNION." Match size and color of pipe labels.

C. Insulate instrument connections for thermometers, pressure gages, pressure temperature taps, test connections, flow meters, sensors, switches, and transmitters on insulated pipes, vessels, and equipment. Shape insulation at these connections by tapering it to and around the connection with insulating cement and finish with finishing cement, mastic, and flashing sealant.

D. Install removable insulation covers at locations indicated. Installation shall conform to the following:

1. Make removable flange and union insulation from sectional pipe insulation of same thickness as that on adjoining pipe. Install same insulation jacket as adjoining pipe insulation.
2. When flange and union covers are made from sectional pipe insulation, extend insulation from flanges or union long at least two times the insulation thickness over adjacent pipe insulation on each side of flange or union. Secure flange cover in place with stainless-steel or aluminum bands. Select band material compatible with insulation and jacket.
3. Construct removable valve insulation covers in same manner as for flanges except divide the two-part section on the vertical center line of valve body.
4. When covers are made from block insulation, make two halves, each consisting of mitered blocks wired to stainless-steel fabric. Secure this wire frame, with its attached insulation, to flanges with tie wire. Extend insulation at least 2 inches over adjacent pipe insulation on each side of valve. Fill space between flange or union cover and pipe insulation with insulating cement. Finish cover assembly with insulating cement applied in two coats. After first coat is dry, apply and trowel second coat to a smooth finish.
5. Unless a PVC jacket is indicated in field-applied jacket schedules, finish exposed surfaces with a metal jacket.

3.8 CELLULAR-GLASS INSULATION INSTALLATION

A. Insulation Installation on Straight Pipes and Tubes:

1. Secure each layer of insulation to pipe with wire or bands and tighten bands without deforming insulation materials.
2. Where vapor barriers are indicated, seal longitudinal seams, end joints, and protrusions with vapor-barrier mastic and joint sealant.
3. For insulation with factory-applied jackets on above ambient services, secure laps with outward clinched staples at 6 inches o.c.
4. For insulation with factory-applied jackets on below ambient services, do not staple longitudinal tabs but secure tabs with additional adhesive as recommended by insulation material manufacturer and seal with vapor-barrier mastic and flashing sealant.

B. Insulation Installation on Pipe Flanges:

1. Install preformed pipe insulation to outer diameter of pipe flange.
2. Make width of insulation section same as overall width of flange and bolts, plus twice the thickness of pipe insulation.
3. Fill voids between inner circumference of flange insulation and outer circumference of adjacent straight pipe segments with cut sections of cellular-glass block insulation of same thickness as pipe insulation.
4. Install jacket material with manufacturer's recommended adhesive, overlap seams at least 1 inch, and seal joints with flashing sealant.

C. Insulation Installation on Pipe Fittings and Elbows:

1. Install preformed sections of same material as straight segments of pipe insulation when available. Secure according to manufacturer's written instructions.

2. When preformed sections of insulation are not available, install mitered sections of cellular-glass insulation. Secure insulation materials with wire or bands.

D. Insulation Installation on Valves and Pipe Specialties:

1. Install preformed sections of cellular-glass insulation to valve body.
2. Arrange insulation to permit access to packing and to allow valve operation without disturbing insulation.
3. Install insulation to flanges as specified for flange insulation application.

3.9 FLEXIBLE ELASTOMERIC INSULATION INSTALLATION

A. Seal longitudinal seams and end joints with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.

B. Insulation Installation on Pipe Flanges:

1. Install pipe insulation to outer diameter of pipe flange.
2. Make width of insulation section same as overall width of flange and bolts, plus twice the thickness of 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 same thickness as pipe insulation.
4. Secure insulation to flanges and seal seams with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.

C. Insulation Installation on Pipe Fittings and Elbows:

1. Install mitered sections of pipe insulation.
2. Secure insulation materials and seal seams with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.

D. Insulation Installation on Valves and Pipe Specialties:

1. Install preformed valve covers manufactured of same material as pipe insulation when available.
2. When preformed valve covers are not available, install cut sections of pipe and sheet insulation to valve body. Arrange insulation to permit access to packing and to allow valve operation without disturbing insulation.
3. Install insulation to flanges as specified for flange insulation application.
4. Secure insulation to valves and specialties and seal seams with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.

3.10 MINERAL-FIBER INSULATION INSTALLATION

A. Insulation Installation on Straight Pipes and Tubes:

1. Secure each layer of preformed pipe insulation to pipe with wire or bands and tighten bands without deforming insulation materials.
2. Where vapor barriers are indicated, seal longitudinal seams, end joints, and protrusions with vapor-barrier mastic and joint sealant.
3. For insulation with factory-applied jackets on above ambient surfaces, secure laps with outward clinched staples at 6 inches o.c.
4. For insulation with factory-applied jackets on below ambient surfaces, do not staple longitudinal tabs but secure tabs with additional adhesive as recommended by insulation material manufacturer and seal with vapor-barrier mastic and flashing sealant.

B. Insulation Installation on Pipe Flanges:

1. Install preformed pipe insulation to outer diameter of pipe flange.
2. Make width of insulation section same as overall width of flange and bolts, plus twice the thickness of 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. Install jacket material with manufacturer's recommended adhesive, overlap seams at least 1 inch, and seal joints with flashing sealant.

C. Insulation Installation on Pipe Fittings and Elbows:

1. Install preformed sections of same material as straight segments of pipe insulation when available.
2. When preformed insulation elbows and fittings are not available, install mitered sections of pipe insulation, to a thickness equal to adjoining pipe insulation. Secure insulation materials with wire or bands.

D. Insulation Installation on Valves and Pipe Specialties:

1. Install preformed sections of same material as straight segments of pipe insulation when available.
2. When preformed sections are not available, install mitered sections of pipe insulation to valve body.
3. Arrange insulation to permit access to packing and to allow valve operation without disturbing insulation.
4. Install insulation to flanges as specified for flange insulation application.

E. Blanket Insulation Installation on Ducts and Plenums: Secure with adhesive and insulation pins.

1. Apply adhesives according to manufacturer's recommended coverage rates per unit area, for 50 percent coverage of duct and plenum surfaces.
2. Apply adhesive to entire circumference of ducts and to all surfaces of fittings and transitions.
3. Install capacitor-discharge-weld pins and speed washers on sides and bottom of horizontal ducts and sides of vertical ducts as follows:

    a. On duct sides with dimensions 18 inches and smaller, place pins along longitudinal centerline of duct. Space 3 inches maximum from insulation end joints, and 16 inches o.c.

b. On duct sides with dimensions larger than 18 inches, place pins 16 inches o.c. each way, and 3 inches maximum from insulation joints. Install additional pins to hold insulation tightly against surface at cross bracing.
c. Pins may be omitted from top surface of horizontal, rectangular ducts and plenums.
d. Do not overcompress insulation during installation.
e. Impale insulation over pins and attach speed washers.
f. 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.

4. For ducts and plenums with surface temperatures below ambient, install a continuous unbroken vapor barrier. Create a facing lap for longitudinal seams and end joints with insulation by removing 2 inches (50 mm) from 1 edge and 1 end of insulation segment. Secure laps to adjacent insulation section with 1/2-inch (13-mm) outward-clinching staples, 1 inch (25 mm) o.c. Install vapor barrier consisting of factory- or field-applied jacket, adhesive, vapor-barrier mastic, and sealant at joints, seams, and protrusions.

   a. Repair punctures, tears, and penetrations with tape or mastic to maintain vapor-barrier seal.
   b. Install vapor stops for ductwork and plenums operating below 50 deg F (10 deg C) at 18-foot (5.5-m) intervals. Vapor stops shall consist of vapor-barrier mastic applied in a Z-shaped pattern over insulation face, along butt end of insulation, and over the surface. Cover insulation face and surface to be insulated a width equal to 2 times the insulation thickness but not less than 3 inches (75 mm).

5. Overlap unfaced blankets a minimum of 2 inches on longitudinal seams and end joints. At end joints, secure with steel bands spaced a maximum of 18 inches o.c.
6. Install insulation on rectangular duct elbows and transitions with a full insulation section for each surface. Install insulation on round and flat-oval duct elbows with individually mitered gores cut to fit the elbow.
7. Insulate duct stiffeners, hangers, and flanges that protrude beyond insulation surface with 6-inch- wide strips of same material used to insulate duct. Secure on alternating sides of stiffener, hanger, and flange with pins spaced 6 inches o.c.

F. Board Insulation Installation on Ducts and Plenums: Secure with adhesive and insulation pins.

1. Apply adhesives according to manufacturer's recommended coverage rates per unit area, for 50 percent coverage of duct and plenum surfaces.
2. Apply adhesive to entire circumference of ducts and to all surfaces of fittings and transitions.
3. Install capacitor-discharge-weld pins and speed washers on sides and bottom of horizontal ducts and sides of vertical ducts as follows:

   a. On duct sides with dimensions 18 inches and smaller, place pins along longitudinal centerline of duct. Space 3 inches maximum from insulation end joints, and 16 inches o.c.
   b. On duct sides with dimensions larger than 18 inches, space pins 16 inches o.c. each way, and 3 inches maximum from insulation joints. Install additional pins to hold insulation tightly against surface at cross bracing.
   c. Pins may be omitted from top surface of horizontal, rectangular ducts and plenums.
   d. Do not overcompress insulation during installation.

e. 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.

4. For ducts and plenums with surface temperatures below ambient, install a continuous unbroken vapor barrier. Create a facing lap for longitudinal seams and end joints with insulation by removing 2 inches (50 mm) from 1 edge and 1 end of insulation segment. Secure laps to adjacent insulation section with 1/2-inch (13-mm) outward-clinching staples, 1 inch (25 mm) o.c. Install vapor barrier consisting of factory- or field-applied jacket, adhesive, vapor-barrier mastic, and sealant at joints, seams, and protrusions.

   a. Repair punctures, tears, and penetrations with tape or mastic to maintain vapor-barrier seal.
   b. Install vapor stops for ductwork and plenums operating below 50 deg F (10 deg C) at 18-foot (5.5-m) intervals. Vapor stops shall consist of vapor-barrier mastic applied in a Z-shaped pattern over insulation face, along butt end of insulation, and over the surface. Cover insulation face and surface to be insulated a width equal to 2 times the insulation thickness but not less than 3 inches (75 mm).

5. Install insulation on rectangular duct elbows and transitions with a full insulation section for each surface. Groove and score insulation to fit as closely as possible to outside and inside radius of elbows. Install insulation on round and flat-oval duct elbows with individually mitered gores cut to fit the elbow.
6. Insulate duct stiffeners, hangers, and flanges that protrude beyond insulation surface with 6-inch- wide strips of same material used to insulate duct. Secure on alternating sides of stiffener, hanger, and flange with pins spaced 6 inches o.c.

3.11 FIELD-APPLIED JACKET INSTALLATION

A. Where glass-cloth jackets are indicated, install directly over bare insulation or insulation with factory-applied jackets.

   1. Draw jacket smooth and tight to surface with 2-inch overlap at seams and joints.
   2. Embed glass cloth between two 0.062-inch- thick coats of lagging adhesive.
   3. Completely encapsulate insulation with coating, leaving no exposed insulation.

B. Where FSK jackets are indicated, install as follows:

   1. Draw jacket material smooth and tight.
   2. Install lap or joint strips with same material as jacket.
   3. Secure jacket to insulation with manufacturer's recommended adhesive.
   4. Install jacket with 1-1/2-inch laps at longitudinal seams and 3-inch- wide joint strips at end joints.
   5. Seal openings, punctures, and breaks in vapor-retarder jackets and exposed insulation with vapor-barrier mastic.

C. Where PVC jackets are indicated, install with 1-inch overlap at longitudinal seams and end joints; for horizontal applications, install with longitudinal seams along top and bottom of tanks and vessels. Seal with manufacturer's recommended adhesive.

1. Apply two continuous beads of adhesive to seams and joints, one bead under lap and the finish bead along seam and joint edge.

D. Where metal jackets are indicated, install with 2-inch 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 o.c. and at end joints.

3.12 FIRE-RATED INSULATION SYSTEM INSTALLATION

A. Where fire-rated insulation system is indicated, secure system to ducts and duct hangers and supports to maintain a continuous UL-listed fire rating.

B. Insulate duct access panels and doors to achieve same fire rating as duct.

C. Install firestopping at penetrations through fire-rated assemblies. Fire-stop systems are specified in Division 7 Section "Through-Penetration Firestop Systems."

3.13 FINISHES

A. Duct, Equipment, and Pipe Insulation with ASJ, Glass-Cloth, or Other Paintable Jacket Material: Paint jacket with paint system identified below and as specified in Division 9 painting Sections. Paint only those items in exposed, public areas.

1. Flat Acrylic Finish: Two finish coats over a primer that is compatible with jacket material and finish coat paint. Add fungicidal agent to render fabric mildew proof.

a. Finish Coat Material: Interior, flat, latex-emulsion size.

B. Flexible Elastomeric Thermal Insulation: After adhesive has fully cured, apply two coats of insulation manufacturer's recommended protective coating.

C. Color: Final color as selected by Architect. Vary first and second coats to allow visual inspection of the completed Work.

D. Do not field paint aluminum or stainless-steel jackets.

3.14 FIELD QUALITY CONTROL

A. Testing Agency: Engage a qualified independent inspecting agency to perform field inspections and prepare inspection reports.

B. All insulation applications will be considered defective Work if sample inspection reveals noncompliance with requirements. Remove defective Work.

C. Install new insulation and jackets to replace insulation and jackets removed for inspection. Repeat inspection procedures after new materials are installed.

3.15 DUCT INSULATION SCHEDULE, GENERAL

A. Plenums and Ducts Requiring Insulation:

1. Indoor, concealed supply and outdoor air.
2. Indoor, exposed supply and outdoor air.
3. Indoor, concealed return located in nonconditioned space.
4. Indoor, exposed return located in nonconditioned space.
5. Indoor, concealed oven and warewash exhaust.
6. Indoor, exposed oven and warewash exhaust.
7. Indoor, concealed exhaust air.
8. Indoor, exposed exhaust air.
9. Outdoor, concealed supply and return.
10. Outdoor, exposed supply and return.

B. Items Not Insulated:

1. Metal ducts with duct liner of sufficient thickness to comply with energy code and ASHRAE/IESNA 90.1.
2. Factory-insulated flexible ducts.
3. Factory-insulated plenums and casings.
4. Flexible connectors.
5. Vibration-control devices.
6. Factory-insulated access panels and doors.

3.16 INDOOR DUCT AND PLENUM INSULATION SCHEDULE

A. Concealed, round and flat-oval, supply-air duct insulation shall be the following:

1. Mineral-Fiber Blanket: 2 inches thick and 1.5-lb/cu. ft. nominal density.

B. Concealed, round and flat-oval, return-air duct insulation shall be the following:

1. Mineral-Fiber Blanket: 2 inches thick and 1.5-lb/cu. ft. nominal density.

C. Concealed, round and flat-oval, outdoor-air duct insulation shall be the following:

1. Mineral-Fiber Blanket: 2 inches thick and 1.5-lb/cu. ft. nominal density.

D. Concealed, round and flat-oval, exhaust-air duct insulation shall be the following:

1. Mineral-Fiber Blanket: 2 inches thick and 1.5-lb/cu. ft. nominal density.

E. Concealed, rectangular, supply-air duct insulation shall be the following:

1. Mineral-Fiber Blanket: 2 inches thick and 1.5-lb/cu. ft. nominal density.

F. Concealed, rectangular, return-air duct insulation shall be the following:

1. Mineral-Fiber Blanket: 2 inches thick and 1.5-lb/cu. ft. nominal density.

G. Concealed, rectangular, outdoor-air duct insulation shall be the following:

1. Mineral-Fiber Blanket: 2 inches thick and 1.5-lb/cu. ft. nominal density.

H. Concealed, rectangular, exhaust-air duct insulation shall be the following:

1. Mineral-Fiber Blanket: 2 inches thick and 1.5-lb/cu. ft. nominal density.

I. Concealed, return-air plenum insulation shall be the following:
   1. Mineral-Fiber Blanket: 2 inches thick and 1.5-lb/cu. ft. nominal density.
   2. Mineral-Fiber Board: 1-1/2 inches thick and 2-lb/cu. ft. nominal density.

J. Exposed, round and flat-oval, supply-air duct insulation shall be the following:

   1. Double wall insulated duct.

K. Exposed, round and flat-oval, return-air duct insulation shall be the following:
   1. Mineral-Fiber Blanket: 2 inches thick and 1.5-lb/cu. ft. nominal density.
   2. Insulation not required in conditioned spaces.

L. Exposed, round and flat-oval, outdoor-air duct insulation shall be the following:
   1. Mineral-Fiber Blanket: 2 inches thick and 1.5-lb/cu. ft. nominal density.

M. Exposed, round and flat-oval, exhaust-air duct insulation shall be the following:
   1. Mineral-Fiber Blanket: 2 inches thick and nominal density.
   2. Insulation not required in conditioned spaces.

N. Exposed, rectangular, supply-air duct insulation shall be the following:
   1. Mineral-Fiber Blanket: 2 inches thick and 1.5-lb/cu. ft. nominal density.
   2. For rectangular ducts in public spaces, use double-wall insulated duct.

O. Exposed, rectangular, return-air duct insulation shall be the following:
   1. Mineral-Fiber Blanket: 2 inches thick and nominal density.
   2. Insulation not required in conditioned spaces.

P. Exposed, rectangular, outdoor-air duct insulation shall be the following:
   1. Mineral-Fiber Blanket: 2 inches thick and 1.5-lb/cu. ft. nominal density.

Q. Exposed, rectangular, exhaust-air duct insulation shall be the following:
   1. Mineral-Fiber Blanket: 2 inches thick and 1.5-lb/cu. ft. nominal density.
   2. Insulation not required in conditioned spaces.

R. Exposed, return-air plenum insulation shall be the following:
   1. Mineral-Fiber Blanket: 2 inches thick and 1.5-lb/cu. ft. nominal density.
   2. Mineral-Fiber Board: 1-1/2 inches thick and 2-lb/cu. ft. nominal density.

3.17 ABOVEGROUND, OUTDOOR DUCT AND PLENUM INSULATION SCHEDULE

A. Insulation materials and thicknesses are identified below. If more than one material is listed for a duct system, selection from materials listed is Contractor's option.

B. Round, flat-oval, and rectangular supply-air duct insulation shall be the following:
   1. Flexible Elastomeric: 3 layers, each 1” thick.

C. Round,flat-oval, and rectangular return-air duct insulation shall be the following:
   1. Flexible Elastomeric: 3 layers, each 1” thick.

3.18 EQUIPMENT INSULATION SCHEDULE

A. Insulation materials and thicknesses are identified below. If more than one material is listed for a type of equipment, selection from materials listed is Contractor's option.

B. Insulate indoor and outdoor equipment in paragraphs below that is not factory insulated.

C. Chillers: Insulate cold surfaces on chillers, including, but not limited to, evaporator bundles, suction piping, compressor inlets, tube sheets, water boxes, and nozzles with the following:
1. Flexible Elastomeric: 1 inch thick.

D. Heat-exchanger (water-to-water for cooling service) insulation shall be the following:
1. Flexible Elastomeric: 1 inch thick.

E. Chilled-water pump insulation shall be the following:

1. Cellular Glass: 3 inches thick.

2. Phenolic Foam: 2 inches thick.

F. Condenser-water pump insulation shall be the following:
1. Not applicable.

G. Domestic water pump insulation shall be the following:
1. Not applicable.

H. Heating-hot-water pump insulation shall be the following:
1. Cellular Glass: 3 inches thick.

I. Chilled-water expansion/compression tank insulation shall be the following:
1. Flexible Elastomeric: 1 inch thick.

J. Chilled-water air-separator insulation shall be the following:
1. Flexible Elastomeric: 1 inch thick.

K. Domestic hot-water storage tank insulation shall be the following:

1. Mineral-Fiber Board: 4 inches thick and 2-lb/cu. ft. nominal density.

L. Thermal storage tank (brine, water, ice) insulation shall be the following:

1. Cellular Glass: 4 inches thick.

3.19 PIPING INSULATION SCHEDULE, GENERAL

A. Acceptable preformed pipe and tubular insulation materials and thicknesses are identified for each piping system and pipe size range. If more than one material is listed for a piping system, selection from materials listed is Contractor's option.

B. Items Not Insulated: Unless otherwise indicated, do not install insulation on the following:

1. Fire-suppression piping.
2. Drainage piping located in crawl spaces.
3. Below-grade piping.
4. Chrome-plated pipes and fittings unless there is a potential for personnel injury.

3.20 INDOOR PIPING INSULATION SCHEDULE

A. Domestic Cold Water:

1. Insulation shall be the following:
    a. Mineral-Fiber Pipe Insulation, Type I: 1/2 inch thick.

B. Domestic Hot and Recirculated Hot Water:

1. Insulation shall be the following:
    a. Mineral-Fiber Pipe Insulation, Type I: 1 inch thick.

C. Domestic Chilled Water (Potable):

1. All Pipe Sizes: Insulation shall be the following:
    a. Mineral-Fiber Pipe Insulation, Type I: 1 inch thick.

D. Stormwater and Overflow:

1. All Pipe Sizes: Insulation shall be the following:
    a. Mineral-Fiber Pipe Insulation, Type I: 1 inch thick.
2. Insulation required only on horizontal runs.

E. Roof Drain and Overflow Drain Bodies:

1. All Pipe Sizes: Insulation shall be the following:
    a. Mineral-Fiber Pipe Insulation, Type I: 1 inch thick.

F. Condensate and Equipment Drain Water below 60 Deg F:

1. All Pipe Sizes: Insulation shall be the following:
    a. Flexible Elastomeric: 3/4 inch thick.

G. Floor Drains, Traps, and Sanitary Drain Piping within 10 Feet of Drain Receiving Condensate and Equipment Drain Water below 60 Deg F:

1. All Pipe Sizes: Insulation shall be the following:
    a. Mineral-Fiber Pipe Insulation, Type I: 1 inch thick.

H. Chilled Water and Brine, above 40 Deg F:

1. NPS 4 DN 100 and Smaller: Insulation shall be the following:

    a. Cellular Glass: 1-1/2 inches thick.

    b. Phenolic Foam: 1 inch thick.

2. NPS 6 (DN 150) to NPS 12 (DN300: Insulation shall be the following:

a. Cellular Glass: 2 inches thick.

b. Phenolic Foam: 1 ½ inches thick.

3. NPS 14 (DN350) and Larger: Insulation shall be the following:

a. Cellular Glass: 2 - ½ inches thick.

b. Phenolic Foam: 2 inches thick.

I. Condenser-Water Supply and Return:

1. No insulation.

J. Heating-Hot-Water Supply and Return, 200 Deg F and below:

1. Insulation shall be the following:
a. Mineral-Fiber, Preformed Pipe, Type I: 2 inches thick.

K. Refrigerant Suction and Hot-Gas Piping:

1. All Pipe Sizes: Insulation shall be the following:
a. Flexible Elastomeric: 3/4 inch thick.

3.21 OUTDOOR, ABOVEGROUND PIPING INSULATION SCHEDULE

A. Domestic Water Piping:

1. All Pipe Sizes: Insulation shall be the following:
a. Mineral-Fiber Pipe Insulation, Type I: 1 inch thick.

B. Domestic Hot and Recirculated Hot Water:

1. All Pipe Sizes: Insulation shall be the following:
a. Mineral-Fiber Pipe Insulation, Type I: 1 inches thick.

C. Chilled Water and Brine:

1. All Pipe Sizes: Insulation shall be the following:

a. Cellular Glass: Refer to interior schedule for thickness.

b. Phenolic Foam: Refer to interior schedule for thickness.

D. Condenser-Water Supply and Return:

1. All Pipe Sizes: Insulation not required.

E. Heating-Hot-Water Supply and Return, 200 Deg F and below:

1. All Pipe Sizes: Insulation shall be the following:
   a. Mineral-Fiber Pipe Insulation, Type I: 1 ½ inches thick.

F. Refrigerant Suction and Hot-Gas Piping:

1. All Pipe Sizes: Insulation shall be the following:
   a. Flexible Elastomeric: 1 inch thick.

3.22 OUTDOOR, UNDERGROUND PIPING INSULATION SCHEDULE

A. Loose-fill insulation, for belowground piping, is specified in Division 2 piping distribution Sections.

B. Chilled Water, All Sizes: Use pre-insulated pipe system.

C. Condenser-Water Supply and Return, All Sizes: Insulation not required. Provide anti corrosion coating as specified in Hydronic Piping Specification.

D. Heating-Hot-Water Supply and Return, All Sizes, 200 Deg F and below: Use pre-insulated pipe system.

3.23 INDOOR, FIELD-APPLIED JACKET SCHEDULE

A. Install jacket over insulation material. For insulation with factory-applied jacket, install the field-applied jacket over the factory-applied jacket.

B. If more than one material is listed, selection from materials listed is Contractor's option.

C. Ducts and Plenums, Concealed:

1. None.

D. Ducts and Plenums, Exposed:

1. None.

E. Equipment, Concealed:

1. None.

F. Equipment, Exposed, up to 48 Inches in Diameter or with Flat Surfaces up to 72 Inches:

1. None.

G. Equipment, Exposed, Larger Than 48 Inches in Diameter or with Flat Surfaces Larger Than 72 Inches:

1. None.

H. Piping, Concealed:

1. ASJ – factory.

I. Piping, Exposed:
1. PVC: 20 mils thick.

3.24 OUTDOOR, FIELD-APPLIED JACKET SCHEDULE

A. Install jacket over insulation material. For insulation with factory-applied jacket, install the field-applied jacket over the factory-applied jacket.

B. If more than one material is listed, selection from materials listed is Contractor's option.

C. Ducts and Plenums, Concealed:
1. Painted Aluminum, Smooth: 0.020 inch thick.

D. Ducts and Plenums, Exposed:
1. Painted Aluminum, Smooth: 0.020 inch thick.

E. Equipment, Concealed:
1. PVC: 20 mils thick.

F. Equipment, Exposed:

1. Aluminum, Smooth: 0.020 inch thick.

G. Piping, Concealed:
1. PVC: 20 mils thick.

H. Piping, Exposed:
1. Aluminum, Smooth: 0.020 inch thick.

3.25 UNDERGROUND, FIELD-INSTALLED INSULATION JACKET

A. For underground direct-buried piping applications, install underground direct-buried jacket over insulation material.

END OF SECTION 15080

SECTION 15150 - SANITARY WASTE AND VENT PIPING

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 for soil, waste, and vent piping inside the building:

1. Pipe, tube, and fittings.
2. Special pipe fittings.
3. Encasement for underground metal piping.

B. Related Sections include the following:

1. Division 15 Section "Chemical-Waste Piping" for chemical-waste and vent piping systems.

1.3 DEFINITIONS

A. EPDM: Ethylene-propylene-diene terpolymer rubber.

B. PE: Polyethylene plastic.

C. PVC: Polyvinyl chloride plastic.

1.4 PERFORMANCE REQUIREMENTS

A. Components and installation shall be capable of withstanding the following minimum working pressure, unless otherwise indicated:

1. Soil, Waste, and Vent Piping: 10-foot head of water.

1.5 SUBMITTALS

A. Product Data: For pipe, tube, fittings, and couplings.

B. Shop Drawings:
1. Sovent Drainage System: Include plans, elevations, sections, and details.

C. Field quality-control inspection and test reports.

1.6 QUALITY ASSURANCE

A. Piping materials shall bear label, stamp, or other markings of specified testing agency.

B. Comply with NSF 14, "Plastics Piping Systems Components and Related Materials," for plastic piping components. Include marking with "NSF-dwv" for plastic drain, waste, and vent piping; "NSF-drain" for plastic drain piping; "NSF-tubular" for plastic continuous waste piping; and "NSF-sewer" for plastic sewer piping.

PART 2 - PRODUCTS

2.1 PIPING MATERIALS

A. Refer to Part 3 "Piping Applications" Article for applications of pipe, tube, fitting, and joining materials.

2.2 HUB-AND-SPIGOT, CAST-IRON SOIL PIPE AND FITTINGS

A. Pipe and Fittings: ASTM A 74, Service class.

B. Gaskets: ASTM C 564, rubber.

C. Lead and Oakum: ASTM B 29, pure lead and oakum or hemp fiber.

2.3 HUBLESS CAST-IRON SOIL PIPE AND FITTINGS

A. Pipe and Fittings: ASTM A 888 or CISPI 301.

B. Shielded Couplings: ASTM C 1277 assembly of metal shield or housing, corrosion-resistant fasteners, and rubber sleeve with integral, center pipe stop.

1. Standard, Shielded, Stainless-Steel Couplings: CISPI 310, with stainless-steel corrugated shield; stainless-steel bands and tightening devices; and ASTM C 564, rubber sleeve.

2. Heavy-Duty, Shielded, Stainless-Steel Couplings: With stainless-steel shield, stainless-steel bands and tightening devices, and ASTM C 564, rubber sleeve.

C. Rigid, Unshielded Couplings: ASTM C 1461, sleeve-type, reducing- or transition-type mechanical coupling molded from ASTM C 1440, TPE material with corrosion-resistant-metal tension band and tightening mechanism on each end.

2.4 PVC PIPE AND FITTINGS

A. Solid-Wall PVC Pipe: ASTM D 2665, drain, waste, and vent.

1. PVC Socket Fittings: ASTM D 2665, socket type, made to ASTM D 3311, drain, waste, and vent patterns.

2.5 SPECIAL PIPE FITTINGS

A. Sovent Drainage System Fittings: ASME B16.45 or ASSE 1043, cast-iron aerator and deaerator fittings.

B. Flexible, Nonpressure Pipe Couplings: Comply with ASTM C 1173, elastomeric, sleeve-type, reducing or transition pattern. Include shear ring, ends of same sizes as piping to be joined, and corrosion-resistant-metal tension band and tightening mechanism on each end.

1. Sleeve Materials:

a. For Cast-Iron Soil Pipes: ASTM C 564, rubber.
b. For Plastic Pipes: ASTM F 477, elastomeric seal or ASTM D 5926, PVC.
c. For Dissimilar Pipes: ASTM D 5926, PVC or other material compatible with pipe materials being joined.

C. Shielded Nonpressure Pipe Couplings: ASTM C 1460, elastomeric or rubber sleeve with full-length, corrosion-resistant outer shield and corrosion-resistant-metal tension band and tightening mechanism on each end.

D. Expansion Joints: Two or three-piece, ductile-iron assembly consisting of telescoping sleeve(s) with gaskets and restrained-type, ductile-iron, bell-and-spigot end sections complying with AWWA C110 or AWWA C153. Select and assemble components for expansion indicated. Include AWWA C111, ductile-iron glands, rubber gaskets, and steel bolts.

E. Wall-Penetration Fittings: Compound, ductile-iron coupling fitting with sleeve and flexing sections for up to 20-degree deflection, gaskets, and restrained-joint ends complying with AWWA C110 or AWWA C153. Include AWWA C111, ductile-iron glands, rubber gaskets, and steel bolts.

F. Tubular Fittings: ASTM F 409, PVC drainage-pattern tube and tubular fittings with ends as required for application.

2.6 ENCASEMENT FOR UNDERGROUND METAL PIPING

A. Description: ASTM A 674 or AWWA C105, high-density, crosslaminated PE film of 0.004-inch (0.10-mm) minimum thickness.

B. Form: tube.

C. Color: Black.

PART 3 - EXECUTION

3.1 EXCAVATION

A. Refer to Division 2 Section "Earthwork" for excavating, trenching, and backfilling.

3.2 PIPING APPLICATIONS

A. Flanges and unions may be used on aboveground pressure piping, unless otherwise indicated.

B. Piping installed in building plenums shall meet requirements of materials within ducts or plenums (ceiling spaces used as supply or return air plenums) and shall have a flame-spread index of not more than 25 and a smoke-developed rating of not more than 50 when tested in accordance with the test for Surface Burning Characteristics of Materials.

C. Aboveground, soil and waste piping NPS 4 (DN 100) and smaller shall be any of the following:

1. Service class, cast-iron soil pipe and fittings; gaskets; and compression joints.
2. Hubless cast-iron soil pipe and fittings; standard, shielded, stainless-steel couplings; and hubless-coupling joints.
3. Solid-wall PVC pipe, PVC socket fittings, and solvent-cemented joints.

D. Aboveground, soil and waste piping NPS 5 (DN 125) and larger shall be any of the following:

1. Service class, cast-iron soil pipe and fittings; gaskets; and compression joints.
2. Hubless cast-iron soil pipe and fittings; standard, shielded, stainless-steel couplings; and hubless-coupling joints.
3. Solid-wall PVC pipe, PVC socket fittings, and solvent-cemented joints.

E. Aboveground, vent piping all sizes shall be any of the following:

1. Service class, cast-iron soil pipe and fittings; gaskets; and compression joints.
2. Hubless cast-iron soil pipe and fittings; standard, shielded, stainless-steel couplings; and hubless-coupling joints.
3. Solid-wall PVC pipe, PVC socket fittings, and solvent-cemented joints.

F. Above and belowground, sovent drainage system with soil, waste, and vent piping materials indicated.

G. Underground, soil, waste, and vent piping all sizes shall be any of the following:

1. Service class, cast-iron soil piping; gaskets; and gasketed joints.
2. Hubless cast-iron soil pipe and fittings; heavy-duty shielded, cast-iron couplings; and hubless-coupling joints.
3. Solid wall PVC pipe, PVC socket fittings, and solvent-cemented joints.

3.3 PIPING INSTALLATION

A. Sanitary sewer piping outside the building is specified in Division 2 Section "Sanitary Sewerage."

B. Basic piping installation requirements are specified in Division 15 Section "Basic Mechanical Materials and Methods."

C. Install cleanouts at grade and extend to where building sanitary drains connect to building sanitary sewers.

D. 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. Sleeves and mechanical sleeve seals are specified in Division 15 Section "Basic Mechanical Materials and Methods."

E. Install cast-iron soil piping according to CISPI's "Cast Iron Soil Pipe and Fittings Handbook," Chapter IV, "Installation of Cast Iron Soil Pipe and Fittings."

1. Install encasement on underground piping according to ASTM A 674 or AWWA C105.

F. 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 1/4 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 fixtures 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.

G. 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.

H. Install soil and waste drainage and vent piping at the following minimum slopes, unless otherwise indicated:

1. Building Sanitary Drain: 2 percent downward in direction of flow for piping NPS 3 (DN 80) and smaller; 1 percent downward in direction of flow for piping NPS 4 (DN 100) and larger.
2. Horizontal Sanitary Drainage Piping: 2 percent downward in direction of flow.
3. Vent Piping: 1 percent down toward vertical fixture vent or toward vent stack.

I. Install engineered soil and waste drainage and vent piping systems as follows:

1. Combination Waste and Vent: Comply with standards of authorities having jurisdiction.
2. Sovent Drainage System: Comply with ASSE 1043 and sovent fitting manufacturer's written installation instructions.
3. Reduced-Size Venting: Comply with standards of authorities having jurisdiction.

J. Sleeves are not required for cast-iron soil piping passing through concrete slabs-on-grade if slab is without membrane waterproofing.

K. Install PVC soil and waste drainage and vent piping according to ASTM D 2665.

L. Install underground PVC soil and waste drainage piping according to ASTM D 2321.

M. Do not enclose, cover, or put piping into operation until it is inspected and approved by authorities having jurisdiction.

3.4 JOINT CONSTRUCTION

A. Basic piping joint construction requirements are specified in Division 15 Section "Basic Mechanical Materials and Methods."

B. Join hub-and-spigot, cast-iron soil piping with gasket joints according to CISPI's "Cast Iron Soil Pipe and Fittings Handbook" for compression joints.

C. Join hub-and-spigot, cast-iron soil piping with calked joints according to CISPI's "Cast Iron Soil Pipe and Fittings Handbook" for lead and oakum calked joints.

D. Join hubless cast-iron soil piping according to CISPI 310 and CISPI's "Cast Iron Soil Pipe and Fittings Handbook" for hubless-coupling joints.

E. Grooved Joints: Assemble joint with keyed coupling, gasket, lubricant, and bolts according to coupling and fitting manufacturer's written instructions.

F. PVC Nonpressure Piping Joints: Join piping according to ASTM D 2665.

3.5 VALVE INSTALLATION

A. General valve installation requirements are specified in Division 15 Section "Valves."

B. Backwater Valves: Install backwater valves in piping subject to sewage backflow.

1. Horizontal Piping: Horizontal backwater valves.
2. Floor Drains: Drain outlet backwater valves, unless drain has integral backwater valve.
3. Install backwater valves in accessible locations.
4. Backwater valve are specified in Division 15 Section "Plumbing Specialties."

3.6 HANGER AND SUPPORT INSTALLATION

A. Pipe hangers and supports are specified in Division 15 Section "Hangers and Supports." Install the following:

1. Vertical Piping: MSS Type 8 or Type 42, clamps.
2. Install individual, straight, horizontal piping runs according to the following:

    a. 100 Feet (30 m) and Less: MSS Type 1, adjustable, steel clevis hangers.
    b. Longer Than 100 Feet (30 m): MSS Type 43, adjustable roller hangers.
    c. Longer Than 100 Feet (30 m), if Indicated: MSS Type 49, spring cushion rolls.

3. Multiple, Straight, Horizontal Piping Runs 100 Feet (30 m) or Longer: MSS Type 44, pipe rolls. Support pipe rolls on trapeze.
4. Base of Vertical Piping: MSS Type 52, spring hangers.

B. Install supports according to Division 15 Section "Hangers and Supports."

C. Support vertical piping and tubing at base and at each floor.

D. Rod diameter may be reduced 1 size for double-rod hangers, with 3/8-inch (10-mm) minimum rods.

E. Install hangers for cast-iron soil piping with the following maximum horizontal spacing and minimum rod diameters:

1. NPS 1-1/2 and NPS 2 (DN 40 and DN 50): 60 inches (1500 mm) with 3/8-inch (10-mm) rod.
2. NPS 3 (DN 80): 60 inches (1500 mm) with 1/2-inch (13-mm) rod.
3. NPS 4 and NPS 5 (DN 100 and DN 125): 60 inches (1500 mm) with 5/8-inch (16-mm) rod.
4. NPS 6 (DN 150): 60 inches (1500 mm) with 3/4-inch (19-mm) rod.
5. NPS 8 to NPS 12 (DN 200 to DN 300): 60 inches (1500 mm) with 7/8-inch (22-mm) rod.

F. Install supports for vertical cast-iron soil piping every 15 feet (4.5 m).

G. Install hangers for PVC piping with the following maximum horizontal spacing and minimum rod diameters:

1. NPS 1-1/2 and NPS 2 (DN 40 and DN 50): 48 inches (1200 mm) with 3/8-inch (10-mm) rod.
2. NPS 3 (DN 80): 48 inches (1200 mm) with 1/2-inch (13-mm) rod.
3. NPS 4 and 5 (DN 100 and 125): 48 inches (1200 mm) with 5/8-inch (16-mm) rod.
4. NPS 6 (DN 150): 48 inches (1200 mm) with 3/4-inch (19-mm) rod.
5. NPS 8 to NPS 12 (DN 200 to DN 300): 48 inches (1200 mm) with 7/8-inch (22-mm) rod.

H. Install supports for vertical PVC piping every 48 inches (1200 mm).

I. Support piping and tubing not listed above according to MSS SP-69 and manufacturer's written instructions.

3.7 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.
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.

4. 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.

3.8 FIELD QUALITY CONTROL

A. 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.

B. Reinspection: If authorities having jurisdiction find that piping will not pass test or inspection, make required corrections and arrange for reinspection.

C. Reports: Prepare inspection reports and have them signed by authorities having jurisdiction.

D. 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.

3.9 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.

3.10 PROTECTION

A. Exposed PVC Piping: Protect plumbing vents exposed to sunlight with two coats of water-based latex paint.

END OF SECTION 15150

SECTION 15430 - PLUMBING SPECIALTIES

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 plumbing specialties:

1. Backflow preventers.
2. Dishwasher air-gap fittings.
3. Water regulators.
4. Balancing valves.
5. Thermostatic water mixing valves.
6. Water tempering valves.
7. Strainers.
8. Outlet boxes.
9. Washer-supply outlets.
10. Hose stations.
11. Key-operation hydrants.
12. Wheel-handle wall hydrants.
13. Nondraining nonfreeze post hydrants.
14. Trap seal primer valves.
15. Drain valves.
16. Backwater valves.
17. Miscellaneous piping specialties.
18. Sleeve penetration systems.
19. Flashing materials.
20. Cleanouts.
21. Floor drains.
22. Trench drains.
23. Roof drains.
24. Grease interceptors.
25. Oil interceptors.
26. Solids interceptors.

1.3 DEFINITIONS

A. The following are industry abbreviations for plastic piping materials:

1. ABS: Acrylonitrile-butadiene-styrene plastic.
2. PE: Polyethylene plastic.

3. PUR: Polyurethane plastic.
4. PVC: Polyvinyl chloride plastic.

1.4 PERFORMANCE REQUIREMENTS

A. Provide components and installation capable of producing piping systems with following minimum working-pressure ratings, unless otherwise indicated:

1. Domestic Water Piping: 125 psig (860 kPa).
2. Sanitary Waste and Vent Piping: 10-foot head of water (30 kPa).
3. Storm Drainage Piping: 10-foot head of water (30 kPa).

1.5 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. Backflow preventers and water regulators.
2. Balancing valves and strainers.
3. Thermostatic water mixing valves and water tempering valves.
4. Water hammer arresters, air vents, and trap seal primer valves and systems.
5. Drain valves, hose bibbs, hydrants, and hose stations.
6. Outlet boxes and washer-supply outlets.
7. Backwater valves, cleanouts, floor drains, open receptors, trench drains, and roof drains.
8. Air-admittance valves, vent caps, vent terminals, and roof flashing assemblies.
9. Grease interceptors, oil interceptors, and solids interceptors.
10. Sleeve penetration systems.

B. Shop Drawings: Diagram power, signal, and control wiring.

C. Field test reports.

D. Maintenance Data: For plumbing specialties to include in maintenance manuals. Include the following:

1. Backflow preventers and water regulators.
2. Thermostatic water mixing valves and water tempering valves.
3. Trap seal primer valves and systems.
4. Hose stations and hydrants.
5. Grease interceptors, oil interceptors, and solids interceptors.

1.6 QUALITY ASSURANCE

A. Product Options: Drawings indicate size, profiles, and dimensional requirements of plumbing specialties and are based on the specific system indicated. Refer to Division 1 Section "Product Requirements."

B. Plumbing specialties shall bear label, stamp, or other markings of specified testing agency.

C. 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.

D. ASME Compliance: Comply with ASME B31.9, "Building Services Piping," for piping materials and installation.

E. NSF Compliance:

1. Comply with NSF 14, "Plastics Piping Components and Related Materials," for plastic domestic water piping components. Include marking "NSF-pw" on plastic potable-water piping and "NSF-dwv" on plastic drain, waste, and vent piping.
2. Comply with NSF 61, "Drinking Water System Components--Health Effects, Sections 1 through 9," for potable domestic water plumbing specialties.

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. Operating Key Handles: Equal to 100 percent of amount installed for each key-operated hose bibb and hydrant installed.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. In other Part 2 articles where subparagraph titles below introduce lists, the following requirements apply for product selection:
1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the manufacturers specified.
2. Manufacturers: Subject to compliance with requirements, provide products by the manufacturers specified.

2.2 BACKFLOW PREVENTERS

A. Available Manufacturers:

B. Manufacturers:
1. B & K Industries, Inc.
2. Cla-Val Co.
3. Conbraco Industries, Inc.
4. Mueller Co.; Hersey Meters Div.
5. Park Equipment.
6. Watts Industries, Inc.; Water Products Div.
7. Zurn Industries, Inc.; Wilkins Div.

C. General: ASSE standard, backflow preventers.

1. NPS 2 (DN 50) and Smaller: Bronze body with threaded ends.
2. NPS 2-1/2 (DN 65) and Larger: Bronze, cast-iron, steel, or stainless-steel body with flanged ends.

    a. Interior Lining: AWWA C550 or FDA-approved, epoxy coating for backflow preventers having cast-iron or steel body.

3. Interior Components: Corrosion-resistant materials.
4. Exterior Finish: Polished chrome plate if used in chrome-plated piping system.
5. Strainer: On inlet, if indicated.

D. Pipe-Applied, Atmospheric-Type Vacuum Breakers: ASSE 1001, with floating disc and atmospheric vent.

E. Hose-Connection Vacuum Breakers: ASSE 1011, nickel plated, with nonremovable and manual drain features, and ASME B1.20.7, garden-hose threads on outlet. Units attached to rough-bronze-finish hose connections may be rough bronze.

F. Intermediate Atmospheric-Vent Backflow Preventers: ASSE 1012, suitable for continuous pressure application. Include inlet screen and two independent check valves with intermediate atmospheric vent.

G. Reduced-Pressure-Principle Backflow Preventers: ASSE 1013, suitable for continuous pressure application. Include outside screw and yoke gate valves on inlet and outlet, and strainer on inlet; test cocks; and pressure-differential relief valve with ASME A112.1.2 air-gap fitting located between two positive-seating check valves.

1. Pressure Loss: 12 psig (83 kPa) maximum, through middle 1/3 of flow range.

H. Double-Check Backflow Prevention Assemblies: ASSE 1015, suitable for continuous pressure application. Include shutoff valves on inlet and outlet, and strainer on inlet; test cocks; and two positive-seating check valves.

1. Pressure Loss: 5 psig (35 kPa) maximum, through middle 1/3 of flow range.

I. Antisiphon-Pressure-Type Vacuum Breakers: ASSE 1020, suitable for continuous pressure application. Include shutoff valves, spring-loaded check valve, spring-loaded floating disc, test cocks, and atmospheric vent.

1. Pressure Loss: 5 psig (35 kPa) maximum, through middle 1/3 of flow range.

J. Dual-Check-Valve-Type Backflow Preventers: ASSE 1024, suitable for continuous pressure application. Include union inlet and two independent check valves.

K. Dual-Check-Valve-Type Backflow Preventers: ASSE 1032, suitable for continuous pressure application for carbonated beverage dispensers. Include stainless-steel body; primary and secondary checks; ball check; intermediate atmospheric-vent port for relieving carbon dioxide; and threaded ends, NPS 3/8 (DN 10).

L. Laboratory Faucet Vacuum Breakers: ASSE 1035, suitable for continuous pressure application and chrome plated; consisting of primary and secondary checks; intermediate vacuum breaker; and threaded ends, NPS 1/4 or NPS 3/8 (DN 8 or DN 10) as required.

M. Reduced-Pressure Detector Assembly Backflow Preventers: ASSE 1047, FM approved or UL listed, and suitable for continuous pressure application. Include outside screw and yoke gate valves on inlet and outlet, and strainer on inlet. Include test cocks; pressure-differential relief valve with ASME A112.1.2 air-gap fitting located between two positive-seating check valves; and bypass with displacement-type water meter, valves, and reduced-pressure backflow preventer.

1. Pressure Loss: 12 psig (83 kPa) maximum, through middle 1/3 of flow range.

N. Double-Check Detector Assembly Backflow Preventers: ASSE 1048, FM approved or UL listed, and suitable for continuous pressure application. Include outside screw and yoke gate valves on inlet and outlet, and strainer on inlet. Include test cocks; two positive-seating check valves; and bypass with displacement-type water meter, valves, and double-check backflow preventer.

1. Pressure Loss: 5 psig (35 kPa) maximum, through middle 1/3 of flow range.

O. Hose-Connection Backflow Preventers: ASSE 1052, suitable for at least 3-gpm (0.19-L/s) flow and applications with up to 10-foot head of water (30-kPa) back pressure. Include two check valves; intermediate atmospheric vent; and nonremovable, ASME B1.20.7, garden-hose threads on outlet.

P. Back-Siphonage Backflow Vacuum Breakers: ASSE 1056, suitable for continuous pressure and backflow applications. Include shutoff valves, check valve, test cocks, and vacuum vent.

2.3 DISHWASHER AIR-GAP FITTINGS

A. Description: ASSE 1021, fitting suitable for use with domestic dishwashers and for deck mounting; with plastic body, chrome-plated brass cover; and capacity of at least 5 gpm (0.32 L/s); and inlet pressure of at least 5 psig (35 kPa) at temperature of at least 140 deg F (60 deg C). Include 5/8-inch- (16-mm-) ID inlet and 7/8-inch- (22-mm-) ID outlet hose connections.

B. Hoses: Rubber and suitable for temperature of at least 140 deg F (60 deg C).

1. Inlet Hose: 5/8-inch- (16-mm-) ID and 48 inches long.
2. Outlet Hose: 7/8-inch- (22-mm-) ID and 48 inches long.

2.4 WATER REGULATORS

A. Available Manufacturers:
1. Cla-Val Co.
2. Conbraco Industries, Inc.
3. Watts Industries, Inc.; Water Products Div.
4. Zurn Industries, Inc.; Wilkins Div.

B. General: ASSE 1003, water regulators, rated for initial working pressure of 150 psig (1035 kPa) minimum. Include integral factory-installed or separate field-installed, Y-pattern strainer.

1. NPS 2 (DN 50) and Smaller: Bronze body with threaded ends.

   a. General-Duty Service: Single-seated, direct operated, unless otherwise indicated.
   b. Booster Heater Water Supply: Single-seated, direct operated with integral bypass.

2. NPS 2-1/2 (DN 65) and Larger: Bronze or cast-iron body with flanged ends. Include AWWA C550 or FDA-approved, interior epoxy coating for regulators with cast-iron body.

   a. Type: Single-seated, direct operated.
   b. Type: Pilot-operated, single- or double-seated, cast-iron-body main valve, with bronze-body pilot valve.

3. Interior Components: Corrosion-resistant materials.
4. Exterior Finish: Polished chrome plate if used in chrome-plated piping system.

2.5 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. Available Manufacturers:

   a. Amtrol, Inc.
   b. Flow Design, Inc.
   c. ITT Industries; Bell & Gossett Div.
   d. Watts Industries, Inc.; Water Products Div.

2. NPS 2 (DN 50) and Smaller: Bronze body with brass ball, adjustment knob, calibrated nameplate, and threaded or solder-joint ends.
3. NPS 2 (DN 50) and Smaller: Bronze, Y-pattern body with adjustment knob and threaded ends.
4. NPS 2-1/2 (DN 65) 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 standard or 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. Available Manufacturers:

   a. Conbraco Industries, Inc.
   b. Crane Co.
   c. Grinnell Corporation.

d. Hammond Valve.
e. Milwaukee Valve Company.
f. NIBCO INC.
g. Red-White Valve Corp.

2.6 THERMOSTATIC WATER MIXING VALVES

A. Manufacturers:
1. Bradley.
2. Lawler Manufacturing Company, Inc.
3. Leonard Valve Company.
4. Powers.
5. Symmons Industries, Inc.
6. T & S Brass and Bronze Works, Inc.

B. General: ASSE 1017, manually adjustable, thermostatic water mixing valve with bronze body. Include check stop and union on hot- and cold-water-supply inlets, adjustable temperature setting, and thermometer. Refer to plumbing schedules for further information.

2.7 WATER TEMPERING VALVES

A. Available Manufacturers:

B. Manufacturers:

1. Heat-Timer Corporation.
2. Holby Valve Co., Inc.
3. Sparco, Inc.
4. Watts Industries, Inc.; Water Products Div.

C. General: Manually adjustable, thermostatically controlled water tempering valve; bronze body; and adjustable temperature setting.

D. System Water Tempering Valves: Piston or discs controlling both hot- and cold-water flow, capable of limited antiscald protection. Include threaded inlets and outlet.

1. Finish: [**Rough bronze**] [**Chrome plated**].

E. Limited-Volume, Water Tempering Valves: Solder-joint inlets and NPS 3/4 (DN 20) maximum outlet.

2.8 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.
4. Y-Pattern Strainers: Screwed screen retainer with centered blowdown.

    a. Drain: Factory- or field-installed, hose-end drain valve.

2.9 OUTLET BOXES

A. Available Manufacturers:

1. Acorn Engineering Company.
2. Gray, Guy Manufacturing Co., Inc.
3. Oatey.
4. Symmons Industries, Inc.
5. Zurn Industries, Inc.; Jonespec Div.

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 and drain. Refer to plumbing schedules for further information.

D. Icemaker Outlet Boxes: With hose connection. Refer to plumbing schedules for further information.

E. Reinforcement: 2-by-4-inch (38-by-89-mm) fire-retardant-treated-wood blocking between studs. Fire-retardant-treated-wood blocking is specified in Division 6 Section "Rough Carpentry."

2.10 HOSE STATIONS

A. Available Manufacturers:
1. Leonard Valve Company.
2. Strahman Valves, Inc.
3. T & S Brass and Bronze Works, Inc.

B. General: Assembly with fitting complying with ASME A112.18.1M and hose-connection outlet with threads complying with ASME B1.20.7. Refer to plumbing schedules for further information.

2.11 KEY-OPERATION HYDRANTS

A. Available Manufacturers:

1. Josam Co.
2. Simmons Manufacturing Co.
3. Smith, Jay R. Mfg. Co.

4. Tyler Pipe; Wade Div.
5. Watts Industries, Inc.
6. Woodford Manufacturing Co.
7. Zurn Industries.

B. General: ASME A112.21.3M, key-operation hydrant with pressure rating of 125 psig (860 kPa). Refer to plumbing schedule for further information.

2.12 WHEEL-HANDLE WALL HYDRANTS

A. Available Manufacturers:
1. B & K Industries, Inc.
2. NIBCO INC.
3. Sioux Chief Manufacturing Co., Inc.
4. Watts Industries, Inc.; Water Products Div.
5. Woodford Manufacturing Co.
6. Zurn Industries, Inc.; Jonespec Div.

B. Refer to plumbing schedule for further information.

2.13 NONDRAINING NONFREEZE POST HYDRANTS

A. General: All-metal lever operation with nondraining water-storage reservoir, designed without drain and to be freezeproof with components of at least length required for burial of valve and water storage reservoir below frost line. Refer to plumbing schedule for further information.

2.14 TRAP SEAL PRIMER VALVES

A. Supply-Type Trap Seal Primer Valves: ASSE 1018, water-supply-fed type, with the following characteristics:

1. Available Manufacturers:
   a. Josam Co.
   b. MIFAB Manufacturing, Inc.
   c. Precision Plumbing Products, Inc.
   d. Smith.
   e. Wade.
   f. Watts Industries, Inc.
   g. Zurn Industries.

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.

B. Drainage-Type Trap Seal Primer Valves: ASSE 1044, fixture-trap, waste-drainage-fed type, with the following characteristics:

1. Chrome-plated, cast-brass, NPS 1-1/4 (DN 32) minimum, lavatory P-trap with NPS 3/8 (DN 10) minimum, trap makeup connection.

C. Trap Seal Primer System: Factory-fabricated, automatic-operation assembly for wall mounting with the following:

1. Piping: NPS 3/4, ASTM B 88, Type L (DN 20, ASTM B 88M, Type B); copper, water tubing inlet and manifold with number of NPS 1/2 (DN 15) outlets as indicated.
2. Cabinet: Steel box with stainless-steel cover.
3. Electric Controls: 24-hour timer, solenoid valve, and manual switch for 120-V ac power.
4. Water Hammer Arrester: ASSE 1010.
5. Vacuum Breaker: ASSE 1001.

2.15 DRAIN VALVES

A. Hose-End Drain Valves: MSS SP-110, NPS 3/4 (DN 20) ball valve, rated for 400-psig (2760-kPa) minimum CWP. Include two-piece, copper-alloy body with standard port, chrome-plated brass ball, replaceable seats and seals, blowout-proof stem, and vinyl-covered steel handle.

1. Inlet: Threaded or solder joint.
2. Outlet: Short-threaded nipple with ASME B1.20.7, garden-hose threads and cap.

B. Hose-End Drain Valve: MSS SP-80, gate valve, Class 125, ASTM B 62 bronze body, with NPS 3/4 (DN 20) threaded or solder-joint inlet and ASME B1.20.7, garden-hose threads on outlet and cap. Hose bibbs are prohibited for this application.

C. Stop-and-Waste Drain Valves: MSS SP-110, ball valve, rated for 200-psig (1380-kPa) minimum CWP or MSS SP-80, Class 125, gate valve; ASTM B 62 bronze body, with NPS 1/8 (DN 6) side drain outlet and cap.

2.16 BACKWATER VALVES

A. Available Manufacturers:

1. Josam Co.
2. Smith, Jay R. Mfg. Co.
3. Watts Industries, Inc.; Drainage Products Div.
4. Zurn Industries, Inc.; Specification Drainage Operation.

B. Horizontal Backwater Valves: ASME A112.14.1, cast-iron body, with removable bronze swing-check valve and threaded or bolted cover.

1. Closed-Position Check Valve: Factory assembled or field modified to hang closed unless subject to backflow condition.
2. Open-Position Check Valve: Factory assembled or field modified to hang open for airflow.

3. Extension: ASTM A 74, Service class; full-size, cast-iron, soil-pipe extension to field-installed cleanout at floor, instead of cover.

C. Drain Outlet Backwater Valves: Cast-iron or bronze body, with removable ball float, threaded inlet, and threaded or spigot outlet for installation in bottom outlet of floor drain.

2.17 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. Available Manufacturers:

a. Josam Co.
b. Smith, Jay R. Mfg. Co.
c. Tyler Pipe; Wade Div.
d. Zurn Industries, Inc.; Specification Drainage Operation.

B. Water Hammer Arresters: ASSE 1010 or PDI-WH 201, piston type with pressurized metal-tube cushioning chamber. Sizes indicated are based on ASSE 1010, Sizes AA and A through F or PDI-WH 201, Sizes A through F.

1. Available Manufacturers:
a. Josam Co.
b. Precision Plumbing Products, Inc.
c. Sioux Chief Manufacturing Co., Inc.
d. Watts Industries, Inc.
e. Zurn Industries, Inc.

C. 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 nonremovable, drainable hose-connection vacuum breaker; and garden-hose threads complying with ASME B1.20.7 on outlet.

1. Finish for Equipment Rooms: Rough bronze, or chrome or nickel plated.
2. Finish for Service Areas: Rough bronze.
3. Finish for Finished Rooms: Chrome or nickel plated.
4. Operation for Equipment Rooms: Wheel handle or operating key.
5. Operation for Service Areas: Operating key.
6. Operation for Finished Rooms: Operating key.
7. Include operating key with each operating-key hose bibb.
8. Include wall flange with each chrome- or nickel-plated hose bibb.

D. Air Vents: Float type for automatic air venting.

1. Bolted Construction: Bronze body with replaceable, corrosion-resistant metal float and stainless-steel mechanism and seat; threaded NPS 3/8 (DN 10) minimum inlet; 125-psig (860-kPa) minimum pressure rating at 140 deg F (60 deg C); and threaded vent outlet.

2. Welded Construction: Stainless-steel body with corrosion-resistant metal float, stainless-steel mechanism and seat, threaded NPS 3/8 (DN 10) minimum inlet, 150-psig (1035-kPa) minimum pressure rating, and threaded vent outlet.

E. Air-Admittance Valves: Plastic housing with mechanical-operation sealing diaphragm, designed to admit air into drainage and vent piping and to prevent transmission of sewer gas into building.

1. Available Manufacturers:

   a. B & K Industries, Inc.
   b. IPS Corporation.
   c. J & B Products.
   d. Oatey.
   e. Sioux Chief Manufacturing Co., Inc.

2. Stack Vent Valve: ASSE 1050, designed for installation as terminal on soil, waste, and vent stacks, instead of stack vent extending through roof, in NPS 2 to NPS 4 (DN 50 to DN 100).
3. Fixture Vent Valve: ASSE 1051, designed for installation on waste piping, instead of vent connection, for single fixture, in NPS 1-1/4 to NPS 2 (DN 32 to DN 50).

F. Roof Flashing Assemblies: Manufactured assembly made of 4-lb/sq. ft., 0.0625-inch- thick, lead flashing collar and skirt extending at least 8 inches from pipe with galvanized steel boot reinforcement, and counterflashing fitting.

1. Available Manufacturers:
2. Manufacturers:

   a. Acorn Engineering Company; Elmdor/Stoneman Div.

3. Open-Top Vent Cap: Without cap.
4. Low-Silhouette Vent Cap: With vandal-proof vent cap.
5. Extended Vent Cap: With field-installed, vandal-proof vent cap.

G. Open Drains: Shop or field fabricate from ASTM A 74, Service class, hub-and-spigot, cast-iron, soil-pipe fittings. Include P-trap, hub-and-spigot riser section; and where required, increaser fitting, joined with ASTM C 564, rubber gaskets.

H. Deep-Seal Traps: Cast-iron or bronze casting, with inlet and outlet matching connected piping and cleanout trap seal primer valve connection.

1. NPS 2 (DN 50): 4-inch- (100-mm-) minimum water seal.
2. NPS 2-1/2 (DN 65) and Larger: 5-inch- (125-mm-) minimum water seal.

I. Floor-Drain Inlet Fittings: Cast iron, with threaded inlet and threaded or spigot outlet, and trap seal primer valve connection.

J. 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.

K. 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.

L. 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.

M. 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.

N. 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.

O. Downspout Boots: ASTM A 48 (ASTM A 48M), gray-iron casting, with NPS 4 (DN 100) outlet; shop-applied bituminous coating; and inlet size to match downspout.

P. Downspout Boots: ASTM A 74, Service class, hub-and-spigot, cast-iron soil pipe.

Q. Conductor Nozzles: Bronze body with threaded inlet for connected conductor size, and bronze wall flange with mounting holes.

1. Finish: Nickel bronze.

2.18 SLEEVE PENETRATION SYSTEMS

A. Available 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.

2.19 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. Copper Sheet: ASTM B 152 (ASTM B 152M), of the following minimum weights and thicknesses, unless otherwise indicated:

1. General Applications: 12 oz./sq. ft. (3.7 kg/sq. m or 0.41-mm thickness).
2. Vent Pipe Flashing: 8 oz./sq. ft. (2.5 kg/sq. m or 0.27-mm thickness).

C. Zinc-Coated Steel Sheet: ASTM A 653/A 653M, with 0.20 percent copper content and 0.04-inch (1.01-mm) minimum thickness, unless otherwise indicated. Include G90 (Z275) hot-dip galvanized, mill-phosphatized finish for painting if indicated.

D. Elastic Membrane Sheet: ASTM D 4068, flexible, chlorinated polyethylene, 40-mil (1.01-mm) minimum thickness.

E. Fasteners: Metal compatible with material and substrate being fastened.

F. Metal Accessories: Sheet metal strips, clamps, anchoring devices, and similar accessory units required for installation; matching or compatible with material being installed.

G. Solder: ASTM B 32, lead-free alloy.

H. Bituminous Coating: SSPC-Paint 12, solvent-type, bituminous mastic.

2.20 CLEANOUTS

A. Cleanouts,: Comply with ASME A112.3.1.

1. Application: Floor cleanout and wall cleanout.
2. Manufacturer:
    a. Josam Co.
    b. Smith.
    c. Wade.
    d. Zurn.
3. Refer to Plumbing Schedule for Specification Standards.

2.21 FLOOR DRAINS

A. Floor Drains,: Comply with ASME A112.3.1.

1. Application: Floor drain.
2. Manufacturer:
    a. Josam Co.
    b. MiFab.
    c. Smith.
    d. Wade Div.

e. Zurn Industries.

3. Refer to Plumbing Schedule for Specification Standards.

2.22 TRENCH DRAINS

A. Trench Drains: Comply with ASME A112.3.1.

1. Manufacturer:

a. Josam Co.
b. Smith.
c. Wade Div.
d. Zurn Industries.

2. Refer to Plumbing Schedule for Specification Standards.

2.23 ROOF DRAINS

A. Roof Drains,: Comply with ASME A112.3.1.

1. Application: Roof drain.
2. Manufacturer:

a. Josam Co.
b. Smith.
c. Wade Div.
d. Zurn Industries.

3. Refer to Plumbing Schedule for Specification Standards.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Refer to Division 15 Section "Basic Mechanical Materials and Methods" for piping joining materials, joint construction, and basic installation requirements.

B. Install backflow preventers in each water supply to mechanical equipment and systems and to other equipment and water systems that may be sources of contamination. Comply with authorities having jurisdiction.

1. Locate backflow preventers in same room as connected equipment or system.
2. Install drain for backflow preventers with atmospheric-vent drain connection with air-gap fitting, fixed air-gap fitting, or equivalent positive pipe separation of at least two pipe diameters in drain piping and pipe to floor drain. Locate air-gap device attached to or under backflow preventer. Simple air breaks are not acceptable for this application.
3. Do not install bypass piping around backflow preventers.

C. Install pressure regulators with inlet and outlet shutoff valves and balance valve bypass. Install pressure gages on inlet and outlet.

D. Install strainers on supply side of each control valve, pressure regulator, and solenoid valve.

E. Install draining-type ground and ground post hydrants with 1 cu. yd. of crushed gravel around drain hole.

1. Set ground hydrants with box flush with grade.
2. Set post hydrants in concrete paving or in 1 cu. ft. of concrete block at grade.

F. 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.

G. 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.

H. Install expansion joints on vertical risers, stacks, and conductors if indicated.

I. 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.

J. Install cleanout deck plates with top flush with finished floor, for floor cleanouts for piping below floors.

K. Install cleanout wall access covers, of types indicated, with frame and cover flush with finished wall, for cleanouts located in concealed piping.

L. Install flashing flange and clamping device with each stack and cleanout passing through floors with waterproof membrane.

M. Install vent flashing sleeves on stacks passing through roof. Secure over stack flashing according to manufacturer's written instructions.

N. 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.

O. 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.

P. Install interceptors, including trapping, venting, and flow-control fitting, according to authorities having jurisdiction and with clear space for servicing.

1. Above-Floor Installation: Set unit with bottom resting on floor, unless otherwise indicated.
2. Flush with Floor Installation: Set unit and extension, if required, with cover flush with finished floor.
3. Recessed Floor Installation: Set unit in receiver housing having bottom or cradle supports, with receiver housing cover flush with finished floor.
4. Install cleanout immediately downstream from interceptors not having integral cleanout on outlet.
5. Coordinate oil-interceptor storage tank and gravity drain with Division 2 Section "Fuel-Oil Distribution."

Q. 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.

R. Fasten recessed-type plumbing specialties to reinforcement built into walls.

S. Install wood-blocking reinforcement for wall-mounting and recessed-type plumbing specialties.

T. Install individual shutoff valve in each water supply to plumbing specialties. Use ball, gate, or globe valve if specific valve is not indicated. Install shutoff valves in accessible locations. Refer to Division 15 Section "Valves" for general-duty ball, butterfly, check, gate, and globe valves.

U. Install air vents at piping high points. Include ball, gate, or globe valve in inlet.

V. Install traps on plumbing specialty drain outlets. Omit traps on indirect wastes unless trap is indicated.

W. 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. Piping installation requirements are specified in other Division 15 Sections. Drawings indicate general arrangement of piping, fittings, and specialties.

B. Install piping adjacent to equipment to allow service and maintenance.

C. Connect plumbing specialties to piping specified in other Division 15 Sections.

D. Ground equipment.

E. 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.

F. Connect plumbing specialties and devices that require power according to Division 16 Sections.

G. 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. Install valve on outlet of automatic drawoff-type unit.
2. Oil Interceptors: Connect inlet, outlet, vent, and gravity drawoff piping to unit; flow-control fitting and vent to unit inlet piping; and gravity drawoff and suction piping to oil storage tank.
3. Solids Interceptors: Connect inlet and outlet.

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.
2. Copper Sheets: Solder joints of copper sheets.

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 Division 7 Section "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.

G. Fabricate and install flashing and pans, sumps, and other drainage shapes.

3.4 LABELING AND IDENTIFYING

A. Equipment Nameplates and Signs: Install engraved plastic-laminate equipment nameplate or sign on or near each backflow preventer thermostatic water mixing valve water tempering valve grease interceptor and oil interceptor.

1. Text: Distinguish among multiple units, inform operator of operational requirements, indicate safety and emergency precautions, and warn of hazards and improper operations, in addition to identifying unit.
2. Refer to Division 15 Section "Basic Mechanical Materials and Methods Mechanical Identification" for nameplates and signs.

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.

3.6 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain equipment. Refer to Division 1 Section "Closeout Procedures."

END OF SECTION 15430

15732 - Rooftop Units

Packaged Rooftop Units

Part 1 - General

1.01 Related Documents

1.02 General Description

A. This section includes the design, controls and installation requirements for packaged rooftop units.

1.03 Quality Assurance

A. Packaged air-cooled condenser units shall be certified in accordance with ANSI/AHRI Standard 340/360 performance rating of commercial and industrial unitary air-conditioning and heat pump equipment for units greater than 6 tons.

B. Packaged air-cooled condenser units shall be certified in accordance with ANSI/AHRI Standard 210/240 performance rating of commercial and industrial unitary air-conditioning and heat pump equipment for units less than 6 tons.

C. Unit and refrigeration system shall comply with ASHRAE 15, Safety Standard for Mechanical Refrigeration.

D. Unit shall be certified in accordance with UL Standard 1995/CSA C22.2 No. 236, Safety Standard for Heating and Cooling Equipment.

E. Unit Energy Efficiency Ratio (EER) shall be equal to or greater than prescribed by ASHRAE 90.1, Energy Efficient Design of New Buildings except Low-Rise Residential Buildings.

F. Unit shall be safety certified by ETL and be ETL US and ETL Canada listed. Unit nameplate shall include the ETL/ETL Canada label.

1.04 Submittals

A. Product Data: Literature shall be provided that indicates dimensions, operating and shipping weights, capacities, ratings, fan performance, filter information, factory supplied accessories, electrical characteristics and connection requirements. Installation, Operation and Maintenance manual with startup requirements shall be provided.

B. Shop Drawings: Unit drawings shall be provided that indicate assembly, unit dimensions, construction details, clearances, and connection details. Computer generated fan curves for each fan shall be submitted with specific design operation point noted. Wiring diagram shall be provided with details for both power and control systems and differentiate between factory installed and field installed wiring.

1.05 Delivery, Storage, and Handling

A. Unit shall be shipped with doors bolted shut and outside air hood closed to prevent damage during transport and thereafter while in storage awaiting installation.

B. Follow Installation, Operation and Maintenance manual instructions for rigging, moving, and unloading the unit at its final location.

C. Unit shall be stored in a clean, dry place protected from construction traffic in accordance with the Installation, Operation and Maintenance manual.

1.06 Warranty

A. Manufacturer shall provide a limited "parts only" warranty for a period of 12 months from the date of equipment startup or 18 months from the date of original equipment shipment from the factory, whichever is less. Warranty shall cover material and workmanship that prove defective, within the specified warranty period, provided manufacturer's written instructions for installation, operation and maintenance have been followed. Warranty excludes parts associated with routine maintenance, such as belts and air filters.

B. The manufacturer shall provide extended 48-month, parts only, warranty on the compressor.

Part 2 - Products

2.01 Manufacturer

A. Products shall be provided by the following manufacturers:

1. AAON

2. Greenheck

2.02 Rooftop Units

A. General Description

1. Packaged rooftop unit shall include compressors, evaporator coils, filters, supply fans, dampers, air-cooled condenser coils, condenser fans, modulating reheat coil, electric heaters, and unit controls.

2. Unit shall be factory assembled and tested including leak testing of the coils, pressure testing of the refrigeration circuit, and run testing of the completed unit. Run test report shall be supplied with the unit in the controls compartment's literature pocket.

3. Unit shall have decals and tags to indicate lifting and rigging, service areas and caution areas for safety and to assist service personnel.

4. Unit components shall be labeled, including pipe stub outs, refrigeration system components and electrical and controls components.

5. Estimated sound power levels (dB) shall be shown on the unit ratings sheet.

6. Installation, Operation and Maintenance manual shall be supplied within the unit.

7. Laminated color-coded wiring diagram shall match factory installed wiring and shall be affixed to the interior of the control compartment's access door.

8. Unit nameplate shall be provided in two locations on the unit, affixed to the exterior of the unit and affixed to the interior of the control compartment's access door.

B. Construction

1. All cabinet walls, access doors, and roof shall be fabricated of double wall, impact resistant, rigid polyurethane foam panels.

2. Unit insulation shall have a minimum thermal resistance R-value of 13. Foam insulation shall have a minimum density of 2 pounds/cubic foot and shall be tested in accordance with ASTM D-1929-11 for a minimum flash ignition temperature of 610°F.

3. Unit construction shall be double wall with G90 galvanized steel on both sides and a thermal break. Double wall construction with a thermal break prevents moisture accumulation on the insulation, provides a cleanable interior, prevents heat transfer through the panel, and prevents exterior condensation on the panel.

4. Unit shall be designed to reduce air leakage and infiltration through the cabinet. Cabinet leakage shall not exceed 1% of total airflow when tested at 3 times the minimum external static pressure provided in AHRI Standard 340/360 (units greater than 6 tons) and AHRI Standard 210/240 (for units 6 tons and less). Panel deflection shall not exceed L/240 ratio at 125% of design static pressure, at a maximum 8 inches of positive or negative static pressure, to reduce air leakage. Deflection shall be measured at the midpoint of the panel height and width. Continuous sealing shall be included between panels and between access doors and openings to reduce air leakage. Refrigerant piping and electrical conduit through cabinet panels shall include sealing to reduce air leakage.

5. Roof of the air tunnel shall be sloped to provide complete drainage. Cabinet shall have rain break overhangs above access doors.

6. Access to filters, dampers, cooling coils, modulating hot gas reheat coil, heaters, compressors, and electrical and controls components shall be through hinged access doors with quarter turn, zinc cast, lockable handles. Full length stainless steel piano hinges shall be included on the doors.

7. Exterior paint finish shall be capable of withstanding at least 2,500 hours, with no visible corrosive effects, when tested in a salt spray and fog atmosphere in accordance with ASTM B 117-95 test procedure.

8. Units with cooling coils shall include double sloped 304 stainless steel drain pans.

9. Unit shall be provided with base discharge and return air openings. All openings through the base pan of the unit shall have upturned flanges of at least 1/2 inch in height around the opening.

10. Unit shall include lifting lugs on the top of the unit.

C. Electrical

1. Unit shall be provided with factory installed and factory wired, non-fused disconnect switch.

2. Unit shall be provided with factory installed and factory wired 115V, 13 amp GFI outlet with outlet disconnect switch in the unit control panel.

3. Unit shall be provided with phase and brown out protection which shuts down all motors in the unit if the electrical phases are more that 10% out of balance on voltage, the voltage is more that 10% under design voltage, or on phase reversal.

4. Unit shall be provided with remote stop/start terminals which require contact closure for unit operation. When these contacts are open the low voltage circuit is broken and the unit will not operate.

D. Supply Fans

1. Unit shall include direct drive, unhoused, backward curved, plenum supply fans.

2. Blowers and motors shall be dynamically balanced and mounted on rubber isolators.

3. Motors shall be premium efficiency ODP with ball bearings rated for 200,000 hours service with external lubrication points.

G. Cooling Coils

1. Evaporator Coils

   a. Coils shall be designed for use with R-410A refrigerant and constructed of copper tubes with aluminum (copper) fins mechanically bonded to the tubes and galvanized (304 stainless) steel end casings. Fin design shall be sine wave rippled.

   b. Coils shall have interlaced circuitry and shall be **6 row high capacity.**

   c. Coils shall be helium leak tested.

   d. Coils shall be furnished with a factory installed thermostatic expansion valves.

H. Refrigeration System

1. Unit shall be factory charged with R-410A refrigerant.

2. Compressors shall be scroll type with thermal overload protection, independently circuited, and carry a 5 year non-prorated warranty, from the date of original equipment shipment from the factory.

3. Compressors shall be mounted in an isolated service compartment which can be accessed without affecting unit operation. Lockable hinged compressor access doors shall be fabricated of double wall, rigid polyurethane foam insulated panels to prevent the transmission of noise outside the cabinet.

4. Compressors shall be isolated from the base pan with the compressor manufacturer's recommended rubber vibration isolators, to reduce any transmission of noise from the compressors into the building area.

5. Each refrigeration circuit shall be equipped with thermostatic expansion valve type refrigerant flow control.

6. Each refrigeration circuit shall be equipped with automatic reset low pressure and manual reset high pressure refrigerant safety controls, Schrader type service fittings on both the high pressure and low pressure sides, and factory installed liquid line filter driers.

7. Lead refrigeration circuit shall be provided with hot gas reheat coil, modulating valves, electronic controller, supply air temperature sensor and a dehumidification control signal terminal which allow the unit to have a dehumidification mode of operation, which includes supply air temperature control to prevent supply air temperature swings and overcooling of the space.

8. Each capacity stage shall be equipped with a 5 minute off, delay timer to prevent compressor short cycling.

9. Each capacity stage shall be equipped with an adjustable, 20 second delay timer to prevent multiple capacity stages from starting all at once.

10. Units 9 tons or great shall require two independently circuited compressors.

11. Units 6 tons or less shall include a two-step compressor which shall modulate between two capacity settings, 67% and 100%.

12. For units greater than 6 tons lead and lag refrigeration circuits shall be provided with factory installed hot gas bypass to protect against evaporator frosting and to prevent excessive compressor cycling.

13. For units great than 6 tons first capacity stage shall be provided with on/off condenser fan cycling and adjustable compressor lockout to allow cooling operation down to 35°F.

I. Condensers

1. Air-Cooled Condenser

a. Condenser fans shall be vertical discharge, axial flow, direct drive fans.

b. Coils shall be designed for use with R-410A refrigerant. Coils shall be multi-pass and fabricated from aluminum microchannel tubes or coils shall be constructed of copper tubes with aluminum fins mechanically bonded to the tubes and aluminum end casings. Fin design of copper tube coils shall be sine wave rippled.

c. Coils shall be designed for a minimum of 10°F of refrigerant sub-cooling.

d. Coils shall be helium leak tested.

e. Coil shall have a flexible, epoxy polymer e-coat uniformly applied to all coil surface areas without material bridging between fins. Humidity and water immersion resistance shall be up to a minimum 1,000 and 250 hours respectively (ASTM D2247-92 and ASTM D870-92). Corrosion durability shall be confirmed through testing to no less than 6,000 hours salt spray per ASTM B117-90. Coated coils shall receive a spray-applied, UV-resistant polyurethane topcoat to prevent UV degradation of the e-coat. Coating shall carry a 5 year warranty, from the date of original equipment shipment from the factory. The first 12 months from the date of equipment startup, or 18 months from the date of original equipment shipment from the factory, whichever is less, shall be covered under the standard AAON limited parts warranty. The remaining period of the warranty shall be covered by Luvata Electrofin. The Luvata Electrofin written instructions for installation, operation, coil cleaning, maintenance, and recording keeping must be followed. Refer to the Luvata Electrofin Terms and Conditions of Sale.

K. Electric Heating

1. Unit shall include an include electric heater consisting of electric heating coils, fuses, and a high temperature limit switch, with capacities as shown on the plans.

2. Electric heating coils shall be located in the reheat position downstream of the supply fans.

M. Filters

1. Unit shall include 2 inch thick, pleated panel filters with an ASHRAE efficiency of 30% and MERV rating of 8, upstream of the cooling coil.

N. Outside Air

1. Unit shall include 0-25% motorized outside air damper assembly, bird screen, outside air hood and a return air connection.

G. Controls

2. Standard Terminal Block

a. Unit shall be provided with a terminal block for field installation of controls.

H. Accessories

1. Unit shall be provided with a terminal block for field installation of a smoke detector which shuts off the unit’s control circuit.

2.03 Curbs

A. Curbs shall to be fully gasketed between the curb top and unit bottom with the curb providing full perimeter support, cross structure support and air seal for the unit. Curb gasket shall be furnished within the control compartment of the rooftop unit to be mounted on the curb immediately before mounting of the rooftop unit.

B. Solid bottom curb shall be factory assembled and fully lined with 1 inch neoprene coated fiberglass insulation and include a wood nailer strip.

Part 3 - Execution

3.01 Installation, Start Up, Operation, and Maintenance

A. Installation, Operation and Maintenance manual shall be supplied with the unit.

B. Installing contractor shall install unit, including field installed components, in accordance with Installation, Operation and Maintenance manual instructions.

C. Factory Authorized Representative shall provide on-site Start Up of the rooftop package unit and associated controls. A startup report shall be provided detailing the completion of work and initial settings. Startup and startup report to the owner shall include the following items.

i. Compressors and Refrigerant

ii. Condenser Fans

iii. Economizer

iv. Electrical Power

v. Electric Heat

vi. Factory Installed Controls

vii. Factory Provided Field Installed Sensors

viii. Mechanical Cooling and Dehumidification System

ix. Supply Fan

x. Variable Frequency Drives

xi. Field Installed Thermostat.

D. Owner will schedule start up appointment with Factory Authorized Representative.

E. Factory Authorized Representative shall be located within 100 miles of jobsite.

F. Factory Authorized Service Technician shall be located within 100 miles of jobsite.

3.02 Factory Authorized Representative shall provide on-site training to the owner. Training shall cover operation and maintenance of the package unit and all factory provide control items. The owner shall schedule the time and date directly with the Factory Authorized Representative.

SECTION 15815 - METAL DUCTS

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. Section Includes:

1. Metal Ductwork.
2. Nonmetal ductwork.
3. Casing and plenums.
4. Kitchen hood ductwork.
5. Dishwasher exhaust ductwork.
6. Hangers and supports.

B. References:

1. ASTM A 36/A 36M - Standard Specification for Carbon Structural Steel; 1997a.
2. ASTM A 366/A 366M - Standard Specification for Commercial Steel (CS) Sheet, Carbon, (0.15 Maximum Percent) Cold Rolled; 1997.
3. ASTM A 569/A 569M - Standard Specification for Steel, Carbon (0.15 Maximum Percent), Hot-Rolled Sheet and Strip Commercial; 1998.
4. ASTM A 653/A 653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 1998.
5. NFPA 90A - Standard for the Installation of Air Conditioning and Ventilating Systems; National Fire Protection Association; 1996.
6. NFPA 90B - Standard for the Installation of Warm Air Heating and Air Conditioning Systems; National Fire Protection Association; 1996.
7. NFPA 96 - Standard for Ventilation Control and Fire Protection of Commercial Cooking Operations; National Fire Protection Association; 1994.
8. SMACNA (DCS) - HVAC Duct Construction Standards - Metal and Flexible; Sheet Metal and Air Conditioning Contractors' National Association; latest Edition.
9. UL 181 - Standard for Factory-Made Air Ducts and Air Connectors; Underwriters Laboratories Inc.; 1996.

1.3 PERFORMANCE REQUIREMENTS

A. Duct construction, including sheet metal thicknesses, seam and joint construction, reinforcements, and hangers and supports, shall comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible", latest edition and NFPA 90A.

B. Structural Performance: Duct hangers and supports shall withstand the effects of gravity loads and stresses within limits and under conditions described in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible".

C. Airstream Surfaces: Surfaces in contact with the airstream shall comply with requirements in ASHRAE 62.1-2004.

1.4 SUBMITTALS

A. Product Data: For each type of the following products:

1. Liners and adhesives.
2. Sealants and gaskets.
3. Duct Construction Standards (DCS) for each pressure class required for this project. DCS shall include transverse and longitudinal joint type, any internal or external reinforcement and sheetmetal thickness and size for each pressure class.
4. Flexible duct manufacturer, type and product details.
5. Flexible connection materials and connection types.
6. Fitting fabrication details.
7. Damper details.
8. Description of hanger types and sizes for duct sizes used in this project. Hangers must comply with the latest edition of SMACNA's "HVAC Duct Construction Standards - Metal and Flexible". Hanger submittal should include hanger spacing to be used.

B. Coordination Drawings: Provide drawings indicating fabrication, assembly, and installation, including plans, elevations, sections, components, and attachments to other work. Minimum scale of ¼” = 1’0”. Coordinate duct location with other trades.

C. Project Record Documents: Record actual locations of ducts and duct fittings. Record changes in fitting location and type. Show additional fittings used.

1.5 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with minimum three years of documented experience.

B. Installer Qualifications: Company specializing in performing the type of work specified in this section, with minimum 5 years of documented experience.

1.6 ENVIRONMENTAL REQUIREMENTS

A. Do not install duct sealants when temperatures are less than those recommended by sealant manufacturers.

B. Maintain temperatures within acceptable range during and after installation of duct sealants.

PART 2 - PRODUCTS

2.1 SINGLE-WALL RECTANGULAR DUCTS AND FITTINGS

A. General Fabrication Requirements: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" based on indicated static-pressure class unless otherwise indicated.

B. Elbows, Transitions, Offsets, Branch Connections, and Other Duct Construction: Construct with a radius of not less than 1-1/2 times width of duct on centerline. Where not possible, provide a centerline radius of 1.0 times the width of duct. Where space constraints will not allow a centerline radius of 1.0 times the width of duct, provide rectangular elbows with double wall (airfoil) factory fabricated turning vanes installed on vane runner rails. Turning vanes shall not be used in bends other than 90 degrees.

1. Branch connections shall be 45 degree entry fittings.

C. Increase duct sizes gradually, not exceeding 15 degrees divergence wherever possible; maximum 30 degrees divergence upstream of equipment and 45 degrees convergence downstream.

2.2 DOUBLE-WALL RECTANGULAR DUCTS AND FITTINGS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. McGill AirFlow LLC.
2. SPOT
3. SEMCO

B. Rectangular Ducts: Fabricate ducts with indicated dimensions for the inner duct.

C. Outer Duct: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" based on indicated static-pressure class unless otherwise indicated. If duct is exposed to the weather, provide a continuous sheetmetal hat channel over all transverse joints and position openings in longitudinal seams facing in the direction of possible water flow. Provide a flexible, adhesive aluminum jacket designed for this application over entire duct surface per manufacturer’s recommendations.

D. Interstitial Insulation: Fibrous-glass liner complying with ASTM C 1071, NFPA 90A, or NFPA 90B; and with NAIMA AH124, "Fibrous Glass Duct Liner Standard."

1. Maximum Thermal Conductivity: 0.27 Btu x in./h x sq. ft. x deg F (0.039 W/m x K) at 75 deg F (24 deg C) mean temperature.
2. Install spacers that position the inner duct at uniform distance from outer duct without compressing insulation.
3. Coat insulation with antimicrobial coating.
4. Cover insulation with polyester film complying with UL 181, Class 1.
5. Insulation thickness to be 2 inches.

E. Inner Duct: Minimum 0.028-inch (0.7-mm) solid sheet steel.

2.3 SINGLE-WALL ROUND AND FLAT-OVAL DUCTS AND FITTINGS

A. General Fabrication Requirements: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Chapter 3, "Round, Oval, and Flexible Duct," based on indicated static-pressure class unless otherwise indicated.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

    a. Lindab Inc.
    b. McGill AirFlow LLC.
    c. SEMCO Incorporated.
    d. Sheet Metal Connectors, Inc.
    e. SPOT

B. Flat-Oval Ducts: Indicated dimensions are the duct width (major dimension) and diameter of the round sides connecting the flat portions of the duct (minor dimension).

C. Transverse Joints: Select joint types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-2, "Transverse Joints - Round Duct," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

1. Transverse Joints in Ducts Larger Than 36 Inches (1524 mm) in Diameter: Flanged.

D. Longitudinal Seams: Round and flat oval duct must be spiral seam ductwork. Longitudinal seam snap-lock duct will not be allowed.

E. Tees, Laterals and Bends: Fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-4, "90 Degree Tees and Laterals," and Figure 3-5, "Conical Tees," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

1. Elbows and bends: Construct with a radius of not less than 1-1/2 times width of duct on centerline. Where not possible, provide a centerline radius of 1.0 times the width of duct. Elbows shall be of gored, pleated or stamped construction. 90 degree bends shall be a minimum of 5-gore. 45 degree bends shall be a minimum of 3 gore. Adjustable elbows will not be allowed.

2. Branch connections shall be conical, 45 deg. entry or lateral fittings.

2.4 DOUBLE-WALL ROUND AND FLAT-OVAL DUCTS AND FITTINGS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Lindab Inc.
2. McGill AirFlow LLC.
3. SEMCO Incorporated.
4. SPOT

B. Flat-Oval Ducts: Indicated dimensions are the duct width (major dimension) and diameter of the round sides connecting the flat portions of the duct (minor dimension) of the inner duct.

C. Outer Duct: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Chapter 3, "Round, Oval, and Flexible Duct," based on static-pressure class unless otherwise indicated.

1. Transverse Joints: Select joint types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-2, "Transverse Joints - Round Duct," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

    a. Transverse Joints in Ducts Larger Than 36 Inches (1524 mm) in Diameter: Flanged.

2. Longitudinal Seams: Round and flat oval duct must be spiral seam ductwork. Longitudinal seam snap-lock duct will not be allowed.

3. Tees and Laterals: Select types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-4, "90 Degree Tees and Laterals," and Figure 3-5, "Conical Tees," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

    a. Elbows and bends: Construct with a radius of not less than 1-1/2 times width of duct on centerline. Where not possible, provide a centerline radius of 1.0 times the width of duct. Elbows shall be of gored, pleated or stamped construction. 90 degree bends shall be a minimum of 5-gore. 45 degree bends shall be a minimum of 3 gore. Adjustable elbows will not be allowed.
    b. Branch connections shall be conical, 45 deg. entry or lateral fittings.

D. Inner Duct: Minimum 0.028-inch (0.7-mm) solid sheet steel.

E. Interstitial Insulation: Fibrous-glass liner complying with ASTM C 1071, NFPA 90A, or NFPA 90B; and with NAIMA AH124, "Fibrous Glass Duct Liner Standard."

1. Maximum Thermal Conductivity: [0.27 Btu x in./h x sq. ft. x deg F (0.039 W/m x K)] at 75 deg F (24 deg C) mean temperature.
2. Install spacers that position the inner duct at uniform distance from outer duct without compressing insulation.
3. Coat insulation with antimicrobial coating.
4. Cover insulation with polyester film complying with UL 181, Class 1.

2.5 SHEET METAL MATERIALS

A. General Material Requirements: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" for acceptable materials, material thicknesses, and duct construction methods unless otherwise indicated. Sheet metal materials shall be free of pitting, seam marks, roller marks, stains, discolorations, and other imperfections.

B. Galvanized Sheet Steel: Comply with ASTM A 653/A 653M.

1. Galvanized Coating Designation: G90 (Z275).
2. Finishes for Surfaces Exposed to View: Mill phosphatized.

C. Carbon-Steel Sheets: Comply with ASTM A 1008/A 1008M, with oiled, matte finish for exposed ducts.

D. Stainless-Steel Sheets: Comply with ASTM A 480/A 480M, Type 304 or 316, as indicated in the "Duct Schedule" Article; cold rolled, annealed, sheet. Exposed surface finish shall be No. 2B, No. 2D, No. 3, or No. 4 as indicated in the "Duct Schedule" Article.

E. Aluminum Sheets: Comply with ASTM B 209 (ASTM B 209M) Alloy 3003, H14 temper; with mill finish for concealed ducts, and standard, one-side bright finish for duct surfaces exposed to view.

F. Tie Rods: Galvanized steel, 3/8-inch (10-mm) minimum diameter.

2.6 DUCT LINER

A. Fibrous-Glass Duct Liner: Comply with ASTM C 1071, NFPA 90A, or NFPA 90B; and with NAIMA AH124, "Fibrous Glass Duct Liner Standard."

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. CertainTeed Corporation; Insulation Group.
b. Johns Manville.
c. Knauf Insulation.
d. Owens Corning.

2. Maximum Thermal Conductivity:

a. Type I, Flexible: 0.27 Btu x in./h x sq. ft. x deg F (0.039 W/m x K) at 75 deg F (24 deg C) mean temperature.
b. Type II, Rigid: 0.23 Btu x in./h x sq. ft. x deg F (0.033 W/m x K) at 75 deg F (24 deg C) mean temperature.

3. Antimicrobial Erosion-Resistant Coating: Apply to the surface of the liner that will form the interior surface of the duct to act as a moisture repellent and erosion-resistant coating. Antimicrobial compound shall be tested for efficacy by an NRTL and registered by the EPA for use in HVAC systems.

4. Water-Based Liner Adhesive: Comply with NFPA 90A or NFPA 90B and with ASTM C 916.

    a. For indoor applications, use adhesive that has a VOC content of 80 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

B. Insulation Pins and Washers:

1. Cupped-Head, Capacitor-Discharge-Weld Pins: Copper- or zinc-coated steel pin, fully annealed for capacitor-discharge welding, 0.106-inch- (2.6-mm-) diameter shank, length to suit depth of insulation indicated with integral 1-1/2-inch (38-mm) galvanized carbon-steel washer.
2. Insulation-Retaining Washers: Self-locking washers formed from 0.016-inch- (0.41-mm-) thick galvanized steel; with beveled edge sized as required to hold insulation securely in place but not less than 1-1/2 inches (38 mm) in diameter.

C. Shop Application of Duct Liner: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 2-19, "Flexible Duct Liner Installation."

1. Adhere a single layer of indicated thickness of duct liner with at least 90 percent adhesive coverage at liner contact surface area. Attaining indicated thickness with multiple layers of duct liner is prohibited.
2. Apply adhesive to transverse edges of liner facing upstream that do not receive metal nosing.
3. Butt transverse joints without gaps, and coat joint with adhesive.
4. Fold and compress liner in corners of rectangular ducts or cut and fit to ensure butted-edge overlapping.
5. Do not apply liner in rectangular ducts with longitudinal joints, except at corners of ducts, unless duct size and dimensions of standard liner make longitudinal joints necessary.
6. Apply adhesive coating on longitudinal seams in ducts with air velocity of 2500 fpm (12.7 m/s).
7. Secure liner with mechanical fasteners 4 inches (100 mm) from corners and at intervals not exceeding 12 inches (300 mm) transversely; at 3 inches (75 mm) from transverse joints and at intervals not exceeding 18 inches (450 mm) longitudinally.
8. Secure transversely oriented liner edges facing the airstream with metal nosings that have either channel or "Z" profiles or are integrally formed from duct wall. Fabricate edge facings at the following locations:

    a. Fan discharges.
    b. Intervals of lined duct preceding unlined duct.
    c. Upstream edges of transverse joints in ducts where air velocities are higher than 2500 fpm (12.7 m/s) or where indicated.

9. Secure insulation between perforated sheet metal inner duct of same thickness as specified for outer shell. Use mechanical fasteners that maintain inner duct at uniform distance from outer shell without compressing insulation.

    a. Sheet Metal Inner Duct Perforations: 3/32-inch (2.4-mm) diameter, with an overall open area of 23 percent.

10. Terminate inner ducts with buildouts attached to fire-damper sleeves, dampers, turning vane assemblies, or other devices. Fabricated buildouts (metal hat sections) or other buildout means are optional; when used, secure buildouts to duct walls with bolts, screws, rivets, or welds.

2.7 SEALANT AND GASKETS

A. General Sealant and Gasket Requirements: Surface-burning characteristics for sealants and gaskets shall be a maximum flame-spread index of 25 and a maximum smoke-developed index of 50 when tested according to UL 723; certified by an NRTL.

B. Water-Based Joint and Seam Sealant:

1. Application Method: Brush on.
2. Solids Content: Minimum 65 percent.
3. Shore A Hardness: Minimum 20.
4. Water resistant.
5. Mold and mildew resistant.
6. VOC: Maximum 75 g/L (less water).
7. Maximum Static-Pressure Class: 10-inch wg (2500 Pa), positive and negative.
8. Service: Indoor or outdoor.
9. Substrate: Compatible with galvanized sheet steel (both PVC coated and bare), stainless steel, or aluminum sheets.

C. Flange Gaskets: Butyl rubber, neoprene, or EPDM polymer with polyisobutylene plasticizer.

2.8 HANGERS AND SUPPORTS

A. Hanger Rods for Noncorrosive Environments: Cadmium-plated steel rods and nuts.

B. Hanger Rods for Corrosive Environments: Electrogalvanized, all-thread rods or galvanized rods with threads painted with zinc-chromate primer after installation.

C. Strap and Rod Sizes: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Table 4-1 (Table 4-1M), "Rectangular Duct Hangers Minimum Size," and Table 4-2, "Minimum Hanger Sizes for Round Duct."

D. Steel Cables for Galvanized-Steel Ducts: Galvanized steel complying with ASTM A 603.

E. Steel Cables for Stainless-Steel Ducts: Stainless steel complying with ASTM A 492.

F. Steel Cable End Connections: Cadmium-plated steel assemblies with brackets, swivel, and bolts designed for duct hanger service; with an automatic-locking and clamping device.

G. Duct Attachments: Sheet metal screws, blind rivets, or self-tapping metal screws; compatible with duct materials.

H. Trapeze and Riser Supports:

1. Supports for Galvanized-Steel Ducts: Galvanized-steel shapes and plates.

2. Supports for Stainless-Steel Ducts: Stainless-steel shapes and plates.
3. Supports for Aluminum Ducts: Aluminum or galvanized steel coated with zinc chromate.

2.9 Insulated Flexible Ducts

2.10 Kitchen Exhaust Ducts

2.11 Dishwasher Exhaust Ducts

PART 3 - EXECUTION

3.1 DUCT INSTALLATION

A. Drawing plans, schematics, and diagrams indicate general location and arrangement of duct system. Indicated duct locations, configurations, and arrangements were used to size ducts and calculate friction loss for air-handling equipment sizing and for other design considerations. Install duct systems as indicated unless deviations to layout are approved on Shop Drawings and Coordination Drawings.

B. Install ducts according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" unless otherwise indicated.

C. Install round and flat-oval ducts in maximum practical lengths.

D. Install ducts with fewest possible joints.

E. Install factory- or shop-fabricated fittings for changes in direction, size, and shape and for branch connections.

F. Unless otherwise indicated, install ducts vertically and horizontally, and parallel and perpendicular to building lines.

G. Install ducts close to walls, overhead construction, columns, and other structural and permanent enclosure elements of building.

H. Install ducts with a clearance of 1 inch (25 mm), plus allowance for insulation thickness.

I. Route ducts to avoid passing through transformer vaults and electrical equipment rooms and enclosures.

J. Where ducts pass through non-fire-rated interior partitions and exterior walls and are exposed to view, cover the opening between the partition and duct or duct insulation with sheet metal flanges of same metal thickness as the duct. Overlap openings on four sides by at least 1-1/2 inches (38 mm).

K. Where ducts pass through fire-rated interior partitions and exterior walls, install fire dampers. Comply with requirements in Division 15 Section "Duct Accessories" for fire and smoke dampers.

L. Protect duct interiors from moisture, construction debris and dust, and other foreign materials. Comply with SMACNA's "Duct Cleanliness for New Construction Guidelines."

3.2 INSTALLATION OF EXPOSED DUCTWORK

A. Protect ducts exposed in finished spaces from being dented, scratched, or damaged.

B. Trim duct sealants flush with metal. Create a smooth and uniform exposed bead. Do not use two-part tape sealing system.

C. Grind welds to provide smooth surface free of burrs, sharp edges, and weld splatter. When welding stainless steel with a No. 3 or 4 finish, grind the welds flush, polish the exposed welds, and treat the welds to remove discoloration caused by welding.

D. Maintain consistency, symmetry, and uniformity in the arrangement and fabrication of fittings, hangers and supports, duct accessories, and air outlets.

E. Repair or replace damaged sections and finished work that does not comply with these requirements.

3.3 ADDITIONAL INSTALLATION REQUIREMENTS FOR COMMERCIAL KITCHEN HOOD EXHAUST DUCT

A. Install commercial kitchen hood exhaust ducts without dips and traps that may hold grease, and sloped a minimum of 2 percent to drain grease back to the hood.

B. Install fire-rated access panel assemblies at each change in direction and at maximum intervals of 20 feet (6 m) in horizontal ducts, and at every floor for vertical ducts, or as indicated on Drawings. Locate access panel on top or sides of duct a minimum of 1-1/2 inches (38 mm) from bottom of duct.

C. Do not penetrate fire-rated assemblies except as allowed by applicable building codes and authorities having jurisdiction.

3.4 DUCT SEALING

A. Seal all duct according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

B. Seal ducts to the following seal classes according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible":

1. Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."
2. All duct: Seal Class A.

3.5 HANGER AND SUPPORT INSTALLATION

A. Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Chapter 4, "Hangers and Supports."

B. Building Attachments: Concrete inserts, powder-actuated fasteners, or structural-steel fasteners appropriate for construction materials to which hangers are being attached.

1. Where practical, install concrete inserts before placing concrete.
2. Install powder-actuated concrete fasteners after concrete is placed and completely cured.
3. Use powder-actuated concrete fasteners for standard-weight aggregate concretes or for slabs more than 4 inches (100 mm) thick.
4. Do not use powder-actuated concrete fasteners for lightweight-aggregate concretes or for slabs less than 4 inches (100 mm) thick.
5. Do not use powder-actuated concrete fasteners for seismic restraints.

C. Hanger Spacing: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Table 4-1 (Table 4-1M), "Rectangular Duct Hangers Minimum Size," and Table 4-2, "Minimum Hanger Sizes for Round Duct," for maximum hanger spacing; install hangers and supports within 24 inches (610 mm) of each elbow and within 48 inches (1200 mm) of each branch intersection.

D. Hangers Exposed to View: Threaded rod and angle or channel supports.

E. Support vertical ducts with steel angles or channel secured to the sides of the duct with welds, bolts, sheet metal screws, or blind rivets; support at each floor and at a maximum intervals of 16 feet (5 m).

F. Install upper attachments to structures. Select and size upper attachments with pull-out, tension, and shear capacities appropriate for supported loads and building materials where used.

3.6 CONNECTIONS

A. Make connections to equipment with flexible connectors complying with Division 15 Section "Duct Accessories."

B. Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" for branch, outlet and inlet, and terminal unit connections.

3.7 FIELD QUALITY CONTROL

A. Perform tests and inspections.

B. Leakage Tests:

1. Comply with SMACNA's "HVAC Air Duct Leakage Test Manual." Submit a test report for each test.
2. Test the following systems:

a. Ducts with a Pressure Class Higher Than 3-Inch wg (750 Pa): Test representative duct sections, selected by Engineer from sections installed**,** totaling no less than 25 percent of total installed duct area for each designated pressure class.

3. Disassemble, reassemble, and seal segments of systems to accommodate leakage testing and for compliance with test requirements.
4. Test for leaks before applying external insulation.
5. Conduct tests at static pressures equal to maximum design pressure of system or section being tested. If static-pressure classes are not indicated, test system at maximum system design pressure. Do not pressurize systems above maximum design operating pressure.
6. Give seven days' advance notice for testing.

C. Duct System Cleanliness Tests:

1. Visually inspect duct system to ensure that no visible contaminants are present.

D. Duct system will be considered defective if it does not pass tests and inspections.

E. Prepare test and inspection reports.

3.8 DUCT SCHEDULE

A. Fabricate ducts with galvanized sheet steel except as otherwise indicated and as follows:

1. Underground Ducts: Concrete-encased, PVC-coated, galvanized sheet steel**.**

B. Supply Ducts:

1. Ducts Connected to Fan Coil Units, Furnaces, Heat Pumps, and Terminal Units:

a. Pressure Class: Positive [1-inch wg (250 Pa)]
b. SMACNA Leakage Class for Rectangular: 12
c. SMACNA Leakage Class for Round and Flat Oval: 12

2. Ducts Connected to Constant-Volume Air-Handling Units:

a. Pressure Class: Positive 1-inch wg (500 Pa), or round up the ESP listed in the equipment schedules and provide, whichever is greater.
b. SMACNA Leakage Class for Rectangular: 12
c. SMACNA Leakage Class for Round and Flat Oval: 12

3. Ducts Connected to Variable-Air-Volume Air-Handling Units prior to terminal units:

a. Pressure Class: Positive 3-inch wg (750 Pa)
b. SMACNA Leakage Class for Rectangular: 12
c. SMACNA Leakage Class for Round and Flat Oval: 12

C. Return, toilet exhaust and outside air ducts:

1. Pressure Class: Positive or negative 1-inch wg (250 Pa).
2. SMACNA Leakage Class for Rectangular: 12

3. SMACNA Leakage Class for Round and Flat Oval: 12

D. Special Exhaust Ducts:

1. Ducts Connected to Commercial Kitchen Hoods: Comply with NFPA 96.

a. Exposed to View: Type 304, stainless-steel sheet.
b. Concealed: Type 304, stainless-steel sheet.
c. Welded seams and joints.
d. Pressure Class: Positive or negative 4-inch wg (1000 Pa).
e. Minimum SMACNA Seal Class: Welded seams, joints, and penetrations.
f. SMACNA Leakage Class: 3.
g. Minimum 18 gauge or thickness required per local code, whichever is greater

2. Ducts Connected to Dishwasher Hoods:

a. Type 304, stainless-steel sheet.
b. Welded seams and flanged joints with watertight EPDM gaskets.
c. Pressure Class: Positive or negative 2-inch wg (500 Pa).
d. Minimum SMACNA Seal Class: Welded seams, joints, and penetrations.
e. SMACNA Leakage Class: 3.
f. Minimum 18 gauge or thickness required per local code, whichever is greater

E. Duct Exposed to View

1. Supply Air Ducts: shall be double wall spiral round construction with 1” thick insulation in conditioned spaces and 2” insulation in unconditioned spaces.
2. Return and Exhaust Air Ducts: shall be un-insulated single wall spiral round construction in conditioned spaces and double wall round construction with 1” insulation in unconditioned spaces.

END OF SECTION 15815

SECTION 15820 - DUCT ACCESSORIES

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. Backdraft dampers.
2. Volume dampers.
3. Motorized control dampers.
4. Fire dampers.
5. Smoke dampers.
6. Combination fire and smoke dampers.
7. Turning vanes.
8. Duct-mounting access doors.
9. Flexible connectors.
10. Flexible ducts.
11. Duct accessory hardware.
12. Louvers.

B. Related Sections include the following:

1. Division 13 Section "Fire Alarm" for duct-mounting fire and smoke detectors.

1.3 SUBMITTALS

A. Product Data: For the following:

1. Backdraft dampers.
2. Volume dampers.
3. Motorized control dampers.
4. Fire dampers.
5. Smoke dampers.
6. Combination fire and smoke dampers.
7. Turning vanes.
8. Duct-mounting access doors.
9. Flexible connectors.
10. Flexible ducts.

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. Special fittings.
2. Manual-volume damper installations.
3. Motorized-control damper installations.
4. Fire-damper, smoke-damper, and combination fire- and smoke-damper installations, including sleeves and duct-mounting access doors.
5. Wiring Diagrams: Power, signal, and control wiring.

C. Coordination Drawings: Reflected ceiling plans, drawn to scale and coordinating penetrations and ceiling-mounting items. Show ceiling-mounting access panels and access doors required for access to duct accessories.

1.4 QUALITY ASSURANCE

A. Comply with NFPA 90A, "Installation of Air Conditioning and Ventilating Systems," and NFPA 90B, "Installation of Warm Air Heating and Air Conditioning Systems."

1.5 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. Fusible Links: Furnish quantity equal to 10 percent of amount installed.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:
1. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers specified.

2.2 SHEET METAL MATERIALS

A. Comply with SMACNA's "HVAC Duct Construction Standards--Metal and Flexible" for acceptable materials, material thicknesses, and duct construction methods, unless otherwise indicated.

B. Galvanized Sheet Steel: Lock-forming quality; complying with ASTM A 653/A 653M and having G90 (Z275) coating designation; ducts shall have mill-phosphatized finish for surfaces exposed to view.

C. Stainless Steel: ASTM A 480/A 480M.

D. Aluminum Sheets: ASTM B 209 (ASTM B 209M), alloy 3003, temper H14; with mill finish for concealed ducts and standard, 1-side bright finish for exposed ducts.

E. Extruded Aluminum: ASTM B 221 (ASTM B 221M), alloy 6063, temper T6.

F. Reinforcement Shapes and Plates: Galvanized-steel reinforcement where installed on galvanized sheet metal ducts; compatible materials for aluminum and stainless-steel ducts.

G. Tie Rods: Galvanized steel, 1/4-inch (6-mm) minimum diameter for lengths 36 inches (900 mm) or less; 3/8-inch (10-mm) minimum diameter for lengths longer than 36 inches (900 mm).

2.3 BACKDRAFT DAMPERS

A. Manufacturers:
1. CESCO Products.
2. Greenheck.
3. Ruskin Company.

B. Description: Multiple-blade, parallel action gravity balanced, with blades of maximum 6-inch (150-mm) width, with sealed edges, assembled in rattle-free manner with 90-degree stop, steel ball bearings, and axles; adjustment device to permit setting for varying differential static pressure.

C. Frame: 20 gauge, galvanized sheet steel, with welded corners and mounting flange.

D. Blades: 0.025-inch- thick, roll-formed aluminum.

E. Blade Seals: Vinyl.

F. Blade Axles: Stainless Steel.

G. Tie Bars and Brackets: Galvanized steel.

H. Basis of Design: Ruskin S3G.

2.4 VOLUME DAMPERS

A. Manufacturers:
1. Flexmaster U.S.A., Inc.
2. METALAIRE, Inc.
3. Nailor Industries Inc.
4. Ruskin Company.

B. General Description: 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.

1. Pressure Classes of 2-Inch wg (750 Pa) or Higher: End bearings or other seals for ducts with axles full length of damper blades and bearings at both ends of operating shaft.

C. 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 22 gauge 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. Single Skin Steel Blades: 22 gauge, galvanized sheet steel.
3. Blade Axles: Galvanized steel.
4. Bearings: Molded synthetic.
5. Tie Bars and Brackets: Aluminum.
6. Tie Bars and Brackets: Galvanized steel.
7. Basis of Design: Ruskin MD 15 (rectangular) and MDRS25 (round).

D. Jackshaft: 1-inch- (25-mm-) diameter, galvanized-steel pipe rotating within 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 in multiple-damper assembly.

E. 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.

2.5 MOTORIZED CONTROL DAMPERS

A. Manufacturers:
1. CESCO Products.
2. Greenheck.
3. METALAIRE, Inc.
4. Nailor Industries Inc.
5. Ruskin Company.

B. General Description: AMCA-rated, parallel (return air applications) or opposed (outside air applications) blade design; minimum of 16 gauge thick, galvanized-steel frames with holes for duct mounting; minimum of 16 gauge thick, galvanized-steel damper blades with maximum blade width of 8 inches (203 mm).

1. Secure blades to 1/2-inch- (13-mm-) diameter, zinc-plated axles using zinc-plated hardware, with nylon blade bearings, blade-linkage hardware of zinc-plated steel and brass, ends sealed against spring-stainless-steel blade bearings, and thrust bearings at each end of every blade.
2. Operating Temperature Range: From minus 40 to plus 200 deg F (minus 40 to plus 93 deg C).
3. Provide closed-cell neoprene edging rated for leakage at less than 10 cfm per sq. ft. of damper area, at differential pressure of 1-inch wg; when tested according to AMCA 500D.

C. Basis of Design: Ruskin CD35.

2.6 FIRE DAMPERS

A. Manufacturers:
1. CESCO Products.
2. Greenheck.
3. METALAIRE, Inc.
4. Nailor Industries Inc.
5. Ruskin Company.

B. Fire dampers shall be labeled according to UL 555.

C. Fire Rating: 1-1/2 hours (3 hours as noed).

D. Frame: Curtain type with blades outside airstream; fabricated with roll-formed, 20 gauge galvanized steel; with mitered and interlocking corners.

E. Mounting Sleeve: Factory- or field-installed, galvanized sheet steel.
1. Minimum Thickness: 20 gauge frame complies with sleeve requirements.

F. Mounting Orientation: Vertical or horizontal as indicated.

G. Blades: 24 gauge, 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 blade lock and stainless-steel closure spring.

I. Fusible Links: Replaceable, 165 deg F rated.

J. Basis of Design: 1-1/2 hour – Ruskin 1BD2-B (rectangular) and FDR25 (round), 3 hour – Ruskin 1BD2-B3 (rectangular)

2.7 COMBINATION FIRE AND SMOKE DAMPERS

A. Manufacturers:
1. CESCO Products.
2. Greenheck.
3. Nailor Industries Inc.
4. Ruskin Company.

B. General Description: Labeled according to UL 555S. Combination fire and smoke dampers shall be labeled according to UL 555 for 1-1/2-hour rating.

C. Fusible Links: Replaceable, 165 deg F rated.

D. Frame and Blades16 gauge, galvanized sheet steel.

E. Mounting Sleeve: Factory-installed, galvanized sheet steel; length to suit wall or floor application.

F. Damper Motors: Modulating and two-position action.

1. Comply with requirements in Division 15 Section "Motors."
2. Permanent-Split-Capacitor or Shaded-Pole Motors: With oil-immersed and sealed gear trains.
3. Spring-Return Motors: Equip with an integral spiral-spring mechanism where indicated. Enclose entire spring mechanism in a removable housing designed for service or adjustments. Size for running torque rating of 150 in. x lbf (17 N x m) and breakaway torque rating of 150 in. x lbf (17 N x m).
4. Outdoor Motors and Motors in Outside-Air Intakes: Equip with O-ring gaskets designed to make motors weatherproof. Equip motors with internal heaters to permit normal operation at minus 40 deg F (minus 40 deg C).
5. Nonspring-Return Motors: For dampers larger than 25 sq. ft. (2.3 sq. m), size motor for running torque rating of 150 in. x lbf (17 N x m) and breakaway torque rating of 300 in. x lbf (34 N x m).
6. Electrical Connection: 115 V, single phase, 60 Hz.

G. Basis of Design: Ruskin FSD376.

2.8 TURNING VANES

A. Fabricate to comply with SMACNA's "HVAC Duct Construction Standards--Metal and Flexible" for vanes and vane runners. Vane runners shall automatically align vanes.

B. Manufactured Turning Vanes: Fabricate 1-1/2-inch- (38-mm-) wide, double-vane, curved blades of galvanized sheet steel set 3/4 inch (19 mm) o.c.; support with bars perpendicular to blades set 2 inches (50 mm) o.c.; and set into vane runners suitable for duct mounting.

C. Acoustic Turning Vanes: Fabricate airfoil-shaped aluminum extrusions with perforated faces and fibrous-glass fill.

2.9 DUCT-MOUNTING ACCESS DOORS

A. General Description: Fabricate doors airtight and suitable for duct pressure class.

B. Door: Double wall, duct mounting, and rectangular; fabricated of galvanized sheet metal with insulation fill and thickness 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.

1. Manufacturers:
   a. CESCO Products.
   b. Flexmaster U.S.A., Inc.
   c. Greenheck.
   d. Nailor Industries Inc.

2. Frame: Galvanized sheet steel, with bend-over tabs and foam gaskets.
3. Provide number of hinges and locks as follows:

   a. Less Than 12 Inches (300 mm) Square: Secure with two sash locks.
   b. Up to 18 Inches (450 mm) Square: Two hinges and two sash locks.

c. Up to 24 by 48 Inches (600 by 1200 mm): Three hinges and two compression latches.
d. Sizes 24 by 48 Inches (600 by 1200 mm) and Larger: One additional hinge.

C. Seal around frame attachment to duct and door to frame with neoprene or foam rubber.

D. Insulation: 1-inch- (25-mm-) thick, fibrous-glass or polystyrene-foam board.

2.10 FLEXIBLE CONNECTORS

A. Manufacturers:

1. Ductmate Industries, Inc.
2. Duro Dyne Corp.
3. Ventfabrics, Inc.
4. Ward Industries, Inc.

B. General Description: Flame-retardant or noncombustible fabrics, coatings, and adhesives complying with UL 181, Class 1.

C. Metal-Edged Connectors: Factory fabricated with a fabric strip 3-1/2 inches 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-) thick aluminum sheets. Select metal compatible with ducts.

D. Indoor System, Flexible Connector Fabric: Glass fabric double coated with neoprene.

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.
3. Service Temperature: Minus 40 to plus 200 deg F (Minus 40 to plus 93 deg C).

E. Outdoor System, Flexible Connector Fabric: Glass fabric double coated with weatherproof, synthetic rubber resistant to UV rays and ozone.

1. Minimum Weight: 24 oz./sq. yd. (810 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.
3. Service Temperature: Minus 50 to plus 250 deg F (Minus 45 to plus 121 deg C).

2.11 INSULATED ACOUSTICAL MEDIUM PRESSURE FLEXIBLE DUCT

A. Where flexible duct is shown on drawings, provide Flexmaster Type 8M UL 181 Class I Air Duct or equal.

B. The duct shall be constructed of a CPE fabric supported by helical wound galvanized steel. The fabric shall be mechanically locked to the steel helix without the use of adhesives or chemicals.

C. The internal working pressure rating shall be at least 6” w.g. positive and 4” w.g. negative with a bursting pressure of at least 2 ½ time the working pressure

D. The duct shall be rated for a velocity of at lease 4000 feet per minute.

E. The duct must be suitable for continuous operation at a temperature range of -20° F to +250° F.

F. Acoustical performance, when tested by an independent laboratory in accordance with the Air Diffusion Council's Flexible Air Duct Test Code FD 72-R1, Section 3.0, Sound Properties, shall be as follows:

1. The insertion loss (dB) of a 10 foot length of straight duct when tested in accordance with ASTM E477, at a velocity of 2500 feet per minute, shall be at least:

Octave Band	2	3	4	5	6	7
Hz.	125	250	500	1000	2000	4000
6" diameter	7	31	40	38	40	27
8" diameter	13	29	36	35	38	22
12" diameter	21	28	29	33	26	12

2. The radiated noise reduction (dB) of a 10 foot length of straight duct when tested in accordance with ASTM E477, at a velocity of 2500 feet per minute, shall be at least:

Octave Band	2	3	4	5	6	7
Hz.	125	250	500	1000	2000	4000
6" diameter	5	8	7	8	11	15
8" diameter	10	7	7	8	10	13
12" diameter	9	6	6	5	9	13

3. The self generated sound power levels (LW) dB re 10^{-12} Watt of a 10 foot length of straight duct for an empty sheet metal duct when tested in accordance with ASTM E477, at a velocity of 1000 feet per minute, shall not exceed:

Octave Band	2	3	4	5	6	7
Hz.	125	250	500	1000	2000	4000
6" diameter	42	31	23	18	17	21
8" diameter	41	34	27	19	18	21

12” diameter	54	45	38	31	27	23

G. Factory insulate the flexible duct with fiberglass insulation. Provide insulation as required by ASHRAE 90.1.

H. Cover the insulation with a fire retardant metalized vapor barrier jacket reinforced with crosshatched scrim having a permeance of not greater than 0.05 perms when tested in accordance with ASTM #96, Procedure A.

2.12 DUCT 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 of length to suit duct insulation thickness.

B. Adhesives: High strength, quick setting, neoprene based, waterproof, and resistant to gasoline and grease.

2.13 LOUVERS

A. Manufacturers:
1. Ruskin
2. Greenheck

B. Description: Stationary-type louver with blades designed to prevent the penetration of wind driven rain.
1. Extended sill to drain water to building exterior.
2. Extruded aluminum alloy as follows:
   a. 5” deep frame with 0.081” wall thickness.
   b. Blades shall be double drainable and sight proof.
   c. Provide with aluminum screen.

PART 3 - EXECUTION

3.1 APPLICATION AND INSTALLATION

A. Install duct accessories according to applicable details in SMACNA's "HVAC Duct Construction Standards--Metal and Flexible" for metal ducts and in NAIMA AH116, "Fibrous Glass Duct Construction Standards," for fibrous-glass ducts.

B. Provide duct accessories of materials suited to duct materials; use galvanized-steel accessories in galvanized-steel ducts, stainless-steel accessories in stainless-steel ducts, and aluminum accessories in aluminum ducts.

C. Install backdraft dampers on exhaust fans or exhaust ducts nearest to outside and where indicated.

D. Provide balancing dampers at points on supply, return, and exhaust systems where branches lead from larger ducts as required for air balancing. Install at a minimum of two duct widths from branch takeoff.

E. Provide test holes at fan inlets and outlets and elsewhere as indicated.

F. Install fire and smoke dampers, with fusible links, according to manufacturer's UL-approved written instructions.

G. Install duct silencers independent of ducts with flexible duct connectors, lagged with loaded vinyl sheet on inlets and outlets where indicated.

H. Install duct access doors to allow for inspecting, adjusting, and maintaining accessories and terminal units as follows:

1. On both sides of duct coils.
2. Downstream from volume dampers and equipment.
3. Adjacent to fire or smoke dampers, providing access to reset or reinstall fusible links.
4. To interior of ducts for cleaning; before and after each change in direction, at maximum 50-foot (15-m) spacing.
5. On sides of ducts where adequate clearance is available.

I. Install the following sizes for duct-mounting, rectangular access doors:

1. One-Hand or Inspection Access: 8 by 5 inches (200 by 125 mm).
2. Two-Hand Access: 12 by 6 inches (300 by 150 mm).
3. Head and Hand Access: 18 by 10 inches (460 by 250 mm).
4. Head and Shoulders Access: 21 by 14 inches (530 by 355 mm).
5. Body Access: 25 by 14 inches (635 by 355 mm).
6. Body Plus Ladder Access: 25 by 17 inches (635 by 430 mm).

J. Install the following sizes for duct-mounting, round access doors:

1. One-Hand or Inspection Access: 8 inches (200 mm) in diameter.
2. Two-Hand Access: 10 inches (250 mm) in diameter.
3. Head and Hand Access: 12 inches (300 mm) in diameter.
4. Head and Shoulders Access: 18 inches (460 mm) in diameter.
5. Body Access: 24 inches (600 mm) in diameter.

K. Label access doors according to Division 15 Section "Mechanical Identification."

L. Install flexible connectors immediately adjacent to equipment in ducts associated with fans and motorized equipment supported by vibration isolators.

M. For fans developing static pressures of 5-inch wg (1250 Pa) and higher, cover flexible connectors with loaded vinyl sheet held in place with metal straps.

N. Connect terminal units to supply ducts directly or with maximum 12-inch (300-mm) lengths of flexible duct. Do not use flexible ducts to change directions.

O. Connect diffusers or light troffer boots to low pressure ducts with maximum 60-inch (1500-mm) lengths of flexible duct clamped or strapped in place.

P. Connect flexible ducts to metal ducts with draw bands.

Q. Install duct test holes where indicated and required for testing and balancing purposes.

3.2 ADJUSTING

A. Adjust duct accessories for proper settings.

B. Adjust fire and smoke dampers for proper action.

C. Final positioning of manual-volume dampers is specified in Division 15 Section "Testing, Adjusting, and Balancing."

END OF SECTION 15820

SECTION 15855 - DIFFUSERS, REGISTERS, AND GRILLES

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. Section Includes:
   1. Ceiling and wall mounted diffusers, registers, and grilles.

B. Related Sections:

   1. Division 10 Section "Louvers and Vents" for fixed and adjustable louvers and wall vents, whether or not they are connected to ducts.
   2. Division 15 Section "Duct Accessories" for fire and smoke dampers and volume-control dampers not integral to diffusers, registers, and grilles.

1.3 SUBMITTALS

A. Product Data: For each type of product indicated, include the following:

   1. Data Sheet: Indicate materials of construction, finish, and mounting details; and performance data including throw and drop, static-pressure drop, and noise ratings.
   2. Diffuser, Register, and Grille Schedule: Indicate drawing designation, room location, quantity, model number, size, and accessories furnished.

B. Samples for Initial Selection: For diffusers, registers, and grilles with factory-applied color finishes.

C. Samples for Verification: For diffusers, registers, and grilles, in manufacturer's standard sizes to verify color selected.

D. Coordination Drawings: Reflected ceiling plans, drawn to scale, on which the following items are shown and coordinated with each other, using input from Installers of the items involved:

   1. Ceiling suspension assembly members.
   2. Method of attaching hangers to building structure.
   3. Size and location of initial access modules for acoustical tile.
   4. Ceiling-mounted items including lighting fixtures, diffusers, grilles, speakers, sprinklers, access panels, and special moldings.
   5. Duct access panels.

E. Source quality-control reports.

PART 2 - PRODUCTS

2.1 Manufacturers:

A.

1. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:
   a. METALAIRE, Inc.
   b. Price Industries.
   c. Titus.

2. Refer to drawings for air device accessories.

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.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Install diffusers, registers, and grilles level and plumb.

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 practical. For units installed in lay-in ceiling panels, locate units in the center of panel. 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 connections 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.

END OF SECTION 15855

SECTION 15950 - TESTING, ADJUSTING, AND BALANCING

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.

B. Contractual Relationship

1. The scope of the TAB work as defined in this Section is indicated in order that the Contractor will be advised of the coordination, adjustment, and system modification which will be required under the project work in order to complete the requirements for final TAB. The TAB firm will not have a contractual relationship with the Mechanical Contractor, but will be responsible to the General Contractor for the satisfactory execution of the TAB work. **The General Contractor in his original bid shall include the costs required to cover all work which may be required in the TAB phases as defined herein and as may be necessary for the completion of the TAB work as defined by the TAB firm**.

1.2 SUMMARY

A. Section Includes:

1. Balancing Air Systems:

   a. Constant-volume air systems.
   b. Variable-air-volume systems.

2. Balancing Hydronic Piping Systems:
   a. Primary-secondary hydronic systems.

1.3 DEFINITIONS

A. AABC: Associated Air Balance Council.

B. NEBB: National Environmental Balancing Bureau.

C. TAB: Testing, adjusting, and balancing.

D. TABB: Testing, Adjusting, and Balancing Bureau.

E. TAB Specialist: An entity engaged to perform TAB Work.

1.4 SUBMITTALS

A. Qualification Data: Within 30 days of Contractor's Notice to Proceed, submit documentation that the TAB contractor and this Project's TAB team members meet the qualifications specified in "Quality Assurance" Article.

B. Contract Documents Examination Report: Within 45 days of Contractor's Notice to Proceed, submit the Contract Documents review report as specified in Part 3.

C. Strategies and Procedures Plan: Within 90 days of Contractor's Notice to Proceed, submit TAB strategies and step-by-step procedures as specified in "Preparation" Article.

D. Certified TAB reports.

E. Sample report forms.

F. Instrument calibration reports, to include the following:

1. Instrument type and make.
2. Serial number.
3. Application.
4. Dates of use.
5. Dates of calibration.

1.5 QUALITY ASSURANCE

A. TAB Contractor Qualifications: Engage a TAB entity certified by AABC or NEBB.

B. TAB Conference: Meet with Architect & Owner’s representative on approval of the TAB strategies and procedures plan to develop a mutual understanding of the details. Require the participation of the TAB field supervisor and technicians. Provide seven days' advance notice of scheduled meeting time and location.

1. Agenda Items:

a. The Contract Documents examination report.
b. The TAB plan.
c. Coordination and cooperation of trades and subcontractors.
d. Coordination of documentation and communication flow.

C. Certify TAB field data reports and perform the following:

1. Review field data reports to validate accuracy of data and to prepare certified TAB reports.
2. Certify that the TAB team complied with the approved TAB plan and the procedures specified and referenced in this Specification.

D. TAB Report Forms: Use standard TAB contractor's forms approved by Engineer.

E. Instrumentation Type, Quantity, Accuracy, and Calibration: As described in ASHRAE 111, Section 5, "Instrumentation."

1.6 PROJECT CONDITIONS

A. Partial Owner Occupancy: Owner may occupy completed areas of building before Substantial Completion. Cooperate with Owner during TAB operations to minimize conflicts with Owner's operations.

1.7 COORDINATION

A. Notice: Provide seven days' advance notice for each test. Include scheduled test dates and times.

B. Perform TAB after leakage and pressure tests on air and water distribution systems have been satisfactorily completed.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine the Contract Documents to become familiar with Project requirements and to discover conditions in systems' designs that may preclude proper TAB of systems and equipment.

B. Examine systems for installed balancing devices, such as test ports, gage cocks, thermometer wells, flow-control devices, balancing valves and fittings, and manual volume dampers. Verify that locations of these balancing devices are accessible.

C. Examine the approved submittals for HVAC systems and equipment.

D. Examine 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 ceiling plenums and underfloor air plenums used for supply, return, or relief air to verify that they meet the leakage class of connected ducts as specified in Division 15 Section "Metal Ducts" and are properly separated from adjacent areas. Verify that penetrations in plenum walls are sealed and fire-stopped if required.

F. Examine equipment performance data including fan and pump curves.

1. 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.
2. Calculate system-effect factors to reduce performance ratings of HVAC equipment when installed under conditions different from the conditions used to rate equipment performance. To calculate system effects for air systems, use tables and charts found in AMCA 201, "Fans and Systems," or in SMACNA's "HVAC Systems - Duct Design." Compare results with the design data and installed conditions.

G. Examine system and equipment installations and verify that field quality-control testing, cleaning, and adjusting specified in individual Sections have been performed.

H. Examine test reports specified in individual system and equipment Sections.

I. Examine HVAC equipment and filters and verify that bearings are greased, belts are aligned and tight, and equipment with functioning controls is ready for operation.

J. Examine terminal units, such as variable-air-volume boxes, and verify that they are accessible and their controls are connected and functioning.

K. Examine strainers. Verify that startup screens are replaced by permanent screens with indicated perforations.

L. Examine three-way valves for proper installation for their intended function of diverting or mixing fluid flows.

M. Examine heat-transfer coils for correct piping connections and for clean and straight fins.

N. Examine system pumps to ensure absence of entrained air in the suction piping.

O. Examine operating safety interlocks and controls on HVAC equipment.

P. Report deficiencies discovered before and during performance of TAB procedures. Observe and record system reactions to changes in conditions. Record default set points if different from indicated values.

3.2 PREPARATION

A. Prepare a TAB plan that includes strategies and step-by-step procedures.

B. Complete system-readiness checks and prepare reports. Verify the following:

1. Permanent electrical-power wiring is complete.
2. Hydronic systems are filled, clean, and free of air.
3. Automatic temperature-control systems are operational.
4. Equipment and duct access doors are securely closed.
5. Balance, smoke, and fire dampers are open.
6. Isolating and balancing valves are open and control valves are operational.
7. Ceilings are installed in critical areas where air-pattern adjustments are required and access to balancing devices is provided.
8. Windows and doors can be closed so indicated conditions for system operations can be met.

3.3 GENERAL PROCEDURES FOR TESTING AND BALANCING

A. Perform testing and balancing procedures on each system according to the procedures contained in AABC's "National Standards for Total System Balance" or NEBB's "Procedural Standards for Testing, Adjusting, and Balancing of Environmental Systems" and in this Section.

1. Comply with requirements in ASHRAE 62.1-2004, Section 7.2.2, "Air Balancing."

B. Cut insulation, ducts, pipes, and equipment cabinets for installation of test probes to the minimum extent necessary for TAB procedures.

1. After testing and balancing, patch probe holes in ducts with same material and thickness as used to construct ducts.
2. After testing and balancing, install test ports and duct access doors that comply with requirements in Division 15 Section "Duct Accessories."
3. Install and join new insulation that matches removed materials. Restore insulation, coverings, vapor barrier, and finish according to Division 15 Section "HVAC Insulation."

C. Mark equipment and balancing devices, including damper-control positions, valve position indicators, fan-speed-control levers, and similar controls and devices, with paint or other suitable, permanent identification material to show final settings.

D. Take and report testing and balancing measurements in inch-pound (IP) units.

3.4 GENERAL PROCEDURES FOR BALANCING AIR SYSTEMS

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. Determine the best locations in main and branch ducts for accurate duct-airflow measurements.

E. Check airflow patterns from the outdoor-air louvers and dampers and the return- and exhaust-air dampers through the supply-fan discharge and mixing dampers.

F. Locate start-stop and disconnect switches, electrical interlocks, and motor starters.

G. Verify that motor starters are equipped with properly sized thermal protection.

H. Check dampers for proper position to achieve desired airflow path.

I. Check for airflow blockages.

J. Check condensate drains for proper connections and functioning.

K. Check for proper sealing of air-handling-unit components.

L. Verify that air duct system is sealed as specified in Division 15 Section "Metal Ducts."

3.5 PROCEDURES FOR CONSTANT-VOLUME AIR SYSTEMS

A. Adjust fans to deliver total indicated airflows within the maximum allowable fan speed listed by fan manufacturer.

1. Measure total airflow.

    a. Where sufficient space in ducts is unavailable for Pitot-tube traverse measurements, measure airflow at terminal outlets and inlets and calculate the total airflow.

2. Measure fan static pressures as follows to determine actual static pressure:

    a. Measure outlet static pressure as far downstream from the fan as practical 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 the flexible connection, and downstream from duct restrictions.
    d. Measure inlet static pressure of double-inlet fans through the wall of the plenum that houses the fan.

3. Measure static pressure across each component that makes up an air-handling unit, rooftop unit, and other air-handling and -treating equipment.

    a. Report the cleanliness status of filters and the time static pressures are measured.

4. Measure static pressures entering and leaving other devices, such as sound traps, heat-recovery equipment, and air washers, under final balanced conditions.
5. Review Record Documents to determine variations in design static pressures versus actual static pressures. Calculate actual system-effect factors. Recommend adjustments to accommodate actual conditions.
6. Obtain approval from Architect for adjustment of fan speed higher or lower than indicated speed. Comply with requirements in Division 15 Sections for air-handling units for adjustment of fans, belts, and pulley sizes to achieve indicated air-handling-unit performance.
7. 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 that no overload will occur. Measure amperage in full-cooling, full-heating, economizer, and any other operating mode to determine the maximum required brake horsepower.

B. Adjust volume dampers for main duct, submain ducts, and major branch ducts to indicated airflows within specified tolerances.

1. Measure airflow of submain and branch ducts.

    a. Where sufficient space in submain 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. Measure static pressure at a point downstream from the balancing damper, and adjust volume dampers until the proper static pressure is achieved.

3. Remeasure each submain and branch duct after all have been adjusted. Continue to adjust submain and branch ducts to indicated airflows within specified tolerances.

C. Measure air outlets and inlets without making adjustments.

1. Measure terminal outlets using a direct-reading hood or outlet manufacturer's written instructions and calculating factors.

D. Adjust air outlets and inlets for each space to indicated airflows within specified tolerances of indicated values. Make adjustments using branch volume dampers rather than extractors and the dampers at air terminals.

1. Adjust each outlet in same room or space to within specified tolerances of indicated 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 PROCEDURES FOR MOTORS

A. Motors, 1/2 HP and Larger: Test at final balanced conditions and record the following data:

1. Manufacturer's name, model number, and serial number.
2. Motor horsepower rating.
3. Motor rpm.
4. Efficiency rating.
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 of the controller to prove proper operation. Record observations including name of controller manufacturer, model number, serial number, and nameplate data.

3.7 PROCEDURES FOR CONDENSING UNITS

A. Verify proper rotation of fans.

B. Measure entering- and leaving-air temperatures.

C. Record compressor data.

3.8 PROCEDURES FOR HEAT-TRANSFER COILS

A. Measure, adjust, and record the following data for each water coil:

1. Entering- and leaving-water temperature.

2. Water flow rate.
3. Water pressure drop.
4. Dry-bulb temperature of entering and leaving air.
5. Wet-bulb temperature of entering and leaving air for cooling coils.
6. Airflow.
7. Air pressure drop.

B. Measure, adjust, and record the following data for each electric heating coil:

1. Nameplate data.
2. Airflow.
3. Entering- and leaving-air temperature at full load.
4. Voltage and amperage input of each phase at full load and at each incremental stage.
5. Calculated kilowatt at full load.
6. Fuse or circuit-breaker rating for overload protection.

C. Measure, adjust, and record the following data for each steam coil:

1. Dry-bulb temperature of entering and leaving air.
2. Airflow.
3. Air pressure drop.
4. Inlet steam pressure.

D. Measure, adjust, and record the following data for each refrigerant coil:

1. Dry-bulb temperature of entering and leaving air.
2. Wet-bulb temperature of entering and leaving air.
3. Airflow.
4. Air pressure drop.
5. Refrigerant suction pressure and temperature.

3.9 TOLERANCES

A. Set HVAC system's air flow rates and water flow rates within the following tolerances:

1. Supply, Return, and Exhaust Fans and Equipment with Fans: Plus or minus 10 percent.
2. Air Outlets and Inlets: Plus or minus 10 percent.
3. Cooling-Water Flow Rate: Plus or minus 10 percent.

3.10 REPORTING

A. Initial Construction-Phase Report: Based on examination of the Contract Documents as specified in "Examination" Article, prepare a report on the adequacy of design for systems' balancing devices. Recommend changes and additions to systems' balancing devices to facilitate proper performance measuring and balancing. Recommend changes and additions to HVAC systems and general construction to allow access for performance measuring and balancing devices.

B. Status Reports: Prepare progress reports to describe completed procedures, procedures in progress, and scheduled procedures. Include a list of deficiencies and problems found in systems being tested and balanced. Prepare a separate report for each system and each building floor for systems serving multiple floors.

3.11 FINAL REPORT

A. General: Prepare a certified written report; tabulate and divide the report into separate sections for tested systems and balanced systems.

1. Include a certification sheet at the front of the report's binder, signed and sealed by the certified testing and balancing engineer.
2. Include a list of instruments used for procedures, along with proof of calibration.

B. Final Report Contents: In addition to certified field-report data, include the following:

1. Pump curves.
2. Fan curves.
3. Manufacturers' test data.
4. Field test reports prepared by system and equipment installers.
5. Other information relative to equipment performance; do not include Shop Drawings and product data.

C. General Report Data: In addition to form titles and entries, include the following data:

1. Title page.
2. Name and address of the TAB contractor.
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 TAB supervisor who certifies the report.
10. Table of Contents with the total number of pages defined for each section of the report. Number each page in the report.
11. Summary of contents including the following:

    a. Indicated versus final performance.
    b. Notable characteristics of systems.
    c. Description of system operation sequence if it varies from the Contract Documents.

12. Nomenclature sheets for each item of equipment.
13. Data for terminal units, including manufacturer's name, type, size, and fittings.
14. Notes to explain why certain final data in the body of reports vary from indicated values.
15. Test conditions for fans and pump performance forms including the following:

    a. Settings for outdoor-, 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. Inlet vane settings for variable-air-volume systems.
g. Settings for supply-air, static-pressure controller.
h. Other system operating conditions that affect performance.

D. System Diagrams: Include schematic layouts of air and hydronic distribution systems. Present each system with single-line diagram and include the following:

1. Quantities of outdoor, 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.
7. Position of balancing devices.

E. Air-Handling-Unit Test Reports: For air-handling units with coils, include the following:

1. Unit Data:

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. Center-to-center dimensions of sheave, and amount of adjustments in inches (mm).
j. Number, make, and size of belts.
k. Number, type, and size of filters.

2. Motor Data:

a. Motor make, and frame type and size.
b. Horsepower and rpm.
c. Volts, phase, and hertz.
d. Full-load amperage and service factor.
e. Sheave make, size in inches (mm), and bore.
f. Center-to-center dimensions of sheave, and amount of adjustments in inches (mm).

3. Test Data (Indicated and Actual Values):

a. Total air flow 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. Filter static-pressure differential in inches wg (Pa).
f. Preheat-coil static-pressure differential in inches wg (Pa).

g. Cooling-coil static-pressure differential in inches wg (Pa).
h. Heating-coil static-pressure differential in inches wg (Pa).
i. Outdoor airflow in cfm (L/s).
j. Return airflow in cfm (L/s).
k. Outdoor-air damper position.
l. Return-air damper position.
m. Vortex damper position.

F. Apparatus-Coil Test Reports:

1. Coil Data:

a. System identification.
b. Location.
c. Coil type.
d. Number of rows.
e. Fin spacing in fins per inch (mm) o.c.
f. Make and model number.
g. Face area in sq. ft. (sq. m).
h. Tube size in NPS (DN).
i. Tube and fin materials.
j. Circuiting arrangement.

2. Test Data (Indicated and Actual Values):

a. Air flow rate in cfm (L/s).
b. Average face velocity in fpm (m/s).
c. Air pressure drop in inches wg (Pa).
d. Outdoor-air, wet- and dry-bulb temperatures in deg F (deg C).
e. Return-air, wet- and dry-bulb temperatures in deg F (deg C).
f. Entering-air, wet- and dry-bulb temperatures in deg F (deg C).
g. Leaving-air, wet- and dry-bulb temperatures in deg F (deg C).
h. Water flow rate in gpm (L/s).
i. Water pressure differential in feet of head or psig (kPa).
j. Entering-water temperature in deg F (deg C).
k. Leaving-water temperature in deg F (deg C).
l. Refrigerant expansion valve and refrigerant types.
m. Refrigerant suction pressure in psig (kPa).
n. Refrigerant suction temperature in deg F (deg C).
o. Inlet steam pressure in psig (kPa).

G. Fan Test Reports: For supply, return, and exhaust fans, include the following:

1. Fan Data:

a. System identification.
b. Location.
c. Make and type.
d. Model number and size.
e. Manufacturer's serial number.
f. Arrangement and class.

g. Sheave make, size in inches (mm), and bore.
h. Center-to-center dimensions of sheave, and amount of adjustments in inches (mm).

2. Motor Data:

a. Motor make, and frame type and size.
b. Horsepower and rpm.
c. Volts, phase, and hertz.
d. Full-load amperage and service factor.
e. Sheave make, size in inches (mm), and bore.
f. Center-to-center dimensions of sheave, and amount of adjustments in inches (mm).
g. Number, make, and size of belts.

3. Test Data (Indicated and Actual Values):

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).

H. Round, Flat-Oval, and Rectangular Duct Traverse Reports: Include a diagram with a grid representing the duct cross-section and record the following:

1. Report Data:

a. System and air-handling-unit number.
b. Location and zone.
c. Traverse air temperature in deg F (deg C).
d. Duct static pressure in inches wg (Pa).
e. Duct size in inches (mm).
f. Duct area in sq. ft. (sq. m).
g. Indicated air flow rate in cfm (L/s).
h. Indicated velocity in fpm (m/s).
i. Actual air flow rate in cfm (L/s).
j. Actual average velocity in fpm (m/s).
k. Barometric pressure in psig (Pa).

I. Instrument Calibration Reports:

1. Report Data:

a. Instrument type and make.
b. Serial number.
c. Application.
d. Dates of use.
e. Dates of calibration.

3.12 INSPECTIONS

A. Initial Inspection:

1. After testing and balancing are complete, operate each system and randomly check measurements to verify that the system is operating according to the final test and balance readings documented in the final report.
2. Check the following for each system:

    a. Measure airflow of at least 10 percent of air outlets.
    b. Measure room temperature at each thermostat/temperature sensor. Compare the reading to the set point.
    c. Verify that balancing devices are marked with final balance position.
    d. Note deviations from the Contract Documents in the final report.

B. Final Inspection:

1. After initial inspection is complete and documentation by random checks verifies that testing and balancing are complete and accurately documented in the final report.
2. The TAB contractor's test and balance engineer shall conduct the inspection in the presence of Construction Manager.
3. Construction Manager shall randomly select measurements, documented in the final report, to be rechecked. Rechecking shall be limited to either 10 percent of the total measurements recorded or the extent of measurements that can be accomplished in a normal 8-hour business day.
4. If rechecks yield measurements that differ from the measurements documented in the final report by more than the tolerances allowed, the measurements shall be noted as "FAILED."
5. If the number of "FAILED" measurements is greater than 10 percent of the total measurements checked during the final inspection, the testing and balancing shall be considered incomplete and shall be rejected.

C. TAB Work will be considered defective if it does not pass final inspections. If TAB Work fails, proceed as follows:

1. Recheck all measurements and make adjustments. Revise the final report and balancing device settings to include all changes; resubmit the final report and request a second final inspection.
2. If the second final inspection also fails, Owner may contract the services of another TAB contractor to complete TAB Work according to the Contract Documents and deduct the cost of the services from the original TAB contractor's final payment.

D. Prepare test and inspection reports.

3.13 ADDITIONAL TESTS

A. Within 90 days of completing TAB, perform additional TAB to verify that balanced conditions are being maintained throughout and to correct unusual conditions.

B. Seasonal Periods: If initial TAB procedures were not performed during near-peak summer and winter conditions, perform additional TAB during near-peak summer and winter conditions.

END OF SECTION 15950

SECTION 16051 - COMMON WORK RESULTS FOR ELECTRICAL

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. Section Includes:

1. Electrical equipment coordination and installation.
2. Sleeves for raceways and cables.
3. Sleeve seals.
4. Grout.
5. Common electrical installation requirements.

1.3 DEFINITIONS

A. EPDM: Ethylene-propylene-diene terpolymer rubber.

B. NBR: Acrylonitrile-butadiene rubber.

1.4 SUBMITTALS

A. Product Data: For sleeve seals.

1.5 COORDINATION

A. Coordinate arrangement, mounting, and support of electrical equipment:

1. To allow maximum possible headroom unless specific mounting heights that reduce headroom are indicated.
2. To provide for ease of disconnecting the equipment with minimum interference to other installations.
3. To allow right of way for piping and conduit installed at required slope.
4. So connecting raceways, cables, wireways, cable trays, and busways will be clear of obstructions and of the working and access space of other equipment.

B. Coordinate installation of required supporting devices and set sleeves in cast-in-place concrete, masonry walls, and other structural components as they are constructed.

C. Coordinate location of access panels and doors for electrical items that are behind finished surfaces or otherwise concealed. Access doors and panels are specified in Division 8 Section "Access Doors and Frames."

D. Coordinate sleeve selection and application with selection and application of firestopping specified in Division 7 Section "Through-Penetration Firestop Systems."

PART 2 - PRODUCTS

2.1 SLEEVES FOR RACEWAYS AND CABLES

A. Steel Pipe Sleeves: ASTM A 53/A 53M, Type E, Grade B, Schedule 40, galvanized steel, plain ends.

B. Cast-Iron Pipe Sleeves: Cast or fabricated "wall pipe," equivalent to ductile-iron pressure pipe, with plain ends and integral waterstop, unless otherwise indicated.

C. Sleeves for Rectangular Openings: Galvanized sheet steel.

1. Minimum Metal Thickness:

a. For sleeve cross-section rectangle perimeter less than 50 inches (1270 mm) and no side more than 16 inches (400 mm), thickness shall be 0.052 inch (1.3 mm).
b. For sleeve cross-section rectangle perimeter equal to, or more than, 50 inches (1270 mm) and 1 or more sides equal to, or more than, 16 inches (400 mm), thickness shall be 0.138 inch (3.5 mm).

2.2 SLEEVE SEALS

A. Description: Modular sealing device, designed for field assembly, to fill annular space between sleeve and raceway or cable.

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. Advance Products & Systems, Inc.
b. Calpico, Inc.
c. Metraflex Co.
d. Pipeline Seal and Insulator, Inc.

2. Sealing Elements: EPDM interlocking links shaped to fit surface of cable or conduit. Include type and number required for material and size of raceway or cable.
3. Pressure Plates: Carbon steel. Include two for each sealing element.
4. Connecting Bolts and Nuts: Carbon steel with corrosion-resistant coating of length required to secure pressure plates to sealing elements. Include one for each sealing element.

2.3 GROUT

A. Nonmetallic, Shrinkage-Resistant Grout: ASTM C 1107, factory-packaged, nonmetallic aggregate grout, noncorrosive, nonstaining, mixed with water to consistency suitable for application and a 30-minute working time.

PART 3 - EXECUTION

3.1 COMMON REQUIREMENTS FOR ELECTRICAL INSTALLATION

A. Comply with NECA 1.

B. Measure indicated mounting heights to bottom of unit for suspended items and to center of unit for wall-mounting items.

C. Headroom Maintenance: If mounting heights or other location criteria are not indicated, arrange and install components and equipment to provide maximum possible headroom consistent with these requirements.

D. Equipment: Install to facilitate service, maintenance, and repair or replacement of components of both electrical equipment and other nearby installations. Connect in such a way as to facilitate future disconnecting with minimum interference with other items in the vicinity.

E. Right of Way: Give to piping systems installed at a required slope.

3.2 SLEEVE INSTALLATION FOR ELECTRICAL PENETRATIONS

A. Electrical penetrations occur when raceways, cables, wireways, cable trays, or busways penetrate concrete slabs, concrete or masonry walls, or fire-rated floor and wall assemblies.

B. Concrete Slabs and Walls: Install sleeves for penetrations unless core-drilled holes or formed openings are used. Install sleeves during erection of slabs and walls.

C. Use pipe sleeves unless penetration arrangement requires rectangular sleeved opening.

D. Fire-Rated Assemblies: Install sleeves for penetrations of fire-rated floor and wall assemblies unless openings compatible with firestop system used are fabricated during construction of floor or wall.

E. Cut sleeves to length for mounting flush with both surfaces of walls.

F. Extend sleeves installed in floors 2 inches (50 mm) above finished floor level.

G. Size pipe sleeves to provide 1/4-inch (6.4-mm) annular clear space between sleeve and raceway or cable, unless indicated otherwise.

H. Seal space outside of sleeves with grout for penetrations of concrete and masonry

1. Promptly pack grout solidly between sleeve and wall so no voids remain. Tool exposed surfaces smooth; protect grout while curing.

I. Interior Penetrations of Non-Fire-Rated Walls and Floors: Seal annular space between sleeve and raceway or cable, using joint sealant appropriate for size, depth, and location of joint. Comply with requirements in Division 7 Section "Joint Sealants."

J. Fire-Rated-Assembly Penetrations: Maintain indicated fire rating of walls, partitions, ceilings, and floors at raceway and cable penetrations. Install sleeves and seal raceway and cable penetration sleeves with firestop materials. Comply with requirements in Division 7 Section "Through-Penetration Firestop Systems."

K. Roof-Penetration Sleeves: Seal penetration of individual raceways and cables with flexible boot-type flashing units applied in coordination with roofing work.

L. Aboveground, Exterior-Wall Penetrations: Seal penetrations using steel pipe sleeves and mechanical sleeve seals. Select sleeve size to allow for 1-inch (25-mm) annular clear space between pipe and sleeve for installing mechanical sleeve seals.

M. Underground, Exterior-Wall Penetrations: Install cast-iron pipe sleeves. Size sleeves to allow for 1-inch (25-mm) annular clear space between raceway or cable and sleeve for installing mechanical sleeve seals.

3.3 SLEEVE-SEAL INSTALLATION

A. Install to seal exterior wall penetrations.

B. Use type and number of sealing elements recommended by manufacturer for raceway or cable material and size. Position raceway or cable in center of sleeve. Assemble mechanical sleeve seals and install in annular space between raceway or cable and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make watertight seal.

3.4 FIRESTOPPING

A. Apply firestopping to penetrations of fire-rated floor and wall assemblies for electrical installations to restore original fire-resistance rating of assembly. Firestopping materials and installation requirements are specified in Division 7 Section "Through-Penetration Firestop Systems."

END OF SECTION 16051

SECTION 16060 - GROUNDING AND BONDING

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 methods and materials for grounding systems and equipment.

1. Overhead-lines grounding.
2. Underground distribution grounding.
3. Common ground bonding with lightning protection system.

1.3 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Other Informational Submittals: Plans showing dimensioned as-built locations of grounding features specified in Part 3 "Field Quality Control" Article, including the following:

1. Test wells.
2. Ground rods.
3. Ground rings.
4. Grounding arrangements and connections for separately derived systems.
5. Grounding for sensitive electronic equipment.

C. Qualification Data: For testing agency and testing agency's field supervisor.

D. Field quality-control test reports.

E. Operation and Maintenance Data: For grounding to include the following in emergency, operation, and maintenance manuals:

1.4 QUALITY ASSURANCE

A. Testing Agency Qualifications: An independent agency, with the experience and capability to conduct the testing indicated, that is a member company of the InterNational Electrical Testing Association or is a nationally recognized testing laboratory (NRTL) as defined by OSHA in 29 CFR 1910.7, and that is acceptable to authorities having jurisdiction.

1. Testing Agency's Field Supervisor: Person currently certified by the InterNational Electrical Testing Association to supervise on-site testing specified in Part 3.

B. 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.

C. Comply with UL 467 for grounding and bonding materials and equipment.

PART 2 - PRODUCTS

2.1 CONDUCTORS

A. Insulated Conductors: Copper wire or cable insulated for 600 V unless otherwise required by applicable Code or authorities having jurisdiction.

B. Bare Copper Conductors:

1. Solid Conductors: ASTM B 3.
2. Stranded Conductors: ASTM B 8.
3. Tinned Conductors: ASTM B 33.
4. Bonding Cable: 28 kcmil, 14 strands of No. 17 AWG conductor, 1/4 inch (6 mm) in diameter.
5. Bonding Conductor: No. 4 or No. 6 AWG, stranded conductor.
6. Bonding Jumper: Copper tape, braided conductors, terminated with copper ferrules; 1-5/8 inches (41 mm) wide and 1/16 inch (1.6 mm) thick.
7. Tinned Bonding Jumper: Tinned-copper tape, braided conductors, terminated with copper ferrules; 1-5/8 inches (41 mm) wide and 1/16 inch (1.6 mm) thick.

C. Bare Grounding Conductor and Conductor Protector for Wood Poles:

1. No. 4 AWG minimum, soft-drawn copper.
2. Conductor Protector: Half-round PVC or wood molding. If wood, use pressure-treated fir or cypress or cedar.

D. Grounding Bus: Rectangular bars of annealed copper, 1/4 by 2 inches (6 by 50 mm) in cross section, unless otherwise indicated; with insulators.

2.2 CONNECTORS

A. Listed and labeled by a nationally recognized testing laboratory acceptable to authorities having jurisdiction for applications in which used, and for specific types, sizes, and combinations of conductors and other items connected.

B. Bolted Connectors for Conductors and Pipes: Copper or copper alloy, bolted pressure-type, with at least two bolts.

1. Pipe Connectors: Clamp type, sized for pipe.

C. Welded Connectors: Exothermic-welding kits of types recommended by kit manufacturer for materials being joined and installation conditions.

2.3 GROUNDING ELECTRODES

A. Ground Rods: Copper-clad steel; 3/4 inch by10 feet (19 mm by 3 m) in diameter.

PART 3 - EXECUTION

3.1 APPLICATIONS

A. Conductors: Install solid conductor for No. 8 AWG and smaller, and stranded conductors for No. 6 AWG and larger, unless otherwise indicated.

B. Underground Grounding Conductors: Install barecopper conductor, No. 2/0 AWG minimum.

1. Bury at least 24 inches (600 mm) below grade.

C. Isolated Grounding Conductors: Green-colored insulation with continuous yellow stripe. On feeders with isolated ground, identify grounding conductor where visible to normal inspection, with alternating bands of green and yellow tape, with at least three bands of green and two bands of yellow.

D. Grounding Bus: Install in electrical and telephone equipment rooms, in rooms housing service equipment, and elsewhere as indicated.

1. Install bus on insulated spacers 1 inch (25 mm), minimum, from wall 6 inches (150 mm) above finished floor, unless otherwise indicated.
2. Where indicated on both sides of doorways, route bus up to top of door frame, across top of doorway, down to specified height above floor, and connect to horizontal bus.

E. Conductor Terminations and Connections:

1. Pipe and Equipment Grounding Conductor Terminations: Bolted connectors.
2. Underground Connections: Welded connectors, except at test wells and as otherwise indicated.
3. Connections to Ground Rods at Test Wells: Bolted connectors.
4. Connections to Structural Steel: Welded connectors.

3.2 GROUNDING OVERHEAD LINES

A. Comply with IEEE C2 grounding requirements.

B. Install 2 parallel ground rods if resistance to ground by a single, ground-rod electrode exceeds 25 ohms.

C. Drive ground rods until tops are 12 inches (300 mm) below finished grade in undisturbed earth.

D. Ground-Rod Connections: Install bolted connectors for underground connections and connections to rods.

E. Lightning Arrester Grounding Conductors: Separate from other grounding conductors.

F. Secondary Neutral and Transformer Enclosure: Interconnect and connect to grounding conductor.

G. Protect grounding conductors running on surface of wood poles with molding extended from grade level up to and through communication service and transformer spaces.

3.3 GROUNDING UNDERGROUND DISTRIBUTION SYSTEM COMPONENTS

A. Comply with IEEE C2 grounding requirements.

B. Grounding Manholes and Handholes: Install a driven ground rod through manhole or handhole floor, close to wall, and set rod depth so 4 inches (100 mm) will extend above finished floor. If necessary, install ground rod before manhole is placed and provide No. 1/0 AWG bare, tinned-copper conductor from ground rod into manhole through a waterproof sleeve in manhole wall. Protect ground rods passing through concrete floor with a double wrapping of pressure-sensitive insulating tape or heat-shrunk insulating sleeve from 2 inches (50 mm) above to 6 inches (150 mm) below concrete. Seal floor opening with waterproof, nonshrink grout.

C. Grounding Connections to Manhole Components: Bond exposed-metal parts such as inserts, cable racks, pulling irons, ladders, and cable shields within each manhole or handhole, to ground rod or grounding conductor. Make connections with No. 4 AWG minimum, stranded, hard-drawn copper bonding conductor. Train conductors level or plumb around corners and fasten to manhole walls. Connect to cable armor and cable shields as recommended by manufacturer of splicing and termination kits.

D. Pad-Mounted Transformers and Switches: Install two ground rods and ground ring around the pad. Ground pad-mounted equipment and noncurrent-carrying metal items associated with substations by connecting them to underground cable and grounding electrodes. Install tinned-copper conductor not less than No. 2 AWG for ground ring and for taps to equipment grounding terminals. Bury ground ring not less than 6 inches (150 mm) from the foundation.

3.4 EQUIPMENT GROUNDING

A. Install insulated equipment grounding conductors with all feeders and branch circuits.

B. Install insulated equipment grounding conductors with the following items, in addition to those required by NFPA 70:

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.
8. Busway Supply Circuits: Install insulated equipment grounding conductor from grounding bus in the switchgear, switchboard, or distribution panel to equipment grounding bar terminal on busway.

9. Computer and Rack-Mounted Electronic Equipment Circuits: Install insulated equipment grounding conductor in branch-circuit runs from equipment-area power panels and power-distribution units.
10. X-Ray Equipment Circuits: Install insulated equipment grounding conductor in circuits supplying x-ray equipment.

C. Air-Duct Equipment Circuits: Install insulated equipment grounding conductor to duct-mounted electrical devices operating at 120 V and more, including air cleaners, heaters, dampers, humidifiers, and other duct electrical equipment. Bond conductor to each unit and to air duct and connected metallic piping.

D. Water Heater, Heat-Tracing, and Antifrost Heating Cables: Install a separate insulated equipment grounding conductor to each electric water heater and heat-tracing cable. Bond conductor to heater units, piping, connected equipment, and components.

E. Isolated Grounding Receptacle Circuits: Install an insulated equipment grounding conductor connected to the receptacle grounding terminal. Isolate conductor from raceway and from panelboard grounding terminals. Terminate at equipment grounding conductor terminal of the applicable derived system or service, unless otherwise indicated.

F. Isolated Equipment Enclosure Circuits: For designated equipment supplied by a branch circuit or feeder, isolate equipment enclosure from supply circuit raceway with a nonmetallic raceway fitting listed for the purpose. Install fitting where raceway enters enclosure, and install a separate insulated equipment grounding conductor. Isolate 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. Signal and Communication Equipment: For telephone, alarm, voice and data, and other communication equipment, 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-by-50-by-300-mm) grounding bus.
2. Terminal Cabinets: Terminate grounding conductor on cabinet grounding terminal.

3.5 INSTALLATION

A. Grounding Conductors: Route along shortest and straightest paths possible, unless otherwise indicated or required by Code. Avoid obstructing access or placing conductors where they may be subjected to strain, impact, or damage.

B. Common Ground Bonding with Lightning Protection System: Comply with NFPA 780 and UL 96 when interconnecting with lightning protection system. Bond electrical power system ground directly to lightning protection system grounding conductor at closest point to electrical service grounding electrode. Use bonding conductor sized same as system grounding electrode conductor, and install in conduit.

C. Ground Rods: Drive rods until tops are 2 inches (50 mm) below finished floor or final grade, unless otherwise indicated.

1. Interconnect ground rods with grounding electrode conductor below grade and as otherwise indicated. Make connections without exposing steel or damaging coating, if any.
2. For grounding electrode system, 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, and connect to the service grounding electrode conductor.

D. Test Wells: Ground rod driven through drilled hole in bottom of handhole. Handholes are specified in Division 2 Section "Underground Ducts and Utility Structures," and shall be at least 12 inches (300 mm) deep, with cover.

1. Test Wells: Install at least one test well for each service, unless otherwise indicated. Install at the ground rod electrically closest to service entrance. Set top of test well flush with finished grade or floor.

E. Bonding Straps and Jumpers: Install in locations accessible for inspection and maintenance, except where routed through short lengths of conduit.

1. Bonding to Structure: Bond straps directly to basic structure, taking care not to penetrate any adjacent parts.
2. Bonding to Equipment Mounted on Vibration Isolation Hangers and Supports: Install so vibration is not transmitted to rigidly mounted equipment.
3. Use exothermic-welded connectors for outdoor locations, but if a disconnect-type connection is required, use a bolted clamp.

F. Grounding and Bonding for Piping:

1. Metal Water Service Pipe: Install 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, using a bolted clamp connector or by bolting a lug-type connector to a pipe flange, using one of the lug bolts of the flange. Where a dielectric main water fitting is installed, connect grounding conductor on street side of fitting. Bond metal grounding conductor conduit or sleeve to conductor at each end.
2. Water Meter Piping: Use braided-type bonding jumpers to electrically bypass water meters. Connect to pipe with a bolted connector.
3. Bond each aboveground portion of gas piping system downstream from equipment shutoff valve.

G. Bonding Interior Metal Ducts: Bond metal air ducts to equipment grounding conductors of associated fans, blowers, electric heaters, and air cleaners. Install tinned bonding jumper to bond across flexible duct connections to achieve continuity.

H. Grounding for Steel Building Structure: Install a driven ground rod at base of each corner column and at intermediate exterior columns at distances not more than 60 feet (18 m) apart.

I. Ufer Ground (Concrete-Encased Grounding Electrode): Fabricate according to NFPA 70, using a minimum of 20 feet (6 m) of bare copper conductor not smaller than No. 4 AWG.

1. If concrete foundation is less than 20 feet (6 m) long, coil excess conductor within base of foundation.

2. 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 grounding electrode external to concrete.

3.6 FIELD QUALITY CONTROL

A. Testing Agency: Engage a qualified testing and inspecting agency to perform the following field tests and inspections and prepare test reports:

B. Perform the following tests and inspections and prepare test reports:

1. After installing grounding system but before permanent electrical circuits have 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, at ground test wells, and at individual ground rods. Make tests at ground rods before any conductors are connected.

    a. Measure ground resistance not less than two full days after last trace of precipitation and without 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.
    b. Perform tests by fall-of-potential method according to IEEE 81.

3. Prepare dimensioned drawings locating each test well, 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.

C. Report measured ground resistances that exceed the following values:

1. Power and Lighting Equipment or System with Capacity 500 kVA and Less: 10 ohms.
2. Power and Lighting Equipment or System with Capacity 500 to 1000 kVA: 5 ohms.
3. Power and Lighting Equipment or System with Capacity More Than 1000 kVA: 3 ohms.
4. Power Distribution Units or Panelboards Serving Electronic Equipment: 1 ohm(s).
5. Substations and Pad-Mounted Equipment: 5 ohms.
6. Manhole Grounds: 10 ohms.
7. ohms.

D. Excessive Ground Resistance: If resistance to ground exceeds specified values, notify Architect promptly and include recommendations to reduce ground resistance.

END OF SECTION 16060

SECTION 16075 - ELECTRICAL IDENTIFICATION

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. Section Includes:

1. Identification for raceways.
2. Identification of power and control cables.
3. Identification for conductors.
4. Underground-line warning tape.
5. Warning labels and signs.
6. Instruction signs.
7. Equipment identification labels.
8. Miscellaneous identification products.

1.3 SUBMITTALS

A. Product Data: For each electrical identification product indicated.

B. Samples: For each type of label and sign to illustrate size, colors, lettering style, mounting provisions, and graphic features of identification products.

C. Identification Schedule: An index of nomenclature of electrical equipment and system components used in identification signs and labels.

1.4 QUALITY ASSURANCE

A. Comply with ANSI A13.1 and IEEE C2.

B. Comply with NFPA 70.

C. Comply with 29 CFR 1910.144 and 29 CFR 1910.145.

D. Comply with ANSI Z535.4 for safety signs and labels.

E. Adhesive-attached labeling materials, including label stocks, laminating adhesives, and inks used by label printers, shall comply with UL 969.

1.5 COORDINATION

A. Coordinate identification names, abbreviations, colors, and other features with requirements in other Sections requiring identification applications, Drawings, Shop Drawings, manufacturer's wiring diagrams, and the Operation and Maintenance Manual; and with those required by codes, standards, and 29 CFR 1910.145. Use consistent designations throughout Project.

B. Coordinate installation of identifying devices with completion of covering and painting of surfaces where devices are to be applied.

C. Coordinate installation of identifying devices with location of access panels and doors.

D. Install identifying devices before installing acoustical ceilings and similar concealment.

PART 2 - PRODUCTS

2.1 POWER RACEWAY IDENTIFICATION MATERIALS

A. Comply with ANSI A13.1 for minimum size of letters for legend and for minimum length of color field for each raceway size.

B. Colors for Raceways Carrying Circuits at 600 V or Less:

1. Black letters on an orange field.
2. Legend: Indicate voltage and system or service type.

C. Colors for Raceways Carrying Circuits at More Than 600 V:

1. Black letters on an orange field.
2. Legend: "DANGER CONCEALED HIGH VOLTAGE WIRING" with 3-inch- (75-mm-) high letters on 20-inch (500-mm) centers.

D. Self-Adhesive Vinyl Labels for Raceways Carrying Circuits at 600 V or Less: Preprinted, flexible label laminated with a clear, weather- and chemical-resistant coating and matching wraparound adhesive tape for securing ends of legend label.

E. Snap-Around Labels for Raceways Carrying Circuits at 600 V or Less: Slit, pretensioned, flexible, preprinted, color-coded acrylic sleeve, with diameter sized to suit diameter of raceway or cable it identifies and to stay in place by gripping action.

F. Snap-Around, Color-Coding Bands for Raceways Carrying Circuits at 600 V or Less: Slit, pretensioned, flexible, solid-colored acrylic sleeve, 2 inches (50 mm) long, with diameter sized to suit diameter of raceway or cable it identifies and to stay in place by gripping action.

G. Tape and Stencil for Raceways Carrying Circuits More Than 600 V: 4-inch- (100-mm-) wide black stripes on 10-inch (250-mm) centers diagonally over orange background that extends full length of raceway or duct and is 12 inches (300 mm) wide. Stop stripes at legends.

H. Metal Tags: Brass or aluminum, 2 by 2 by 0.05 inch (50 by 50 by 1.3 mm), with stamped legend, punched for use with self-locking cable tie fastener.

I. Write-On Tags: Polyester tag, 0.010 inch (0.25 mm) thick, with corrosion-resistant grommet and cable tie for attachment to conductor or cable.

1. Marker for Tags: Permanent, waterproof, black ink marker recommended by tag manufacturer.

2. Marker for Tags: Machine-printed, permanent, waterproof, black ink marker recommended by printer manufacturer.

2.2 ARMORED AND METAL-CLAD CABLE IDENTIFICATION MATERIALS

A. Comply with ANSI A13.1 for minimum size of letters for legend and for minimum length of color field for each raceway and cable size.

B. Colors for Raceways Carrying Circuits at 600 V and Less:

1. Black letters on an orange field.
2. Legend: Indicate voltage and system or service type.

C. Colors for Raceways Carrying Circuits at More Than 600 V:

1. Black letters on an orange field.
2. Legend: "DANGER CONCEALED HIGH VOLTAGE WIRING" with 3-inch- (75-mm-) high letters on 20-inch (500-mm) centers.

D. Self-Adhesive Vinyl Labels: Preprinted, flexible label laminated with a clear, weather- and chemical-resistant coating and matching wraparound adhesive tape for securing ends of legend label.

E. Self-Adhesive Vinyl Tape: Colored, heavy duty, waterproof, fade resistant; 2 inches (50 mm) wide; compounded for outdoor use.

2.3 POWER AND CONTROL CABLE IDENTIFICATION MATERIALS

A. Comply with ANSI A13.1 for minimum size of letters for legend and for minimum length of color field for each raceway and cable size.

B. Snap-Around, Color-Coding Bands: Slit, pretensioned, flexible, solid-colored acrylic sleeve, 2 inches (50 mm) long, with diameter sized to suit diameter of raceway or cable it identifies and to stay in place by gripping action.

2.4 CONDUCTOR IDENTIFICATION MATERIALS

A. Color-Coding Conductor Tape: Colored, self-adhesive vinyl tape not less than 3 mils (0.08 mm) thick by 1 to 2 inches (25 to 50 mm) wide.

B. Marker Tapes: Vinyl or vinyl-cloth, self-adhesive wraparound type, with circuit identification legend machine printed by thermal transfer or equivalent process.

1. Marker for Tags: Permanent, waterproof, black ink marker recommended by tag manufacturer.

2.5 UNDERGROUND-LINE WARNING TAPE

A. Tape:

1. Recommended by manufacturer for the method of installation and suitable to identify and locate underground electrical and communications utility lines.
2. Printing on tape shall be permanent and shall not be damaged by burial operations.

3. Tape material and ink shall be chemically inert, and not subject to degrading when exposed to acids, alkalis, and other destructive substances commonly found in soils.

2.6 WARNING LABELS AND SIGNS

A. Comply with NFPA 70 and 29 CFR 1910.145.

B. Self-Adhesive Warning Labels: Factory-printed, multicolor, pressure-sensitive adhesive labels, configured for display on front cover, door, or other access to equipment unless otherwise indicated.

C. Baked-Enamel Warning Signs:

1. Preprinted aluminum signs, punched or drilled for fasteners, with colors, legend, and size required for application.
2. 1/4-inch (6.4-mm) grommets in corners for mounting.
3. Nominal size, 7 by 10 inches (180 by 250 mm).

2.7 INSTRUCTION SIGNS

A. Engraved, laminated acrylic or melamine plastic, minimum 1/16 inch (1.6 mm) thick for signs up to 20 sq. inches (129 sq. cm) and 1/8 inch (3.2 mm) thick for larger sizes.

1. Engraved legend with black letters on white face.
2. Punched or drilled for mechanical fasteners.
3. Framed with mitered acrylic molding and arranged for attachment at applicable equipment.

B. Adhesive Film Label: Machine printed, in black, by thermal transfer or equivalent process. Minimum letter height shall be 3/8 inch (10 mm).

2.8 EQUIPMENT IDENTIFICATION LABELS

A. Engraved, Laminated Acrylic or Melamine Label: Punched or drilled for screw mounting. White letters on a dark-gray background. Minimum letter height shall be 3/8 inch (10 mm).

B. Stenciled Legend: In nonfading, waterproof, black ink or paint. Minimum letter height shall be 1 inch (25 mm).

2.9 CABLE TIES

A. General-Purpose Cable Ties: Fungus inert, self extinguishing, one piece, self locking, Type 6/6 nylon.

1. Minimum Width: 3/16 inch (5 mm).
2. Tensile Strength at 73 deg F (23 deg C), According to ASTM D 638: 12,000 psi (82.7 MPa).
3. Temperature Range: Minus 40 to plus 185 deg F (Minus 40 to plus 85 deg C).
4. Color: Black except where used for color-coding.

B. UV-Stabilized Cable Ties: Fungus inert, designed for continuous exposure to exterior sunlight, self extinguishing, one piece, self locking, Type 6/6 nylon.

1. Minimum Width: 3/16 inch (5 mm).
2. Tensile Strength at 73 deg F (23 deg C), According to ASTM D 638: 12,000 psi (82.7 MPa).

3. Temperature Range: Minus 40 to plus 185 deg F (Minus 40 to plus 85 deg C).
4. Color: Black.

C. Plenum-Rated Cable Ties: Self extinguishing, UV stabilized, one piece, self locking.

1. Minimum Width: 3/16 inch (5 mm).
2. Tensile Strength at 73 deg F (23 deg C), According to ASTM D 638: 7000 psi (48.2 MPa).
3. UL 94 Flame Rating: 94V-0.
4. Temperature Range: Minus 50 to plus 284 deg F (Minus 46 to plus 140 deg C).
5. Color: Black.

2.10 MISCELLANEOUS IDENTIFICATION PRODUCTS

A. Paint: Comply with requirements in Division 9 painting Sections for paint materials and application requirements. Select paint system applicable for surface material and location (exterior or interior).

B. Fasteners for Labels and Signs: Self-tapping, stainless-steel screws or stainless-steel machine screws with nuts and flat and lock washers.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Verify identity of each item before installing identification products.

B. Location: Install identification materials and devices at locations for most convenient viewing without interference with operation and maintenance of equipment.

C. Apply identification devices to surfaces that require finish after completing finish work.

D. Self-Adhesive Identification Products: Clean surfaces before application, using materials and methods recommended by manufacturer of identification device.

E. Attach signs and plastic labels that are not self-adhesive type with mechanical fasteners appropriate to the location and substrate.

F. System Identification Color-Coding Bands for Raceways and Cables: Each color-coding band shall completely encircle cable or conduit. Place adjacent bands of two-color markings in contact, side by side. Locate bands at changes in direction, at penetrations of walls and floors, at 50-foot (15-m) maximum intervals in straight runs, and at 25-foot (7.6-m) maximum intervals in congested areas.

G. Aluminum Wraparound Marker Labels and Metal Tags: Secure tight to surface of conductor or cable at a location with high visibility and accessibility.

H. Cable Ties: For attaching tags. Use general-purpose type, except as listed below:

1. Outdoors: UV-stabilized nylon.
2. In Spaces Handling Environmental Air: Plenum rated.

I. Underground-Line Warning Tape: During backfilling of trenches install continuous underground-line warning tape directly above line at 6 to 8 inches (150 to 200 mm) below finished grade. Use multiple tapes where width of multiple lines installed in a common trenchexceeds 16 inches (400 mm) overall.

J. Painted Identification: Comply with requirements in Division 9 painting Sections for surface preparation and paint application.

3.2 IDENTIFICATION SCHEDULE

A. Concealed Raceways, Duct Banks, More Than 600 V, within Buildings: Tape and stencil 4-inch- (100-mm-) wide black stripes on 10-inch (250-mm) centers over orange background that extends full length of raceway or duct and is 12 inches (300 mm) wide. Stencil legend "DANGER CONCEALED HIGH VOLTAGE WIRING" with 3-inch- (75-mm-) high black letters on 20-inch (500-mm) centers. Stop stripes at legends. Apply to the following finished surfaces:

1. Floor surface directly above conduits running beneath and within 12 inches (300 mm) of a floor that is in contact with earth or is framed above unexcavated space.
2. Wall surfaces directly external to raceways concealed within wall.
3. Accessible surfaces of concrete envelope around raceways in vertical shafts, exposed in the building, or concealed above suspended ceilings.

B. Accessible Raceways and Metal-Clad Cables, 600 V or Less, for Service, Feeder, and Branch Circuits More Than 30 A, and 120 V to ground: Identify with self-adhesive vinyl label. Install labels at 10-foot (3-m) maximum intervals.

C. Accessible Raceways and Cables within Buildings: Identify the covers of each junction and pull box of the following systems with self-adhesive vinyl labels with the wiring system legend and system voltage. System legends shall be as follows:
1. Power.

D. Power-Circuit Conductor Identification, 600 V or Less: For conductors in vaults, pull and junction boxes, manholes, and handholes, use color-coding conductor tape to identify the phase.

1. Color-Coding for Phase and Voltage Level Identification, 600 V or Less: Use colors listed below for ungrounded service feeder and branch-circuit conductors.

a. Color shall be factory applied or field applied for sizes larger than No. 8 AWG, if authorities having jurisdiction permit.
b. Colors for 208/120-V Circuits:

1) Phase A: Black.
2) Phase B: Red.
3) Phase C: Blue.

c. Colors for 480/277-V Circuits:

1) Phase A: Brown.
2) Phase B: Orange.
3) Phase C: Yellow.

d. Field-Applied, Color-Coding Conductor Tape: Apply in half-lapped turns for a minimum distance of 6 inches (150 mm) from terminal points and in boxes where splices or taps are made. Apply last two turns of tape with no tension to prevent possible unwinding. Locate bands to avoid obscuring factory cable markings.

E. Power-Circuit Conductor Identification, More than 600 V: For conductors in vaults, pull and junction boxes, manholes, and handholes, use nonmetallic plastic tag holder with adhesive-backed phase tags, and a separate tag with the circuit designation.

F. Install instructional sign including the color-code for grounded and ungrounded conductors using adhesive-film-type labels.

G. Conductors to Be Extended in the Future: Attach marker tape to conductors and list source.

H. Auxiliary Electrical Systems Conductor Identification: Identify field-installed alarm, control, and signal connections.

1. Identify conductors, cables, and terminals in enclosures and at junctions, terminals, and pull points. Identify by system and circuit designation.
2. Use system of marker tape designations that is uniform and consistent with system used by manufacturer for factory-installed connections.
3. Coordinate identification with Project Drawings, manufacturer's wiring diagrams, and the Operation and Maintenance Manual.

I. Locations of Underground Lines: Identify with underground-line warning tape for power, lighting, communication, and control wiring and optical fiber cable.

1. Limit use of underground-line warning tape to direct-buried cables.
2. Install underground-line warning tape for both direct-buried cables and cables in raceway.

J. Workspace Indication: Install floor marking tape to show working clearances in the direction of access to live parts. Workspace shall be as required by NFPA 70 and 29 CFR 1926.403 unless otherwise indicated. Do not install at flush-mounted panelboards and similar equipment in finished spaces.

K. Warning Labels for Indoor Cabinets, Boxes, and Enclosures for Power and Lighting: Baked-enamel warning signs.

1. Comply with 29 CFR 1910.145.
2. Identify system voltage with black letters on an orange background.
3. Apply to exterior of door, cover, or other access.
4. For equipment with multiple power or control sources, apply to door or cover of equipment including, but not limited to, the following:

a. Power transfer switches.
b. Controls with external control power connections.

L. Operating Instruction Signs: Install instruction signs to facilitate proper operation and maintenance of electrical systems and items to which they connect. Install instruction signs with approved legend where instructions are needed for system or equipment operation.

M. Equipment Identification Labels: On each unit of equipment, install unique designation label that is consistent with wiring diagrams, schedules, and the Operation and Maintenance Manual. Apply labels to disconnect switches and protection equipment, central or master units, control panels, control stations, terminal cabinets, and racks of each system. Systems include power, lighting, control, communication, signal, monitoring, and alarm systems unless equipment is provided with its own identification.

1. Labeling Instructions:

a. Indoor Equipment: Engraved, laminated acrylic or melamine label. Unless otherwise indicated, provide a single line of text with 1/2-inch- (13-mm-) high letters on 1-1/2-inch- (38-mm-) high label; where two lines of text are required, use labels 2 inches (50 mm) high.
b. Outdoor Equipment: Engraved, laminated acrylic or melamine label.

c. Elevated Components: Increase sizes of labels and letters to those appropriate for viewing from the floor.
d. Unless provided with self-adhesive means of attachment, fasten labels with appropriate mechanical fasteners that do not change the NEMA or NRTL rating of the enclosure.

2. Equipment to Be Labeled:

a. Panelboards: Typewritten directory of circuits in the location provided by panelboard manufacturer. Panelboard identification shall be self-adhesive, engraved, laminated acrylic or melamine label.
b. Enclosures and electrical cabinets.
c. Access doors and panels for concealed electrical items.
d. Switchgear.
e. Switchboards.
f. Transformers: Label that includes tag designation shown on Drawings for the transformer, feeder, and panelboards or equipment supplied by the secondary.
g. Enclosed switches.
h. Enclosed circuit breakers.
i. Enclosed controllers.
j. Push-button stations.
k. Contactors.

END OF SECTION 16075

SECTION 16120 - 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 the following:

1. Building wires and cables rated 600 V and less.
2. Connectors, splices, and terminations rated 600 V and less.
3. Sleeves and sleeve seals for cables.

B. Related Sections include the following:

1. Division 16 Section "Voice and Data Communication Cabling" for cabling used for voice and data circuits.
2. Division 16 Section "Undercarpet Cables" for flat cables for undercarpet installations.
3. Division 16 Section "Medium-Voltage Cables" for single-conductor and multiconductor cables, cable splices, and terminations for electrical distribution systems with 2001 to 35,000 V.

1.3 DEFINITIONS

A. EPDM: Ethylene-propylene-diene terpolymer rubber.

B. NBR: Acrylonitrile-butadiene rubber.

1.4 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Qualification Data: For testing agency.

C. Field quality-control test reports.

1.5 QUALITY ASSURANCE

A. Testing Agency Qualifications: An independent agency, with the experience and capability to conduct the testing indicated, that is a member company of the InterNational Electrical Testing

Association or is a nationally recognized testing laboratory (NRTL) as defined by OSHA in 29 CFR 1910.7, and that is acceptable to authorities having jurisdiction.

1. Testing Agency's Field Supervisor: Person currently certified by the InterNational Electrical Testing Association or the National Institute for Certification in Engineering Technologies to supervise on-site testing specified in Part 3.

B. 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.

C. Comply with NFPA 70.

1.6 COORDINATION

A. Set sleeves in cast-in-place concrete, masonry walls, and other structural components as they are constructed.

PART 2 - PRODUCTS

2.1 CONDUCTORS AND CABLES

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. Alcan Products Corporation; Alcan Cable Division.
2. American Insulated Wire Corp.; a Leviton Company.
3. Encore Wire
4. Southwire Company.

B. Copper Conductors: Comply with NEMA WC 70.

C. Conductor Insulation: Comply with NEMA WC 70 for Types THHN-THWN SO.

D. Multiconductor Cable: Comply with NEMA WC 70 for metal-clad cable, Type MC with ground wire.

2.2 CONNECTORS AND SPLICES

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. AFC Cable Systems, Inc.
2. Hubbell Power Systems, Inc.
3. O-Z/Gedney; EGS Electrical Group LLC.

4. 3M; Electrical Products Division.
5. Tyco Electronics Corp.

C. Description: Factory-fabricated connectors and splices of size, ampacity rating, material, type, and class for application and service indicated.

2.3 SLEEVES FOR CABLES

A. Steel Pipe Sleeves: ASTM A 53/A 53M, Type E, Grade B, Schedule 40, galvanized steel, plain ends.

B. Cast-Iron Pipe Sleeves: Cast or fabricated "wall pipe," equivalent to ductile-iron pressure pipe, with plain ends and integral waterstop, unless otherwise indicated.

C. Sleeves for Rectangular Openings: Galvanized sheet steel with minimum 0.052- or 0.138-inch (1.3- or 3.5-mm) thickness as indicated and of length to suit application.

D. Coordinate sleeve selection and application with selection and application of firestopping specified in Division 7 Section "Through-Penetration Firestop Systems."

2.4 SLEEVE SEALS

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. Advance Products & Systems, Inc.
2. Calpico, Inc.
3. Metraflex Co.
4. Pipeline Seal and Insulator, Inc.

B. Description: Modular sealing device, designed for field assembly, to fill annular space between sleeve and cable.

1. Sealing Elements: EPDM interlocking links shaped to fit surface of cable or conduit. Include type and number required for material and size of raceway or cable.
2. Pressure Plates: Carbon steel. Include two for each sealing element.
3. Connecting Bolts and Nuts: Carbon steel with corrosion-resistant coating of length required to secure pressure plates to sealing elements. Include one for each sealing element.

PART 3 - EXECUTION

3.1 CONDUCTOR MATERIAL APPLICATIONS

A. Feeders: Copper. Solid for No. 10 AWG and smaller; stranded for No. 8 AWG and larger.

B. Branch Circuits: Copper. Solid for No. 10 AWG and smaller; stranded for No. 8 AWG and larger.

3.2 CONDUCTOR INSULATION AND MULTICONDUCTOR CABLE APPLICATIONS AND WIRING METHODS

A. Service Entrance: Type THHN-THWN, single conductors in raceway.

B. Exposed Feeders: Type THHN-THWN, single conductors in raceway.

C. Feeders Concealed in Ceilings, Walls, Partitions, and Crawlspaces: Type THHN-THWN, single conductors in raceway.

D. Feeders Concealed in Concrete, below Slabs-on-Grade, and Underground: Type THHN-THWN, single conductors in raceway.

E. Feeders Installed below Raised Flooring: Type THHN-THWN, single conductors in raceway.

F. Exposed Branch Circuits, Including in Crawlspaces: Type THHN-THWN, single conductors in raceway.

G. Branch Circuits Concealed in Ceilings, Walls, and Partitions: Type THHN-THWN, single conductors in raceway.

H. Branch Circuits Concealed in Concrete, below Slabs-on-Grade, and Underground: Type THHN-THWN, single conductors in raceway.

I. Branch Circuits Installed below Raised Flooring: Type THHN-THWN, single conductors in raceway.

J. Branch Circuits in Cable Tray: Type THHN-THWN, single conductors in raceway.

K. Cord Drops and Portable Appliance Connections: Type SO, hard service cord with stainless-steel, wire-mesh, strain relief device at terminations to suit application.

L. Class 1 Control Circuits: Type THHN-THWN, in raceway.

M. Class 2 Control Circuits: Type THHN-THWN, in raceway.

3.3 INSTALLATION OF CONDUCTORS AND CABLES

A. Conceal cables in finished walls, ceilings, and floors, unless otherwise indicated.

B. 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.

C. Use pulling means, including fish tape, cable, rope, and basket-weave wire/cable grips, that will not damage cables or raceway.

D. Install exposed cables parallel and perpendicular to surfaces of exposed structural members, and follow surface contours where possible.

E. Support cables according to Division 16 Section "Electrical Supports and Seismic Restraints."

F. Identify and color-code conductors and cables according to Division 16 Section "Electrical Identification."

3.4 CONNECTIONS

A. 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. Make splices and taps that are compatible with conductor material and that possess equivalent or better mechanical strength and insulation ratings than unspliced conductors.

C. Wiring at Outlets: Install conductor at each outlet, with at least 6 inches (150 mm) of slack.

3.5 SLEEVE INSTALLATION FOR ELECTRICAL PENETRATIONS

A. Coordinate sleeve selection and application with selection and application of firestopping specified in Division 7 Section "Through-Penetration Firestop Systems."

B. Concrete Slabs and Walls: Install sleeves for penetrations unless core-drilled holes or formed openings are used. Install sleeves during erection of slabs and walls.

C. Use pipe sleeves unless penetration arrangement requires rectangular sleeved opening.

D. Rectangular Sleeve Minimum Metal Thickness:

1. For sleeve rectangle perimeter less than 50 inches (1270 mm) and no side greater than 16 inches (400 mm), thickness shall be 0.052 inch (1.3 mm).
2. For sleeve rectangle perimeter equal to, or greater than, 50 inches (1270 mm) and 1 or more sides equal to, or greater than, 16 inches (400 mm), thickness shall be 0.138 inch (3.5 mm).

E. Fire-Rated Assemblies: Install sleeves for penetrations of fire-rated floor and wall assemblies unless openings compatible with firestop system used are fabricated during construction of floor or wall.

F. Cut sleeves to length for mounting flush with both wall surfaces.

G. Extend sleeves installed in floors 2 inches (50 mm) above finished floor level.

H. Seal space outside of sleeves with grout for penetrations of concrete and masonry and with approved joint compound for gypsum board assemblies.

I. Interior Penetrations of Non-Fire-Rated Walls and Floors: Seal annular space between sleeve and cable, using joint sealant appropriate for size, depth, and location of joint according to Division 7 Section "Joint Sealants."

J. Fire-Rated-Assembly Penetrations: Maintain indicated fire rating of walls, partitions, ceilings, and floors at cable penetrations. Install sleeves and seal with firestop materials according to Division 7 Section "Through-Penetration Firestop Systems."

K. Roof-Penetration Sleeves: Seal penetration of individual cables with flexible boot-type flashing units applied in coordination with roofing work.

L. Aboveground Exterior-Wall Penetrations: Seal penetrations using sleeves and mechanical sleeve seals. Size sleeves to allow for 1-inch (25-mm) annular clear space between pipe and sleeve for installing mechanical sleeve seals.

M. Underground Exterior-Wall Penetrations: Install cast-iron "wall pipes" for sleeves. Size sleeves to allow for 1-inch (25-mm) annular clear space between cable and sleeve for installing mechanical sleeve seals.

3.6 SLEEVE-SEAL INSTALLATION

A. Install to seal underground exterior-wall penetrations.

B. Use type and number of sealing elements recommended by manufacturer for cable material and size. Position cable in center of sleeve. Assemble mechanical sleeve seals and install in annular space between cable and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make watertight seal.

3.7 FIRESTOPPING

A. Apply firestopping to electrical penetrations of fire-rated floor and wall assemblies to restore original fire-resistance rating of assembly according to Division 7 Section "Through-Penetration Firestop Systems."

3.8 FIELD QUALITY CONTROL

A. Testing Agency: Engage a qualified testing agency to perform tests and inspections and prepare test reports.

B. Perform tests and inspections and prepare test reports.

C. Tests and Inspections:

1. After installing conductors and cables and before electrical circuitry has been energized, test service entrance and feeder conductors, and conductors feeding the following critical equipment and services for compliance with requirements.

2. Perform each visual and mechanical inspection and electrical test stated in NETA Acceptance Testing Specification. Certify compliance with test parameters.

D. Test Reports: Prepare a written report to record the following:

1. Test procedures used.
2. Test results that comply with requirements.
3. Test results that do not comply with requirements and corrective action taken to achieve compliance with requirements.

E. Remove and replace malfunctioning units and retest as specified above.

END OF SECTION 16120

SECTION 16130 - RACEWAYS AND BOXES

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.

B. Related Sections include the following:

1. Division 2 Section "Underground Ducts and Utility Structures" for exterior ductbanks, manholes, and underground utility construction.

1.3 DEFINITIONS

A. EMT: Electrical metallic tubing.

B. ENT: Electrical nonmetallic tubing.

C. EPDM: Ethylene-propylene-diene terpolymer rubber.

D. FMC: Flexible metal conduit.

E. IMC: Intermediate metal conduit.

F. LFMC: Liquidtight flexible metal conduit.

G. LFNC: Liquidtight flexible nonmetallic conduit.

H. NBR: Acrylonitrile-butadiene rubber.

I. 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: For the following raceway components. Include plans, elevations, sections, details, and attachments to other work.
1. For handholes and boxes for underground wiring, including the following:

a. Duct entry provisions, including locations and duct sizes.
b. Frame and cover design.
c. Grounding details.
d. Dimensioned locations of cable rack inserts, and pulling-in and lifting irons.
e. Joint details.

C. Coordination Drawings: Conduit routing plans, drawn to scale, on which the following items are shown and coordinated with each other, based on input from installers of the items involved:

1. Structural members in the paths of conduit groups with common supports.
2. HVAC and plumbing items and architectural features in the paths of conduit groups with common supports.

3. Dimensioned Outline Drawings of Equipment Unit: Identify center of gravity and locate and describe mounting and anchorage provisions.
4. Detailed description of equipment anchorage devices on which the certification is based and their installation requirements.

D. Qualification Data: For professional engineer and testing agency.

E. Source quality-control test reports.

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.

PART 2 - PRODUCTS

2.1 METAL CONDUIT AND TUBING

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. AFC Cable Systems, Inc.
2. Alflex Inc.
3. Allied Tube & Conduit; a Tyco International Ltd. Co.
4. Anamet Electrical, Inc.; Anaconda Metal Hose.
5. Electri-Flex Co.
6. Manhattan/CDT/Cole-Flex.
7. Maverick Tube Corporation.
8. O-Z Gedney; a unit of General Signal.
9. Wheatland Tube Company.

B. Rigid Steel Conduit: ANSI C80.1.

C. Aluminum Rigid Conduit: ANSI C80.5.

D. IMC: ANSI C80.6.

E. EMT: ANSI C80.3.

F. FMC: Zinc-coated steel.

G. LFMC: Flexible steel conduit with PVC jacket.

H. Fittings for Conduit (Including all Types and Flexible and Liquidtight), EMT, and Cable: NEMA FB 1; listed for type and size raceway with which used, and for application and environment in which installed.

1. Conduit Fittings for Hazardous (Classified) Locations: Comply with UL 886.
2. Fittings for EMT: , set-screw type.
3. Coating for Fittings for PVC-Coated Conduit: Minimum thickness, 0.040 inch (1 mm), with overlapping sleeves protecting threaded joints.

I. Joint Compound for Rigid Steel Conduit or IMC: Listed for use in cable connector assemblies, and compounded for use to lubricate and protect threaded raceway joints from corrosion and enhance their conductivity.

2.2 NONMETALLIC CONDUIT AND TUBING

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. AFC Cable Systems, Inc.
2. Anamet Electrical, Inc.; Anaconda Metal Hose.
3. Arnco Corporation.
4. CANTEX Inc.
5. CertainTeed Corp.; Pipe & Plastics Group.
6. Condux International, Inc.
7. ElecSYS, Inc.
8. Electri-Flex Co.
9. Lamson & Sessions; Carlon Electrical Products.
10. Manhattan/CDT/Cole-Flex.
11. RACO; a Hubbell Company.
12. Thomas & Betts Corporation.

B. ENT: NEMA TC 13.

C. RNC: NEMA TC 2, Type EPC-40-PVC, unless otherwise indicated.

D. LFNC: UL 1660.

E. Fittings for ENT and RNC: NEMA TC 3; match to conduit or tubing type and material.

F. Fittings for LFNC: UL 514B.

2.3 OPTICAL FIBER/COMMUNICATIONS CABLE RACEWAY AND FITTINGS

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. Arnco Corporation.
2. Endot Industries Inc.
3. IPEX Inc.
4. Lamson & Sessions; Carlon Electrical Products.

B. Description: Comply with UL 2024; flexible type, approved for plenum installation.

2.4 METAL WIREWAYS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Cooper B-Line, Inc.
2. Hoffman.
3. Square D; Schneider Electric.

B. Description: Sheet metal sized and shaped as indicated, NEMA 250, Type 1, unless otherwise indicated.

C. 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.

D. Wireway Covers: Hinged type.

E. Finish: Manufacturer's standard enamel finish.

2.5 NONMETALLIC WIREWAYS

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. Hoffman.
2. Lamson & Sessions; Carlon Electrical Products.

B. Description: PVC plastic, extruded and fabricated to size and shape indicated, with snap-on cover and mechanically coupled connections with plastic fasteners.

C. 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.

2.6 SURFACE RACEWAYS

A. Surface Metal Raceways: Galvanized steel with snap-on covers. Manufacturer's standard enamel finish in color selected by Architect.

1. 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:

    a. Thomas & Betts Corporation.
    b. Walker Systems, Inc.; Wiremold Company (The).
    c. Wiremold Company (The); Electrical Sales Division.

B. Surface Nonmetallic Raceways: Two-piece construction, manufactured of rigid PVC with texture and color selected by Architect from manufacturer's standard colors.

1. 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:

    a. Manufacturing Company; Walker Division.
    b. Enduro Systems, Inc.; Composite Products Division.
    c. Hubbell Incorporated; Wiring Device-Kellems Division.
    d. Lamson & Sessions; Carlon Electrical Products.
    e. Panduit Corp.
    f. Walker Systems, Inc.; Wiremold Company (The).
    g. Wiremold Company (The); Electrical Sales Division.

2.7 BOXES, ENCLOSURES, AND CABINETS

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. Cooper Crouse-Hinds; Div. of Cooper Industries, Inc.
2. EGS/Appleton Electric.
3. Erickson Electrical Equipment Company.
4. Hoffman.
5. Hubbell Incorporated; Killark Electric Manufacturing Co. Division.
6. O-Z/Gedney; a unit of General Signal.
7. RACO; a Hubbell Company.
8. Robroy Industries, Inc.; Enclosure Division.
9. Scott Fetzer Co.; Adalet Division.
10. Spring City Electrical Manufacturing Company.
11. Thomas & Betts Corporation.
12. Walker Systems, Inc.; Wiremold Company (The).
13. Woodhead, Daniel Company; Woodhead Industries, Inc. Subsidiary.

B. Sheet Metal Outlet and Device Boxes: NEMA OS 1.

C. Cast-Metal Outlet and Device Boxes: NEMA FB 1, ferrous alloy, Type FD, with gasketed cover.

D. Nonmetallic Outlet and Device Boxes: NEMA OS 2.

E. Metal Floor Boxes: Cast or sheet metal, semi-adjustable, rectangular.

F. Nonmetallic Floor Boxes: Nonadjustable, round.

G. Small Sheet Metal Pull and Junction Boxes: NEMA OS 1.

H. Cast-Metal Access, Pull, and Junction Boxes: NEMA FB 1, cast aluminum with gasketed cover.

I. Hinged-Cover Enclosures: NEMA 250, Type 1, with continuous-hinge cover with flush latch, unless otherwise indicated.

1. Metal Enclosures: Steel, finished inside and out with manufacturer's standard enamel.
2. Nonmetallic Enclosures: Plastic.

J. Cabinets:

1. NEMA 250, Type 1, galvanized-steel box with removable interior panel and removable front, finished inside and out with manufacturer's standard enamel.
2. Hinged door in front cover with flush latch and concealed hinge.
3. Key latch to match panelboards.
4. Metal barriers to separate wiring of different systems and voltage.
5. Accessory feet where required for freestanding equipment.

2.8 HANDHOLES AND BOXES FOR EXTERIOR UNDERGROUND WIRING

A. Description: Comply with SCTE 77.

1. Color of Frame and Cover: Green.
2. Configuration: Units shall be designed for flush burial and have integral closed bottom, unless otherwise indicated.
3. Cover: Weatherproof, secured by tamper-resistant locking devices and having structural load rating consistent with enclosure.
4. Cover Finish: Nonskid finish shall have a minimum coefficient of friction of 0.50.
5. Cover Legend: Molded lettering, as indicated for each service.
6. Conduit Entrance Provisions: Conduit-terminating fittings shall mate with entering ducts for secure, fixed installation in enclosure wall.
7. Handholes 12 inches wide by 24 inches long (300 mm wide by 600 mm long) and larger shall have inserts for cable racks and pulling-in irons installed before concrete is poured.

8. 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:

a. Armorcast Products Company.

b. Carson Industries LLC.
c. CDR Systems Corporation.
d. NewBasis.

B. Fiberglass Handholes and Boxes with Polymer-Concrete Frame and Cover: Sheet-molded, fiberglass-reinforced, polyester-resin enclosure joined to polymer-concrete top ring or frame.

1. 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:

a. Armorcast Products Company.
b. Carson Industries LLC.
c. Christy Concrete Products.
d. Synertech Moulded Products, Inc.; a division of Oldcastle Precast.

C. Fiberglass Handholes and Boxes: Molded of fiberglass-reinforced polyester resin, with covers of polymer concrete.

1. 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:

a. Carson Industries LLC.
b. Christy Concrete Products.
c. Nordic Fiberglass, Inc.

2.9 SLEEVES FOR RACEWAYS

A. Steel Pipe Sleeves: ASTM A 53/A 53M, Type E, Grade B, Schedule 40, galvanized steel, plain ends.

B. Cast-Iron Pipe Sleeves: Cast or fabricated "wall pipe," equivalent to ductile-iron pressure pipe, with plain ends and integral waterstop, unless otherwise indicated.

C. Sleeves for Rectangular Openings: Galvanized sheet steel with minimum 0.052- or 0.138-inch (1.3- or 3.5-mm) thickness as indicated and of length to suit application.

D. Coordinate sleeve selection and application with selection and application of firestopping specified in Division 7 Section "Through-Penetration Firestop Systems."

2.10 SOURCE QUALITY CONTROL FOR UNDERGROUND ENCLOSURES

A. Handhole and Pull-Box Prototype Test: Test prototypes of handholes and boxes for compliance with SCTE 77. Strength tests shall be for specified tier ratings of products supplied.

1. Tests of materials shall be performed by a independent testing agency.
2. Strength tests of complete boxes and covers shall be by either an independent testing agency or manufacturer. A qualified registered professional engineer shall certify tests by manufacturer.

3. Testing machine pressure gages shall have current calibration certification complying with ISO 9000 and ISO 10012, and traceable to NIST standards.

PART 3 - EXECUTION

3.1 RACEWAY APPLICATION

A. Outdoors: Apply raceway products as specified below, unless otherwise indicated:

1. Exposed Conduit: Rigid steel conduit.
2. Concealed Conduit, Aboveground: Rigid steel conduit.
3. Underground Conduit: RNC, Type EPC-40-PVC, direct buried.
4. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): LFMC.
5. Boxes and Enclosures, Aboveground: NEMA 250, Type 3R.

B. Comply with the following indoor applications, unless otherwise indicated:

1. Exposed, Not Subject to Physical Damage: EMT.
2. Exposed, Not Subject to Severe Physical Damage: EMT.
3. Exposed and Subject to Severe Physical Damage: Rigid steel conduit. Includes raceways in the following locations:

    a. Loading dock.
    b. Corridors used for traffic of mechanized carts, forklifts, and pallet-handling units.
    c. Mechanical rooms.

4. Concealed in Ceilings and Interior Walls and Partitions: EMT.
5. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): FMC, except use LFMC in damp or wet locations.
6. Damp or Wet Locations: Rigid steel conduit.
7. Raceways for Optical Fiber or Communications Cable in Spaces Used for Environmental Air: EMT.
8. Raceways for Optical Fiber or Communications Cable Risers in Vertical Shafts: EMT.
9. Raceways for Concealed General Purpose Distribution of Optical Fiber or Communications Cable: EMT.
10. Boxes and Enclosures: NEMA 250, Type 1, except use NEMA 250, Type 4, nonmetallic in damp or wet locations.

C. Minimum Raceway Size: 1/2-inch (16-mm) trade size.

D. Raceway Fittings: Compatible with raceways and suitable for use and location.

1. Rigid and Intermediate Steel Conduit: Use threaded rigid steel conduit fittings, unless otherwise indicated.
2. PVC Externally Coated, Rigid Steel Conduits: Use only fittings listed for use with that material. Patch and seal all joints, nicks, and scrapes in PVC coating after installing conduits and fittings. Use sealant recommended by fitting manufacturer.

E. 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 nonmetallic sleeve.

F. Do not install aluminum conduits in contact with concrete.

3.2 INSTALLATION

A. Comply with NECA 1 for installation requirements applicable to products specified in Part 2 except where requirements on Drawings or in this Article are stricter.

B. 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.

C. Complete raceway installation before starting conductor installation.

D. Support raceways as specified in Division 16 Section "Electrical Supports and Seismic Restraints."

E. Arrange stub-ups so curved portions of bends are not visible above the finished slab.

F. Install no more than the equivalent of three 90-degree bends in any conduit run except for communications conduits, for which fewer bends are allowed.

G. Conceal conduit and EMT within finished walls, ceilings, and floors, unless otherwise indicated.

H. Raceways Embedded in Slabs:

1. Run conduit larger than 1-inch (27-mm) trade size, parallel or at right angles to main reinforcement. Where at right angles to reinforcement, place conduit close to slab support.
2. Arrange raceways to cross building expansion joints at right angles with expansion fittings.
3. Change from ENT to RNC, Type EPC-40-PVC, rigid steel conduit, or IMC before rising above the floor.

I. Threaded Conduit Joints, Exposed to Wet, Damp, Corrosive, or Outdoor Conditions: Apply listed compound to threads of raceway and fittings before making up joints. Follow compound manufacturer's written instructions.

J. Raceway Terminations at Locations Subject to Moisture or Vibration: Use insulating bushings to protect conductors, including conductors smaller than No. 4 AWG.

K. Install pull wires in empty raceways. Use polypropylene 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 pull wire.

L. Raceways for Optical Fiber and Communications Cable: Install raceways, metallic and nonmetallic, rigid and flexible, as follows:

1. 3/4-Inch (19-mm) Trade Size and Smaller: Install raceways in maximum lengths of 50 feet (15 m).
2. 1-Inch (25-mm) Trade Size and Larger: Install raceways in maximum lengths of 75 feet (23 m).
3. Install with a maximum of two 90-degree bends or equivalent for each length of raceway unless Drawings show stricter requirements. Separate lengths with pull or junction boxes or terminations at distribution frames or cabinets where necessary to comply with these requirements.
4. Use insulating bushings to protect wiring.

M. Expansion-Joint Fittings for RNC: Install in each run of aboveground conduit that is located where environmental temperature change may exceed 30 deg F (17 deg C), and that has straight-run length that exceeds 25 feet (7.6 m).

1. Install expansion-joint fittings for each of the following locations, and provide type and quantity of fittings that accommodate temperature change listed for location:

    a. Outdoor Locations Not Exposed to Direct Sunlight: 125 deg F (70 deg C) temperature change.
    b. Outdoor Locations Exposed to Direct Sunlight: 155 deg F (86 deg C) temperature change.
    c. Indoor Spaces: Connected with the Outdoors without Physical Separation: 125 deg F (70 deg C) temperature change.
    d. Attics: 135 deg F (75 deg C) temperature change.
    e. Insert location and corresponding temperature change.

2. Install fitting(s) that provide expansion and contraction for at least 0.00041 inch per foot of length of straight run per deg F (0.06 mm per meter of length of straight run per deg C) of temperature change.
3. Install each expansion-joint fitting with position, mounting, and piston setting selected according to manufacturer's written instructions for conditions at specific location at the time of installation.

N. Flexible Conduit Connections: Use maximum of 72 inches (1830 mm) of flexible conduit for recessed and semirecessed lighting fixtures, equipment subject to vibration, noise transmission, or movement; and for transformers and motors.

1. Use LFMC in damp or wet locations subject to severe physical damage.
2. Use LFMC or LFNC in damp or wet locations not subject to severe physical damage.

O. Recessed Boxes in Masonry Walls: Saw-cut opening for box in center of cell of masonry block, and install box flush with surface of wall.

P. Set metal floor boxes level and flush with finished floor surface.

Q. Set nonmetallic floor boxes level. Trim after installation to fit flush with finished floor surface.

3.3 INSTALLATION OF UNDERGROUND CONDUIT

A. Direct-Buried Conduit:

1. Excavate trench bottom to provide firm and uniform support for conduit. Prepare trench bottom as specified in Division 2 Section "Earthwork" for pipe less than 6 inches (150 mm) in nominal diameter.
2. Install backfill as specified in Division 2 Section "Earthwork."
3. After installing conduit, backfill and compact. Start at tie-in point, and work toward end of conduit run, leaving conduit at end of run free to move with expansion and contraction as temperature changes during this process. Firmly hand tamp backfill around conduit to provide maximum supporting strength. After placing controlled backfill to within 12 inches (300 mm) of finished grade, make final conduit connection at end of run and complete backfilling with normal compaction as specified in Division 2 Section "Earthwork."
4. Install manufactured duct elbows for stub-ups at poles and equipment and at building entrances through the floor, unless otherwise indicated. Encase elbows for stub-up ducts throughout the length of the elbow.
5. Install manufactured rigid steel conduit elbows for stub-ups at poles and equipment and at building entrances through the floor.

    a. Couple steel conduits to ducts with adapters designed for this purpose, and encase coupling with 3 inches (75 mm) of concrete.
    b. For stub-ups at equipment mounted on outdoor concrete bases, extend steel conduit horizontally a minimum of 60 inches (1500 mm) from edge of equipment pad or foundation. Install insulated grounding bushings on terminations at equipment.

6. Warning Planks: Bury warning planks approximately 12 inches (300 mm) above direct-buried conduits, placing them 24 inches (600 mm) o.c. Align planks along the width and along the centerline of conduit.

3.4 INSTALLATION OF UNDERGROUND HANDHOLES AND BOXES

A. Install handholes and boxes level and plumb and with orientation and depth coordinated with connecting conduits to minimize bends and deflections required for proper entrances.

B. Unless otherwise indicated, support units on a level bed of crushed stone or gravel, graded from 1/2-inch (12.5-mm) sieve to No. 4 (4.75-mm) sieve and compacted to same density as adjacent undisturbed earth.

C. Elevation: In paved areas, set so cover surface will be flush with finished grade. Set covers of other enclosures 1 inch (25 mm) above finished grade.

D. Install handholes and boxes with bottom below the frost line, below grade.

E. Install removable hardware, including pulling eyes, cable stanchions, cable arms, and insulators, as required for installation and support of cables and conductors and as indicated. Select arm lengths to be long enough to provide spare space for future cables, but short enough to preserve adequate working clearances in the enclosure.

F. Field-cut openings for conduits according to enclosure manufacturer's written instructions. Cut wall of enclosure with a tool designed for material to be cut. Size holes for terminating fittings to be used, and seal around penetrations after fittings are installed.

3.5 SLEEVE INSTALLATION FOR ELECTRICAL PENETRATIONS

A. Coordinate sleeve selection and application with selection and application of firestopping specified in Division 7 Section "Through-Penetration Firestop Systems."

B. Concrete Slabs and Walls: Install sleeves for penetrations unless core-drilled holes or formed openings are used. Install sleeves during erection of slabs and walls.

C. Use pipe sleeves unless penetration arrangement requires rectangular sleeved opening.

D. Rectangular Sleeve Minimum Metal Thickness:

1. For sleeve cross-section rectangle perimeter less than 50 inches (1270 mm) and no side greater than 16 inches (400 mm), thickness shall be 0.052 inch (1.3 mm).
2. For sleeve cross-section rectangle perimeter equal to, or greater than, 50 inches (1270 mm) and 1 or more sides equal to, or greater than, 16 inches (400 mm), thickness shall be 0.138 inch (3.5 mm).

E. Fire-Rated Assemblies: Install sleeves for penetrations of fire-rated floor and wall assemblies unless openings compatible with firestop system used are fabricated during construction of floor or wall.

F. Cut sleeves to length for mounting flush with both surfaces of walls.

G. Extend sleeves installed in floors 2 inches (50 mm) above finished floor level.

H. Size pipe sleeves to provide 1/4-inch (6.4-mm) annular clear space between sleeve and raceway unless sleeve seal is to be installed.

I. Seal space outside of sleeves with grout for penetrations of concrete and masonry and with approved joint compound for gypsum board assemblies.

J. Interior Penetrations of Non-Fire-Rated Walls and Floors: Seal annular space between sleeve and raceway, using joint sealant appropriate for size, depth, and location of joint. Refer to Division 7 Section "Joint Sealants" for materials and installation.

K. Fire-Rated-Assembly Penetrations: Maintain indicated fire rating of walls, partitions, ceilings, and floors at raceway penetrations. Install sleeves and seal with firestop materials. Comply with Division 7 Section "Through-Penetration Firestop Systems."

L. Roof-Penetration Sleeves: Seal penetration of individual raceways with flexible, boot-type flashing units applied in coordination with roofing work.

M. Aboveground, Exterior-Wall Penetrations: Seal penetrations using sleeves and mechanical sleeve seals. Select sleeve size to allow for 1-inch (25-mm) annular clear space between pipe and sleeve for installing mechanical sleeve seals.

N. Underground, Exterior-Wall Penetrations: Install cast-iron "wall pipes" for sleeves. Size sleeves to allow for 1-inch (25-mm) annular clear space between raceway and sleeve for installing mechanical sleeve seals.

3.6 SLEEVE-SEAL INSTALLATION

A. Install to seal underground, exterior wall penetrations.

B. Use type and number of sealing elements recommended by manufacturer for raceway material and size. Position raceway in center of sleeve. Assemble mechanical sleeve seals and install in annular space between raceway and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make watertight seal.

3.7 FIRESTOPPING

A. Apply firestopping to electrical penetrations of fire-rated floor and wall assemblies to restore original fire-resistance rating of assembly. Firestopping materials and installation requirements are specified in Division 7 Section "Through-Penetration Firestop Systems."

3.8 PROTECTION

A. Provide final protection and maintain conditions that ensure coatings, finishes, and cabinets are without damage or deterioration at 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.

END OF SECTION 16130

SECTION 16410 - ENCLOSED SWITCHES AND CIRCUIT BREAKERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Fusible switches.
2. Nonfusible switches.
3. Enclosures.

1.3 DEFINITIONS

A. NC: Normally closed.

B. NO: Normally open.

C. SPDT: Single pole, double throw.

1.4 SUBMITTALS

A. Product Data: For each type of enclosed switch, circuit breaker, accessory, and component indicated. Include dimensioned elevations, sections, weights, and manufacturers' technical data on features, performance, electrical characteristics, ratings, accessories, and finishes.

1. Enclosure types and details for types other than NEMA 250, Type 1.
2. Current and voltage ratings.
3. Short-circuit current ratings (interrupting and withstand, as appropriate).
4. Detail features, characteristics, ratings, and factory settings of individual overcurrent protective devices, accessories, and auxiliary components.
5. Retain subparagraph below if final system short-circuit and coordination studies will be performed by the designer or will be assigned to an independent consultant. These curves are also beneficial to Owner for future additions or reevaluations of settings of overcurrent protective devices. Although some manufacturers no longer offer curves on translucent graph paper, curves can normally be downloaded from manufacturers' Web sites or be obtained, in electronic form, from various coordination software vendors as part of a subscription service. Retain option in subparagraph below only if manufacturers selected offer

B. Shop Drawings: For enclosed switches and circuit breakers. Include plans, elevations, sections, details, and attachments to other work.

1. Wiring Diagrams: For power, signal, and control wiring.

C. Qualification Data: For qualified testing agency.

D. Field quality-control reports.

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. Manufacturer's field service report.

F. Operation and Maintenance Data: For enclosed switches and circuit breakers to include in emergency, operation, and maintenance manuals. In addition to items specified in Division 1 Section "Operation and Maintenance Data," include the following:

1. Manufacturer's written instructions for testing and adjusting enclosed switches and circuit breakers.

1.5 QUALITY ASSURANCE

A. Testing Agency Qualifications: Member company of NETA or an NRTL.

1. Testing Agency's Field Supervisor: Currently certified by NETA to supervise on-site testing.

B. Source Limitations: Obtain enclosed switches and circuit breakers, overcurrent protective devices, components, and accessories, within same product category, from single source from single manufacturer.

C. Product Selection for Restricted Space: Drawings indicate maximum dimensions for enclosed switches and circuit breakers, including clearances between enclosures, and adjacent surfaces and other items. Comply with indicated maximum dimensions.

D. 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.

E. Comply with NFPA 70.

1.6 PROJECT CONDITIONS

A. Environmental Limitations: Rate equipment for continuous operation under the following conditions unless otherwise indicated:

1. Ambient Temperature: Not less than minus 22 deg F (minus 30 deg C) and not exceeding 104 deg F (40 deg C).

2. Altitude: Not exceeding 6600 feet (2010 m).

1.7 COORDINATION

A. Coordinate layout and installation of switches, circuit breakers, and components with equipment served and adjacent surfaces. Maintain required workspace clearances and required clearances for equipment access doors and panels.

PART 2 - PRODUCTS

2.1 FUSIBLE SWITCHES

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Eaton Electrical Inc.; Cutler-Hammer Business Unit.
2. General Electric Company; GE Consumer & Industrial - Electrical Distribution.
3. Siemens Energy & Automation, Inc.
4. Square D; a brand of Schneider Electric.

B. Type HD, Heavy Duty, Single Throw, 600-V ac, 1200 A and Smaller: UL 98 and NEMA KS 1, horsepower rated, with clips or bolt pads to accommodate specified fuses, lockable handle with capability to accept three padlocks, and interlocked with cover in closed position.

C. Accessories:

1. Equipment Ground Kit: Internally mounted and labeled for copper and aluminum ground conductors.
2. Neutral Kit: Internally mounted; insulated, capable of being grounded and bonded; labeled for copper and aluminum neutral conductors.
3. Isolated Ground Kit: Internally mounted; insulated, capable of being grounded and bonded; labeled for copper and aluminum neutral conductors.
4. Class R Fuse Kit: Provides rejection of other fuse types when Class R fuses are specified.
5. Lugs: Mechanical type, suitable for number, size, and conductor material.
6. Service-Rated Switches: Labeled for use as service equipment.

2.2 NONFUSIBLE SWITCHES

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Eaton Electrical Inc.; Cutler-Hammer Business Unit.
2. Siemens Energy & Automation, Inc.
3. Square D; a brand of Schneider Electric.

B. Type HD, Heavy Duty, Single Throw, 600-V ac, 1200 A and Smaller: UL 98 and NEMA KS 1, horsepower rated, lockable handle with capability to accept three padlocks, and interlocked with cover in closed position.

C. Accessories:

1. Equipment Ground Kit: Internally mounted and labeled for copper and aluminum ground conductors.
2. Neutral Kit: Internally mounted; insulated, capable of being grounded and bonded; labeled for copper and aluminum neutral conductors.
3. Isolated Ground Kit: Internally mounted; insulated, capable of being grounded and bonded; labeled for copper and aluminum neutral conductors.
4. Lugs: Mechanical type, suitable for number, size, and conductor material.

2.3 ENCLOSURES

A. Enclosed Switches and Circuit Breakers: NEMA AB 1, NEMA KS 1, NEMA 250, and UL 50, to comply with environmental conditions at installed location.

1. Indoor, Dry and Clean Locations: NEMA 250, Type 1.
2. Outdoor Locations: NEMA 250, Type 3R.
3. Kitchen Areas: NEMA 250, Type 4X,.
4. Other Wet or Damp, Indoor Locations: NEMA 250, Type 4.
5. Indoor Locations Subject to Dust, Falling Dirt, and Dripping Noncorrosive Liquids: NEMA 250, Type 12.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine elements and surfaces to receive enclosed switches and circuit breakers for compliance with installation tolerances and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Install individual wall-mounted switches and circuit breakers with tops at uniform height unless otherwise indicated.

B. Comply with mounting and anchoring requirements specified in Division 16 Section "Vibration and Seismic Controls for Electrical Systems."

C. Temporary Lifting Provisions: Remove temporary lifting eyes, channels, and brackets and temporary blocking of moving parts from enclosures and components.

D. Install fuses in fusible devices.

E. Comply with NECA 1.

3.3 IDENTIFICATION

A. Comply with requirements in Division 16 Section "Electrical Identification."

1. Identify field-installed conductors, interconnecting wiring, and components; provide warning signs.
2. Label each enclosure with engraved metal or laminated-plastic nameplate.

3.4 FIELD QUALITY CONTROL

A. Testing Agency: Engage a qualified testing agency to perform tests and inspections.

B. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust components, assemblies, and equipment installations, including connections.

C. Perform tests and inspections.

1. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect components, assemblies, and equipment installations, including connections, and to assist in testing.

D. Acceptance Testing Preparation:

1. Test insulation resistance for each enclosed switch and circuit breaker, component, connecting supply, feeder, and control circuit.
2. Test continuity of each circuit.

E. Tests and Inspections:

1. Perform each visual and mechanical inspection and electrical test stated in NETA Acceptance Testing Specification. 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.
3. Perform the following infrared scan tests and inspections and prepare reports:

    a. Initial Infrared Scanning: After Substantial Completion, but not more than 60 days after Final Acceptance, perform an infrared scan of each enclosed switch and circuit breaker. Remove front panels so joints and connections are accessible to portable scanner.
    b. Follow-up Infrared Scanning: Perform an additional follow-up infrared scan of each enclosed switch and circuit breaker 11 months after date of Substantial Completion.
    c. Instruments and Equipment: Use an infrared scanning device designed to measure temperature or to detect significant deviations from normal values. Provide calibration record for device.

4. Test and adjust controls, remote monitoring, and safeties. Replace damaged and malfunctioning controls and equipment.

F. Enclosed switches and circuit breakers will be considered defective if they do not pass tests and inspections.

G. Prepare test and inspection reports, including a certified report that identifies enclosed switches and circuit breakers and that describes scanning results. Include notation of deficiencies detected, remedial action taken, and observations after remedial action.

3.5 ADJUSTING

A. Adjust moving parts and operable components to function smoothly, and lubricate as recommended by manufacturer.

END OF SECTION 16410

SECTION 16511 - 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 the following:

1. Interior lighting fixtures, lamps, and ballasts.
2. Emergency lighting units.
3. Exit signs.
4. Lighting fixture supports.
5. Retrofit kits for fluorescent lighting fixtures.

B. Related Sections include the following:

1. Division 13 Section "Lighting Controls" for manual or programmable control systems with low-voltage control wiring or data communication circuits.
2. Division 16 Section "Wiring Devices" for manual wall-box dimmers for incandescent lamps.
3. Division 16 Section "Lighting Control Devices" for automatic control of lighting, including time switches, photoelectric relays, occupancy sensors, and multipole lighting relays and contactors.
4. Division 16 Section "Stage Lighting" for theatrical lighting fixtures and their controls.
5. Division 16 Section "Dimming Controls" for architectural dimming systems.

1.3 DEFINITIONS

A. BF: Ballast factor.

B. CRI: Color-rendering index.

C. CU: Coefficient of utilization.

D. HID: High-intensity discharge.

E. LER: Luminaire efficacy rating.

F. Luminaire: Complete lighting fixture, including ballast housing if provided.

G. RCR: Room cavity ratio.

1.4 SUBMITTALS

A. Product Data: For each type of lighting fixture, arranged in order of fixture designation. Include data on features, accessories, finishes, and the following:

1. Physical description of lighting fixture including dimensions.
2. Emergency lighting units including battery and charger.
3. Ballast.
4. Energy-efficiency data.
5. Air and Thermal Performance Data: For air-handling lighting fixtures. Furnish data required in "Submittals" Article in Division 15 Section "Diffusers, Registers, and Grilles."
6. Sound Performance Data: For air-handling lighting fixtures. Indicate sound power level and sound transmission class in test reports certified according to standards specified in Division 15 Section "Diffusers, Registers, and Grilles."
7. Life, output, and energy-efficiency data for lamps.
8. Photometric data, in IESNA format, based on laboratory tests of each lighting fixture type, outfitted with lamps, ballasts, and accessories identical to those indicated for the lighting fixture as applied in this Project.

    a. For indicated fixtures, photometric data shall be certified by a qualified independent testing agency. Photometric data for remaining fixtures shall be certified by the manufacturer.
    b. Photometric data shall be certified by a manufacturer's laboratory with a current accreditation under the National Voluntary Laboratory Accreditation Program (NVLAP) for Energy Efficient Lighting Products.

B. Shop Drawings: Show details of nonstandard or custom lighting fixtures. Indicate dimensions, weights, methods of field assembly, components, features, and accessories.

1. Wiring Diagrams: Power and control wiring.

C. Coordination Drawings: Reflected ceiling plan(s) and other details, drawn to scale, on which the following items are shown and coordinated with each other, based on input from installers of the items involved:

1. Lighting fixtures.
2. Suspended ceiling components.
3. Structural members to which suspension systems for lighting fixtures will be attached.
4. Other items in finished ceiling including the following:

    a. Air outlets and inlets.
    b. Speakers.
    c. Sprinklers.
    d. Smoke and fire detectors.
    e. Access panels.

5. Perimeter moldings.

D. Samples for Verification: Interior lighting fixtures designated for sample submission in Interior Lighting Fixture Schedule. Each sample shall include the following:

1. Lamps: Specified units installed.
2. Accessories: Cords and plugs.

E. Product Certificates: For each type of ballast for bi-level and dimmer-controlled fixtures, signed by product manufacturer.

F. Qualification Data: For agencies providing photometric data for lighting fixtures.

G. Field quality-control test reports.

H. Operation and Maintenance Data: For lighting equipment and fixtures to include in emergency, operation, and maintenance manuals.

I. Warranties: Special warranties specified in this Section.

1.5 QUALITY ASSURANCE

A. Luminaire Photometric Data Testing Laboratory Qualifications: Provided by manufacturers' laboratories that are accredited under the National Volunteer Laboratory Accreditation Program for Energy Efficient Lighting Products.

B. Luminaire Photometric Data Testing Laboratory Qualifications: Provided by an independent agency, with the experience and capability to conduct the testing indicated, that is an NRTL as defined by OSHA in 29 CFR 1910.7.

C. 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.

D. Comply with NFPA 70.

E. FMG Compliance: Lighting fixtures for hazardous locations shall be listed and labeled for indicated class and division of hazard by FMG.

F. Mockups: Provide interior lighting fixtures for room or module mockups, complete with power and control connections.

1. Obtain Architect's approval of fixtures for mockups before starting installations.
2. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.
3. Approved fixtures in mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.6 COORDINATION

A. Coordinate layout and installation of lighting fixtures and suspension system with other construction that penetrates ceilings or is supported by them, including HVAC equipment, fire-suppression system, and partition assemblies.

1.7 WARRANTY

A. Special Warranty for Emergency Lighting Batteries: Manufacturer's standard form in which manufacturer of battery-powered emergency lighting unit agrees to repair or replace components of rechargeable batteries that fail in materials or workmanship within specified warranty period.

1. Warranty Period for Emergency Lighting Unit Batteries: 10 years from date of Substantial Completion. Full warranty shall apply for first year, and prorated warranty for the remaining nine years.
2. Warranty Period for Emergency Fluorescent Ballast Batteries: Seven years from date of Substantial Completion. Full warranty shall apply for first year, and prorated warranty for the remaining six years.

B. Special Warranty for Ballasts: Manufacturer's standard form in which ballast manufacturer agrees to repair or replace ballasts that fail in materials or workmanship within specified warranty period.

1. Warranty Period for Electronic Ballasts: Five years from date of Substantial Completion.
2. Warranty Period for Electromagnetic Ballasts: Three years from date of Substantial Completion.

C. Special Warranty for T5 and T8 Fluorescent Lamps: Manufacturer's standard form, made out to Owner and signed by lamp manufacturer agreeing to replace lamps that fail in materials or workmanship, f.o.b. the nearest shipping point to Project site, within specified warranty period indicated below.

1. Warranty Period: One year(s) from date of Substantial Completion.

1.8 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. Lamps: 10 for every 100 of each type and rating installed. Furnish at least one of each type.
2. Plastic Diffusers and Lenses: 1 for every 100 of each type and rating installed. Furnish at least one of each type.
3. Battery and Charger Data: One for each emergency lighting unit.
4. Ballasts: 1 for every 100 of each type and rating installed. Furnish at least one of each type.
5. Globes and Guards: 1 for every 20 of each type and rating installed. Furnish at least one of each type.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Products: Subject to compliance with requirements, provide product indicated on Drawings. Contractors wishing to submit alternate equipment shall submit to the specifying authority, at least 10 days prior to bid opening, the equipment proposed to provide a precise functional equivalent system to meet specifications.

2.2 LIGHTING FIXTURES AND COMPONENTS, GENERAL REQUIREMENTS

A. Recessed Fixtures: Comply with NEMA LE 4 for ceiling compatibility for recessed fixtures.

B. Incandescent Fixtures: Comply with UL 1598. Where LER is specified, test according to NEMA LE 5A.

C. Fluorescent Fixtures: Comply with UL 1598. Where LER is specified, test according to NEMA LE 5 and NEMA LE 5A as applicable.

D. HID Fixtures: Comply with UL 1598. Where LER is specified, test according to NEMA LE 5B.

E. Metal Parts: Free of burrs and sharp corners and edges.

F. Sheet Metal Components: Steel, unless otherwise indicated. Form and support to prevent warping and sagging.

G. Doors, Frames, and Other Internal Access: Smooth operating, free of light leakage under operating conditions, and designed to permit relamping without use of tools. Designed to prevent doors, frames, lenses, diffusers, and other components from falling accidentally during relamping and when secured in operating position.

H. Reflecting surfaces shall have 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.

I. Plastic Diffusers, Covers, and Globes:

1. Acrylic Lighting Diffusers: 100 percent virgin acrylic plastic. High resistance to yellowing and other changes due to aging, exposure to heat, and UV radiation.

    a. Lens Thickness: At least 0.125 inch (3.175 mm) minimum unless different thickness is indicated.
    b. UV stabilized.

2. Glass: Annealed crystal glass, unless otherwise indicated.

J. Electromagnetic-Interference Filters: Factory installed to suppress conducted electromagnetic-interference as required by MIL-STD-461E. Fabricate lighting fixtures with one filter on each ballast indicated to require a filter.

2.3 BALLASTS FOR LINEAR FLUORESCENT LAMPS

A. Electronic Ballasts: Comply with ANSI C82.11; instant-start type, unless otherwise indicated, and designed for type and quantity of lamps served. Ballasts shall be designed for full light output unless dimmer or bi-level control is indicated.

1. Sound Rating: A.
2. Total Harmonic Distortion Rating: Less than 10 percent.
3. Transient Voltage Protection: IEEE C62.41, Category A or better.
4. Operating Frequency: 20 kHz or higher.
5. Lamp Current Crest Factor: 1.7 or less.
6. BF: 0.85 or higher.
7. Power Factor: 0.98 or higher.
8. Parallel Lamp Circuits: Multiple lamp ballasts shall comply with ANSI C 82.11 and shall be connected to maintain full light output on surviving lamps if one or more lamps fail.

B. Electronic Programmed-Start Ballasts for T5 and T5HO Lamps: Comply with ANSI C82.11 and the following:

1. Lamp end-of-life detection and shutdown circuit for T5 diameter lamps.
2. Automatic lamp starting after lamp replacement.
3. Sound Rating: A.
4. Total Harmonic Distortion Rating: Less than 20 percent.
5. Transient Voltage Protection: IEEE C62.41, Category A or better.
6. Operating Frequency: 20 kHz or higher.
7. Lamp Current Crest Factor: 1.7 or less.
8. BF: 0.95 or higher, unless otherwise indicated.
9. Power Factor: 0.98 or higher.

C. Electromagnetic Ballasts: Comply with ANSI C82.1; energy saving, high-power factor, Class P, and having automatic-reset thermal protection.

1. Ballast Manufacturer Certification: Indicated by label.

D. Single Ballasts for Multiple Lighting Fixtures: Factory-wired with ballast arrangements and bundled extension wiring to suit final installation conditions without modification or rewiring in the field.

2.4 BALLASTS FOR COMPACT FLUORESCENT LAMPS

A. Description: Electronic programmed rapid-start type, complying with ANSI C 82.11, designed for type and quantity of lamps indicated. Ballast shall be designed for full light output unless dimmer or bi-level control is indicated:

1. Lamp end-of-life detection and shutdown circuit.
2. Automatic lamp starting after lamp replacement.
3. Sound Rating: A.
4. Total Harmonic Distortion Rating: Less than 20 percent.
5. Transient Voltage Protection: IEEE C62.41, Category A or better.
6. Operating Frequency: 20 kHz or higher.
7. Lamp Current Crest Factor: 1.7 or less.
8. BF: 0.95 or higher, unless otherwise indicated.
9. Power Factor: 0.98 or higher.
10. Interference: Comply with 47 CFR, Chapter 1, Part 18, Subpart C, for limitations on electromagnetic and radio-frequency interference for nonconsumer equipment.
11. Ballast Case Temperature: 75 deg C, maximum.

B. Ballasts for Dimmer-Controlled Lighting Fixtures: Electronic type.

1. Dimming Range: 100 to 5 percent of rated lamp lumens.
2. Ballast Input Watts: Can be reduced to 20 percent of normal.
3. Compatibility: Certified by manufacturer for use with specific dimming control system and lamp type indicated.

2.5 EMERGENCY FLUORESCENT POWER UNIT

A. Internal Type: Self-contained, modular, battery-inverter unit, factory mounted within lighting fixture body and compatible with ballast. Comply with UL 924.

1. Emergency Connection: Operate 1 fluorescent lamp(s) continuously at an output of 1100 lumens each. Connect unswitched circuit to battery-inverter unit and switched circuit to fixture ballast.
2. Night-Light Connection: Operate one fluorescent lamp continuously.
3. Test Push Button and Indicator Light: Visible and accessible without opening fixture or entering ceiling space.

    a. Push Button: Push-to-test type, in unit housing, simulates loss of normal power and demonstrates unit operability.
    b. Indicator Light: LED indicates normal power on. Normal glow indicates trickle charge; bright glow indicates charging at end of discharge cycle.

4. Battery: Sealed, maintenance-free, nickel-cadmium type.
5. Charger: Fully automatic, solid-state, constant-current type with sealed power transfer relay.
6. Integral Self-Test: Factory-installed electronic device automatically initiates code-required test of unit emergency operation at required intervals. Test failure is annunciated by an integral audible alarm and flashing red LED.

B. External Type: Self-contained, modular, battery-inverter unit, suitable for powering one or more fluorescent lamps, remote mounted from lighting fixture. Comply with UL 924.

1. Emergency Connection: Operate one fluorescent lamp continuously. Connect unswitched circuit to battery-inverter unit and switched circuit to fixture ballast.
2. Night-Light Connection: Operate one fluorescent lamp in a remote fixture continuously.

3. Battery: Sealed, maintenance-free, nickel-cadmium type.
4. Charger: Fully automatic, solid-state, constant-current type.
5. Housing: NEMA 250, Type 1 enclosure.
6. Test Push Button: Push-to-test type, in unit housing, simulates loss of normal power and demonstrates unit operability.
7. LED Indicator Light: Indicates normal power on. Normal glow indicates trickle charge; bright glow indicates charging at end of discharge cycle.
8. Integral Self-Test: Factory-installed electronic device automatically initiates code-required test of unit emergency operation at required intervals. Test failure is annunciated by an integral audible alarm and flashing red LED.

2.6 BALLASTS FOR HID LAMPS

A. Electromagnetic Ballast for Metal-Halide Lamps: Comply with ANSI C82.4 and UL 1029. Include the following features, unless otherwise indicated:

1. Ballast Circuit: Constant-wattage autotransformer or regulating high-power-factor type.
2. Minimum Starting Temperature: Minus 22 deg F (Minus 30 deg C) for single-lamp ballasts.
3. Normal Ambient Operating Temperature: 104 deg F (40 deg C).
4. Open-circuit operation that will not reduce average life.
5. Low-Noise Ballasts: Manufacturers' standard epoxy-encapsulated models designed to minimize audible fixture noise.

B. Electronic Ballast for Metal-Halide Lamps: Include the following features unless otherwise indicated:

1. Lamp end-of-life detection and shutdown circuit.
2. Sound Rating: A.
3. Total Harmonic Distortion Rating: Less than 15 percent.
4. Transient Voltage Protection: IEEE C62.41, Category A or better.
5. Lamp Current Crest Factor: 1.5 or less.
6. Power Factor: .90 or higher.
7. Interference: Comply with 47 CFR, Chapter 1, Part 18, Subpart C, for limitations on electromagnetic and radio-frequency interference for nonconsumer equipment.
8. Protection: Class P thermal cutout.
9. Retain subparagraph and associated subparagraphs below for bi-level ballasts.

2.7 EXIT SIGNS

A. Description: Comply with UL 924; for sign colors, visibility, luminance, and lettering size, comply with authorities having jurisdiction.

B. Internally Lighted Signs:

1. Lamps for AC Operation: Fluorescent, 2 for each fixture, 20,000 hours of rated lamp life.
2. Lamps for AC Operation: LEDs, 70,000 hours minimum rated lamp life.

3. Self-Powered Exit Signs (Battery Type): Integral automatic charger in a self-contained power pack.

    a. Battery: Sealed, maintenance-free, nickel-cadmium type.
    b. Charger: Fully automatic, solid-state type with sealed transfer relay.
    c. Operation: Relay automatically energizes lamp from battery when circuit voltage drops to 80 percent of nominal voltage or below. When normal voltage is restored, relay disconnects lamps from battery, and battery is automatically recharged and floated on charger.
    d. Test Push Button: Push-to-test type, in unit housing, simulates loss of normal power and demonstrates unit operability.
    e. LED Indicator Light: Indicates normal power on. Normal glow indicates trickle charge; bright glow indicates charging at end of discharge cycle.
    f. Remote Test: Switch in hand-held remote device aimed in direction of tested unit initiates coded infrared signal. Signal reception by factory-installed infrared receiver in tested unit triggers simulation of loss of its normal power supply, providing visual confirmation of either proper or failed emergency response.
    g. Integral Self-Test: Factory-installed electronic device automatically initiates code-required test of unit emergency operation at required intervals. Test failure is annunciated by an integral audible alarm and flashing red LED.

4. Master/Remote Sign Configurations:

    a. Master Unit: Comply with requirements above for self-powered exit signs, and provide additional capacity in LED power supply for power connection to remote unit.
    b. Remote Unit: Comply with requirements above for self-powered exit signs, except omit power supply, battery and test features. Arrange to receive full power requirements from master unit. Connect for testing concurrently with master unit as a unified system.

2.8 FLUORESCENT LAMPS

A. Low-Mercury Lamps: Comply with EPA's toxicity characteristic leaching procedure test; shall yield less than 0.2 mg of mercury per liter when tested according to NEMA LL 1.

B. T8 rapid-start low-mercury lamps, rated 32 W maximum, nominal length of 48 inches (1220 mm), 2800 initial lumens (minimum), CRI 75 (minimum), color temperature 3500 K, and average rated life 20,000 hours, unless otherwise indicated.

C. T8 rapid-start low-mercury lamps, rated 17 W maximum, nominal length of 24 inches (610 mm), 1300 initial lumens (minimum), CRI 75 (minimum), color temperature 3500 K, and average rated life of 20,000 hours, unless otherwise indicated.

D. T5 rapid-start low-mercury lamps, rated 28 W maximum, nominal length of 45.2 inches (1150 mm), 2900 initial lumens (minimum), CRI 85 (minimum), color temperature 3000 K, and average rated life of 20,000 hours, unless otherwise indicated.

E. Compact Fluorescent Lamps: 4-Pin, low mercury, CRI 80 (minimum), color temperature 3500 K, average rated life of 10,000 hours at 3 hours operation per start, and suitable for use with dimming ballasts, unless otherwise indicated.

1. 13 W: T4, double or triple tube, rated 900 initial lumens (minimum).
2. 18 W: T4, double or triple tube, rated 1200 initial lumens (minimum).
3. 26 W: T4, double or triple tube, rated 1800 initial lumens (minimum).
4. 32 W: T4, triple tube, rated 2400 initial lumens (minimum).
5. 42 W: T4, triple tube, rated 3200 initial lumens (minimum).
6. 55 W: T4, triple tube, rated 4300 initial lumens (minimum).

2.9 HID LAMPS

A. High-Pressure Sodium Lamps: ANSI C78.42, CRI 21 (minimum), color temperature 1900 K, and average rated life of 24,000 hours, minimum.

1. Dual-Arc Tube Lamps: Arranged so only one of two arc tubes is lighted at one time and, when power is restored after an outage, the cooler arc tube, with lower internal pressure, lights instantly, providing an immediate 8 to 15 percent of normal light output.

B. Metal-Halide Lamps: ANSI C78.1372, with a minimum CRI 65, and color temperature 4000 K.

C. Pulse-Start, Metal-Halide Lamps: Minimum CRI 65, and color temperature 4000 K.

D. Ceramic, Pulse-Start, Metal-Halide Lamps: Minimum CRI 80, and color temperature 4000 K.

2.10 LIGHTING FIXTURE SUPPORT COMPONENTS

A. Comply with Division 16 Section "Electrical Supports and Seismic Restraints" for channel- and angle-iron supports and nonmetallic channel and angle supports.

B. Twin-Stem Hangers: Two, 1/2-inch (13-mm) steel tubes with single canopy designed to mount a single fixture. Finish same as fixture.

C. Wires: ASTM A 641/A 641M, Class 3, soft temper, zinc-coated steel, 12 gage (2.68 mm).

D. Wires for Humid Spaces: ASTM A 580/A 580M, Composition 302 or 304, annealed stainless steel, 12 gage (2.68 mm).

E. Rod Hangers: 3/16-inch (5-mm) minimum diameter, cadmium-plated, threaded steel rod.

F. Hook Hangers: Integrated assembly matched to fixture and line voltage and equipped with threaded attachment, cord, and locking-type plug.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Lighting fixtures: Set level, plumb, and square with ceilings and walls. Install lamps in each fixture.

B. Support for Lighting Fixtures in or on Grid-Type Suspended Ceilings: Use grid as a support element.

1. Install a minimum of four ceiling support system rods or wires for each fixture. Locate not more than 6 inches (150 mm) from lighting fixture corners.
2. Support Clips: Fasten to lighting fixtures and to ceiling grid members at or near each fixture corner with clips that are UL listed for the application.
3. Fixtures of Sizes Less Than Ceiling Grid: Install 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.
4. Install at least one independent support rod or wire from structure to a tab on lighting fixture. Wire or rod shall have breaking strength of the weight of fixture at a safety factor of 3.

C. Suspended Lighting Fixture Support:

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. Continuous Rows: Use tubing or stem for wiring at one point and tubing or rod for suspension for each unit length of fixture chassis, including one at each end.

D. Air-Handling Lighting Fixtures: Install with dampers closed and ready for adjustment.

E. Adjust aimable lighting fixtures to provide required light intensities.

F. Connect wiring according to Division 16 Section "Conductors and Cables."

3.2 FIELD QUALITY CONTROL

A. Test for Emergency Lighting: Interrupt power supply to demonstrate proper operation. Verify transfer from normal power to battery and retransfer to normal.

B. Prepare a written report of tests, inspections, observations, and verifications indicating and interpreting results. If adjustments are made to lighting system, retest to demonstrate compliance with standards.

END OF SECTION 16511END OF SECTION 16511

HIDALGO COUNTY
ADULT DETENTION CENTER and LAW ENFORCEMENT FACILITY
REPAIRS and/or REPLACEMENT

Edinburg, Texas

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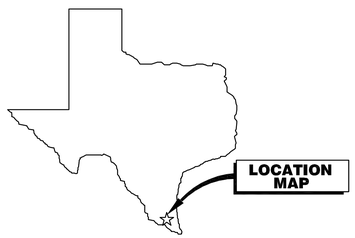
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VICINITY MAP N. T. S.
701 El Cibolo Road
Edinburg, TX.



EDINBURG, TEXAS

☆ HIDALGO COUNTY OFFICIALS ☆

RAMON GARCIA ☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆ COUNTY JUDGE
A.C. CUELLAR, JR. ☆☆☆☆☆☆☆☆☆☆ COMMISSIONER PCT. No. 1
HECTOR "TITO" PALACIOS ☆☆☆☆ COMMISSIONER PCT. No. 2
JOE M. FLORES ☆☆☆☆☆☆☆☆☆☆☆☆ COMMISSIONER PCT. No. 3
JOSEPH PALACIOS ☆☆☆☆☆☆☆☆ COMMISSIONER PCT. No. 4

☆ HIDALGO COUNTY SHERIFF ☆

LUPE TREVINO ☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆ COUNTY SHERIFF

ARCHITECT

SAM GARCIA ARCHITECT
1335 E. Jasmine Ave.
McAllen, TX 78501
(956) 212-4930
info@samgarciaarchitect.com

STRUCTURAL ENGINEERING

CHANIN ENGINEERING LLC
400 Nolana, Suite N2
McAllen, Texas 78504
PH: (956) 687-9421 FAX: (956) 687-3211
www.chaninengineering.com
TBPE FIRM REG. NUMBER F-9369

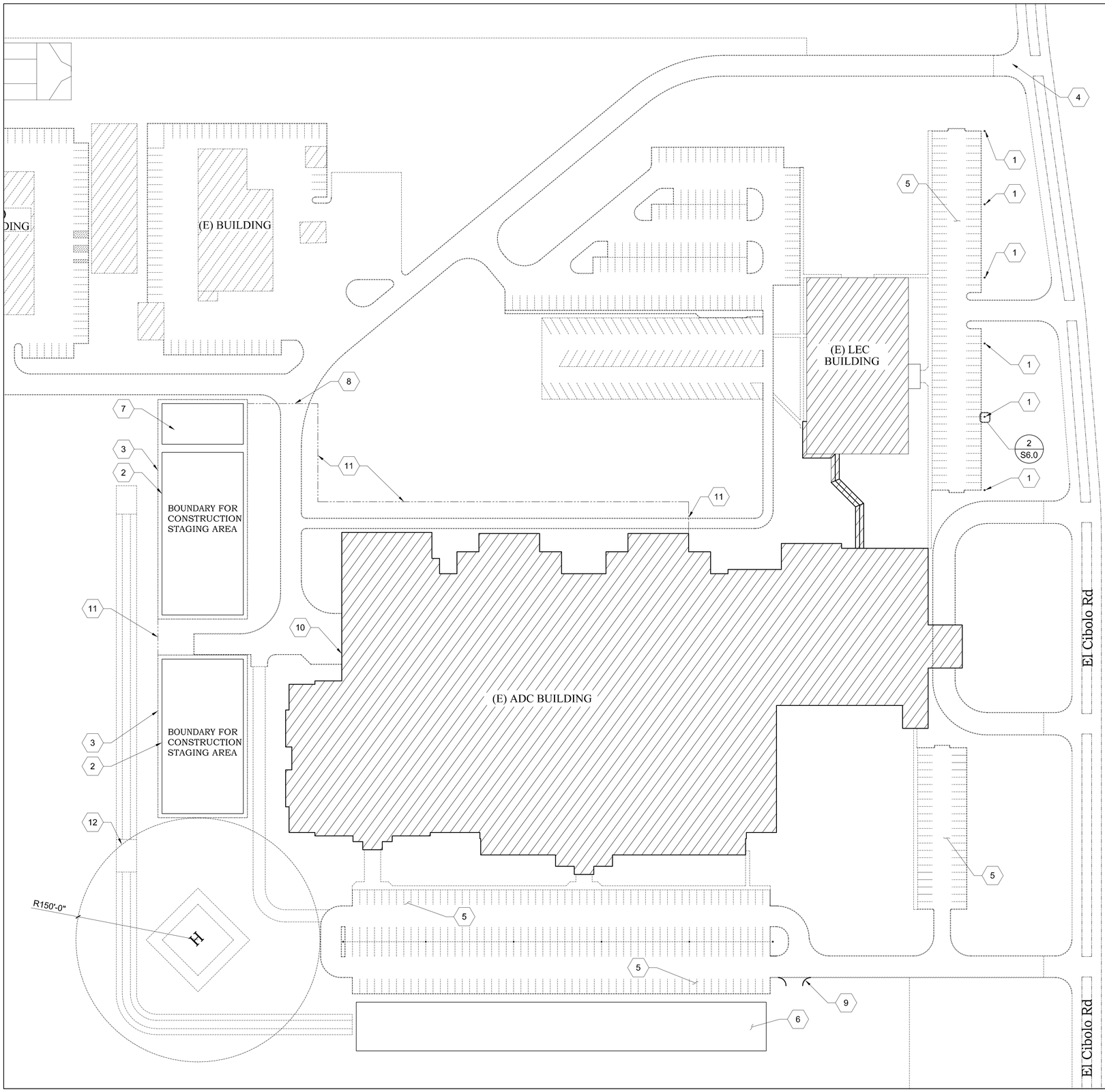
M.E.P. ENGINEERING

MEP SOLUTIONS ENGINEERING
MECHANICAL, ELECTRICAL, PLUMBING ENGINEERS
600 E. BEAUMONT AVE. SUITE 2 McALLEN, TX 78501 (956) 664-2727
TEXAS BOARD OF PROFESSIONAL ENGINEERS REGISTRATION # F-9748

CONSTRUCTION PROJECT MANAGER

Prodigy
Construction Management llc
1335 E. Jasmine Ave.
McAllen, TX 78501
ph: 956-800-1122 fax: 956-664-1832

CS



KEY NOTES:

1. EXISTING PIER AND LIGHTPOLE TO BE REMOVED AND REPLACED SEE M.E.P. DRAWINGS AND SEE DETAIL 2/S6.0 ANY PAVING DAMAGED DURING THIS PORTION OF WORK SHALL BE FIXED AT CONTRACTORS EXPENSE.
2. CONSTRUCTION STAGING AREA
3. 6' HIGH CHAIN LINK FENCE AROUND STAGING AREA AND TEMPORARY PARKING.
4. SECURE ACCESS POINT. GENERAL CONTRACTOR TO PROVIDE DATA BACKGROUND CHECKS ON ANY INDIVIDUALS THAT WILL BE COMING THROUGH FOR PRE-CLEARANCE.
5. ADC AND LEC PARKING AREAS ARE PROHIBITED, FOR CONSTRUCTION PARKING.
6. BOUNDARY AREA FOR TEMPORARY CONSTRUCTION PARKING.
7. BOUNDARY AREA FOR TEMPORARY SPECIALTY VEHICLES PARKING.
8. CHECK POINT LOCATION BY OWNER.
9. PREPARE AREA FOR VEHICULAR ACCESS AND PATCH AT END OF PROJECT CONSTRUCTION.
10. SECURE ACCESS POINT FOR INTERIOR CONSTRUCTION.
11. ORANGE SAFTEY/BARRIER FENCE. CONSTRUCTION WORKERS MAY NOT BE OUTSIDE OF BARRIER FENCE.
12. HELICOPTER CLEARANCE MINUMMUM 150 FT. RADIUS CLEARANCE

N
NORTH

SITE PLAN

SCALE: N.T.S.

CHANIN
ENGINEERING LLC
1400 Nolana, Suite N2
McAllen, Texas 78504
PH: (956) 687-9401 FAX: (956) 687-3211
www.chanineng.com
TBPE FIRM REG. NUMBER F-9369

SEAL:

STATE OF TEXAS
MIGUEL CHANIN
93127
LICENSED
PROFESSIONAL ENGINEER
11-15-13

PROJECT:
HIDALGO COUNTY
ADULT DETENTION CENTER and LAW ENFORCEMENT
FACILITY REPAIRS and/or REPLACEMENT
Edinburg, Texas

JOB NO. 13159
DATE: 11/15/13
DRAWN BY: LR
CHECKED BY:MC
REVISION:
DRAWING NO:
S1.0

GENERAL NOTES

GENERAL

1. THE CONTRACT STRUCTURAL DRAWINGS AND SPECIFICATIONS REPRESENT THE FINISHED STRUCTURE. UNLESS OTHERWISE INDICATED, THEY DO NOT INDICATE THE METHOD OF CONSTRUCTION. THE CONTRACTOR SHALL PROVIDE ALL MEASURES NECESSARY TO PROTECT THE STRUCTURE, WORKMEN, AND OTHER PERSONS DURING CONSTRUCTION. SUCH MEASURES SHALL INCLUDE, BUT NOT BE LIMITED TO BRACING, SHORING FOR CONSTRUCTION EQUIPMENT, SHORING FOR THE BUILDING, SHORING FOR THE EARTH BANKS, FORMS, SCAFFOLDING, PLANNING, SAFETY NETS, SUPPORT AND BRACING FOR CRANES, GIN POLES, ETC. THE CONTRACTOR SHALL SUPERVISE AND DIRECT THE WORK, AND HE SHALL BE SOLELY RESPONSIBLE FOR ALL CONSTRUCTION MEANS, METHODS, TECHNIQUES, SEQUENCES, AND PROCEDURES. OBSERVATION VISITS TO THE SITE BY THE ARCHITECT OR THE ENGINEER SHALL NOT INCLUDE INSPECTION OF THE ABOVE ITEMS.

2. IT IS SOLELY THE CONTRACTOR'S RESPONSIBILITY TO FOLLOW ALL APPLICABLE SAFETY CODES AND REGULATIONS DURING ALL PHASES OF CONSTRUCTION.

3. EQUIPMENT FRAMING LOADS, OPENINGS AND STRUCTURE IN ANY WAY RELATED TO HVAC, PLUMBING, OR ELECTRICAL REQUIREMENTS ARE SHOWN FOR BIDDING PURPOSES ONLY. EXACT WEIGHTS AND LOCATIONS OF MECHANICAL EQUIPMENT SHALL BE COORDINATED BY CONTRACTOR. IF THE FINAL LOCATION VARIES FROM THAT SHOWN ON THE PLANS, CONTRACTOR TO NOTIFY ARCHITECT AND ENGINEER FOR APPROVAL BEFORE INSTALLATION.

4. 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.

5. THE GENERAL CONTRACTOR SHALL VERIFY ALL DIMENSIONS AND CONDITIONS AT THE JOB SITE AND SHALL BE RESPONSIBLE FOR CONDITIONS OF ALL WORK AND MATERIALS.

6. THE CONTRACTOR SHALL REVIEW AND VERIFY ALL DIMENSIONS AND ELEVATIONS SHALL REPORT ANY DISCREPANCIES IN WRITING TO THE ARCHITECT. ANY CONFLICT BETWEEN THE DRAWING AND SPECIFICATIONS OF THE VARIOUS TRADES INVOLVED SHALL BE REPORTED TO THE ARCHITECT AND ENGINEER.

7. DETAILS SHOWN ON DRAWINGS APPLY AT SIMILAR CONDITIONS.

8. ALL WORK SHALL BE DONE IN ACCORDANCE WITH LOCAL STANDARDS AND TO ALL APPLICABLE PROVISIONS OF THE GOVERNING BUILDING CODE.

9. THE ARCHITECT AND ENGINEER SHALL BE NOTIFIED IN WRITING WHEN WORK COMMENCES.

10. CONTRACTOR SUBSTITUTIONS: ANY MATERIALS OR PRODUCTS THAT ARE SUBMITTED FOR APPROVAL THAT ARE DIFFERENT FROM THE MATERIALS OR PRODUCTS SPECIFIED IN THE CONTRACT DOCUMENTS WILL ONLY BE CONSIDERED IF THE FOLLOWING CRITERIA ARE SATISFIED.
    A) A COST SAVING TO THE OWNER IS DOCUMENTED AND SUBMITTED WITH THE REQUEST
    B) THE MATERIAL OR PRODUCT HAS BEEN APPROVED BY THE INTERNATIONAL CONFERENCE OF BUILDING OFFICIALS (ICBO) AND THE ICBO REPORT IS SUBMITTED WITH THE REQUEST.

STRUCTURAL OBSERVATION

THE PROFESSIONAL ENGINEER OR HIS/HER AUTHORIZED REPRESENTATIVE SHALL CONDUCT ALL STRUCTURAL OBSERVATIONS. STRUCTURAL OBSERVATIONS SHALL BE FOR THE PURPOSE OF ASCERTAINING GENERAL COMPLIANCE WITH THE CONSTRUCTION DOCUMENTS. HOWEVER, SUCH OBSERVATION VISITS SHALL NOT RELIEVE THE CONTRACTOR FROM HIS OBLIGATIONS AND RESPONSIBILITIES TO THE CONSTRUCTION DOCUMENTS.

1. ITEMS THAT REQUIRE A STRUCTURAL OBSERVATION ARE AS FOLLOWS:
    A. PLACEMENT OF NEW ROOFING SYSTEM
    B. STRUCTURAL STEEL FRAMING
    C. STEEL REINFORCING IN LIGHT POLE FOUNDATIONS

2. NOTIFY ENGINEER 24 HOURS IN ADVANCE WHEN A STRUCTURAL OBSERVATION IS REQUIRED.

SHOP DRAWINGS & SUBMITTALS

1. SUBMITTAL THAT WILL BE REQUIRED FOR APPROVAL INCLUDE:
    A. CONCRETE MIX DESIGN
    B. CURING COMPOUND FOR CONCRETE
    C. REINFORCING STEEL
    D. STRUCTURAL STEEL
    E. NON SHRINK GROUT
    F. ROOFING COMPONENTS
    G. MECHANICAL CURBS AND ATTACHMENTS

2. ALLOW (2) WEEKS MINIMUM FOR REVIEW OF SHOP DRAWINGS.

3. PRIOR TO ISSUING THE SUBMITTALS TO THE ENGINEER, THE CONTRACTOR SHALL REVIEW THE SHOP DRAWINGS. CONTRACTOR MUST VERIFY ALL DIMENSION WITH ARCHITECTURAL PLANS.

4. REVIEW OF SHOP DRAWINGS BY THE ENGINEER IS FOR GENERAL CONFORMANCE TO THE STRUCTURAL DRAWINGS. APPROVAL OF THE SHOP DRAWINGS BY THE ENGINEER DOES NOT RELIEVE THE CONTRACTOR FOR ANY ERRORS IN DIMENSIONS OR MATERIAL INDICATED ON THE SHOP DRAWINGS.

DESIGN CRITERIA

1. DESIGN LOADS, STRUCTURAL ANALYSIS AND PREPARATIONS OF STRUCTURAL MEMBERS ARE BASED ON THE FOLLOWING CRITERIA:

    CODE: ..... IBC 2012

2. VERTICAL LOADS
    A. DEAD LOAD (ROOF): ..... 25 PSF
    B. LIVE LOAD ROOF (REDUCIBLE): ..... 20 PSF
    C. UPLIFT LOAD ..... SEE ROOF UPLIFT PLAN
    D. MECHANICAL LOAD:
    THE GENERAL CONTRACTOR SHALL SUBMIT ACTUAL WEIGHTS AND LOCATIONS OF EQUIPMENT TO BE USED IN THE PROJECT TO THE STRUCTURAL ENGINEER FOR VERIFICATION OF LOADS USED IN THE DESIGN AT LEAST TWO WEEKS PRIOR TO INSTALLATION.

3. LATERAL LOADS
    A. WIND SPEED (VULT)..... 140 MPH
    B. WIND SPEED (VASD)..... 120 MPH
    B. EXPOSURE CATEGORY: C
    C. IMPORTANCE FACTOR: 1.00
    D. BUILDING CATEGORY: IV
    E. SEISMIC DESIGN CATEGORY: ..... A
    F. SITE CLASS: ..... E

CONCRETE

1. ALL CONCRETE WORK SHALL BE EXECUTED IN ACCORDANCE WITH ACI 318 AND ACI 301 LATEST EDITION.

2. CEMENT SHALL CONFORM TO ASTM C150 TYPE I AGGREGATE SHALL CONFORM TO ASTM C33.

3. CONCRETE SHALL HAVE A MINIMUM 28 DAYS COMPRESSIVE STRENGTH AS FOLLOWS:

MEMBER TYPE	STRENGTH	SLUMP	MAX AGG.
PIERS	3000 PSI	5"	1.5 IN.
FOOTING	3000 PSI	5"	1.5 IN.

4. CURE CONCRETE IN ACCORDANCE WITH ACI 308.1

5. CONDUIT AND PLUMBING LINES SHALL BE PLACED BELOW SLAB REINFORCING AND SHALL BE NO BIGGER THAN 1 INCH.

6. FLYASH MAY BE USED TO REPLACE A PORTION OF THE PORTLAND CEMENT. THE RATIO OF FLYASH TO THE TOTAL OF THE FLYASH AND CEMENT IN A MIX SHALL NOT EXCEED 20%. FLYASH SHALL CONFORM TO ASTM C618, TYPE C OR F.

7. ALL FLOORS SHALL BE CONSTRUCTED WITH A MINIMUM FLATNESS FF=35 AND A MINIMUM LEVELNESS OF FL=25

8. TESTING OF CONCRETE SHALL BE DONE AS FOLLOWS:
    1) SETS SHALL CONSIST OF 3 CYLINDERS
    ONE TESTED AT 7 DAYS
    TWO TESTED AT 28 DAYS
    2) ONE SET SHALL BE TAKEN FOR EACH 150 CY AND FOR EVERY 5000 SF OF SURFACE AREA AND AT LEAST ONCE PER DAY OF POURING
    3) A MINIMUM OF 3 SETS SHALL BE TAKEN FOR EACH CLASS OF CONCRETE

9. NO WATER SHALL BE ADDED TO THE CONCRETE AT THE JOBSITE. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO COORDINATE WITH THE CONCRETE SUPPLIER TO ENSURE A PUMPABLE AND WORKABLE MIX WITHOUT THE ADDITION OF WATER AT THE JOBSITE. THE USE OF PLASTICIZERS, RETARDANTS AND OTHER ADDITIVES SHALL BE AT THE OPTION OF THE CONTRACTOR SUBJECT TO THE APPROVAL OF THE STRUCTURAL ENGINEER. FOLLOW THE RECOMMENDATIONS OF THE MANUFACTURER FOR THE PROPER USE OF ADDITIVES. THE USE OF CALCIUM CHLORIDE OR OTHER CHLORIDE BEARING SALTS SHALL NOT BE PERMITTED.

10. PLACE CONCRETE IN A MANNER SO AS TO PREVENT SEGREGATION OF THE MIX. DELAY FLOATING AND TROWELING OPERATIONS UNTIL CONCRETE HAS LOST SURFACE WATER SHEEN OR ALL FREE WATER. DO NOT SPRINKLE FREE CEMENT ON THE SLAB SURFACE. FINISHING OF SLAB SURFACES SHALL COMPLY WITH THE RECOMMENDATIONS OF ACI 302.1 AND 304.

11. UNLESS SPECIFIED, CONCRETE MUST REACH THE FOLLOWING PERCENTAGES OF ITS 28-DAY COMPRESSIVE STRENGTH (F'c), BEFORE FORMS MAY BE REMOVED.

    WALL, COLUMNS, & BEAM SIDES.....40%
    JOIST PANS & BEAM BOTTOMS (IF RESHORED).....70%
    SHORING FOR FLOOR SYSTEMS (IF NOT RESHORED).....85%

12. NO CONCRETE SHALL BE PLACED OUTSIDE OF THESE SPECIFICATIONS WITHOUT THE OWNER'S PRIOR APPROVAL. ANY ITEMS NOT IN COMPLIANCE WITH THE OUTLINED SPECIFICATION SHALL BE REPORTED TO THE OWNER AND STRUCTURAL ENGINEER WITHIN 24 HOURS.

13. CONSTRUCTION VEHICLE LOADS SHALL NOT BE PERMITTED ON ELEVATED SLABS AT ANY TIME.

STEEL REINFORCING

1. ALL REINFORCEMENT SHALL BE NEW BILLET STEEL CONFORMING TO ASTM A-615 GRADE 60.

2. REINFORCING STEEL SHALL BE DESIGNED, DETAILED, FABRICATED AND PLACED IN ACCORDANCE WITH THE LATEST ACI DETAILING MANUAL (SP-66) AND CSRI MANUAL OF STANDARD PRACTICE FOR DETAILING REINFORCED CONCRETE, (ACI #315) LATEST EDITIONS.

3. BARS SCHEDULED OR DETAILED "CONT" SHALL BE SPLICED AT POINTS OF MINIMUM STRESS AND WITH A MINIMUM LAP AS FOLLOWS:
    A. HORIZONTAL BARS w/ MORE THAN 12" OF CONCRETE COVER
        #6 BARS AND SMALLER - 46 BAR DIAMETERS
        #7 BARS AND BIGGER - 57 BAR DIAMETERS
    B. OTHER BARS
        #6 BARS AND SMALLER - 36 BAR DIAMETERS
        #7 BARS AND BIGGER - 44 BAR DIAMETERS

4. CORNER REINFORCING BARS SHALL BE USED AT ALL CORNERS AND INTERSECTIONS.

5. EXTEND THE SLAB REINFORCING STEEL PERPENDICULAR TO EXTERIOR GRADE BEAM TO THE TOP OUT SIDE REINFORCING BAR OF BEAM.

6. SPACE REINFORCING BARS WITH MINIMUM CLEAR SPACING IN ACCORDANCE WITH ACI 318 OF ONE BAR DIAMETER, BUT NOT LESS THAN 1 INCH. FOR COMPRESSION MEMBERS, SPACE AT A MINIMUM OF 1.5 INCHES OR 1.5 BAR DIAMETERS, WHICHEVER IS GREATER.

7. WHERE REINFORCING BARS ARE PLACED IN MULTIPLE LAYERS, PLACE UPPER BARS DIRECTLY ABOVE LOWER BARS.

8. MAINTAIN CONCRETE COVER AROUND REINFORCEMENT IN ACCORDANCE WITH ACI 318 AND AS FOLLOWS:
    A. FOOTING AND CONCRETE CAST AGAINST EARTH - 3 INCHES
    B. EXPOSED TO EARTH OR WEATHER
        #6 BARS AND BIGGER - 2 INCHES
        #5 BARS AND SMALLER - 1.5 INCHES
    C. BEAMS AND COLUMNS - 1.5 INCHES
    D. SLABS AND WALLS - 1 INCH

9. REPAIR ANY DAMAGE TO VAPOR RETARDER PER MANUFACTURER SPECIFICATIONS.

STRUCTURAL STEEL

1. STRUCTURAL STEEL SHALL BE DETAILED, FABRICATED, AND ERECTED IN ACCORDANCE TO AISC SPECIFICATIONS.

2. MATERIALS USED SHALL BE AS FOLLOWS=
    A. STRUCTURAL W-SHAPES - ASTM A992 GRADE 50
    B. STRUCTURAL M-SHAPES AND S-SHAPES - ASTM A36
    C. STRUCTURAL T-SHAPES - CUT FROM W-SHAPES
    D. CHANNELS AND ANGLES - ASTM A36
    E. ROUND HOLLOW STRUCTURAL SECTIONS - ASTM A500 GRADE B
    F. SQUARE AND RECTANGULAR HOLLOW STRUCTURAL SECTIONS - ASTM A500 GRADE B
    G. STRUCTURAL PLATES - ASTM A36
    H. STRUCTURAL BARS - ASTM A36
    I. HIGH STRENGTH BOLTS - ASTM A325
    J. ELECTRODES - SERIES E70

3. ALL WELDING SHALL BE DONE BY CERTIFIED WELDERS IN ACCORDANCE WITH THE LATEST EDITION OF THE AMERICAN WELDING SOCIETY SPECIFICATIONS.

4. CONNECTIONS NOT DETAILED AND OR SCHEDULED ON STRUCTURAL DRAWINGS SHALL BE DETAILED BY FABRICATOR AND MARKED FOR ENGINEERS APPROVAL. CONNECTIONS TO BE DESIGNED TO AISC SPECIFICATIONS AND SHALL BE CAPABLE OF SUPPORTING 55% OF THE MAXIMUM UNIFORM LOAD CAPACITY FOR THE SPAN SPECIFIED, SHOWN IN THE TABLES OF UNIFORM CONSTANTS OF THE AISC MANUAL OF STEEL CONSTRUCTION.

5. REFER TO ARCHITECTURAL PLANS FOR ANY MISCELLANEOUS STEEL. MISCELLANEOUS STEEL AND CONNECTIONS SHALL BE DESIGNED BY STEEL FABRICATOR.

6. HOT DIP GALVANIZE, IN ACCORDANCE WITH ASTM A123 AND ASTM A153, STRUCTURAL STEEL AND FASTENERS PERMANENTLY EXPOSED TO THE WEATHER.

7. STEEL SUPPORTING OR CONNECTED TO HVAC AND OTHER EQUIPMENT AS SHOWN ON THE DRAWINGS IS SHOWN FOR BIDDING PURPOSES ONLY CONTRACTOR SHALL COORDINATE EXACT LOCATION AND SIZE BEFORE COMMENCING WORK.

8. STRUCTURAL STEEL SHALL BE PAINTED WITH ONE COAT OF RUST INHIBITIVE PAINT.

9. STRUCTURAL DRAWINGS SHALL NOT BE REPRODUCED IN WHOLE OR IN PART FOR SHOP DRAWING SUBMITTALS.

10. ALL WELDED CONNECTION SHALL BE MADE WITH A 1/4" FILLET WELD U.N.O.

11. PROVIDE 1/2" GAP AT ANY PENETRATIONS THROUGH CMU WALL AND INFILL WITH ELASTOMERIC MATERIAL.

12. STEEL FABRICATOR SHALL BE CERTIFIED BY ONE OF THE FOLLOWING: AISC/ IBC/ IAS-ICC

METAL ROOF DECK

1. SHEET STEEL: ASTM A653 GRADE 33 STRUCTURAL QUALITY WITH G90 GALVANIZED COATING CONFORMING TO ASTM A525

2. DECK PROFILE - F
    PROFILE DEPTH - 1.5 IN.
    GAGE - 22

3. METAL DECK ATTACHMENT SHALL BE:
    AT SUPPORTS: #12 TEK SCREWS AT A 36/7 PATTERN
    AT SIDELAPS: #10 TEK SCREWS, 7 PER SPAN

4. WELDING OF METAL DECKING SHALL NOT BE ALLOWED

5. ALL METAL DECK PANELS SHALL SPAN ACROSS A MINIMUM OF FOUR JOISTS OR BEAMS

6. DECK ENDS SHALL BE LAPPED OVER SUPPORTS

CONTRACTOR NOTE

THE STRUCTURAL SYSTEM FOR THIS PROJECT SHALL NOT BE CONSTRUCTED BY USING THE STRUCTURAL DRAWINGS ALONE. THESE DRAWINGS WERE DEVELOPED FROM DATA DERIVED PRIMARILY FROM THE ARCHITECTURAL DRAWINGS AND SECONDARILY FROM MEP, CIVIL AND OTHER DISCIPLINES' DOCUMENTS. IT IS INTENDED THAT CONSTRUCTION PROCEED BY UTILIZING ALL OF THE INFORMATION CONTAINED IN THE ENTIRE SET OF CONSTRUCTION DOCUMENTS TAKEN AS A WHOLE; FAILURE TO DO SO WILL RESULT IN ERRORS WHICH SHALL BE CORRECTED AT THE CONTRACTOR'S EXPENSE.

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CHANIN
ENGINEERING LLC
4040 Nolana, Suite N2
McAllen, Texas 78504
PH: (956) 687-4418 FAX: (956) 687-3211
www.chanlengineering.com
TBPE FIRM REG. NUMBER F-9369

SEAL:



PROJECT:
HIDALGO COUNTY
ADULT DETENTION CENTER and LAW ENFORCEMENT FACILITY REPAIRS and/or REPLACEMENT
Edinburg, Texas

JOB NO. 13159
DATE: 11/15/13
DRAWN BY: LR
CHECKED BY:MC
REVISION:

DRAWING NO:
S2.0

GENERAL NOTES

TABLE 1704.3
REQUIRED VERIFICATION AND INSPECTION OF STEEL CONSTRUCTION

VERIFICATION AND INSPECTION	CONTINUOUS	PERIODIC	REFERENCED STANDARD[a]	IBC REFERENCE
1. MATERIAL VERIFICATION OF HIGH-STRENGTH BOLTS, NUTS AND WASHERS:				
a. IDENTIFICATION MARKINGS TO CONFORM TO ASTM STANDARDS SPECIFIED IN THE APPROVED CONSTRUCTION DOCUMENTS.	——	X	APPLICABLE ASTM MATERIAL SPECIFICATIONS; AISC 360, SECTION A3.3	——
b. MANUFACTURER'S CERTIFICATE OF COMPLIANCE REQUIRED.	——	X	——	——
2. INSPECTION OF HIGH-STRENGTH BOLTING:				
a. BEARING-TYPE CONNECTIONS.	——	X	AISC 360, SECTION M2.5	1704.3.3
b. SLIP-CRITICAL CONNECTIONS.	X	X		
3. MATERIAL VERIFICATION OF STRUCTURAL STEEL:				
a. IDENTIFICATION MARKINGS TO CONFORM TO ASTM STANDARDS SPECIFIED IN THE APPROVED CONSTRUCTION DOCUMENTS.	——	——	ASTM A 6 OR ASTM A 568	1708.4
b. MANUFACTURERS' CERTIFIED MILL TEST REPORTS.	——	——	ASTM A 6 OR ASTM A568	
4. MATERIAL VERIFICATION OF WELD FILLER MATERIALS:				
a. IDENTIFICATION MARKINGS TO CONFORM TO AWS SPECIFICATION IN THE APPROVED CONSTRUCTION DOCUMENTS.	——	——	AISC 360, SECTION A3.5	——
b. MANUFACTURER'S CERTIFICATE OF COMPLIANCE REQUIRED.	——	——	——	——
5. INSPECTION OF WELDING: a. STRUCTURAL STEEL:	——	——		
1) COMPLETE AND PARTIAL PENETRATION GROOVE WELDS.	X	——	AWS D1.1	1704.3.1
2) MULTIPASS FILLET WELDS.	X	——		
3) SINGLE-PASS FILLET WELDS > 5/16"	X	——		
4) SINGLE-PASS FILLET WELDS ≤ 5/16"	——	X		
5) FLOOR AND ROOF DECK WELDS.	——	X	AWS D1.3	——
b. REINFORCING STEEL:	——	——	AWS D1.4 ACI 318: 3.5.2	——
1) VERIFICATION OF WELDABILITY OF REINFORCING STEEL OTHER THAN ASTM A 706.	——	X		
2) REINFORCING STEEL-RESISTING FLEXURAL AND AXIAL FORCES IN INTERMEDIATE AND SPECIAL MOMENT FRAMES, AND BOUNDARY ELEMENTS OF SPECIAL REINFORCED CONCRETE SHEAR WALLS AND SHEAR REINFORCEMENT.	X	——		
3) SHEAR REINFORCEMENT.	X	——		
4) OTHER REINFORCING STEEL.	——	X		
6. INSPECTION OF STEEL FRAME JOINT DETAILS FOR COMPLIANCE WITH APPROVED CONSTRUCTION DOCUMENTS: a. DETAILS SUCH AS BRACING AND STIFFENING. b. MEMBER LOCATIONS. c. APPLICATION OF JOINT DETAILS AT EACH CONNECTION.	—— —— ——	X —— ——	——	1704.3.2

TABLE 1704.4
REQUIRED VERIFICATION AND INSPECTION OF CONCRETE CONSTRUCTION

VERIFICATION AND INSPECTION	CONTINUOUS	PERIODIC	REFERENCED STANDARD[a]	IBC REFERENCE
1. INSPECTION OF REINFORCING STEEL, INCLUDING PRESTRESSING TENDONS, AND PLACEMENT.	——	X	ACI 318: 3.5, 7.1-7.7	1913.4
2. INSPECTION OF REINFORCING STEEL WELDING IN ACCORDANCE WITH TABLE 1704.3, ITEM 5b.	——	——	AWS D1.4 ACI 318: 3.5.2	——
3. INSPECT BOLTS TO BE INSTALLED IN CONCRETE PRIOR TO AND DURING PLACEMENT OF CONCRETE WHERE ALLOWABLE LOADS HAVE BEEN INCREASED.	X	——	——	1911.5
4. VERIFYING USE OF REQUIRED DESIGN MIX.	——	X	ACI 318: Ch. 4, 5.2-5.4	1904.2.2, 1913.2, 1913.3
5. AT THE TIME FRESH CONCRETE IS SAMPLED TO FABRICATE SPECIMENS FOR STRENGTH TESTS, PERFORM SLUMP AND AIR CONTENT TESTS, AND DETERMINE THE TEMPERATURE OF THE CONCRETE.	X	——	ASTM C 172 ASTM C 31 ACI 318: 5.6, 5.8	1913.10
6. INSPECTION OF CONCRETE AND SHOTCRETE PLACEMENT FOR PROPER APPLICATION TECHNIQUES.	X	——	ACI 318: 5.9, 5.10	1913.6, 1913.7, 1913.8
7. INSPECTION FOR MAINTENANCE OF SPECIFIED CURING TEMPERATURE AND TECHNIQUES.	——	X	ACI 318: 5.11-5.13	1913.9
8. INSPECTION OF PRESTRESSED CONCRETE: a. APPLICATION OF PRESTRESSING FORCES. b. GROUTING OF BONDED PRESTRESSING TENDONS IN THE SEISMIC-FORCE-RESISTING SYSTEM.	X X	——	ACI 318: 18.20 ACI 318: 18.18.4	——
9. ERECTION OF PRECAST CONCRETE MEMBERS.	——	X	ACI 318: Ch.16	——
10. VERIFICATION OF IN-SITU CONCRETE STRENGTH, PRIOR TO STRESSING OF TENDONS IN POSTTENSIONED CONCRETE AND PRIOR TO REMOVAL OF SHORES AND FORMS FROM BEAMS AND STRUCTURAL SLABS.	——	X	ACI 318: 6.2	——
11. INSPECT FORMWORK FOR SHAPE, LOCATION AND DIMENSIONS OF THE CONCRETE MEMBER BEING FORMED.	——	X	ACI 318: 6.1.1	——

STRUCTURAL TESTS AND SPECIAL INSPECTION

1. THE OWNER SHALL EMPLOY A SPECIAL INSPECTOR TO PROVIDE INSPECTIONS DURING CONSTRUCTION ON THE TYPES OF WORK LISTED IN THIS SECTION.

2. THE FOLLOWING TERMS AND PHRASES SHALL HAVE THE MEANINGS SHOWN BELOW AS IT PERTAINS TO THIS SECTION,
   A. APPROVED AGENCY- AN ESTABLISHED AND RECOGNIZED AGENCY REGULARLY ENGAGED IN CONDUCTING AND FURNISHING SPECIAL INSPECTION SERVICES.
   B. APPROVED FABRICATOR - AN ESTABLISHED AND QUALIFIED FIRM APPROVED BY BUILDING OFFICIAL. SPECIAL INSPECTIONS ARE NOT REQUIRED WHEN WORK IS PERFORMED ON THE PREMISES OF AN APPROVED FABRICATOR.
   C. SPECIAL INSPECTION, CONTINUOUS- THE FULL TIME OBSERVATION OF WORK REQUIRING SPECIAL INSPECTION.
   D. SPECIAL INSPECTION, PERIODIC - THE PART TIME OR INTERMITTENT OBSERVATION OF WORK REQUIRING SPECIAL INSPECTION.

3. SPECIAL INSPECTORS SHALL KEEP RECORDS OF ALL INSPECTIONS AND SHALL FURNISH REPORTS TO THE BUILDING OFFICIAL AND TO THE REGISTERED DESIGN PROFESSIONAL IN RESPONSIBLE CHARGE. DISCREPANCIES SHALL BE BROUGHT TO THE IMMEDIATE ATTENTION OF THE CONTRACTOR FOR CORRECTION. IF THE DISCREPANCIES ARE NOT CORRECTED THEY SHALL BE BROUGHT TO THE ATTENTION OF THE REGISTERED DESIGN PROFESSIONAL IN RESPONSIBLE CHARGE.

4. THE FOLLOWING ITEMS REQUIRE SPECIAL INSPECTION.

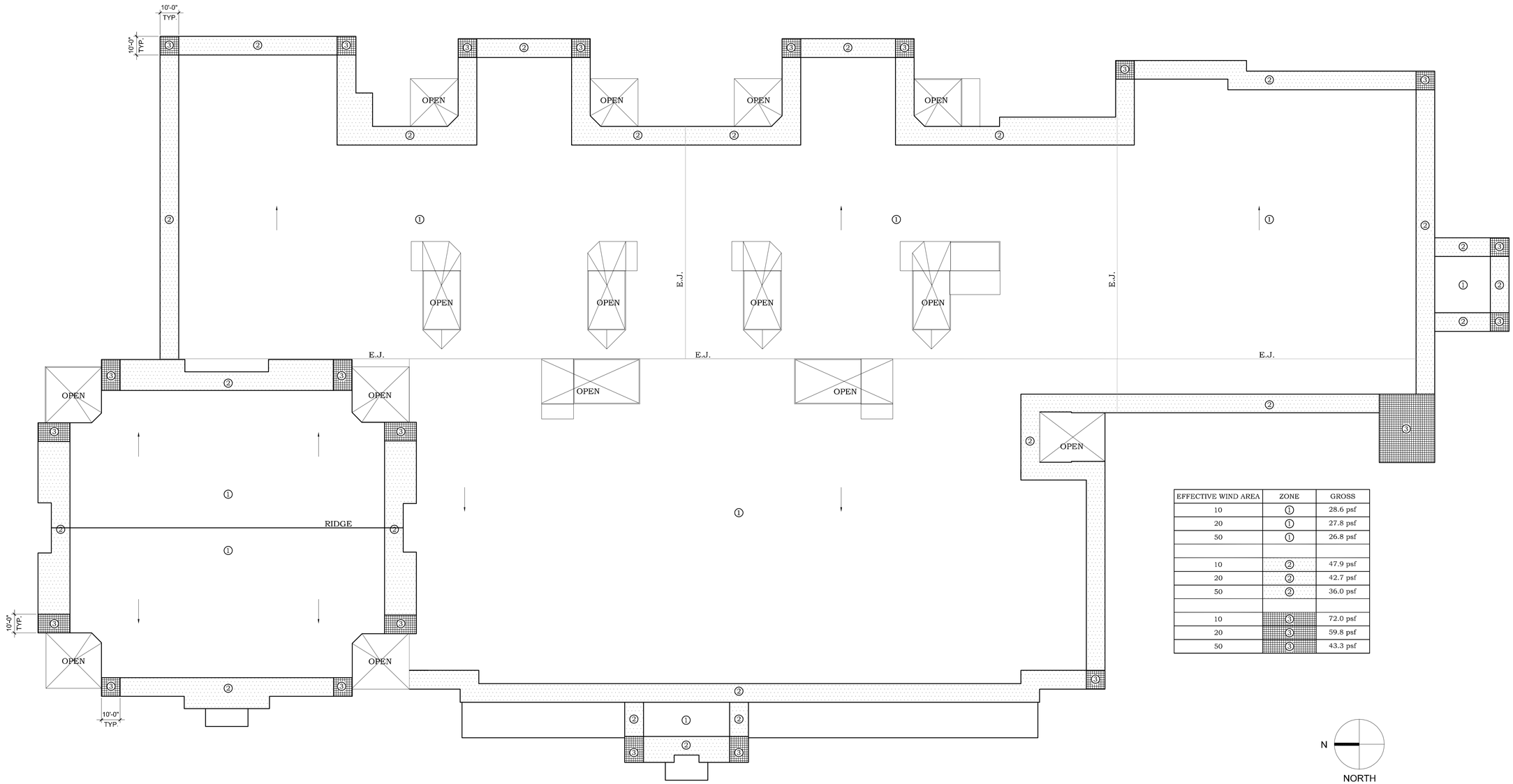
CHANIN
ENGINEERING LLC
4400 Nolana, Suite N2
McAllen, Texas 78504
PH: (956) 687-9421 FAX: (956) 687-3211
www.chaninengineering.com
TBPE FIRM REG. NUMBER F-9369

SEAL:
STATE OF TEXAS
MIGUEL CHANIN
93127
PROFESSIONAL LICENSED ENGINEER
11-15-13

PROJECT:
HIDALGO COUNTY
ADULT DETENTION CENTER and LAW ENFORCEMENT FACILITY REPAIRS and/or REPLACEMENT
Edinburg, Texas

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EFFECTIVE WIND AREA	ZONE	GROSS
10	①	28.6 psf
20	①	27.8 psf
50	①	26.8 psf
10	②	47.9 psf
20	②	42.7 psf
50	②	36.0 psf
10	③	72.0 psf
20	③	59.8 psf
50	③	43.3 psf

NOTE:
SEE ARCHITECTURAL ROOFING SHEETS FOR FASTENER PATTERN REQUIRED TO RESIST UPLIFT LOADS SHOWN

ADULT DETENTION CENTER ROOF UPLIFT PLAN

SCALE: NTS

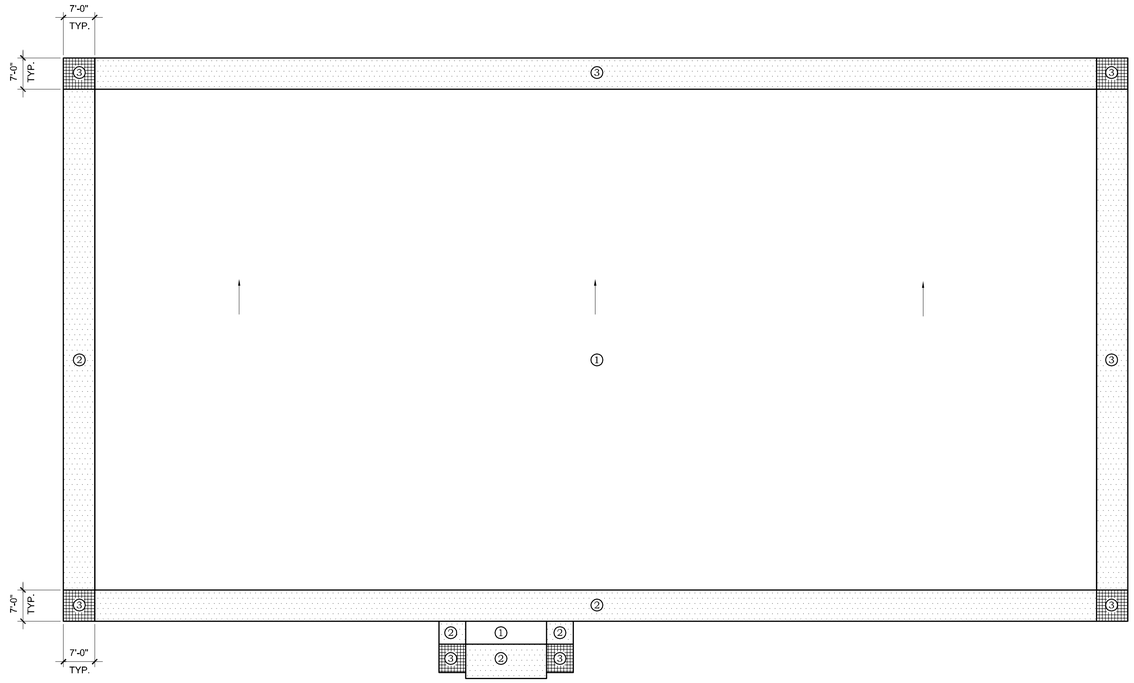
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ENGINEERING LLC
4400 Nolana, Suite N2
McAllen, Texas 78504
PH: (956) 687-9421 FAX: (956) 687-3211
www.chaninengineering.com
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93127
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EFFECTIVE WIND AREA	ZONE	GROSS
10	①	28.6 psf
20	①	27.8 psf
50	①	26.8 psf
10	②	47.9 psf
20	②	42.7 psf
50	②	36.0 psf
10	③	72.0 psf
20	③	59.8 psf
50	③	43.3 psf

N

NORTH

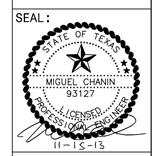
NOTE:
SEE ARCHITECTURAL ROOFING SHEETS FOR FASTENER PATTERN REQUIRED TO RESIST UPLIFT LOADS SHOWN.

LAW ENFORCEMENT CENTER ROOF UPLIFT PLAN

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CHANIN
ENGINEERING LLC
4400 Nolana, Ste. M2
McAllen, Texas 78504
PH: (956) 687-4421 FAX: (956) 687-3211
www.chaninengineering.com
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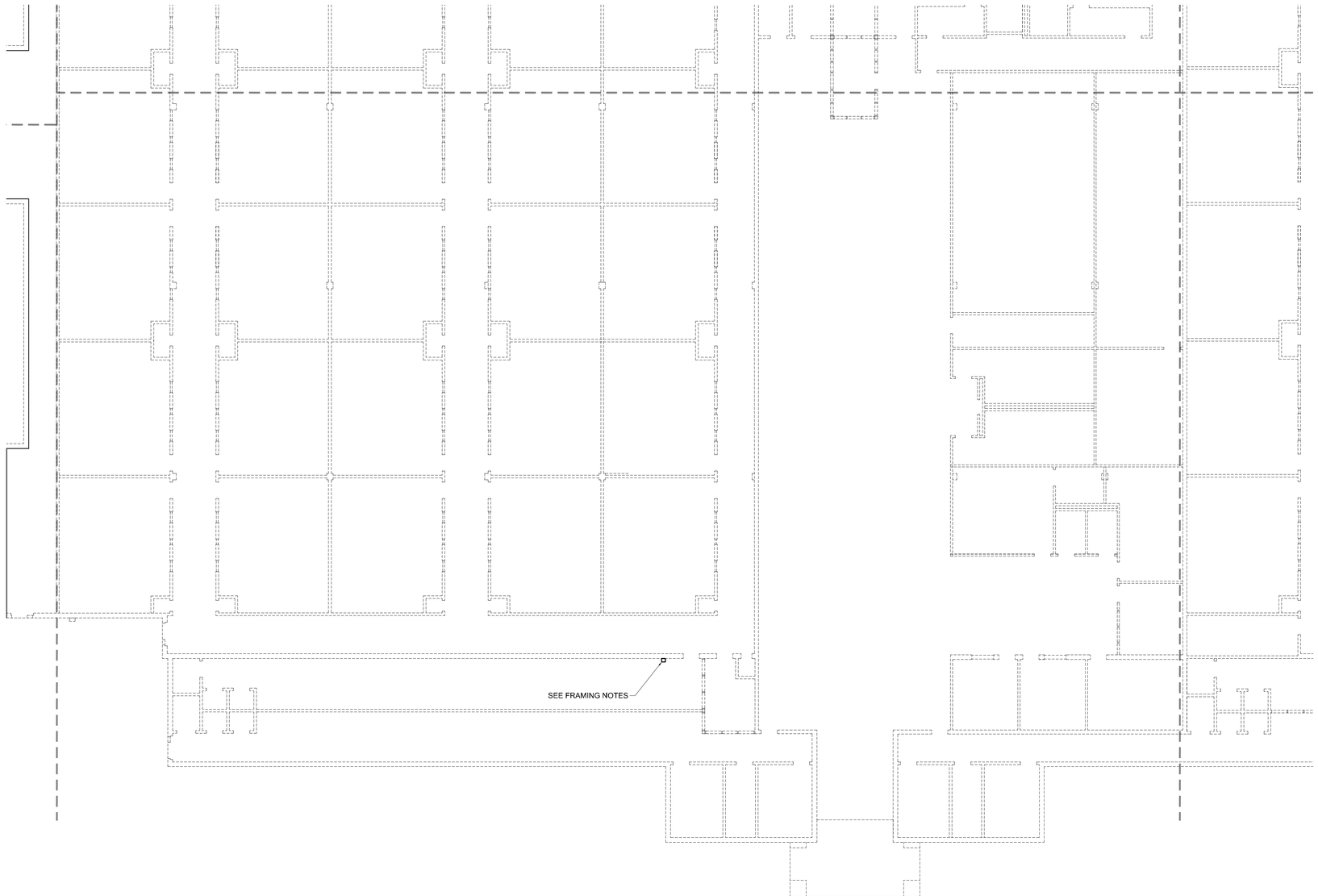
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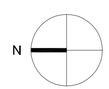


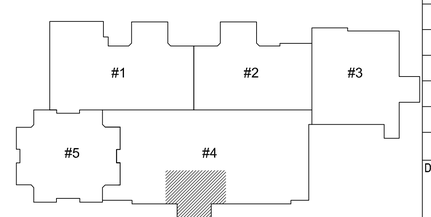
ADULT DETENTION CENTER PARTIAL FLOOR PLAN

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

FRAMING NOTES:

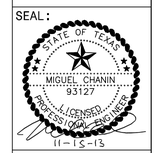
1. CONTRACTOR TO CREATE 2'-0" x 2'-0" OPENING IN (E) CEILING FOR STRUCTURAL ENGINEERING OBSERVATION OF EXISTING TILT-UP WALL CONNECTION. A 3'-6" x 3'-6" x 3'-0" CONCRETE FOOTING w/ #5 AT 12" O.C. T.B. E.W., TO BE ADDED BASED ON OBSERVATION OF EXISTING TILT-UP WALL CONDITION.
2. HSS 6x6x1/4 COLUMN TO BE ADDED BASED ON EXISTING CONDITIONS AND STRUCTURAL ENGINEERING RECOMMENDATIONS.
3. CONTRACTOR TO REPAIR/REFINISH AREAS DISTURBED BY WORK AND LEAVE IN SAME CONDITION AS PRIOR TO CONSTRUCTION.
4. TIMING OF WORK IN THIS AREA SHALL BE COORDINATED w/ ADC ADMINISTRATION.
5. PROVIDE $25,000 ALLOWANCE FOR WORK IN THIS AREA.





CHANIN
ENGINEERING LLC
1400 Nolana, Suite M2
McAllen, Texas 78504
PH: (956) 687-9401 FAX: (956) 687-3211
www.chanlineering.com
TBPE FIRM REG. NUMBER F-9369

SEAL:



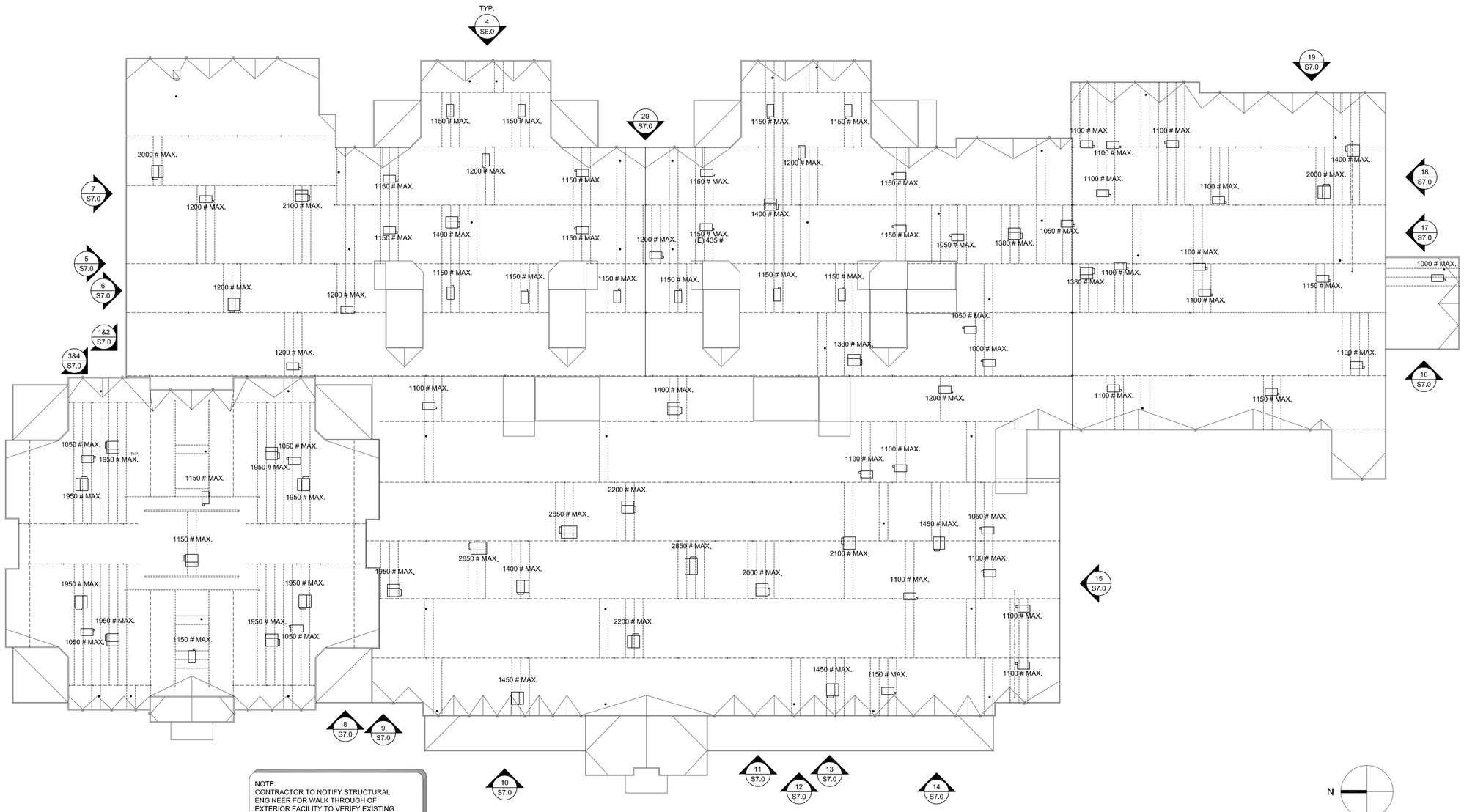
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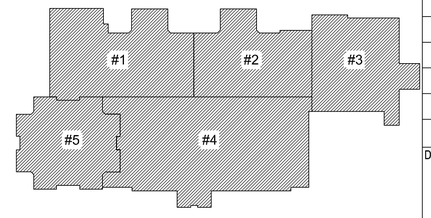
S4.0



NOTE:
CONTRACTOR TO NOTIFY STRUCTURAL ENGINEER FOR WALK THROUGH OF EXTERIOR FACILITY TO VERIFY EXISTING CONDITION OF PANELS. PANEL REPAIR DETAIL WILL APPLY AT LOCATIONS SPECIFIED BY STRUCTURAL ENGINEER. PROVIDE $5,000 ALLOWANCE FOR SPECIFIED WORK. SEE DETAIL 6/S6.0 FOR ADDITIONAL INFORMATION.

ADULT DETENTION CENTER OVERALL ROOF PLAN

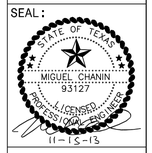
SCALE: 1"= 30'-0"



N
NORTH

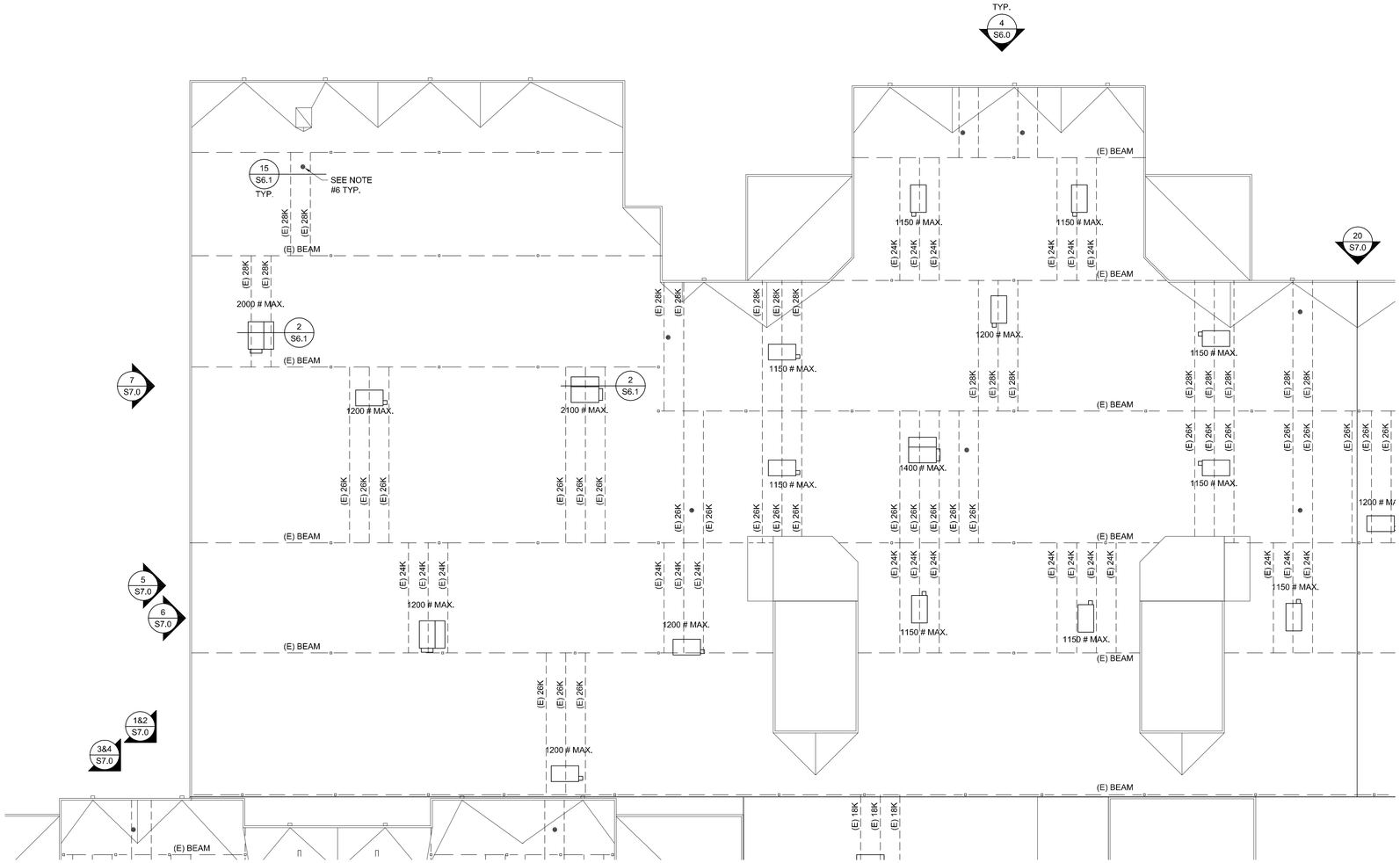
CHANIN
ENGINEERING LLC
4400 Nolana, Suite N2
McAllen, Texas 78504
PH: (956) 687-9421 FAX: (956) 687-3211
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SEAL:



PROJECT:
HIDALGO COUNTY
ADULT DETENTION CENTER and LAW ENFORCEMENT
FACILITY REPAIRS and/or REPLACEMENT
Edinburg, Texas

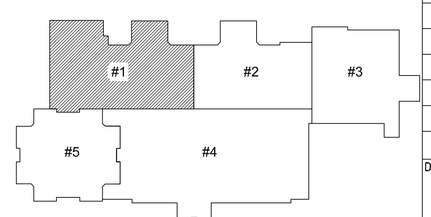
JOB NO. 13159
DATE: 11/15/13
DRAWN BY: LR
CHECKED BY:MC
REVISION:
DRAWING NO:
S5.0



NOTES:

1. MECHANICAL LOADING INDICATED ON PLANS ARE THE MAXIMUM ALLOWABLE LOADING FOR EXISTING STRUCTURAL CONDITIONS.
2. CONTRACTOR TO FIELD VERIFY EXACT LOCATIONS OF ALL RTU'S
3. REFER TO ARCHITECTURAL DRAWINGS FOR ANY ADDITIONAL DIMENSIONS.
4. EXACT JOIST LOCATIONS ARE NOT SHOWN IN PLANS. EXACT JOIST LOCATIONS ARE TO BE FIELD VERIFED.
5. ▨ INDICATES AREA THAT SHALL NOT BE USED AS STAGING AREA.
6. ROOF CONDENSATE DRAIN. REFER TO 15/S6.1 FOR ADDITIONAL INFORMATION. VERIFY ANY/ALL LOCATIONS WITH MEP AND ROOFING DRAWINGS.
7. (E) _ _ K JOIST SHOWN ARE THE AFFECTED JOIST, REFER TO DETAILS 2&4/S6.1 FOR ADDITIONAL INFORMATION.

N
NORTH



ADULT DETENTION CENTER PARTIAL ROOF PLAN

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

CHANIN
ENGINEERING LLC
4400 Nolana, Ste N2
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PH: (956) 687-9421 FAX: (956) 687-3211
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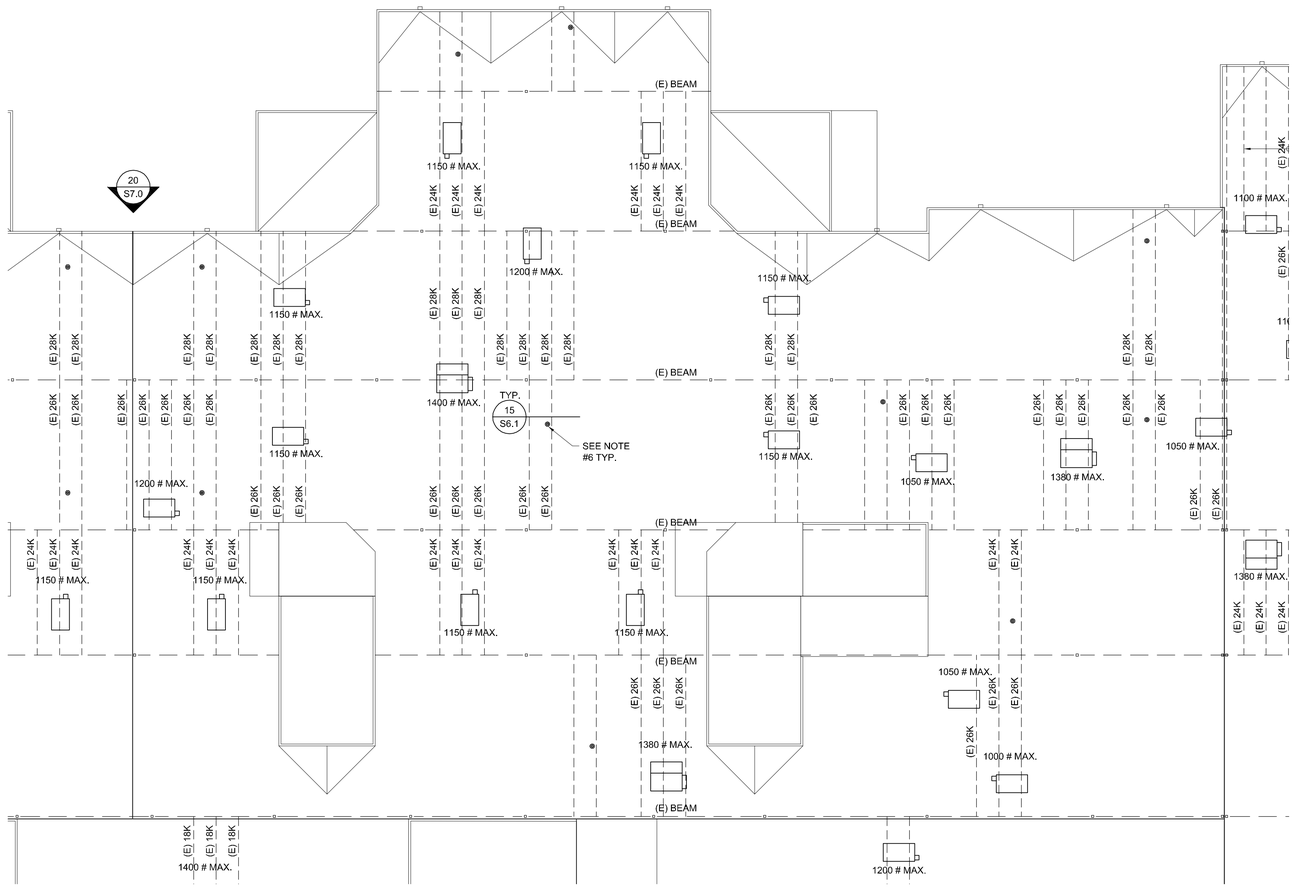
SEAL :

STATE OF TEXAS
MIGUEL CHANIN
93127
LICENSED
PROFESSIONAL ENGINEER
11-15-13

PROJECT:
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ADULT DETENTION CENTER and LAW ENFORCEMENT
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JOB NO. 13159
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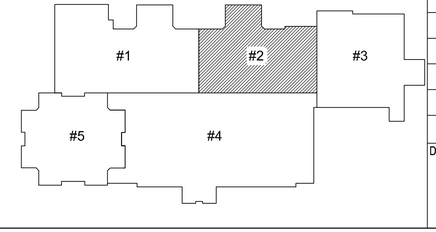
ADULT DETENTION CENTER PARTIAL ROOF PLAN

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

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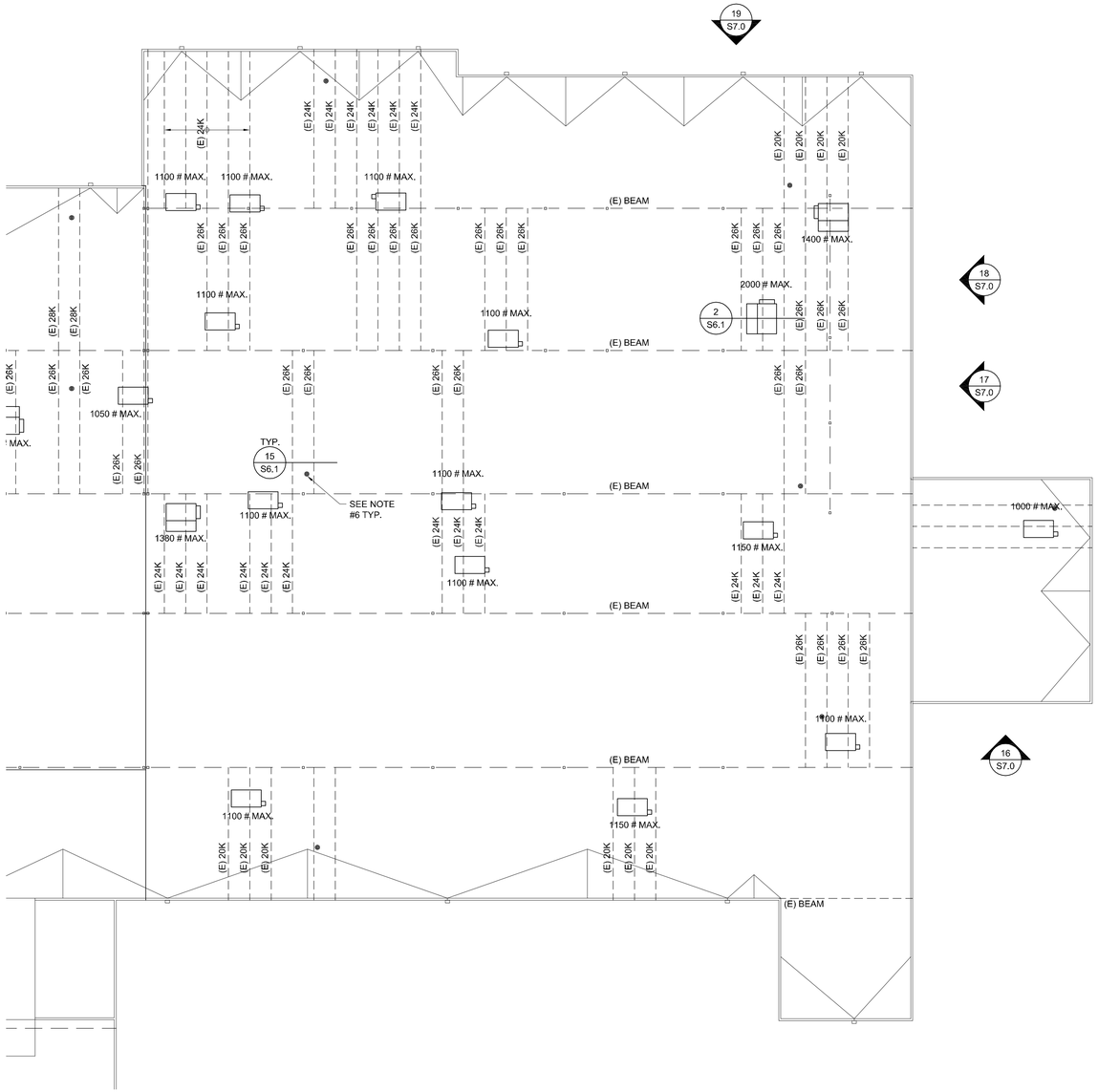
SEAL:

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PROFESSIONAL ENGINEER
11-15-13

PROJECT:
HIDALGO COUNTY
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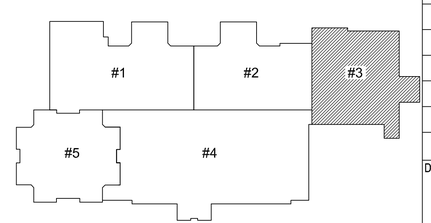
DRAWING NO:
S5.2



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ADULT DETENTION CENTER PARTIAL ROOF PLAN

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

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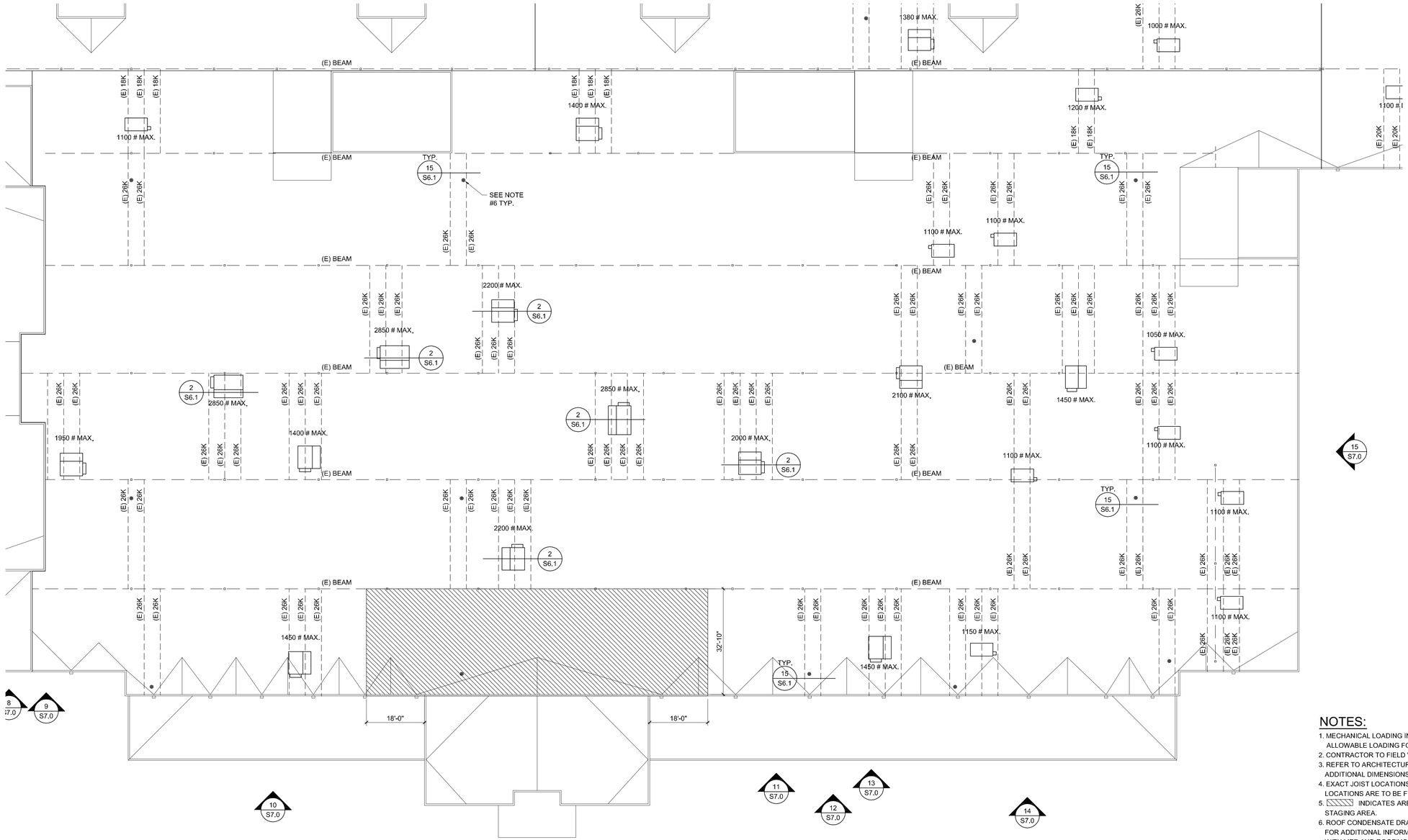
SEAL:

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11-15-13

PROJECT:
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ADULT DETENTION CENTER and LAW ENFORCEMENT FACILITY REPAIRS and/or REPLACEMENT
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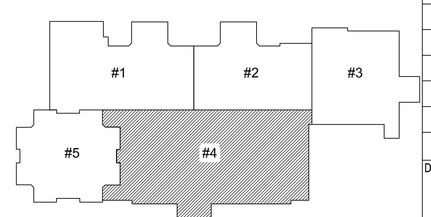
DRAWING NO:
S5.3



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N
NORTH



ADULT DETENTION CENTER PARTIAL ROOF PLAN

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

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4000 Nolana, Suite M2
McAllen, Texas 78504
PH: (956) 687-4421 FAX: (956) 687-3211
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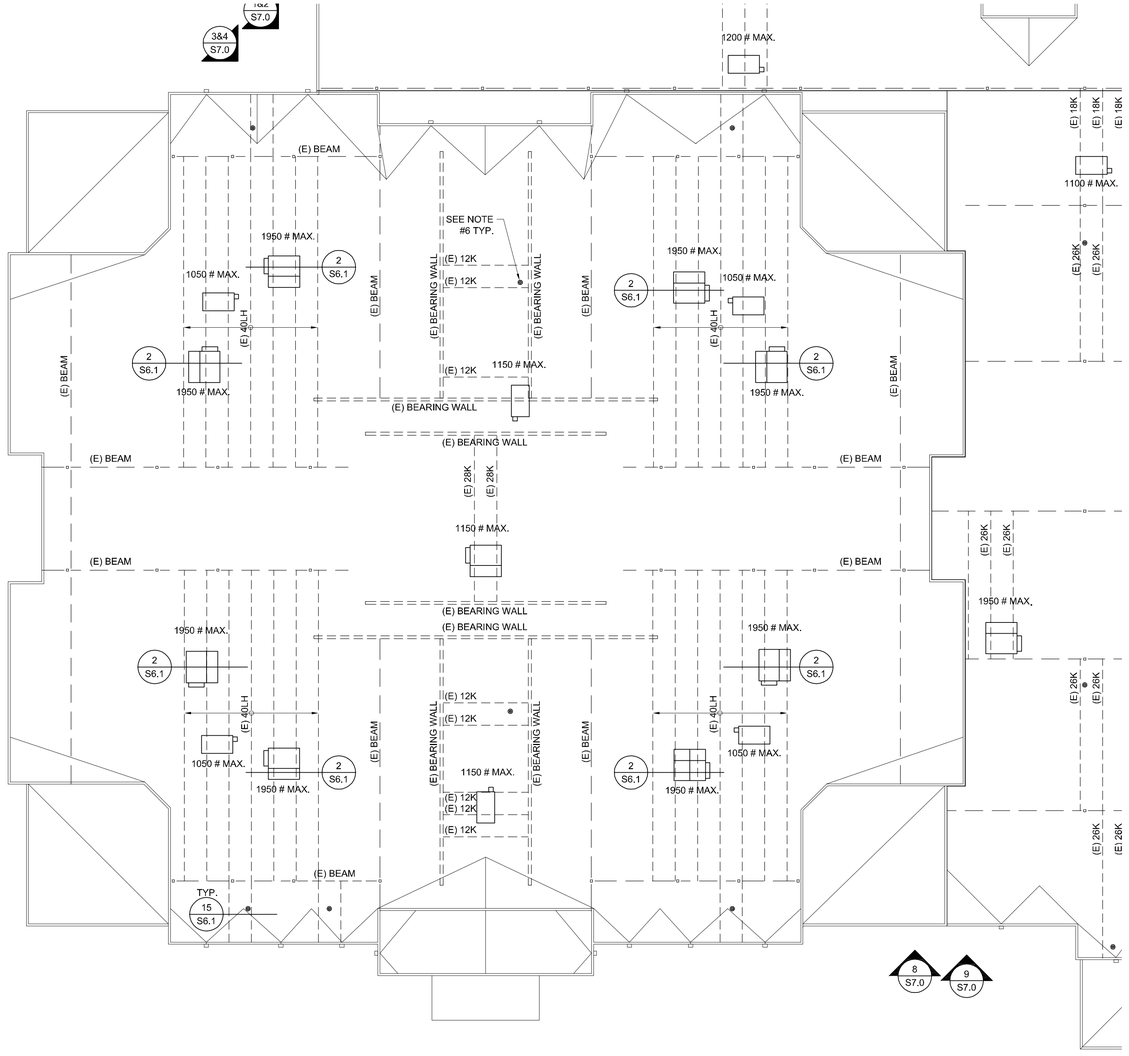
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PROFESSIONAL ENGINEER
11-15-13

PROJECT:
HIDALGO COUNTY
ADULT DETENTION CENTER and LAW ENFORCEMENT
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Edinburg, Texas

JOB NO. 13159
DATE: 11/15/13
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CHECKED BY:MC
REVISION:

DRAWING NO:
S5.4



ADULT DETENTION CENTER PARTIAL ROOF PLAN

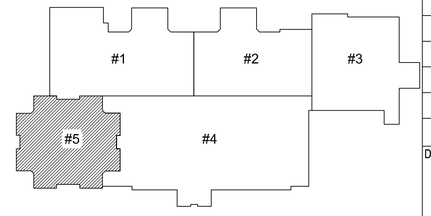
SCALE: 1/16" = 1'-0"

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SEAL:

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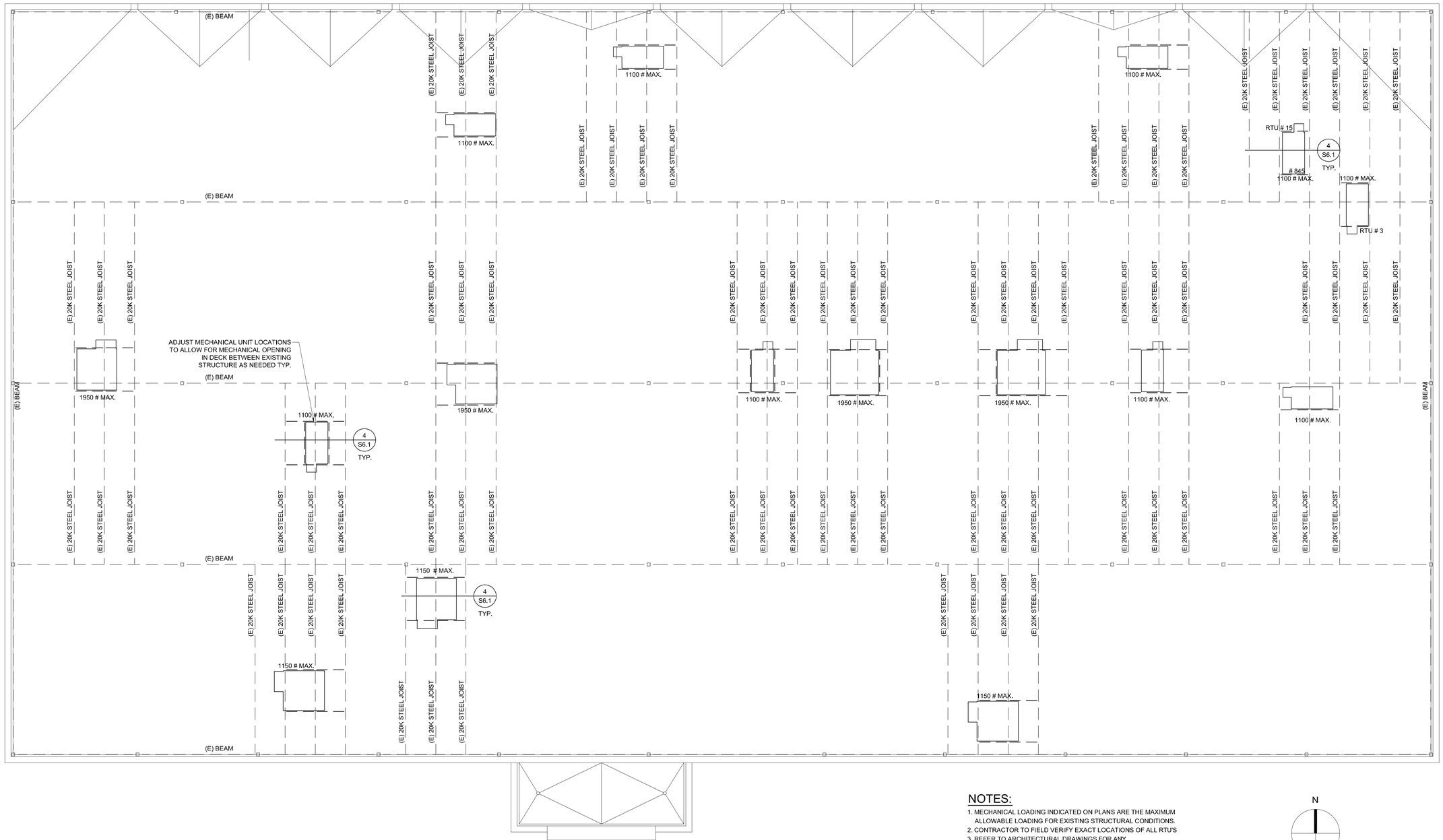
PROJECT:

HIDALGO COUNTY
ADULT DETENTION CENTER and LAW ENFORCEMENT FACILITY REPAIRS and/or REPLACEMENT
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S5.5



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N

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LAW ENFORCEMENT CENTER OVERALL ROOF PLAN

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

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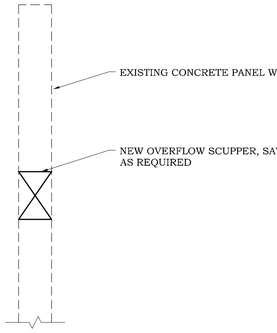
STATE OF TEXAS
MIGUEL CHANIN
93127
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PROFESSIONAL ENGINEER
11-15-13

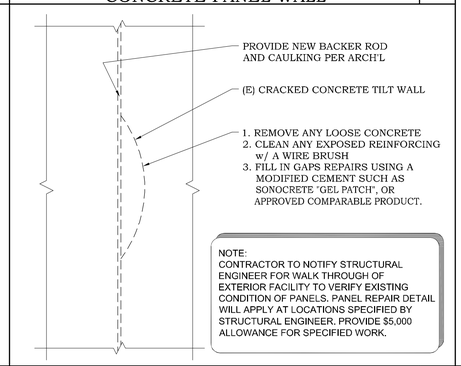
PROJECT:
HIDALGO COUNTY
ADULT DETENTION CENTER and LAW ENFORCEMENT
FACILITY REPAIRS and/or REPLACEMENT
Edinburg, Texas

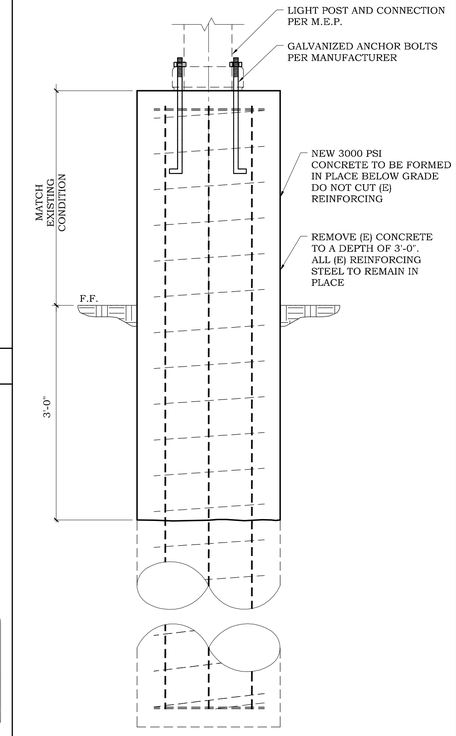
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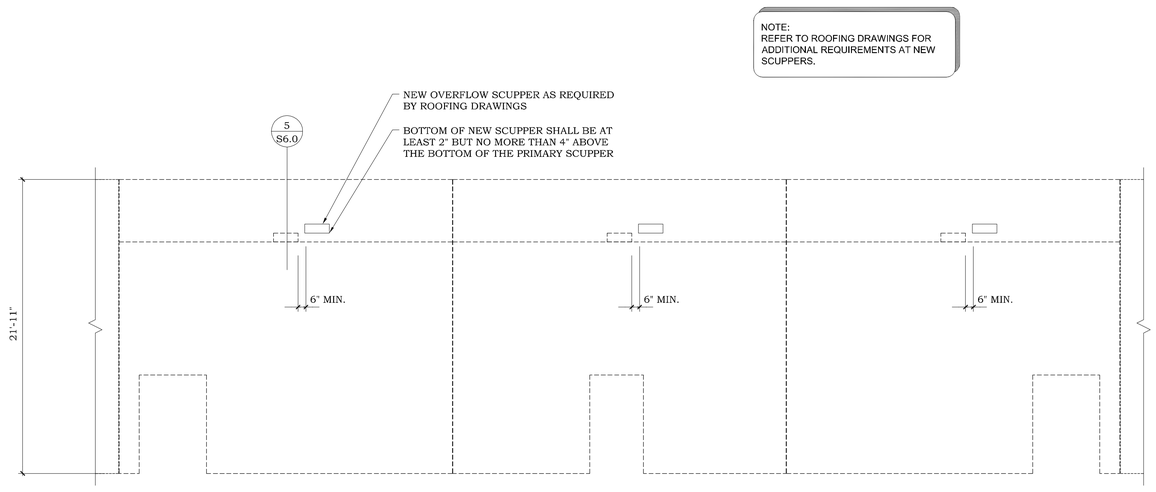
DRAWING NO:
S5.6

NOT USED	17	NOT USED	13	NOT USED	9	NEW SCUPPER TO EXISTING CONCRETE PANEL WALL	5	LIGHT POLE DETAIL	2
NOT USED	18	NOT USED	14	NOT USED	10	TILT-UP PANEL	6		
NOT USED	19	NOT USED	15						
NOT USED	20	NOT USED	16			NEW SCUPPER AT TILT-UP PANEL ELEVATION	4		



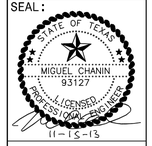






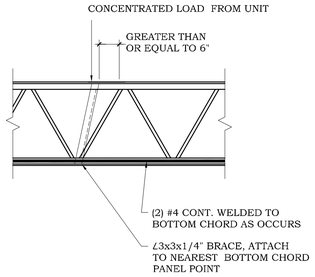
CHANIN
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4200 Nolana, Suite N2
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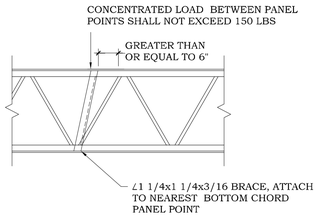


PROJECT:
HIDALGO COUNTY
ADULT DETENTION CENTER and LAW ENFORCEMENT FACILITY REPAIRS and/or REPLACEMENT
Edinburg, Texas

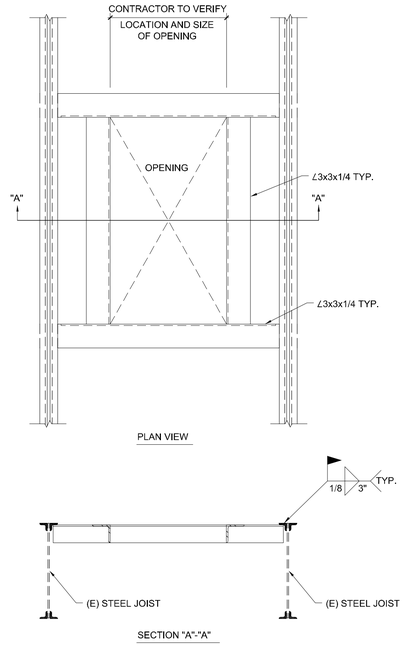
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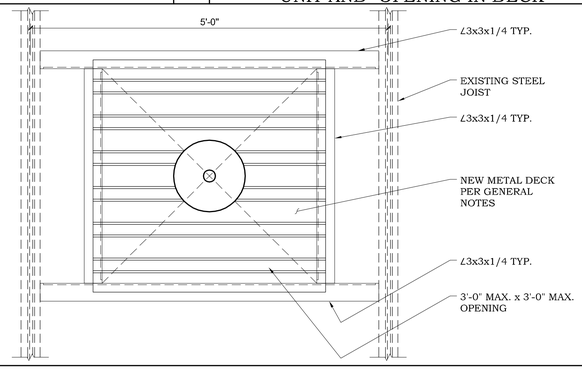
JOIST BRACING AT CONCENTRATED LOAD | 17



JOIST BRACING AT CONCENTRATED LOAD | 18



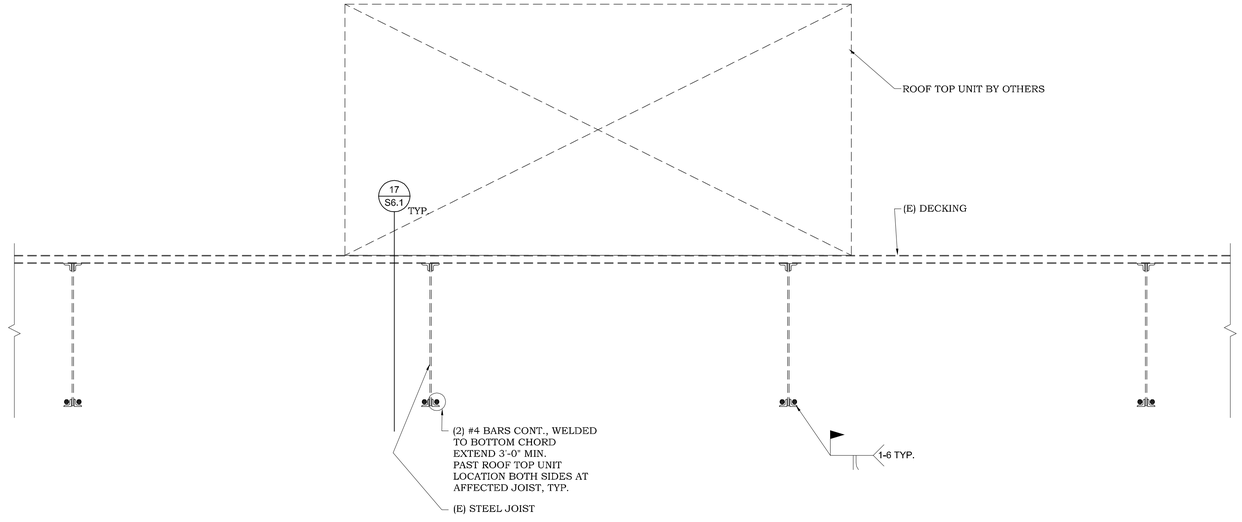
TYP. SUPPORT FOR MECHANICAL UNIT AND OPENING IN DECK | 14



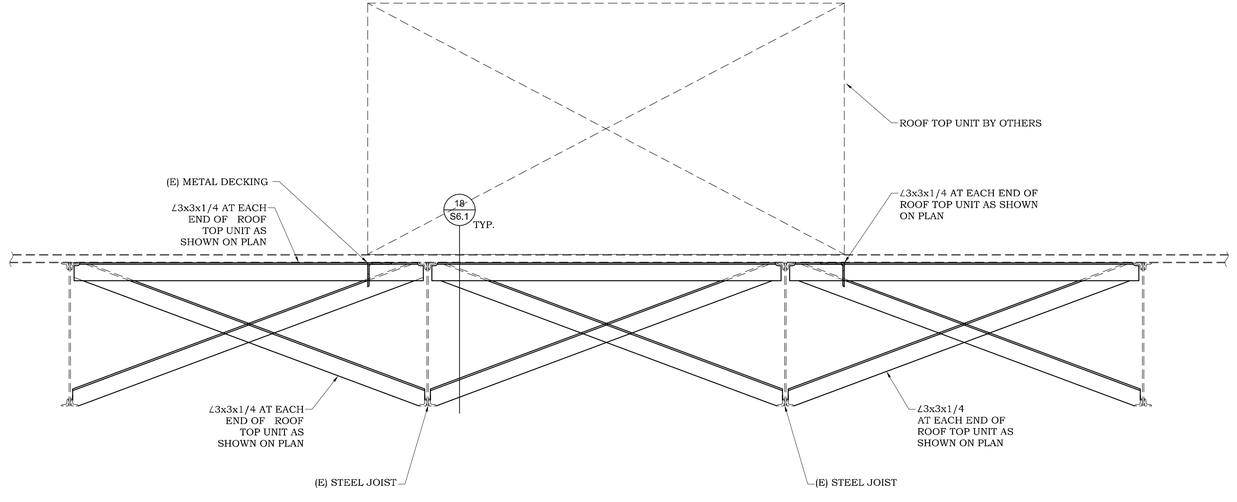
TYP. SUPPORT FOR CONDENSATE ROOF DRAIN AND OPENING IN DECK | 15

NOT USED | 20

NOT USED | 16



ADDITIONAL REINFORCING AT (E) STEEL JOIST | 2



SUPPORT FOR MECHANICAL UNIT | 4

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SEAL:

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11-15-13

PROJECT:
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DRAWING NO:
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PICTURE 17 | 17



PICTURE 13 | 13



PICTURE 9 | 9



PICTURE 5 | 5



PICTURE 1 | 1



PICTURE 18 | 18



PICTURE 14 | 14



PICTURE 10 | 10



PICTURE 6 | 6



PICTURE 2 | 2



PICTURE 19 | 19



PICTURE 15 | 15



PICTURE 11 | 11



PICTURE 7 | 7



PICTURE 3 | 3



PICTURE 20 | 20



PICTURE 16 | 16



PICTURE 12 | 12



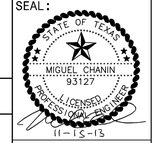
PICTURE 8 | 8



PICTURE 4 | 4

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JOB NO. 13159
DATE: 11/15/13
DRAWN BY: LR
CHECKED BY:MC
REVISION:

DRAWING NO:
S7.0

PROJECT DESCRIPTION

RE-ROOFING, HVAC RENOVATION, FIRE ALARM RENOVATION, WEATHER PROOFING, AND LIMITED INTERIOR REPAIRS FOR THE HIDALGO COUNTY SHERIFF'S OFFICE ADULT DETENTION CENTER AND LAW ENFORCEMENT CENTER, LOCATED IN EDINBURG, TEXAS. WORK WILL PRIMARILY OCCUR AT EXTERIOR OF BUILDINGS AND IS INTENDED TO ALLEVIATE CURRENT AIR AND MOISTURE PENETRATION PROBLEMS ASSOCIATED WITH THE FACILITY. BOTH FACILITIES SHALL REMAIN IN USE DURING CONSTRUCTION.

USE/OCCUPANCY CLASSIFICATIONS

ADULT DETENTION CENTER: INSTITUTIONAL GROUP I-3

LAW ENFORCEMENT CENTER: BUSINESS GROUP B

GENERAL NOTES

1. THE CONTRACTOR SHALL PROTECT AREA AND NEW OR EXISTING MATERIALS AND FINISHES FROM DAMAGE, WHICH MAY OCCUR FROM CONSTRUCTION, TRANSPORT, DUST, WATER, ETC. ANS SHALL PROVIDE AND MAINTAIN TEMPORARY BARRICADES, CLOSURE WALLS, ETC., AS REQUIRED, TO PROTECT THE PUBLIC/ADJACENT AREAS DURING THE PERIOD OF CONSTRUCTION.

2. DAMAGE TO NEW AND EXISTING MATERIALS, FINISHES, STRUCTURES AND EQUIPMENT SHALL BE REPAIRED OR REPLACED TO THE SATISFACTION OF THE OWNER, AT THE EXPENSE OF THE GENERAL CONTRACTOR.

3. MATERIALS SPECIFIED BY THEIR BRAND NAMES ARE TO ESTABLISH STANDARD OF QUALITY AND PERFORMANCE. ANY REQUEST FOR SUBSTITUTION SHALL BE SUBMITTED TO ARCHITECT FOR REVIEW FOR EQUAL QUALITY AND PERFORMANCE AND SHALL NOT BE PURCHASED OR INSTALLED WITHOUT HIS WRITTEN APPROVAL.

4. WORK LISTED, SHOWN OR IMPLIED ON ANY CONSTRUCTION DOCUMENTS SHALL BE SUPPLIED AND INSTALLED BY THE GENERAL CONTRACTOR, EXCEPT WHERE OTHERWISE NOTED. THE GENERAL CONTRACTOR SHALL CLOSELY COORDINATE HIS WORK WITH THAT OF OTHER CONTRACTORS OR VENDORS TO ASSURE THAT ALL SCHEDULES ARE MET AND THAT ALL WORK IS DONE IN CONFORMANCE TO MANUFACTURER'S REQUIREMENTS.

5. THE CONTRACTOR SHALL MAINTAIN A CURRENT AND COMPLETE SET OF CONSTRUCTION DOCUMENTS ON THE JOB SITE DURNING ALL PHASES OF CONSTRUCTION FOR USE OF ALL TRADES AND SHALL PROVIDE ALL SUBCONTRACTORS WITH CURRENT CONSTRUCTION DOCUMENTS AS REQUIRED.

6. THE CONTRACTOR SHALL REMOVE ALL RUBBISH AND WASTE MATERIALS ON A REGULAR BASIS AND SHALL EXERCISE STRICT CONTROL OVER JOB CLEANING TO PREVENT ANY DIRT, DEBRIS, OR DUST FROM AFFECTING, IN ANY WAY, FINISHED AREAS IN OR OUTSIDE JOBSITE. THE BUILDING REFUSE FACILITIES SHALL NOT BE USED FOR THIS PURPOSE.

7. CONTRACTOR SHALL COORDINATE ALL WORK WITH MECHANICAL, ELECTRICAL, PLUMBING, AND OTHER SUB-TRADES AND REPORT TO ARCHITECT ANY DISCREPANCIES FOR CORRECTION OR ADJUSTMENT. NO ALLOWANCE WILL BE MADE FOR INCREASED COST INCURRED DUE TO LACK OF PROPER COORDINATION.

8. THE CONTRACTOR, OR SUBCONTRACTORS, SHALL SECURE AND PAY FOR ALL PERMITS, GOVERNMENTAL FEES, AND LICENSES REQUIRED FOR PROPER COMPLETION OF THE WORK. THE CONTRACTOR SHALL REQUEST ALL INSPECTIONS REQUIRED BY LOCAL GOVERNMENTAL AGENCIES AND COORDINATE HIS WORK WITH SUCH.

9. THE GENERAL CONTRACTOR SHALL SUBMIT ONE (1) COPY OF ALL MANUFACTURER'S WARRANTIES AND OPERATIONS/MAINTENANCE INSTRUCTIONS TO THE OWNER.

10. FIELD VERIFY EXISTING CONDITIONS PRIOR TO STARTING THE WORK. SHOULD THE CONTRACTOR FIND, AFTER THE VISIT TO THE SITE OR DURING CONSTRUCTION, ANY DISCREPANCIES, OMMISSIONS, AMBIGUITIES, OR CONFLICTS IN OR AMONG THE DRAWINGS, OR BE IN DOUBT AS TO THEIR MEANING, HE/SHE SHOULD IMMEDIATELY NOTIFY THE ARCHITECT IN WRITING BEFORE PROCEEDING.

11. ALL WOOD BLOCKING TO BE FIRE TREATED.

12. GROUNDS/BLOCKING MAY NOT BE WHOLLY SHOWN ON DRAWINGS AND GOOD CONSTRUCTION PRACTICE SHALL GOVERN/DETERMINE SAID USE WHEN A QUESTION ARISES.

13. ALL LUMBER IN CONTACT WITH CONCRETE OR MASONRY LESS THAN 8 INCHES FROM THE GROUND SHALL BE PRESSURE TREATED OR REDWOOD.

14. ISOLATE DISSIMILAR METALS SO THEY ARE NOT IN CONTACT WITH EACH OTHER TO PREVENT/AVOID ELECTROLYTIC REACTION.

15. CONTRACTOR SHALL COMPLY WITH CURRENT APPLICABLE LOCAL ORDINANCES FOR UTILITY SERVICES.

16. CONTRACTOR IS RESPONSIBLE FOR LOCATING ALL EXISTING UNDERGROUND UTILITIES. WHERE ENCOUNTERED, CONTRACTOR SHALL MAKE ALL NECESSARY ARRANGEMENTS FOR SUPPORT, SHORE-UP, REROUTE OR UTILITY DISCONNECTIONS AS REQUIRED BY APPLICABLE LOCAL OR PRIVATE UTILITY COMPANIES.

17. THE CONTRACTOR SHALL VERIFY ALL ELECTRICAL AND PLUMBING ROUGH-IN LOCATIONS FOR ANY SPECIAL EQUIPMENT WITH THE SUPPLIER OF SUCH EQUIPMENT.

18. THE CONTRACTOR SHALL COORDINATE HIS WORK WITH THAT OF THEIR SEPARATE CONTRACTORS AT BUILDING PENETRATIONS SUCH AS WINDOWS, DOORS, VENTS, LOUVERS, ETC.

19. THE CONTRACTOR SHALL COORDINATE THE INSTALLATION AND REQUIRED CLEARANCES OF THE EQUIPMENT, NOT STRUCTURAL MEMBER SHALL BE OMITTED, NOTCHED OUT, BLOCKED OUT, OR RELOCATED WITHOUT PRIOR APPROVAL BY THE ARCHITECT OR ENGINEER.

20. ALL PRODUCTS AND MATERIALS SHALL BE INSTALLED IN ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS/SPECIFICATIONS UNLESS SPECIFIED OTHERWISE.

21. MATERIALS, EQUIPMENT, AND CRAFTSMANSHIP OF ALL TRADES SHALL CONFORM TO RECOGNIZED ASTM OF QUALITY APPROPRIATE TO GRADE OF SAID MATERIALS, EQUIPMENT, AND CRAFTSMANSHIP.

22. MATERIALS AND EQUIPMENT SHALL BE NEW, SOUND, OF HIGH QUALITY, AND SUITABLE FOR APPLICATIONS SPECIFIED.

23. MATERIALS SHALL BE POSITIONED IN AN ORDERLY MANNER AND SHALL BE ALIGNED WITH THE BUILDING STRUCTURE. VERTICAL MEMBERS/SURFACES SHALL BE PLUMB. HORIZONTAL MEMBERS/SURFACES SHALL BE LEVEL AND ALL SURFACES TRUE TO PLANES SPECIFIED. CRAFTSMANSHIP SHALL BE NEAT, CLEAN, AND TRUE TO LINE AND DIMENSION. FINISH MATERIALS SHALL BE FREE OF TOOL MARKS, FLAWS AND BLEMISHES, JOINERY AND CONNECTIONS SHALL BE ACCURATE, CLOSE/TIGHT FITTING AND WELL CRAFTED. TOLERANCES RECOGNIZED BY NATIONAL TRADE ASSOCIATIONS WILL BE THE MINIMUM ACCEPTABLE STANDARD FOR RESPECTIVE TRADE WORK.

24. CEILING PLANE SHALL BE LEVEL AND TRUE AND IN ALIGNMENT WITH ALL LIGHTING, SPRINKLER, HVAC, AND OTHER ELEMENTS INCORPORATED THEREIN.

GENERAL NOTES (CONT'D)

25. MECHANICAL, HVAC, AND PLUMBING ELEMENTS SHALL AT NO TIME COME IN CONTACT WITH CEILING CONSTRUCTION EXCEPT AS NECESSARY PENETRATIONS MAY REQUIRE.

26. MATERIALS, EQUIPMENT, AND/OR CONSTRUCTIVE SERVICES NOT INDICATED IN DRAWINGS OR SPECIFIED HEREIN, BUT REQUIRED FOR SUCCESSFUL AND EFFICIENT COMPLETION OF THE INSTALLATION SHALL BE CONSIDERED IMPLIED IN THE DOCUMENTS. CONTENTS AND SAID MATERIAL, EQUIPMENT, AND/OR CONSTRUCTIVE SERVICES SHALL BE FURNISHED AND INSTALLED AT NO ADDITIONAL COST TO THE OWNER.

27. WHERE REFERENCE IS MADE TO VARIOUS TEST STANDARDS FOR MATERIALS OR LEVEL OF CRAFTSMANSHIP, SUCH STANDARDS SHALL BE MAINTAINED PER THE LATEST ADDITION AND/OR ADDENDUM.

28. ANY OMISSIONS OR CONFLICTS WITHIN THE DRAWINGS, NOTES, OR DETAILS SHALL BE REPORTED TO THE ARCHITECT BEFORE PROCEEDING WITH WORK.

29. WHERE SPECIFIC INSTRUCTIONS REQUIRE THAT A PARTICULAR PRODUCT OR MATERIAL BE INSTALLED BY MANUFACTURER OR PER MANUFACTURER'S INSTRUCTIONS, IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO ENSURE THAT ANY SUBCONTRACTORS ARE APPROVED APPLICATORS AND THAT INSTALLERS FOLLOW THE MANUFACTURER'S INSTRUCTIONS.

30. DETAILS SHOWN SHALL BE INCORPORATED INTO CONSTRUCTION AT ALL APPROPRIATE LOCATIONS WHETHER SPECIFICALLY CALLED OUT/IDENTIFIED OR NOT.

31. TYPICAL DETAILS SHALL APPLY IN GENERAL CONSTRUCTION THROUGHOUT, UNLESS DETAILED OTHERWISE ON DRAWINGS.

32. SHOP DRAWINGS: CONTRACTOR SHALL FURNISH SHOP DRAWINGS FOR ALL SHOP FABRICATED ITEMS AND WHERE CUSTOMARILY REQUIRED. SUBMIT FOUR (4) SETS OF SHOP DRAWINGS FOR REVIEW. THE CONTRACTOR SHALL BE RESPONSIBLE FOR CHECKING THE SHOP DRAWINGS FOR ACCURACY, COORDINATION WITH OTHER TRADES, AND COMPLIANCE WITH THE CONTRACT DOCUMENTS BEFORE BEING SUBMITTED FOR APPROVAL. ARCHITECT'S OR ENGINEER'S APPROVAL OF SHOP DRAWINGS SHALL CONSTITUTE REVIEW AND APPROVAL OF THE GENERAL ARRANGEMENT OF COMPONENTS TO COMPLY WITH THE GENERAL INTENT OF THE CONSTRUCTION DOCUMENTS, EVEN IF SUCH ITEMS ARE NOT SHOWN ON THE SHOP DRAWINGS. THE CONTRACTOR SHALL CHECK ALL DIMENSIONS AND CONDITIONS TO INSURE A PROPER FIT UNDER FIELD CONDITIONS AND SHALL MAKE ADJUSTMENTS AS REQUIRED TO MAKE PARTS ALIGN. ALL REVISIONS TO SHOP DRAWINGS AFTER THE FIRST SUBMISSION MUST BE PROPERLY IDENTIFIED ON SUBSEQUENT SUBMISSIONS.

33. NO WORK IS TO COMMENCE UNTIL PLANS HAVE BEEN APPROVED BY THE DEPARTMENT OF BUILDINGS AND PERMIT TO BUILD HAS BEEN OBTAINED BY THE GENERAL CONTRACTOR.

34. PRIOR TO THE START OF CONSTRUCTION, THE GENERAL CONTRACTOR SHALL COORDINATE SCHEDULING OF MEETING WITH HIS PROJECT PERSONNEL, THE OWNER, CONSTRUCTION MANAGER, STRUCTURAL ENGINEER, MEP ENGINEER, ARCHITECT AND OTHERS FOR REVIEW OF PROJECT SCOPE, DESIGN, INTENT, CONSTRUCTION QUALITY EXPECTED, AND FINAL DISCUSSION OF DRAWINGS/DETAILS/QUESTIONS.

35. PERFORM ALL WORK IN ACCORDANCE WITH THE APPLICABLE CODES OF THE LOCAL JURISDICTION.

36. THE GENERAL CONTRACTOR AND ALL VENDORS/SUBCONTRACTORS ARE RESPONSIBLE FOR FIELD VERIFICATION OF ALL DIMENSIONS, QUANTITIES, ETC. OF THEIR RESPECTIVE WORK.

37. DO NOT SCALE DRAWINGS. WHERE DIMENSIONS BETWEEN SMALL SCALE AND DETAIL DRAWINGS DIFFER, DETAIL DIMENSIONS SHALL GOVERN. FIELD VERIFY ALL DIMENSIONS, NOTIFY ARCHITECT OF ANY DISCREPANCIES.

38. THE OWNER MAY PERMIT THE CONTRACTOR TO STORE SOME MATERIALS ON THE SITE IN AN AREA APPROVED BY THE OWNER – PROVIDED THAT THE CONTRACTOR ACCEPTS FULL RESPONSIBILITY FOR ANY AND ALL STORED MATERIALS.

39. GENERAL CONDITIONS OF THE CONTRACT FOR CONSTRUCTION, AIA DOCUMENT A-201, THE LATEST EDITION, SHALL BE MADE A PART OF THESE DRAWINGS.

40. THE GENERAL CONTRACTOR SHALL CARRY WORKMEN'S COMPENSATION AND LIABILITY INSURANCE TO COVER ALL CONSTRUCTION OPERATIONS TO BE PERFORMED.

41. DRAWINGS AND SPECIFICATIONS AS INSTRUMENTS OF SERVICE REMAIN THE PROPERTY OF ARCHITECT AND OTHER DESIGN PROFESSIONALS AND ARE PROTECTED UNDER COMMON LAW COPYRIGHT PROVISIONS. THEY ARE NOT TO BE REUSED EXCEPT BY WRITTEN AGREEMENT AND WITH THE AGREED COMPENSATION TO THE ARCHITECT AND OTHER DESIGN PROFESSIONALS. IF REUSED, WITHOUT PERMISSION, THE ARCHITECT AND OTHER DESIGN PROFESSIONALS SHALL BE INDEMNIFIED AND HELD HARMLESS FROM ALL LIABILITY, LEGAL EXPOSURE, CLAIMS, DAMAGES, LOSSES & EXPENSES. DRAWINGS SHALL NOT BE USED FOR ISSUANCE OF A BUILDING PERMIT UNLESS SIGNED AND SEALED BY THE ARCHITECT AND OTHER DESIGN PROFESSIONALS. DRAWINGS SHALL NOT BE USED FOR MULTIPLE OR PROTOTYPE DEVELOPMENT WITHOUT WRITTEN AUTHORIZATION FROM THE ARCHITECT AND OTHER DESIGN PROFESSIONALS.

42. THE GENERAL CONTRACTOR AND ALL SUB-CONTRACTORS SHALL GUARANTEE ALL WORK FOR A PERIOD OF ONE YEAR FROM DATE OF FINAL COMPLETION/RECEIPT OF FINAL PAYMENT. SHOULD DEFECTS DEVELOP WITHIN THE GUARANTEE PERIOD DUE TO FAULTS IN MATERIALS AND/OR LABOR, THE CONTRACTOR SHALL MAKE REPAIRS AND COMPLETE ALL NECESSARY WORKS AS SOON AS POSSIBLE. SPECIFIC MATERIAL AND/OR MATERIAL ASSEMBLIES SUPPLIED BY INDEPENDENT MANUFACTURERS SHALL BE GUARANTEED AS FOLLOWS: (1) IF MANUFACTURER'S / FABRICATOR'S GUARANTEES / WARRANTIES EXCEED THE ONE YEAR STIPULATED PERIOD OF GUARANTEE / WARRANTY, THE SUCH GUARANTEES / WARRANTIES SHALL BE BINDING FOR THE DURATION STIPULATED IN EXCESS OF THE ONE YEAR STIPULATED PERIOD. (2) IF MANUFACTURER'S / FABRICATOR'S GUARANTEES / WARRANTIES ARE LESS THAN THE ONE YEAR STIPULATED PERIOD OF GUARANTEE / WARRANTY, THEN THE CONTRACTOR AND ASSOCIATED SUB-CONTRACTORS SHALL ASSUME THE GUARANTEES / WARRANTIES FOR MATERILS AND MATERIAL ASSEMBLIES TO THE ONE YEAR STIPULATED PERIOD.

43. THE CONTRACTOR SHALL PERFORM ALL WORK IN STRICT ACCORDANCE WITH CONTRACT DOCUMENTS. THE CONTRACTOR WILL INFORM THE ARCHITECT OF ANY PROPOSED SUBSTITUTIONS IN WRITING AND WILL NOT PROCEED WITH THE PROPOSED SUBSTITUTIONS WITHOUT CONSENT FROM THE ARCHITECT.

CHANIN ENGINEERING LLC
400 Nolana, Suite 7
McAllen, Texas 78504
PH: (956) 687-9421 FAX: (956) 687-3211
www.chaninengineering.com
TBPE FIRM REG. NUMBER F-9369

SEAL:

REGISTERED ARCHITECT
SAMUEL RAYMOND GARCIA
#7333
STATE OF TEXAS

11-15-13

SAM GARCIA ARCHITECT
1325 E. Jasmine Ave.
McAllen, Texas 78501
PH: (956) 212-4930
www.samgarciaarchitect.com

PROJECT:

HIDALGO COUNTY
ADULT DETENTION CENTER and LAW ENFORCEMENT FACILITY REPAIRS and/or REPLACEMENT
Edinburg, Texas

JOB NO. 13159

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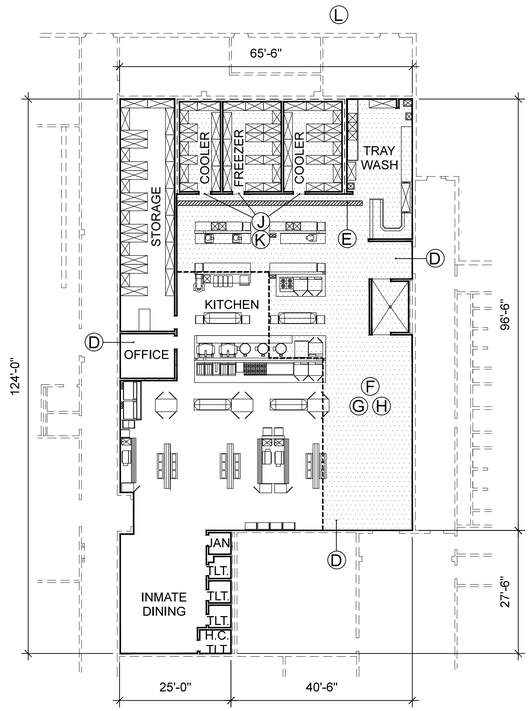
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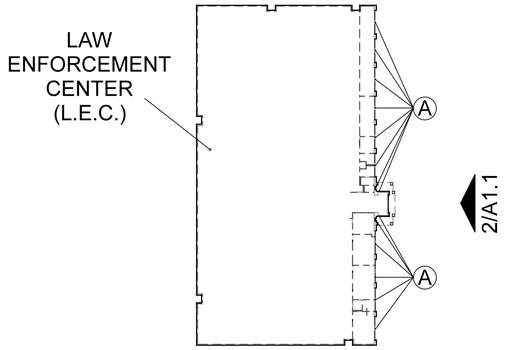
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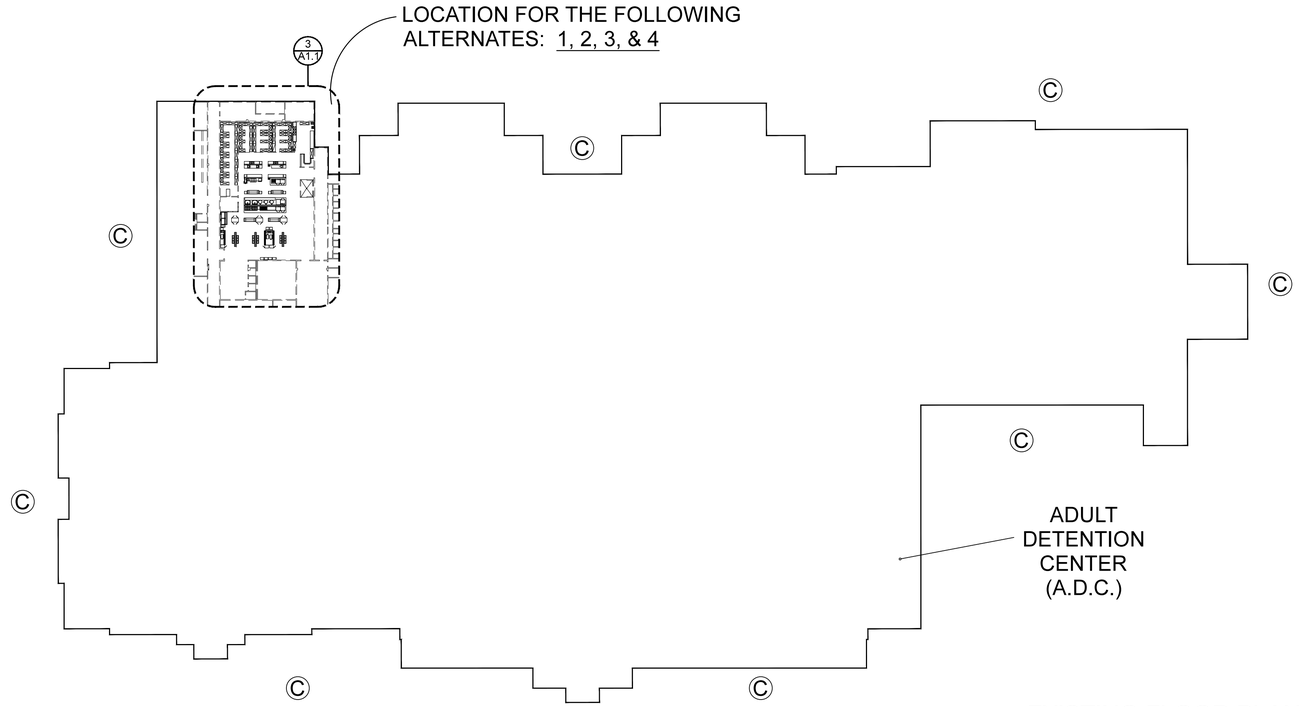
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N ← KITCHEN 3

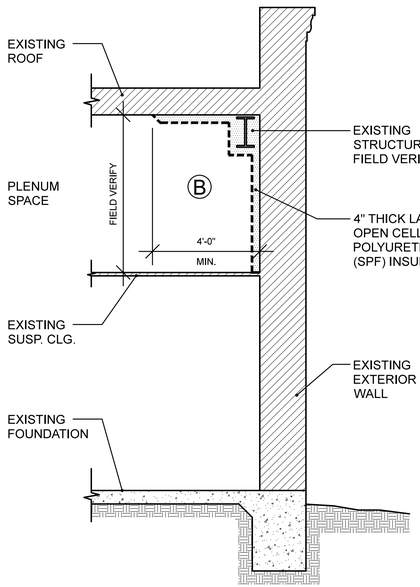
1/16" = 1'-0"





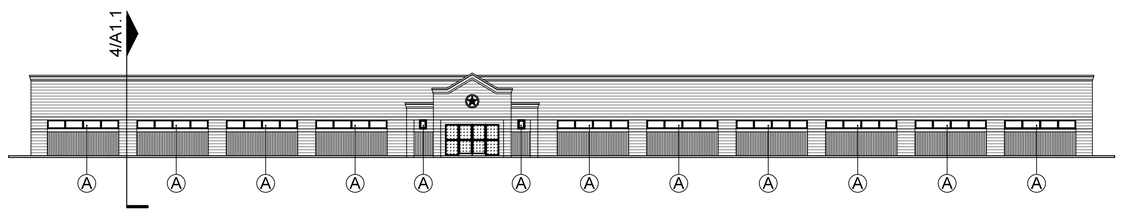
N ← EXISTING FLOOR PLAN 1

1" = 50'-0"



L.E.C. PLENUM INSULATION 4

3/8" = 1'-0"



LAW ENFORCEMENT CENTER (L.E.C.) SOUTH ELEVATION 2

1/16" = 1'-0"

GENERAL NOTES

1. GENERAL CONTRACTOR SHALL ENSURE THAT ALL WORK IS PERFORMED IN CONFORMANCE W/ ALL REQUIREMENTS SET FORTH BY HIDALGO COUNTY LAW ENFORCEMENT OFFICIALS TO ENSURE UNINTERRUPTED OPERATION OF THE ADULT DETENTION CENTER.

2. **INTERIOR RENOVATION WORK AT ADULT DETENTION CENTER SHALL ONLY OCCUR DURING DESIGNATED HOURS: 7:00 P.M. - 2:00 A.M. (M-F).**

3. INTERIOR RENOVATION WORK AT LAW ENFORCEMENT CENTER SHALL ONLY OCCUR DURING NORMAL BUSINESS HOURS: 8:00 A.M. - 5:00 P.M. (M-F).

4. GENERAL CONTRACTOR SHALL MAKE PROVISIONS TO ENSURE THAT TRADES DO NOT LEAVE EQUIPMENT AND/OR PARTIALLY COMPLETED PORTIONS OF WORK EACH AND EVERY TIME THEY LEAVE THE JOBSITE.

5. GENERAL CONTRACTOR SHALL FIELD VERIFY EXISTING CONDITIONS PRIOR TO COMMENCING WORK.

KEY NOTES

BASE BID

(A) LAW ENFORCEMENT CENTER: ALL EXTERIOR WINDOWS ON SOUTH FACADE SHALL BE RE-SEALED. REMOVE AND REPLACE BACKER ROD, SEALANT, AND CAULKING ALONG WINDOW PERIMETER TO PROVIDE WEATHER-TIGHT SEAL.

(B) LAW ENFORCEMENT CENTER: PROVIDE 4" THICK LAYER OF OPEN CELL SPRAY POLYURETHANE FOAM (SPF) INSULATION AT UNDERSIDE OF ROOF DECK AS PER DETAIL 4/A1.1

(C) ADULT DETENTION CENTER: RE-SEAL ALL VERTICAL WALL JOINTS AT EXTERIOR WALLS BY REMOVING EXISTING SEALANT & BACKER ROD & REPLACING W/ NEW ON BOTH THE OUTER AND INNER SURFACES. RE: 6/A2.1

ALTERNATE 1

(D) REMOVE, REPLACE, AND SEAL EXISTING QUARRY TILE IN SELECTED AREA OF KITCHEN FACILITY. WORK SHALL BE STAGED IN SUCH A MANNER TO ENSURE THAT FOOD PREPARATION SERVICES REMAIN AVAILABLE EACH SUBSEQUENT DAY. CONTRACTOR SHALL COORDINATE STAGING WITH OWNER AND PREPARE A "PLAN OF ACTION" PRIOR TO COMMENCING WORK.

*** APPROXIMATELY 3,400 SQ. FT. OF QUARRY TILE**

(E) PROVIDE TRENCH DRAIN ADJACENT TO WALK-IN FREEZER AND COOLERS. RE:MEP.

ALTERNATE 2

(F) REMOVE AND REPLACE SUSPENDED CEILING GRID AND ACOUSTIC CEILING TILE IN MAIN KITCHEN AREA.

(G) REPLACE ALL 2x4 FLUORESCENT LIGHT ASSEMBLIES IN MAIN KITCHEN AREA, RE: MEP.

*** PROVIDE UNIT PRICES FOR EACH TO SERVE AS REFERENCE IN THE EVENT THAT ADDITIONAL FIXTURES NEED TO BE REPLACED.**

(H) REPLACE ALL 2x2 HVAC AIR DIFFUSERS IN MAIN KITCHEN AREA, RE: MEP.

*** PROVIDE UNIT PRICES FOR EACH TO SERVE AS REFERENCE IN THE EVENT THAT ADDITIONAL DIFFUSERS NEED TO BE REPLACED.**

ALTERNATE 3

(J) REPLACE DOORS, HINGES, STRIKES, AND ASSOCIATED HARDWARE ON EXISTING "AMERICAN PANEL" COOLERS (2) AND FREEZER (1).

(K) REPLACE RE-HEAT WIRING AT THRESHOLDS OF EXISTING COOLERS (2) AND FREEZER (1).

*** $6,000.00 ALLOWANCE FOR ALTERNATE 3.**

ALTERNATE 4

(L) REPLACE SINGLE "EXTERIOR COOLER/FREEZER CONDENSING UNIT WITH TWO (2) CONDENSING UNITS. UNIT 1 SHALL SERVE FREEZER; UNIT 2 SHALL SERVE COOLERS.

" EXISTING CONDENSING UNIT IS A "KAIRAK INNOVATIONS INC. - MODEL NO. MAE2-3E2"

*** $19,000.00 ALLOWANCE FOR ALTERNATE 4.**

CHANIN ENGINEERING LLC
400 Dallas, Suite 102
McAllen, Texas 78504
PH: (956) 687-9421 FAX: (956) 687-3211
www.chaninengineering.com
TBPE FIRM REG. NUMBER F-9369

SEAL:

REGISTERED ARCHITECT
SAMUEL RAYMOND GARCIA
STATE OF TEXAS
#7333

11-15-13

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1335 E. Jasmine Ave.
McAllen, Texas 78501
PH: (956) 212-4930
www.samgarciaarchitect.com

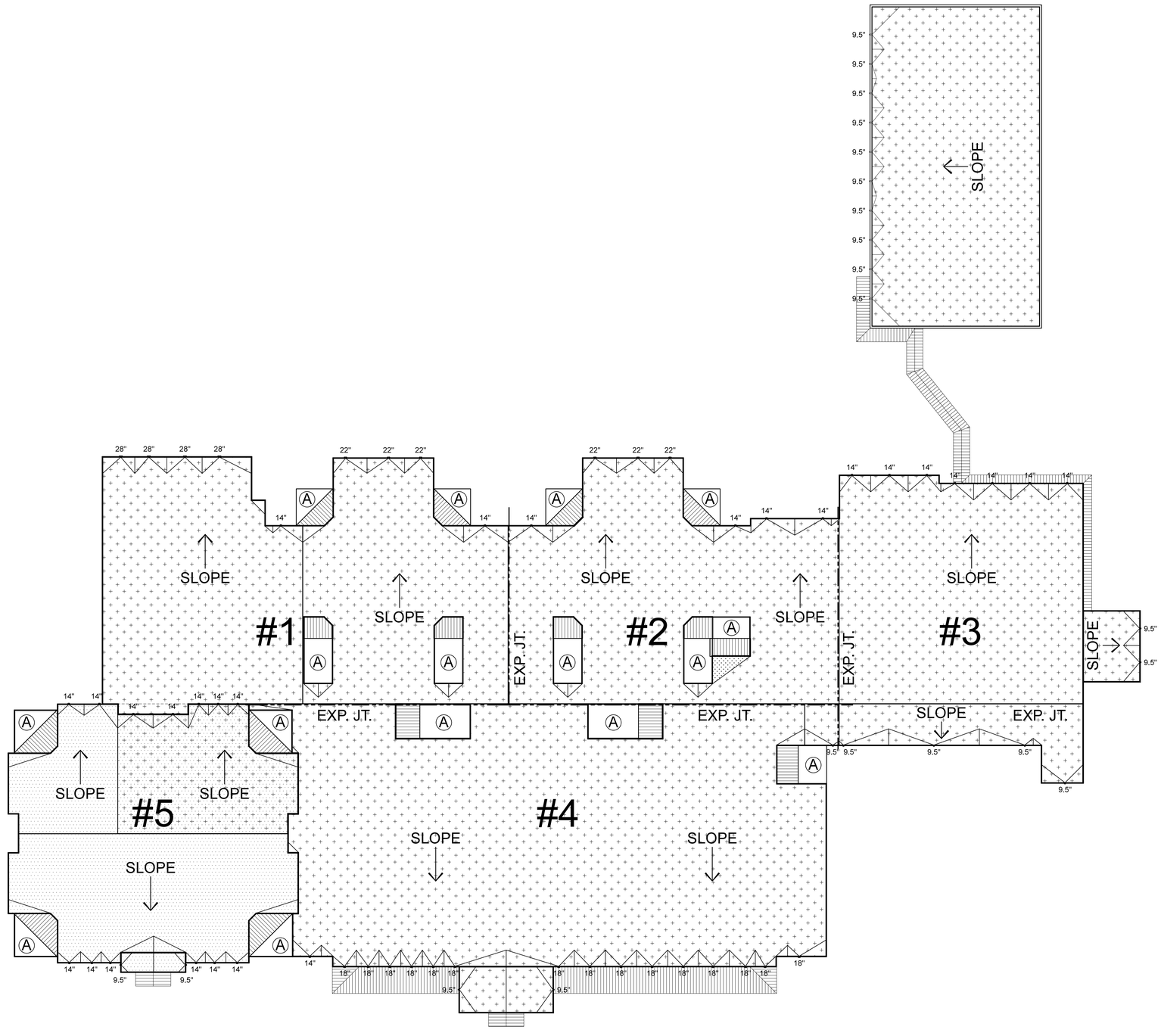
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DRAWN BY: SRG
CHECKED BY:MC
REVISION:

DRAWING NO:

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GENERAL NOTES

1. GENERAL CONTRACTOR SHALL ENSURE THAT ALL WORK IS PERFORMED IN CONFORMANCE W/ ALL REQUIREMENTS SET FORTH BY HIDALGO COUNTY LAW ENFORCEMENT OFFICIALS TO ENSURE UNINTERRUPTED OPERATION OF THE ADULT DETENTION CENTER.

2. GENERAL CONTRACTOR SHALL MAKE PROVISIONS TO ENSURE THAT TRADES DO NOT LEAVE UNATTENDED EQUIPMENT AND/OR MATERIAL, TAKING SPECIAL PRECAUTION TO ENSURE THAT **ABSOLUTELY NOTHING** ENTERS INTO THE SECURE FACILITY THROUGH THE OPEN-AIR EXERCISE YARDS. SEE KEY NOTE A.

3. **ADD ONE SAME SIZE EMERGENCY OVERFLOW SCUPPER FOR EACH EXISTING DRAINAGE SCUPPER AS SHOWN.**

KEY NOTE

Ⓐ **ALL OPEN-AIR EXERCISE YARDS SHALL BE SECURELY COVERED W/ TEMPORARY PRIVACY FABRIC MESH COVERING FOR THE DURATION OF CONSTRUCTION, (MUST ALLOW FOR SOME LIGHT PENETRATION TO YARD BELOW).**

LEGEND

PRIMARY ROOF LEVEL

SECONDARY ROOF LEVEL, THAT DRAINS TO PRIMARY LEVEL. ENLARGE PASS-THROUGH SCUPPERS

SECONDARY ROOF LEVEL

N ←

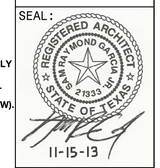
ROOF ZONES

1" = 40'-0"

1

CHANIN ENGINEERING LLC
400 Nolana, Suite G
McAllen, Texas 78504
PH: (956) 687-9421 FAX: (956) 687-3211
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TBPE FIRM REG. NUMBER F-9369

SEAL:



SAM GARCIA ARCHITECT
1335 E. Jasmine Ave.
McAllen, Texas 78501
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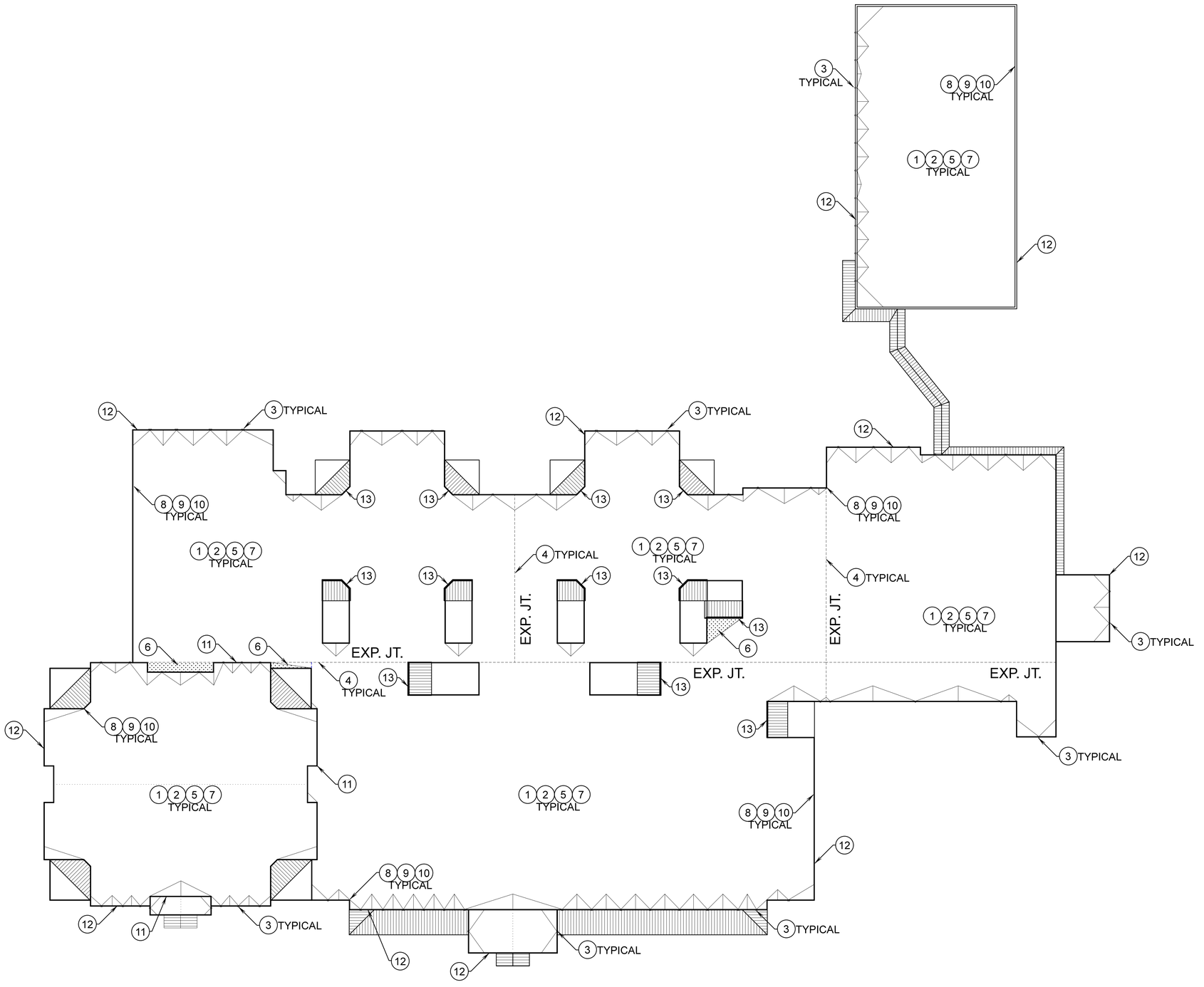
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ROOF MODIFICATIONS

1" = 40'-0"

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GENERAL NOTES

1. AT NEW ROOF CURB LOCATIONS, PROVIDE CRICKETS AT HIGH SIDE TO ENSURE POSITIVE DRAINAGE.

2. PROVIDE CONDENSATE ROOF DRAIN ASSEMBLIES, RE: MEP FOR QUANTITY AND LOCATIONS.

3. RE-SEAL ALL VERTICAL WALL JOINTS AT EXTERIOR WALLS BY REMOVING EXISTING SEALANT & BACKER ROD & REPLACING W/ NEW ON BOTH THE OUTER AND INNER SURFACES. RE: 6/A2.1

KEY NOTES

(1) PERFORM THERMOCORE ® INFRARED SCAN OF ALL ROOF AREAS. IDENTIFY AND MARK ALL WET OR DAMP MATERIALS AND REPLACE AS SPECIFIED.

(2) RAISE ALL EXISTING MECHANICAL CURB HEIGHTS AS REQUIRED TO MEET MINIMUM HEIGHT REQUIREMENTS (8" MINIMUM CLEAR HEIGHT ABOVE ROOF SURFACE) AND PROVIDE APPROPRIATE COUNTERFLASHING AS NEEDED. CO-ORDINATE WITH MECHANICAL CONTRACTOR TO ENSURE NEW CURBS ARE OF THE PROPER HEIGHT. RE: MEP DRAWINGS & SPECS. FOR ADDITIONAL DETAILS

(3) INSTALL ONE ADDITIONAL THRU-WALL OVERFLOW SCUPPER FOR EACH EXISTING PRIMARY SCUPPER TO COMPLY WITH DRAINAGE REQUIREMENTS AS PER CODE. PROVIDE PRE-FINISHED ESCUTCHEON PLATES AROUND THE NEW OVERFLOW SCUPPERS ON THE EXTERIOR WALL FACE.

NOTE: THE BOTTOM OF NEW OVERFLOW SCUPPERS MUST BE AT LEAST 2' BUT NO MORE THAN 4" ABOVE THE BOTTOM OF THE PRIMARY DRAINAGE SCUPPERS.

(4) PROVIDE ADDITIONAL WOOD BLOCKING AT EXPANSION JOINTS AS REQUIRED TO INSTALL RAISED EXPANSION JOINT CURBS.

(5) SPUD AND REMOVE ALL GRAVEL SURFACING FROM ROOF. REPAIR ROOF MEMBRANE DAMAGE AS REQUIRED TO MAINTAIN A WATERTIGHT ROOF SYSTEM DURING THE ROOF RE-COVER PROCESS. STOCKPILE GRAVEL ON PREMISES AS PER OWNER'S DIRECTION, TO BE DETERMINED AT PRE-CONSTRUCTION MEETING.

(6) INSTALL ADDITIONAL CRICKET INSULATION AS NEEDED TO ENSURE POSITIVE DRAINAGE.

(7) INSTALL ROOF RE-COVER SYSTEM AS SPECIFIED.

(8) REMOVE ALL EXISTING BASE FLASHINGS AT WALLS AND CURBS AND INSTALL NEW BASE FLASHING AS SPECIFIED.

(9) REMOVE ALL SHEET METAL FLASHINGS AND INSTALL NEW SHEET METAL FLASHING AT ALL BASE FLASHING AND ROOF PENETRATIONS.

(10) INSTALL NEW THREE COURSE MEMBRANE WATERPROOFING AT PERIMETER PARAPET WALLS. WRAP OVER TOP OF PARAPET AND DOWN OVER NEW COUNTERFLASHING.

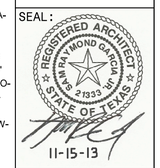
(11) INSTALL NEW ELASTOMERIC WALL COATING ON PROPERLY PREPARED AND PRIMED PREVIOUSLY COATED WALLS ABOVE THE ROOF MEMBRANE. COLOR TO MATCH EXISTING.

(12) REMOVE EXISTING SHEET METAL COPING AND INSTALL NEW PRE-FINISHED SHEET METAL COPING CAP, FLASHING, AND TRIM.

(13) INSTALL NEW PRE-FINISHED GUTTERS AND DOWNSPOUTS AT EAVES OF SLOPED METAL ROOFING ABOVE LOW-SLOPE ROOF MEMBRANE. PROVIDE ONE ADDITIONAL PLY OF CAP SHEET TO SERVE AS SPLASH PAD UNDER EACH NEW DOWNSPOUT.

CHANIN ENGINEERING LLC
400 Jasmine Ave, Suite 102
McAllen, Texas 78504
PH: (956) 687-9421 FAX: (956) 687-3211
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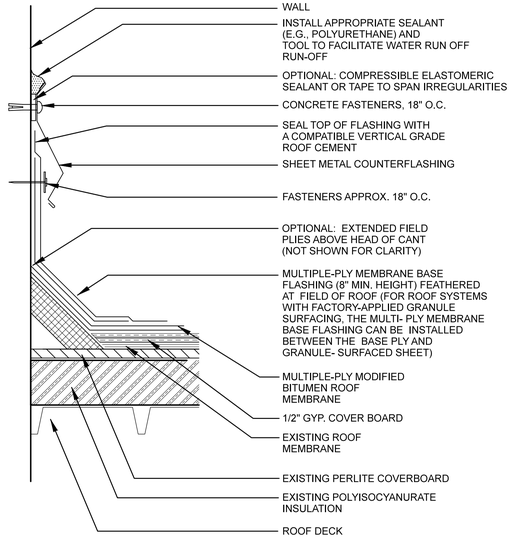
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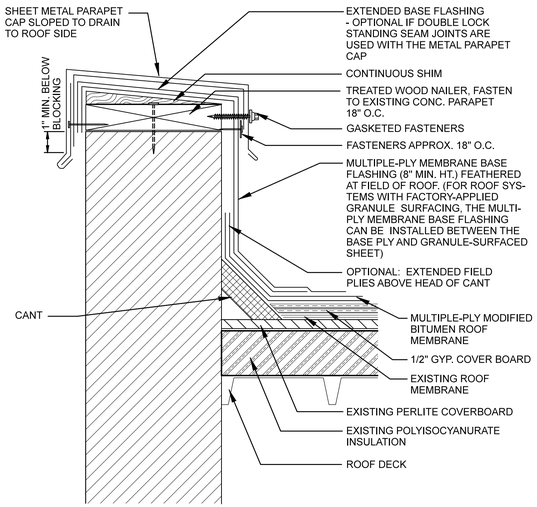
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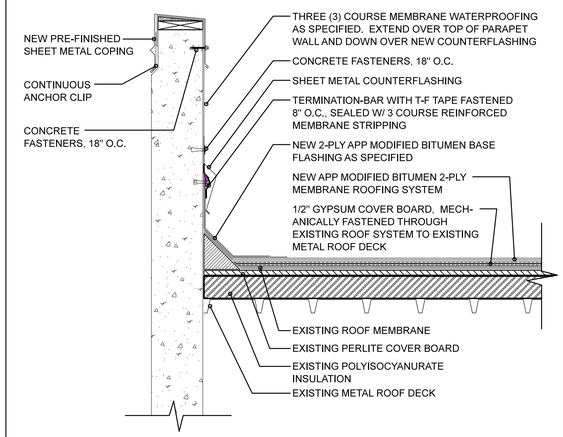
SURFACE MOUNT COUNTER-FLASHING FOR CONCRETE WALLS

N.T.S. 9



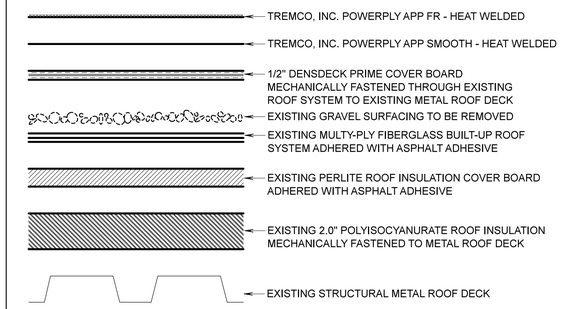
COPING & BASE FLASHING

N.T.S. 7



PARAPET WALL DETAIL

1 1/2" = 1'-0" 4

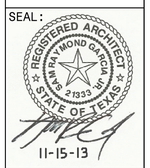


PROPOSED ROOF CONSTRUCTION

3" = 1'-0" 1

CHANIN
ENGINEERING LLC
400 Dallas, Suite 103
McAllen, Texas 78504
PH: (956) 687-9421 FAX: (956) 687-3211
www.chaninengineering.com
TBPE FIRM REG. NUMBER F-9369

SEAL:



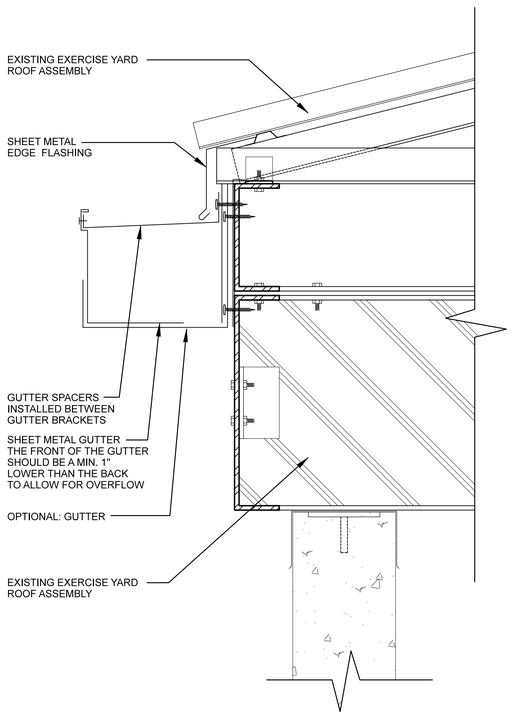
SAM GARCIA ARCHITECT
1325 E. Jasmine Ave.
McAllen, Texas 78501
PH: (956) 212-4930
www.samgarciaarchitect.com

PROJECT:

HIDALGO COUNTY
ADULT DETENTION CENTER and LAW ENFORCEMENT FACILITY REPAIRS and/or REPLACEMENT
Edinburg, Texas

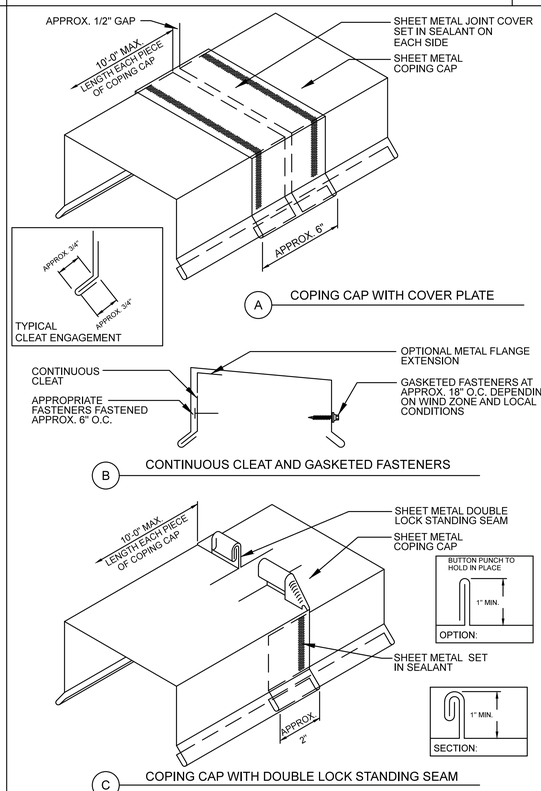
JOB NO.	13159
DATE:	11/15/13
DRAWN BY:	SRG
CHECKED BY:	MC
REVISION:	

DRAWING NO: A2.1



GUTTER DETAIL

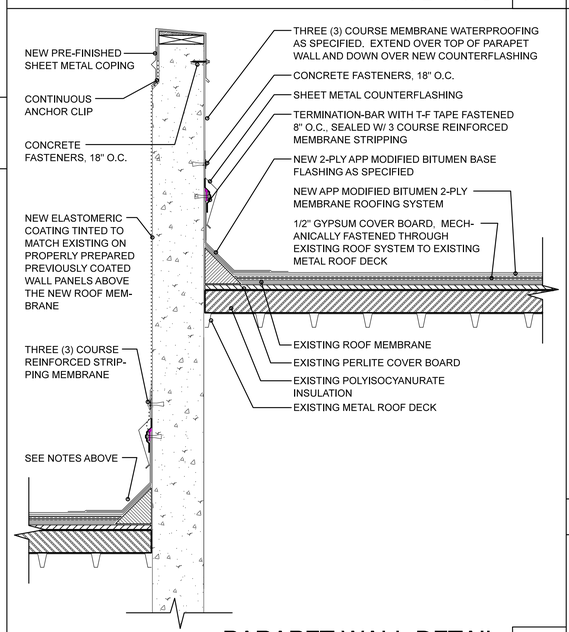
N.T.S. 10



NOTES:
1. CONTINUOUS CLEAT NOT SHOWN FOR CLARITY.
2. COPING JOINERY IS SIMILAR ON BOTH SIDES.
3. REMOVAL OF UNDERLYING METAL HEM MAY HELP FACILITATE PROPER NESTING.

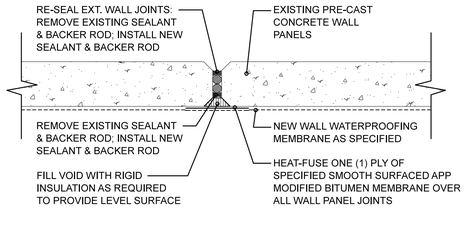
COPING CAP

N.T.S. 8



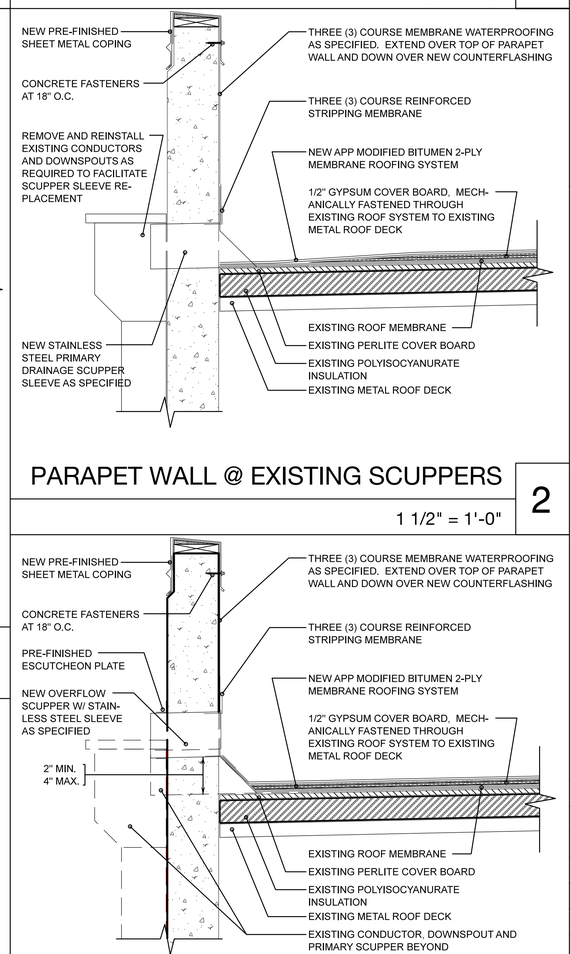
PARAPET WALL DETAIL

1 1/2" = 1'-0" 5



PLAN VIEW PRECAST PANEL JOINT TREATEMENT

1 1/2" = 1'-0" 6

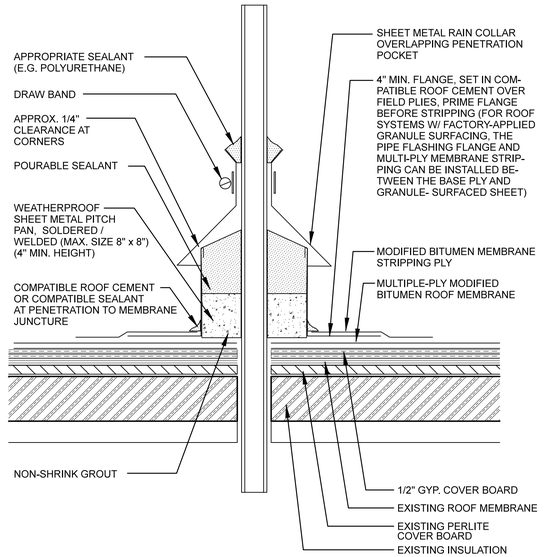


PARAPET WALL @ EXISTING SCUPPERS

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

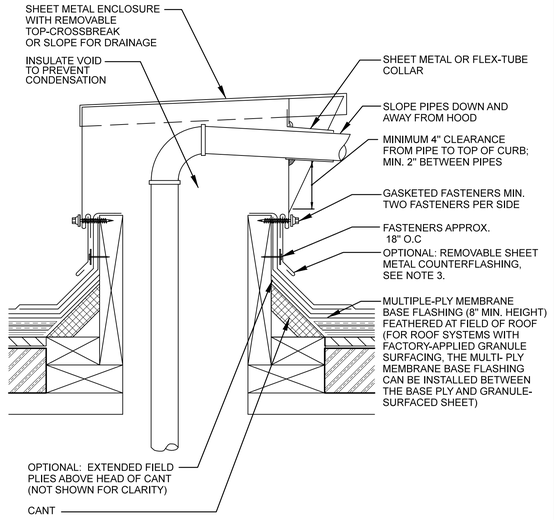
PARAPET WALL DETAIL @ NEW OVERFLOW SCUPPERS

1 1/2" = 1'-0" 3



PENETRATION POCKET

N.T.S. 7

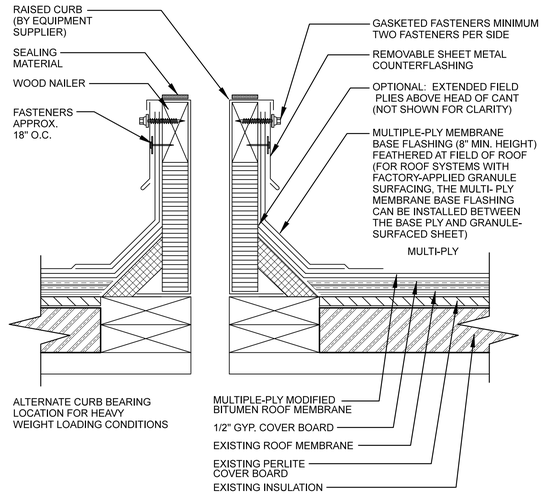


NOTES:

1. THIS DETAIL ILLUSTRATES ANOTHER METHOD OF ELIMINATING PITCH POCKETS AND AN OPTIONAL METHOD OF GROUPING PIPING THAT MUST PENETRATE THE ROOF.
2. MANY MANUFACTURERS OFFER PREFABRICATED BOOTS AND OTHER MATERIALS FOR THIS PURPOSE. SPECIFICS ON THESE PROPRIETARY DESIGNS VARY GREATLY, AND INDIVIDUAL MANUFACTURERS' SPECIFICATIONS SHOULD BE CONSULTED FOR THEIR USE.
3. WHERE THE SHEET METAL ENCLOSURE OVERLAPS THE BASE FLASHING AT LEAST 3". THE REMOVABLE SHEET METAL COUNTERFLASHING IS NOT REQUIRED.

SHEET METAL ENCLOSURE FOR PIPING THROUGH ROOF DECK

N.T.S. 5

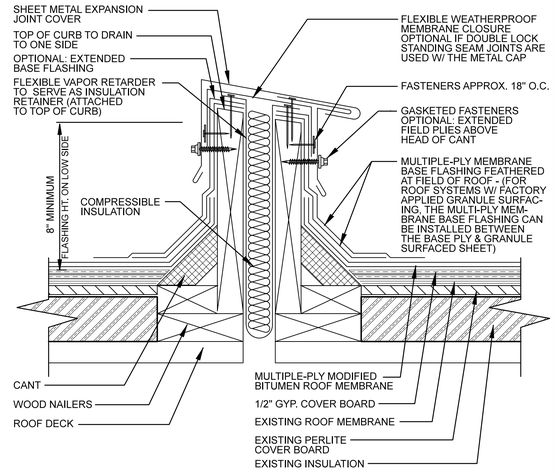


NOTES:

1. THE CURBS, TOP WOOD NAILER, AND SEAL STRIP ARE TO BE SUPPLIED BY THE CURB MANUFACTURER.
2. WHEN POSSIBLE, THE MECHANICAL UNITS SHOULD NOT BE SET UNTIL THE ROOF MEMBRANE AND FLASHING HAVE BEEN INSTALLED.

RAISED CURB DETAIL FOR ROOFTOP AHUs & DUCTS (PREFAB METAL CURB)

N.T.S. 3

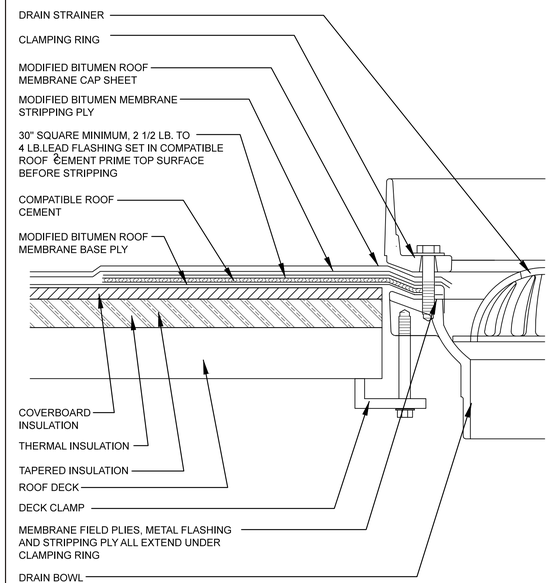


NOTES:

1. THIS DETAIL ALLOWS FOR BUILDING MOVEMENT IN MULTIPLE DIRECTIONS.
2. FLASHING REQUIREMENTS TYPICAL FOR BOTH SIDES OF EXPANSION JOINT.

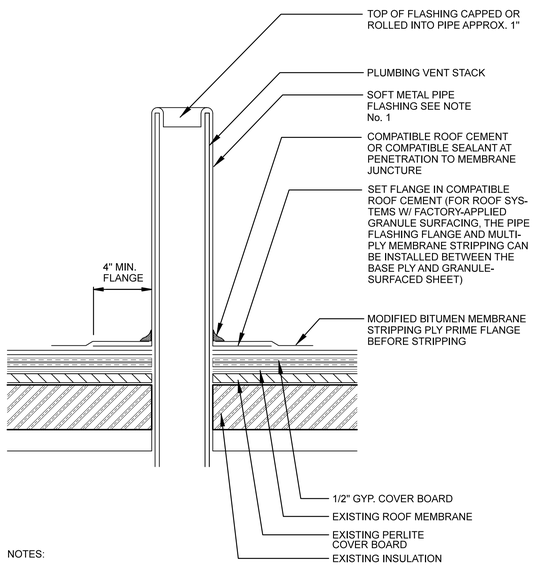
EXPANSION JOINT W/ METAL COVER

N.T.S. 1



MECHANICAL DRAIN FLASHING

N.T.S. 8

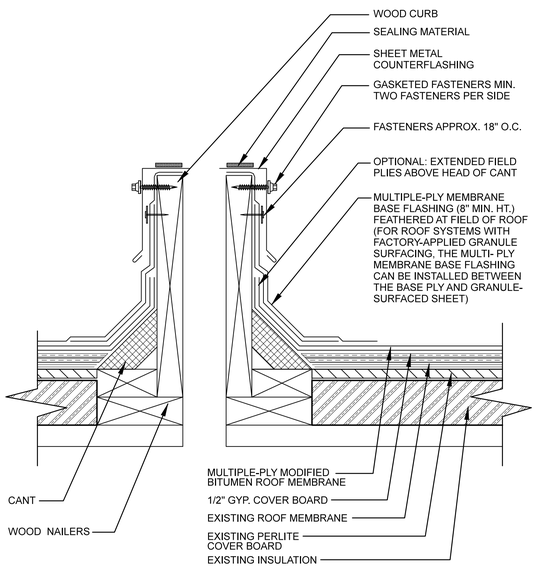


NOTES:

1. SOFT METAL PIPE FLASHING: SHEET LEAD; MINIMUM OF 2 1/2 LB. PER SQUARE FOOT - PRECAUTIONS SHOULD BE TAKEN NOT TO DAMAGE THE SHEET LEAD WHEN USING HEAT-WELDED APPLICATION.
2. IF USING COPPER FLASHING OVER AN IRON OR STEEL PIPE, INSERT A SEPARATOR SHEET (E.G., ASPHALT- SATURATED ROOFING FELT), WRAPPED AROUND PIPE, TO SEPARATE THE COPPER FLASHING FROM DIRECT CONTACT WITH PIPE, TO REDUCE GALVANIC ACTION.
3. VENT STACKS AND OTHER PIPES SHOULD HAVE A MINIMUM OF 12 INCHES OF CLEARANCE ON ALL SIDES FROM WALLS, CURBS, AND OTHER PROJECTIONS TO FACILITATE PROPER FLASHING.

PLUMBING VENT

N.T.S. 6



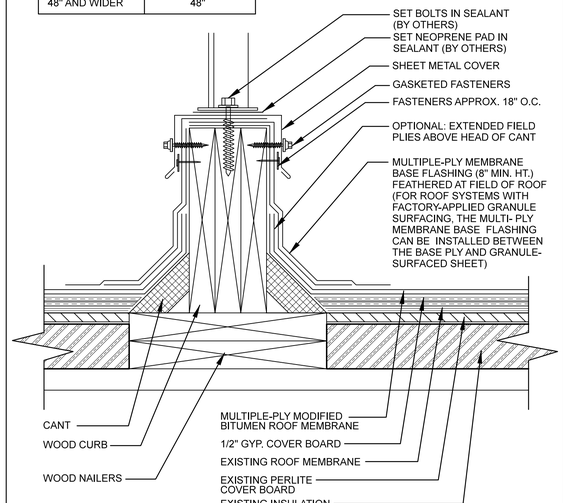
NOTES:

1. WHEN POSSIBLE, THE MECHANICAL UNITS SHOULD NOT BE SET UNTIL THE ROOF MEMBRANE AND FLASHING HAVE BEEN INSTALLED.

RAISED CURB DETAIL FOR ROOFTOP AHUs & DUCTS (SITE-BUILT WOOD CURB)

N.T.S. 4

WIDTH OF EQUIPMENT	HEIGHT OF LEGS
UP TO 24"	24"
24" TO 48"	36"
48" AND WIDER	48"



EQUIPMENT SUPPORT CURB

N.T.S. 2

CHANIN ENGINEERING LLC
400 Dallas, Suite 19
McAllen, Texas 78504
PH: (956) 687-9421 FAX: (956) 687-3211
www.chaninengineering.com
TBPE FIRM REG. NUMBER F-9369

SEAL:

REGISTERED ARCHITECT SAM RAYMOND GARCIA 17333 STATE OF TEXAS

11-15-13

SAM GARCIA ARCHITECT
1325 E. Jasmine Ave.
McAllen, Texas 78501
PH: (956) 212-4930
www.samgarciaarchitect.com

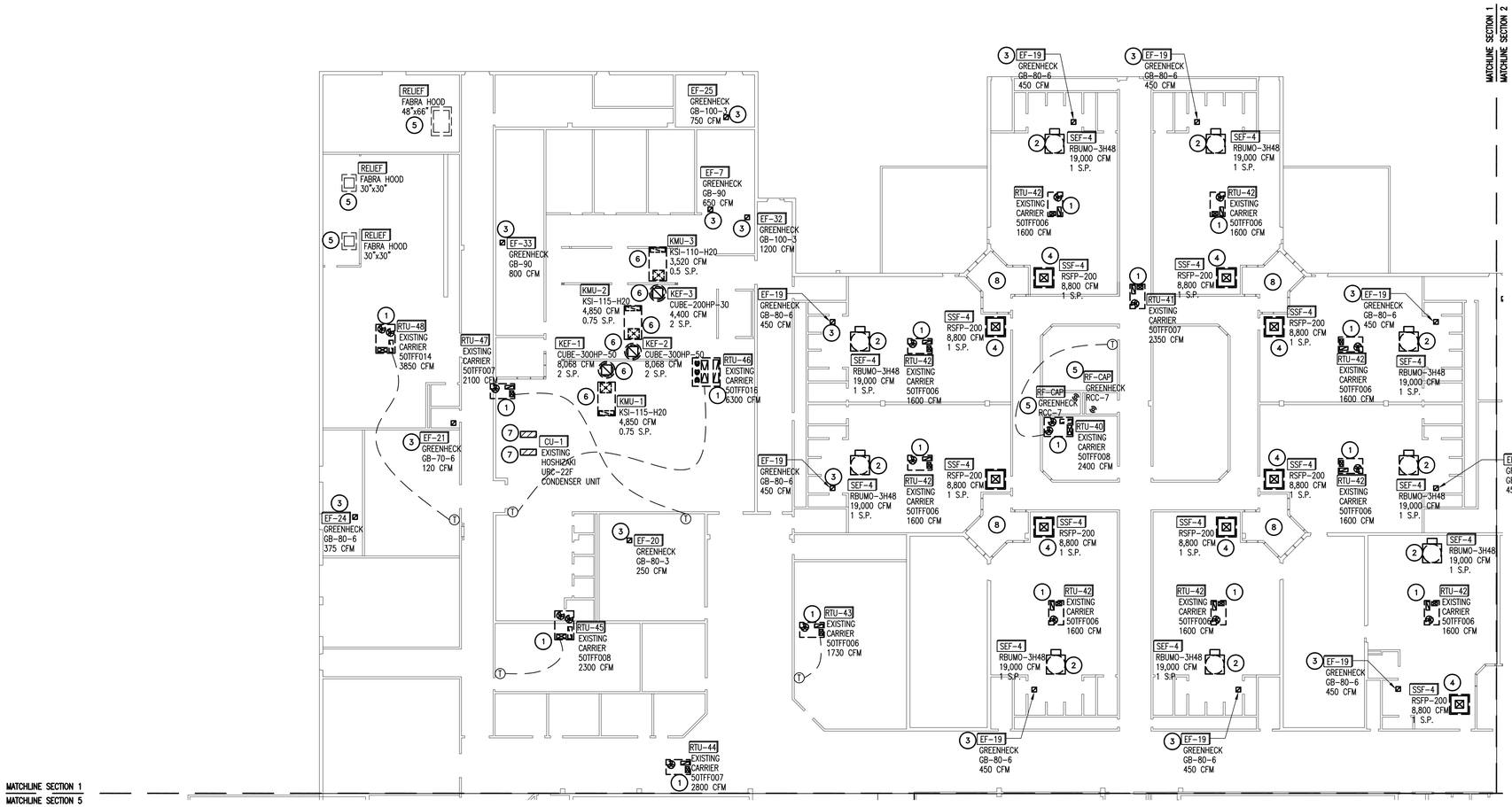
PROJECT:

HIDALGO COUNTY
ADULT DETENTION CENTER and LAW ENFORCEMENT FACILITY REPAIRS and/or REPLACEMENT
Edinburg, Texas

JOB NO. 13159
DATE: 11/15/13
DRAWN BY: SRG
CHECKED BY:MC
REVISION:

DRAWING NO:

A2.2



M.E.P. GENERAL DEMOLITION NOTES:

A. INFORMATION ON THIS PLAN HAS BEEN OBTAINED FROM EXISTING DRAWINGS AND SITE SURVEY. CONTRACTOR SHALL VERIFY EXISTING CONDITIONS AND BECOME FULLY INFORMED AS TO THE EXTENT OF WORK PRIOR TO BIDDING OR COMMENCING WORK. ANY DISCREPANCIES BETWEEN EXISTING CONDITIONS AND CONSTRUCTION DOCUMENTS SHALL BE REPORTED IMMEDIATELY TO THE ENGINEER AND/OR ARCHITECT.

B. THE CONTRACTOR IS FULLY RESPONSIBLE FOR PERFORMING THE DEMOLITION WORK UNDER THIS SECTION OF THE PROJECT IN FULL COMPLIANCE WITH ALL APPLICABLE LOCAL, STATE, AND FEDERAL CODES. IF THE CONTRACTOR DETERMINES THAT THE CONTRACT DOCUMENTS AND PLANS ARE NOT IN COMPLIANCE WITH THE APPLICABLE CODES, HE SHALL INFORM THE ARCHITECT PRIOR TO CONSTRUCTION START FOR DIRECTION. FAILURE TO DO SO SHALL NOT RELIEVE THE CONTRACTOR OF HIS RESPONSIBILITY TO MEET CODE REQUIREMENTS AND REWORK SHALL BE AT CONTRACTOR'S EXPENSE. APPLICABLE CODES AND STANDARDS ON DEMOLITION WORK SHALL INCLUDE THOSE PUBLISHED BY OSHA AND EPA. APPLICABLE CODES AND STANDARDS ON DEMOLITION WORK SHALL INCLUDE THOSE PUBLISHED BY OSHA AND EPA. AN ASBESTOS SURVEY SHALL BE KEPT ON SITE AT ALL TIMES PER TEXAS DEPARTMENT OF HEALTH REQUIREMENTS

C. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO COMPLETE THE NECESSARY DEMOLITION. CONTRACTOR SHALL PATCH AND REPAIR ALL BUILDING DAMAGE CREATED BY DEMOLITION WORK. PATCHING SHALL BE COMPLETED WITH THE SAME MATERIALS AS THE SURROUNDING AREAS.

D. ALL OPENINGS CUT IN MASONRY AND PLASTER WALLS OR CONCRETE FLOORS SHALL BE CORE-DRILLED OR SAWED WHEN POSSIBLE. CONTRACTOR SHALL CHECK BUILDING CONSTRUCTION WITH STRUCTURAL ENGINEER 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 AS REQUIRED BY DRAWINGS AND SPECIFICATIONS.

E. CONTRACTOR SHALL REMOVE AND RETURN ANY AND ALL EXISTING EQUIPMENT/MATERIALS TO OWNER. OWNER SHALL HAVE FULL RIGHT OF OWNERSHIP UNLESS SPECIFIED OTHERWISE. IF THE OWNER WAIVES THIS OPTION, ANY EQUIPMENT, MATERIAL, ETC SHALL BECOME THE PROPERTY OF THE CONTRACTOR.

GENERAL NOTES:

A. REFER TO SCHEDULE SHEET FOR ADDITIONAL GENERAL NOTES.

B. MECHANICAL CONTRACTOR SHALL COORDINATE WITH ALL OTHER TRADES TO MAINTAIN ACCESS CLEARANCES FOR ALL MECHANICAL EQUIPMENT.

C. MECHANICAL CONTRACTOR SHALL COORDINATE THE INSTALLATION OF ALL HVAC SYSTEMS WITH THE OWNER PRIOR TO THE DISRUPTION OF HVAC SERVICE TO THE FACILITY.

D. MECHANICAL CONTRACTOR SHALL FURNISH AND INSTALL ANY ADDITIONAL DUCTWORK REQUIRED TO ACCOMODATE NEW ROOF MOUNTED UNITS.

E. MECHANICAL CONTRACTOR SHALL REPLACE EXISTING THERMOSTATS/SENSORS WITH NEW, RE-USE EXISTING CONTROL WIRING.

F. ROOF CURBS SHALL BE GALVANIZED STEEL WITH MITERED AND WELDED CORNERS FURNISHED WITH WOOD NAILER AND 1-1/2-INCH THICK RIGID FIBERGLASS INSULATION ADHERED TO INSIDE WALL. SIZE AS REQUIRED TO SUIT ROOF OPENING AND EQUIPMENT BASE. SECURE ALL EQUIPMENT TO ROOF CURBS WITH CADMIUM PLATED HARDWARE.

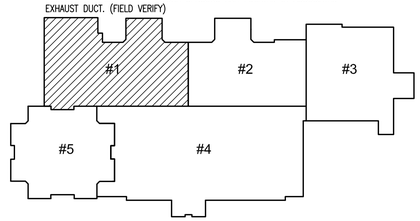
G. NEW ROOFTOP UNITS SHALL BE BALANCED TO THE AIR VOLUMES SHOWN ON THE ROOFTOP UNIT SCHEDULE. REFER TO SPECIFICATIONS.

H. EXISTING EQUIPMENT MODELS SHOWN ARE FROM GREENHECK.

I. REFER TO PLUMBING PLAN FOR NEW ROOF TOP UNIT FOOT PRINT.

KEY NOTES:

1. EXISTING ROOF TOP UNIT TO BE REMOVED AND REPLACED WITH NEW. REFER TO MECHANICAL SCHEDULES FOR UNIT PERFORMANCE. EXISTING ASSOCIATED DUCTWORK, CONTROLS WIRING, AND POWER SHALL REMAIN FOR RE-USE. FURNISH UNIT WITH NEW CURB ADAPTER.
2. EXISTING SMOKE EXHAUST TO BE REMOVED AND REUSED AND SHALL BE PROVIDE WITH NEW ROOF CURB AND MOTORIZED SMOKE DAMPER EQUAL TO A GREENHECK MODEL "SMD-201", INTERLOCK DAMPER WITH FIRE ALARM SYSTEM SUCH THAT THE DAMPER OPENS WHEN FAN IS ENERGIZED. ROOF CURB HEIGHT SHALL BE MINIMUM 8-INCHES ABOVE FINISHED ROOF LEVEL, (MINIMUM 14-INCH ROOF CURB). COORDINATE SIZE OF ROOF CURB WITH ROOFING CONTRACTOR PRIOR TO THE COMMENCEMENT OF WORK.
3. EXISTING GENERAL EXHAUST FAN TO BE REMOVED AND REUSED AND SHALL BE PROVIDE WITH NEW 14-INCH ROOF CURB. ROOF CURB HEIGHT SHALL BE A MINIMUM OF 8-INCHES ABOVE FINISHED ROOF LEVEL, (MINIMUM 14-INCH ROOF CURB). COORDINATE SIZE OF ROOF CURB WITH ROOFING CONTRACTOR PRIOR TO THE COMMENCEMENT OF WORK.
4. EXISTING SMOKE SUPPLY FAN TO BE REMOVED AND REUSED AND SHALL BE PROVIDE WITH NEW ROOF CURB AND MOTORIZED DAMPER EQUAL TO A GREENHECK MODEL VCD-20. EXISTING DAMPERS SHALL BE REMOVED AND RETURNED TO THE OWNER. INTERLOCK DAMPER WITH FIRE ALARM SYSTEM SUCH THAT THE DAMPER OPENS WHEN FAN IS ENERGIZED.
5. EXISTING ROOF HOOD TO BE REMOVED AND REUSED AND SHALL BE PROVIDE WITH NEW 14-INCH ROOF CURB. ROOF CURB HEIGHT SHALL BE A MINIMUM OF 8-INCHES ABOVE FINISHED ROOF LEVEL, (MINIMUM 14-INCH ROOF CURB). COORDINATE SIZE OF ROOF CURB WITH ROOFING CONTRACTOR PRIOR TO THE COMMENCEMENT OF WORK.
6. EXISTING KITCHEN FAN TO BE REMOVED AND REUSED AND SHALL BE PROVIDE WITH NEW 14-INCH ROOF CURB. ROOF CURB HEIGHT SHALL BE A MINIMUM OF 8-INCHES ABOVE FINISHED ROOF LEVEL, (MINIMUM 14-INCH ROOF CURB). COORDINATE SIZE OF ROOF CURB WITH ROOFING CONTRACTOR PRIOR TO THE COMMENCEMENT OF WORK.
7. REMOVE EXISTING SUPPORTS SERVING EXISTING REFRIGERATION CONDENSERS. PROVIDE NEW ROOF EQUIPMENT SUPPORTS EQUAL TO A GREENHECK MODEL "CESR" (GALVANIZED STEEL WITH 6-INCH WIDTH AND 14-INCH HEIGHT). FURNISH AND INSTALL NEW UNISTRUT SYSTEM SPANNING FROM EACH SUPPORT AND MOUNT CONDENSERS. EXTEND EXISTING REFRIGERANT LINES AS REQUIRED TO ACCOMODATE NEW LOCATION. FURNISH AND INSTALL NEW INSULATION AND JACKET ONTO EXTERIOR PORTION OF REFRIGERANT LINES.
8. THERMOSTATS SERVING HOUSING UNITS ARE LOCATED IN GUARD OFFICE. ASSOCIATED REMOTE TEMPERATURE SENSORS ARE LOCATED IN ASSOCIATED EXHAUST DUCT. (FIELD VERIFY)



NORTH

A MECHANICAL PLAN
SCALE: 1/16" = 1'-0" AREA #1

CHANIN
ENGINEERING LLC
400 Nolana, Suite N2
McAllen, Texas 78504
PH: (956) 687-3421 FAX: (956) 687-3211
TBPE FIRM REG. NUMBER F-9369

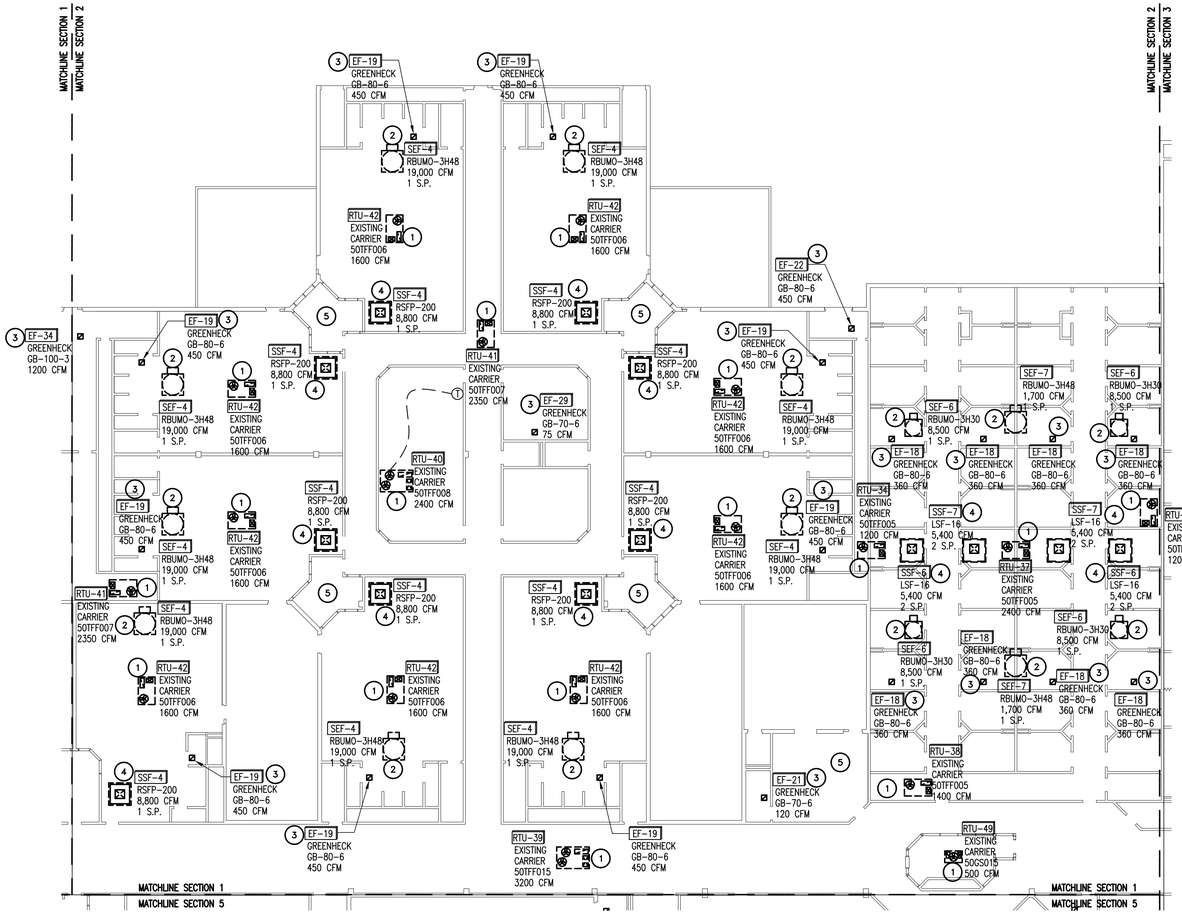
SEAL:
STATE OF TEXAS
LUIS JAVIER PENA
97260
LICENSED
PROFESSIONAL ENGINEER
11.15.2013

MEP SOLUTIONS ENGINEERING
MECHANICAL, ELECTRICAL, PLUMBING ENGINEERS
600 E. BEAUMONT AVE. SUITE 2 McALLEN, TX. 78501 (956) 664-2727
TEXAS BOARD OF PROFESSIONAL ENGINEERS REGISTRATION # F-9748

PROJECT:
HIDALGO COUNTY
ADULT DETENTION CENTER and LAW ENFORCEMENT FACILITY REPAIRS and/or REPLACEMENT
Edinburg, Texas

JOB NO. 13159
DATE: 11/15/13
DRAWN BY: L.S.
CHECKED BY:J.P.
REVISION:

DRAWING NO:
M1.0



NORTH

A MECHANICAL PLAN

SCALE: 1/16" = 1'-0" AREA #2

M.E.P. GENERAL DEMOLITION NOTES:

A. INFORMATION ON THIS PLAN HAS BEEN OBTAINED FROM EXISTING DRAWINGS AND SITE SURVEY. CONTRACTOR SHALL VERIFY EXISTING CONDITIONS AND BECOME FULLY INFORMED AS TO THE EXTENT OF WORK PRIOR TO BIDDING OR COMMENCING WORK. ANY DISCREPANCIES BETWEEN EXISTING CONDITIONS AND CONSTRUCTION DOCUMENTS SHALL BE REPORTED IMMEDIATELY TO THE ENGINEER AND/OR ARCHITECT.

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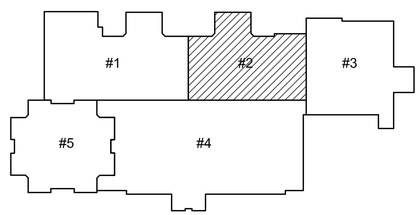
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H. EXISTING EQUIPMENT MODELS SHOWN ARE FROM GREENHECK.

I. REFER TO PLUMBING PLAN FOR NEW ROOF TOP UNIT FOOT PRINT.

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3. EXISTING GENERAL EXHAUST FAN TO BE REMOVED AND REUSED AND SHALL BE PROVIDE WITH NEW 14-INCH ROOF CURB. ROOF CURB HEIGHT SHALL BE A MINIMUM OF 8-INCHES ABOVE FINISHED ROOF LEVEL, (MINIMUM 14-INCH ROOF CURB). COORDINATE SIZE OF ROOF CURB WITH ROOFING CONTRACTOR PRIOR TO THE COMMENCEMENT OF WORK.
4. EXISTING SMOKE SUPPLY FAN TO BE REMOVED AND REUSED AND SHALL BE PROVIDE WITH NEW ROOF CURB AND MOTORIZED DAMPER EQUAL TO A GREENHECK MODEL VCD-20. EXISTING DAMPERS SHALL BE REMOVED AND RETURNED TO THE OWNER. INTERLOCK DAMPER WITH FIRE ALARM SYSTEM SUCH THAT THE DAMPER OPENS WHEN FAN IS ENERGIZED.
5. THERMOSTATS SERVING HOUSING UNITS ARE LOCATED IN GUARD OFFICE. ASSOCIATED REMOTE TEMPERATURE SENSORS ARE LOCATED IN ASSOCIATED EXHAUST DUCT. (FIELD VERIFY)



CHANIN ENGINEERING LLC
400 Nolana, Suite N24
McAllen, Texas 78504
PH: (956) 687-9421 FAX: (956) 687-3211
TBPE FIRM REG. NUMBER F-9369

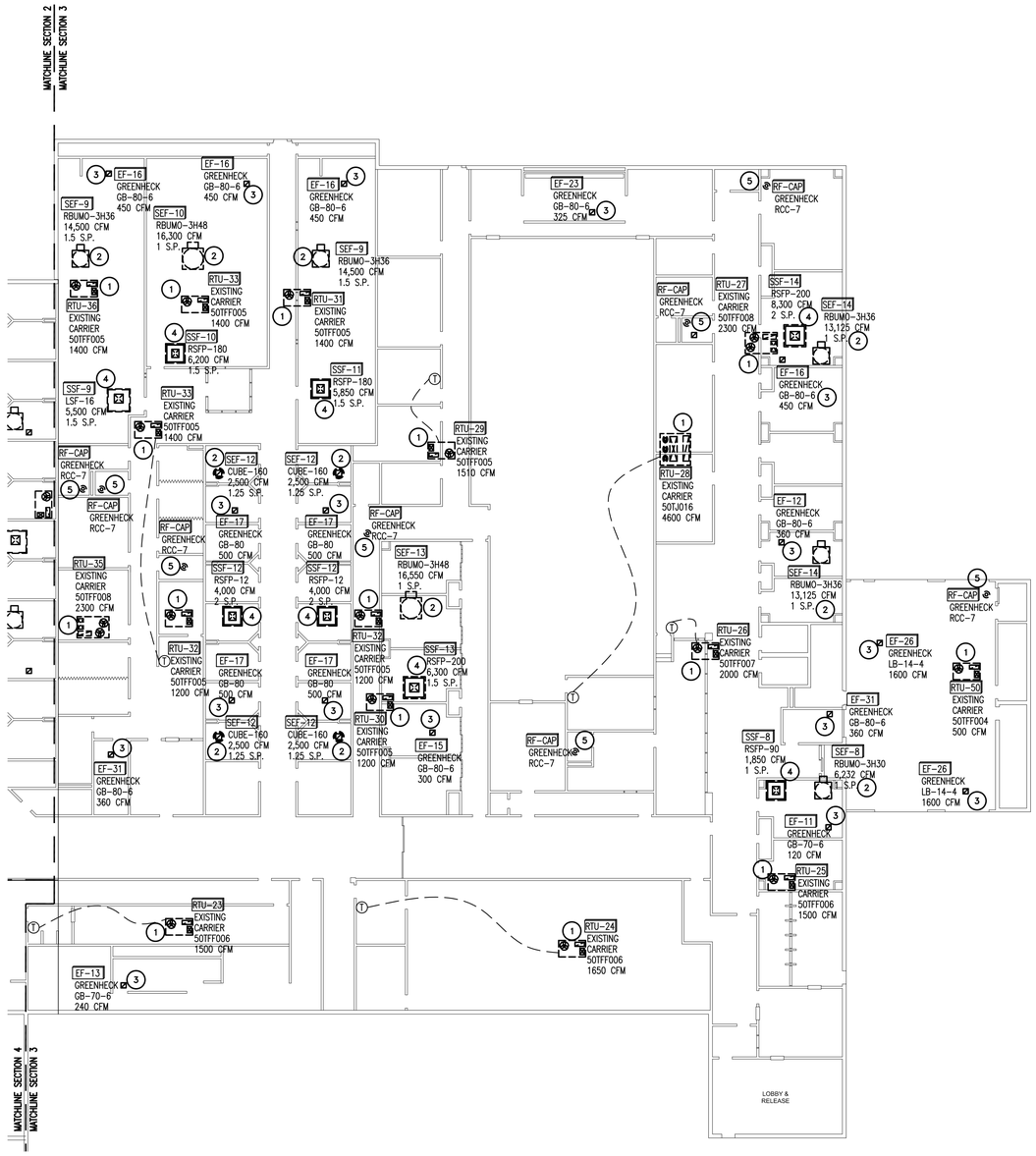
SEAL:

STATE OF TEXAS
LUIS JAVIER PENA
97260
LICENSED PROFESSIONAL ENGINEER
11.15.2013

MEP SOLUTIONS ENGINEERING
MECHANICAL, ELECTRICAL, PLUMBING ENGINEERS
600 E. BEAUMONT AVE. SUITE 2 McALLEN, TX. 78501 (956) 664-2727
TEXAS BOARD OF PROFESSIONAL ENGINEERS REGISTRATION # F-9748

PROJECT:
HIDALGO COUNTY
ADULT DETENTION CENTER and LAW ENFORCEMENT
FACILITY REPAIRS and/or REPLACEMENT
Edinburg, Texas

JOB NO. 13159
DATE: 11/15/13
DRAWN BY: L.S.
CHECKED BY:J.P.
REVISION:
DRAWING NO: M2.0



NORTH

A MECHANICAL PLAN

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

M.E.P. GENERAL DEMOLITION NOTES:

A. INFORMATION ON THIS PLAN HAS BEEN OBTAINED FROM EXISTING DRAWINGS AND SITE SURVEY. CONTRACTOR SHALL VERIFY EXISTING CONDITIONS AND BECOME FULLY INFORMED AS TO THE EXTENT OF WORK PRIOR TO BIDDING OR COMMENCING WORK. ANY DISCREPANCIES BETWEEN EXISTING CONDITIONS AND CONSTRUCTION DOCUMENTS SHALL BE REPORTED IMMEDIATELY TO THE ENGINEER AND/OR ARCHITECT.

B. THE CONTRACTOR IS FULLY RESPONSIBLE FOR PERFORMING THE DEMOLITION WORK UNDER THIS SECTION OF THE PROJECT IN FULL COMPLIANCE WITH ALL APPLICABLE LOCAL, STATE, AND FEDERAL CODES. IF THE CONTRACTOR DETERMINES THAT THE CONTRACT DOCUMENTS AND PLANS ARE NOT IN COMPLIANCE WITH THE APPLICABLE CODES, HE SHALL INFORM THE ARCHITECT PRIOR TO CONSTRUCTION START FOR DIRECTION. FAILURE TO DO SO SHALL NOT RELIEVE THE CONTRACTOR OF HIS RESPONSIBILITY TO MEET CODE REQUIREMENTS AND REWORK SHALL BE AT CONTRACTOR'S EXPENSE. APPLICABLE CODES AND STANDARDS ON DEMOLITION WORK SHALL INCLUDE THOSE PUBLISHED BY OSHA AND EPA. APPLICABLE CODES AND STANDARDS ON DEMOLITION WORK SHALL INCLUDE THOSE PUBLISHED BY OSHA AND EPA. AN ASBESTOS SURVEY SHALL BE KEPT ON SITE AT ALL TIMES PER TEXAS DEPARTMENT OF HEALTH REQUIREMENTS

C. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO COMPLETE THE NECESSARY DEMOLITION. CONTRACTOR SHALL PATCH AND REPAIR ALL BUILDING DAMAGE CREATED BY DEMOLITION WORK. PATCHING SHALL BE COMPLETED WITH THE SAME MATERIALS AS THE SURROUNDING AREAS.

D. ALL OPENINGS CUT IN MASONRY AND PLASTER WALLS OR CONCRETE FLOORS SHALL BE CORE-DRILLED OR SAWED WHEN POSSIBLE. CONTRACTOR SHALL CHECK BUILDING CONSTRUCTION WITH STRUCTURAL ENGINEER 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 AS REQUIRED BY DRAWINGS AND SPECIFICATIONS.

E. CONTRACTOR SHALL REMOVE AND RETURN ANY AND ALL EXISTING EQUIPMENT/MATERIALS TO OWNER. OWNER SHALL HAVE FULL RIGHT OF OWNERSHIP UNLESS SPECIFIED OTHERWISE. IF THE OWNER WAIVES THIS OPTION, ANY EQUIPMENT, MATERIAL, ETC SHALL BECOME THE PROPERTY OF THE CONTRACTOR.

GENERAL NOTES:

A. REFER TO SCHEDULE SHEET FOR ADDITIONAL GENERAL NOTES.

B. MECHANICAL CONTRACTOR SHALL COORDINATE WITH ALL OTHER TRADES TO MAINTAIN ACCESS CLEARANCES FOR ALL MECHANICAL EQUIPMENT.

C. MECHANICAL CONTRACTOR SHALL COORDINATE THE INSTALLATION OF ALL HVAC SYSTEMS WITH THE OWNER PRIOR TO THE DISRUPTION OF HVAC SERVICE TO THE FACILITY.

D. MECHANICAL CONTRACTOR SHALL FURNISH AND INSTALL ANY ADDITIONAL DUCTWORK REQUIRED TO ACCOMODATE NEW ROOF MOUNTED UNITS.

E. MECHANICAL CONTRACTOR SHALL REPLACE EXISTING THERMOSTATS/SENSORS WITH NEW, RE-USE EXISTING CONTROL WIRING.

F. ROOF CURBS SHALL BE GALVANIZED STEEL WITH MITERED AND WELDED CORNERS FURNISHED WITH WOOD NAILER AND 1-1/2-INCH THICK RIGID FIBERGLASS INSULATION ADHERED TO INSIDE WALL. SIZE AS REQUIRED TO SUIT ROOF OPENING AND EQUIPMENT BASE. SECURE ALL EQUIPMENT TO ROOF CURBS WITH CADMIUM PLATED HARDWARE.

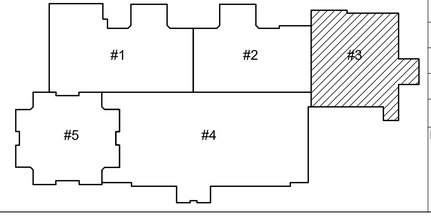
G. NEW ROOFTOP UNITS SHALL BE BALANCED TO THE AIR VOLUMES SHOWN ON THE ROOFTOP UNIT SCHEDULE. REFER TO SPECIFICATIONS.

H. EXISTING EQUIPMENT MODELS SHOWN ARE FROM GREENHECK.

I. REFER TO PLUMBING PLAN FOR NEW ROOF TOP UNIT FOOT PRINT.

KEY NOTES:

1. EXISTING ROOF TOP UNIT TO BE REMOVED AND REPLACED WITH NEW. REFER TO MECHANICAL SCHEDULES FOR UNIT PERFORMANCE. EXISTING ASSOCIATED DUCTWORK, CONTROLS WIRING, AND POWER SHALL REMAIN FOR RE-USE. FURNISH UNIT WITH NEW CURB ADAPTER.
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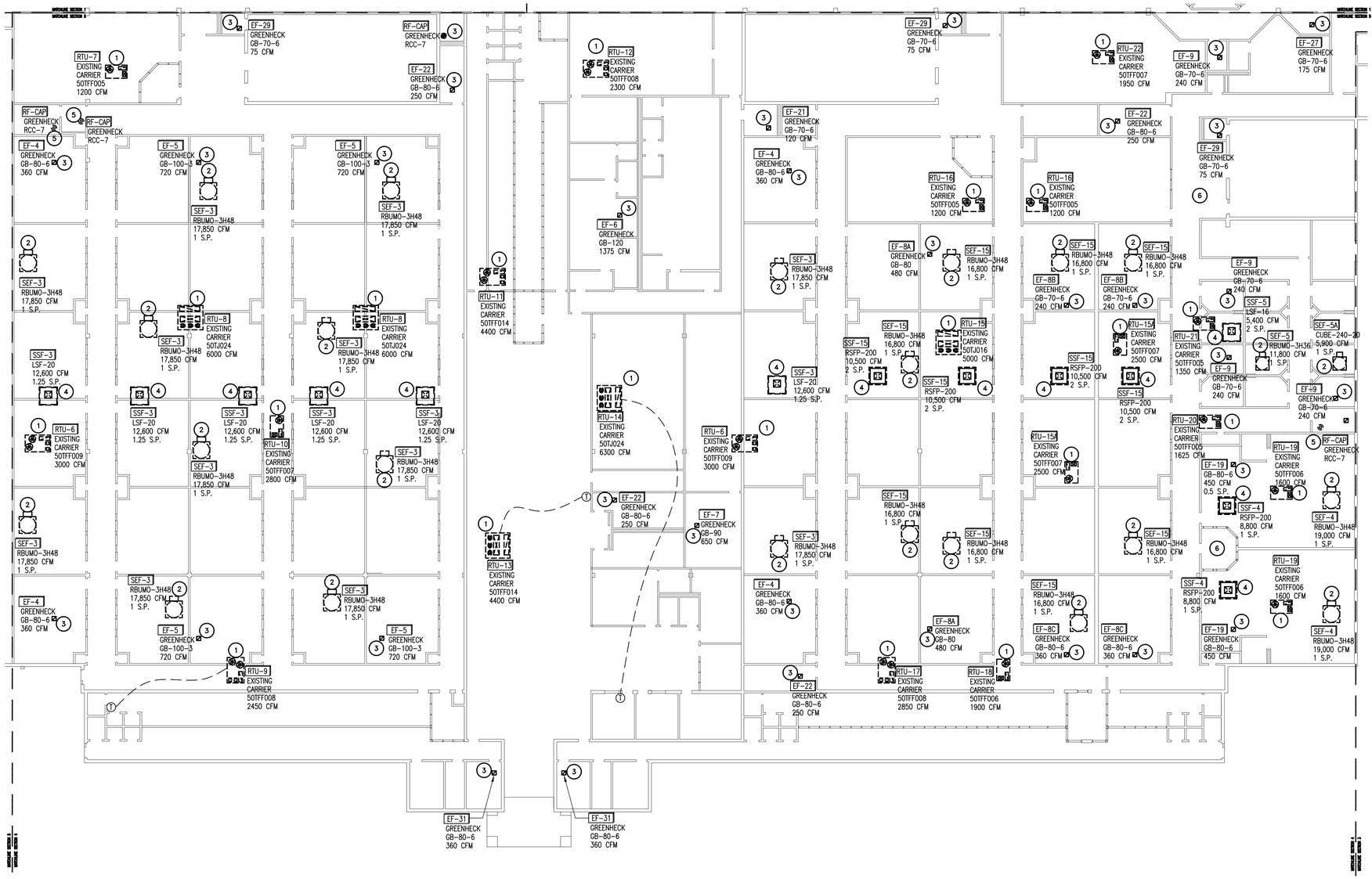
DRAWN BY: L.S.

CHECKED BY:J.P.

REVISION:

DRAWING NO:

M3.0



M.E.P. GENERAL DEMOLITION NOTES:

A. INFORMATION ON THIS PLAN HAS BEEN OBTAINED FROM EXISTING DRAWINGS AND SITE SURVEY. CONTRACTOR SHALL VERIFY EXISTING CONDITIONS AND BECOME FULLY INFORMED AS TO THE EXTENT OF WORK PRIOR TO BIDDING OR COMMENCING WORK. ANY DISCREPANCIES BETWEEN EXISTING CONDITIONS AND CONSTRUCTION DOCUMENTS SHALL BE REPORTED IMMEDIATELY TO THE ENGINEER AND/OR ARCHITECT.

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GENERAL NOTES:

A. REFER TO SCHEDULE SHEET FOR ADDITIONAL GENERAL NOTES.

B. MECHANICAL CONTRACTOR SHALL COORDINATE WITH ALL OTHER TRADES TO MAINTAIN ACCESS CLEARANCES FOR ALL MECHANICAL EQUIPMENT.

C. MECHANICAL CONTRACTOR SHALL COORDINATE THE INSTALLATION OF ALL HVAC SYSTEMS WITH THE OWNER PRIOR TO THE DISRUPTION OF HVAC SERVICE TO THE FACILITY.

D. MECHANICAL CONTRACTOR SHALL FURNISH AND INSTALL ANY ADDITIONAL DUCTWORK REQUIRED TO ACCOMODATE NEW ROOF MOUNTED UNITS.

E. MECHANICAL CONTRACTOR SHALL REPLACE EXISTING THERMOSTATS/SENSORS WITH NEW, RE-USE EXISTING CONTROL WIRING.

F. ROOF CURBS SHALL BE GALVANIZED STEEL WITH MITERED AND WELDED CORNERS FURNISHED WITH WOOD NAILER AND 1-1/2-INCH THICK RIGID FIBERGLASS INSULATION ADHERED TO INSIDE WALL. SIZE AS REQUIRED TO SUIT ROOF OPENING AND EQUIPMENT BASE. SECURE ALL EQUIPMENT TO ROOF CURBS WITH CADMIUM PLATED HARDWARE.

G. NEW ROOFTOP UNITS SHALL BE BALANCED TO THE AIR VOLUMES SHOWN ON THE ROOFTOP UNIT SCHEDULE. REFER TO SPECIFICATIONS.

H. EXISTING EQUIPMENT MODELS SHOWN ARE FROM GREENHECK.

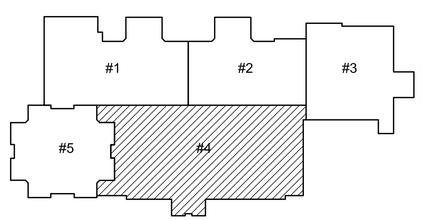
I. REFER TO PLUMBING PLAN FOR NEW ROOF TOP UNIT FOOT PRINT.

KEY NOTES:

1. EXISTING ROOF TOP UNIT TO BE REMOVED AND REPLACED WITH NEW. REFER TO MECHANICAL SCHEDULES FOR UNIT PERFORMANCE. EXISTING ASSOCIATED DUCTWORK, CONTROLS WIRING, AND POWER SHALL REMAIN FOR RE-USE. FURNISH UNIT WITH NEW CURB ADAPTER.
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6. THERMOSTATS SERVING HOUSING UNITS ARE LOCATED IN GUARD OFFICE. ASSOCIATED REMOTE TEMPERATURE SENSORS ARE LOCATED IN ASSOCIATED EXHAUST DUCT. (FIELD VERIFY)

NORTH

A MECHANICAL PLAN
SCALE: 1/16" = 1'-0" AREA #4



CHANIN ENGINEERING LLC
400 Nolana, Suite N24
McAllen, Texas 78504
PH: (956) 687-9421 FAX: (956) 687-3211
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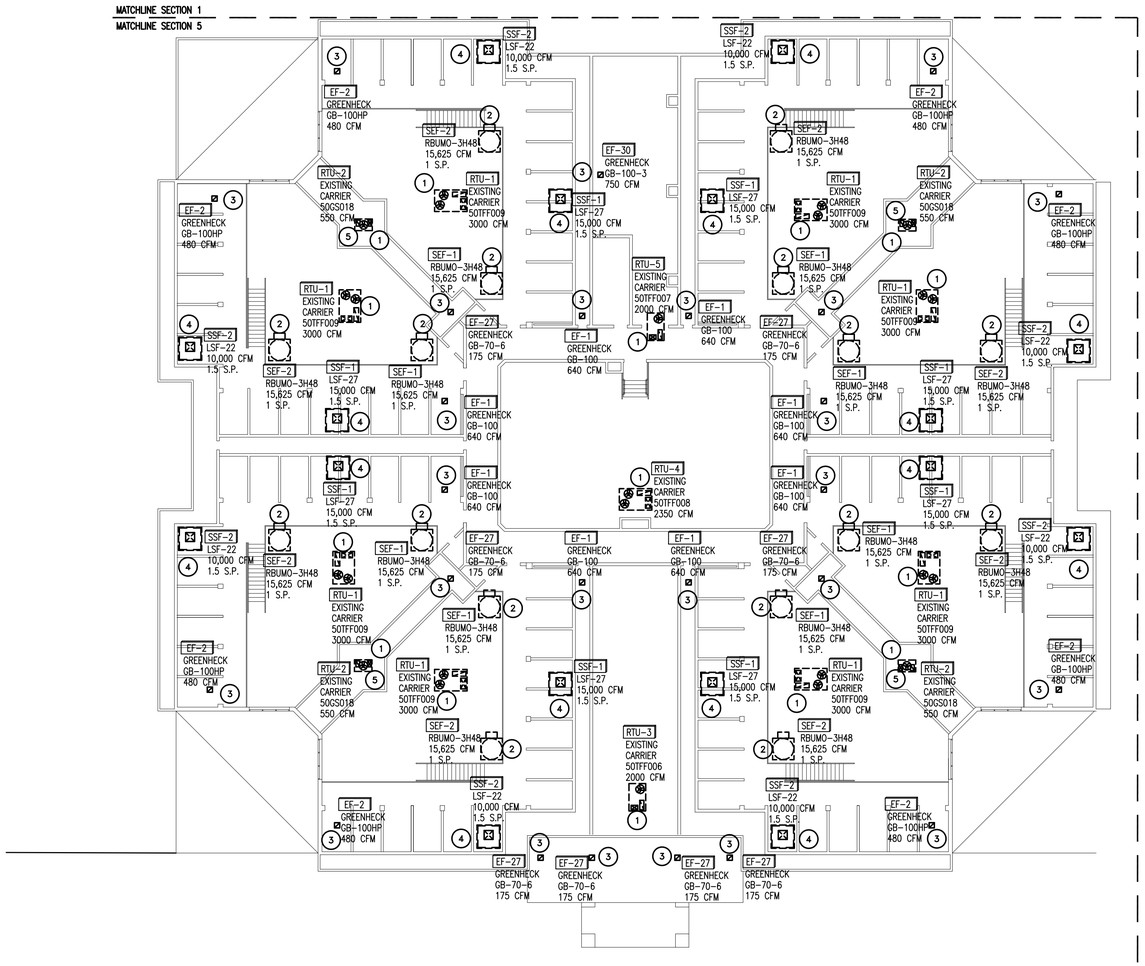
SEAL:
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PROJECT:
HIDALGO COUNTY
ADULT DETENTION CENTER and LAW ENFORCEMENT
FACILITY REPAIRS and/or REPLACEMENT
Edinburg, Texas

JOB NO. 13159
DATE: 11/15/13
DRAWN BY: L.S.
CHECKED BY:J.P.
REVISION:

DRAWING NO:
M4.0



NORTH

A 2nd FLOOR MECHANICAL PLAN

SCALE: 1/16" = 1'-0" AREA #5

M.E.P. GENERAL DEMOLITION NOTES:

A. INFORMATION ON THIS PLAN HAS BEEN OBTAINED FROM EXISTING DRAWINGS AND SITE SURVEY. CONTRACTOR SHALL VERIFY EXISTING CONDITIONS AND BECOME FULLY INFORMED AS TO THE EXTENT OF WORK PRIOR TO BIDDING OR COMMENCING WORK. ANY DISCREPANCIES BETWEEN EXISTING CONDITIONS AND CONSTRUCTION DOCUMENTS SHALL BE REPORTED IMMEDIATELY TO THE ENGINEER AND/OR ARCHITECT.

B. THE CONTRACTOR IS FULLY RESPONSIBLE FOR PERFORMING THE DEMOLITION WORK UNDER THIS SECTION OF THE PROJECT IN FULL COMPLIANCE WITH ALL APPLICABLE LOCAL, STATE, AND FEDERAL CODES. IF THE CONTRACTOR DETERMINES THAT THE CONTRACT DOCUMENTS AND PLANS ARE NOT IN COMPLIANCE WITH THE APPLICABLE CODES, HE SHALL INFORM THE ARCHITECT PRIOR TO CONSTRUCTION START FOR DIRECTION. FAILURE TO DO SO SHALL NOT RELIEVE THE CONTRACTOR OF HIS RESPONSIBILITY TO MEET CODE REQUIREMENTS AND REWORK SHALL BE AT CONTRACTOR'S EXPENSE. APPLICABLE CODES AND STANDARDS ON DEMOLITION WORK SHALL INCLUDE THOSE PUBLISHED BY OSHA AND EPA. APPLICABLE CODES AND STANDARDS ON DEMOLITION WORK SHALL INCLUDE THOSE PUBLISHED BY OSHA AND EPA. AN ASBESTOS SURVEY SHALL BE KEPT ON SITE AT ALL TIMES PER TEXAS DEPARTMENT OF HEALTH REQUIREMENTS

C. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO COMPLETE THE NECESSARY DEMOLITION. CONTRACTOR SHALL PATCH AND REPAIR ALL BUILDING DAMAGE CREATED BY DEMOLITION WORK. PATCHING SHALL BE COMPLETED WITH THE SAME MATERIALS AS THE SURROUNDING AREAS.

D. ALL OPENINGS CUT IN MASONRY AND PLASTER WALLS OR CONCRETE FLOORS SHALL BE CORE-DRILLED OR SAWED WHEN POSSIBLE. CONTRACTOR SHALL CHECK BUILDING CONSTRUCTION WITH STRUCTURAL ENGINEER 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 AS REQUIRED BY DRAWINGS AND SPECIFICATIONS.

E. CONTRACTOR SHALL REMOVE AND RETURN ANY AND ALL EXISTING EQUIPMENT/MATERIALS TO OWNER. OWNER SHALL HAVE FULL RIGHT OF OWNERSHIP UNLESS SPECIFIED OTHERWISE. IF THE OWNER WAVES THIS OPTION, ANY EQUIPMENT, MATERIAL, ETC SHALL BECOME THE PROPERTY OF THE CONTRACTOR.

GENERAL NOTES:

A. REFER TO SCHEDULE SHEET FOR ADDITIONAL GENERAL NOTES.

B. MECHANICAL CONTRACTOR SHALL COORDINATE WITH ALL OTHER TRADES TO MAINTAIN ACCESS CLEARANCES FOR ALL MECHANICAL EQUIPMENT.

C. MECHANICAL CONTRACTOR SHALL COORDINATE THE INSTALLATION OF ALL HVAC SYSTEMS WITH THE OWNER PRIOR TO THE DISRUPTION OF HVAC SERVICE TO THE FACILITY.

D. MECHANICAL CONTRACTOR SHALL FURNISH AND INSTALL ANY ADDITIONAL DUCTWORK REQUIRED TO ACCOMODATE NEW ROOF MOUNTED UNITS.

E. MECHANICAL CONTRACTOR SHALL REPLACE EXISTING THERMOSTATS/SENSORS WITH NEW, RE-USE EXISTING CONTROL WIRING.

F. ROOF CURBS SHALL BE GALVANIZED STEEL WITH MITERED AND WELDED CORNERS FURNISHED WITH WOOD NAILER AND 1-1/2-INCH THICK RIGID FIBERGLASS INSULATION ADHERED TO INSIDE WALL. SIZE AS REQUIRED TO SUIT ROOF OPENING AND EQUIPMENT BASE. SECURE ALL EQUIPMENT TO ROOF CURBS WITH CADMIUM PLATED HARDWARE.

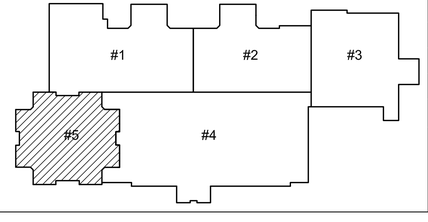
G. NEW ROOFTOP UNITS SHALL BE BALANCED TO THE AIR VOLUMES SHOWN ON THE ROOFTOP UNIT SCHEDULE. REFER TO SPECIFICATIONS.

H. EXISTING EQUIPMENT MODELS SHOWN ARE FROM GREENHECK.

I. REFER TO PLUMBING PLAN FOR NEW ROOF TOP UNIT FOOT PRINT.

KEY NOTES:

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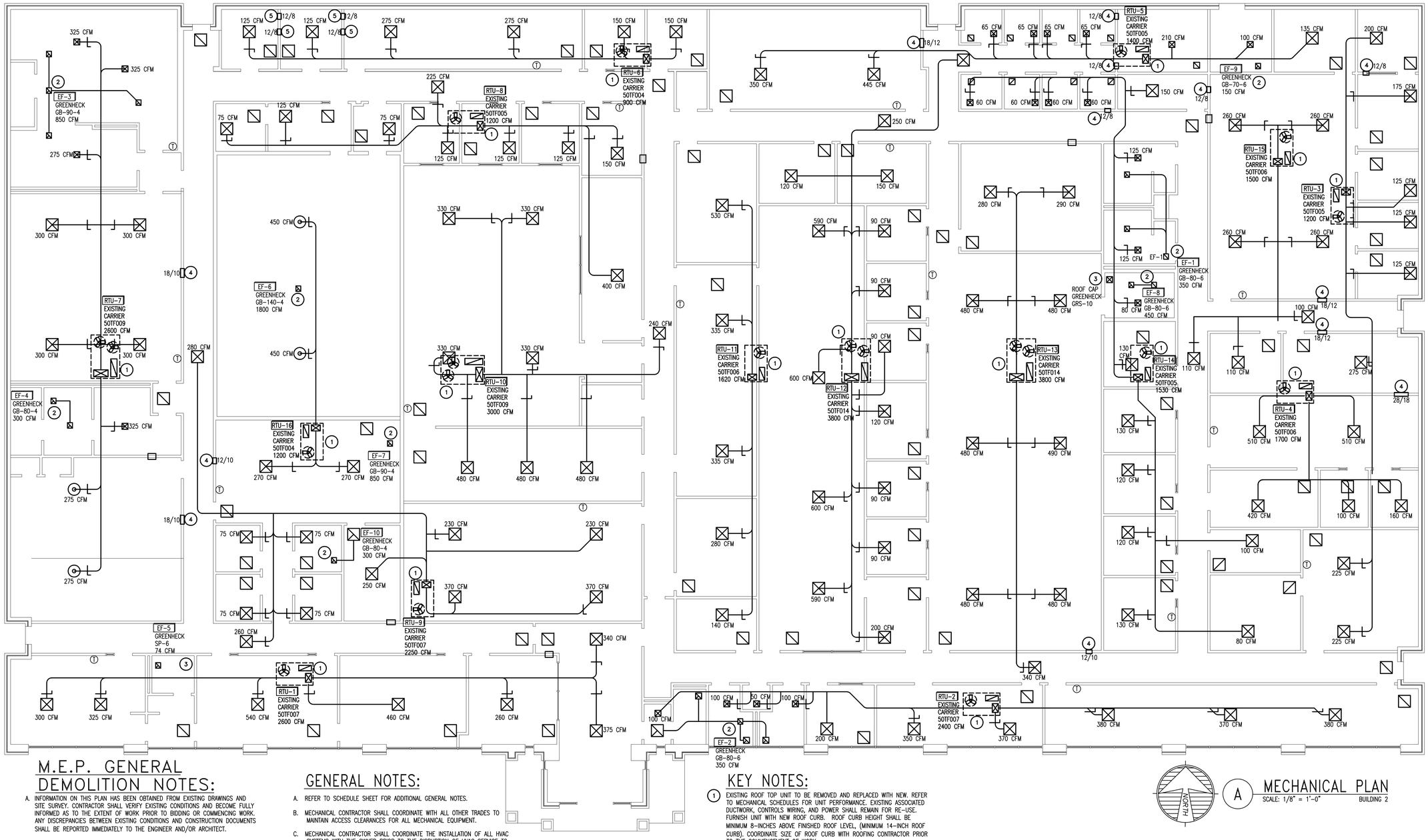
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JOB NO. 13159
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DRAWN BY: L.S.
CHECKED BY:J.P.
REVISION:

DRAWING NO:
M5.0



A MECHANICAL PLAN
SCALE: 1/8" = 1'-0" BUILDING 2

M.E.P. GENERAL DEMOLITION NOTES:

A. INFORMATION ON THIS PLAN HAS BEEN OBTAINED FROM EXISTING DRAWINGS AND SITE SURVEY. CONTRACTOR SHALL VERIFY EXISTING CONDITIONS AND BECOME FULLY INFORMED AS TO THE EXTENT OF WORK PRIOR TO BIDDING OR COMMENCING WORK. ANY DISCREPANCIES BETWEEN EXISTING CONDITIONS AND CONSTRUCTION DOCUMENTS SHALL BE REPORTED IMMEDIATELY TO THE ENGINEER AND/OR ARCHITECT.

B. THE CONTRACTOR IS FULLY RESPONSIBLE FOR PERFORMING THE DEMOLITION WORK UNDER THIS SECTION OF THE PROJECT IN FULL COMPLIANCE WITH ALL APPLICABLE LOCAL, STATE, AND FEDERAL CODES. IF THE CONTRACTOR DETERMINES THAT THE CONTRACT DOCUMENTS AND PLANS ARE NOT IN COMPLIANCE WITH THE APPLICABLE CODES, HE SHALL INFORM THE ARCHITECT PRIOR TO CONSTRUCTION START FOR DIRECTION. FAILURE TO DO SO SHALL NOT RELIEVE THE CONTRACTOR OF HIS RESPONSIBILITY TO MEET CODE REQUIREMENTS AND REWORK SHALL BE AT CONTRACTOR'S EXPENSE. APPLICABLE CODES AND STANDARDS ON DEMOLITION WORK SHALL INCLUDE THOSE PUBLISHED BY OSHA AND EPA. APPLICABLE CODES AND STANDARDS ON DEMOLITION WORK SHALL INCLUDE THOSE PUBLISHED BY OSHA AND EPA. AN ASBESTOS SURVEY SHALL BE KEPT ON SITE AT ALL TIMES PER TEXAS DEPARTMENT OF HEALTH REQUIREMENTS

C. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO COMPLETE THE NECESSARY DEMOLITION. CONTRACTOR SHALL PATCH AND REPAIR ALL BUILDING DAMAGE CREATED BY DEMOLITION WORK. PATCHING SHALL BE COMPLETED WITH THE SAME MATERIALS AS THE SURROUNDING AREAS.

D. ALL OPENINGS CUT IN MASONRY AND PLASTER WALLS OR CONCRETE FLOORS SHALL BE CORE-DRILLED OR SAWED WHEN POSSIBLE. CONTRACTOR SHALL CHECK BUILDING CONSTRUCTION WITH STRUCTURAL ENGINEER 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 AS REQUIRED BY DRAWINGS AND SPECIFICATIONS.

E. CONTRACTOR SHALL REMOVE AND RETURN ANY AND ALL EXISTING EQUIPMENT/MATERIALS TO OWNER. OWNER SHALL HAVE FULL RIGHT OF OWNERSHIP UNLESS SPECIFIED OTHERWISE. IF THE OWNER WAIVES THIS OPTION, ANY EQUIPMENT, MATERIAL, ETC SHALL BECOME THE PROPERTY OF THE CONTRACTOR.

GENERAL NOTES:

A. REFER TO SCHEDULE SHEET FOR ADDITIONAL GENERAL NOTES.

B. MECHANICAL CONTRACTOR SHALL COORDINATE WITH ALL OTHER TRADES TO MAINTAIN ACCESS CLEARANCES FOR ALL MECHANICAL EQUIPMENT.

C. MECHANICAL CONTRACTOR SHALL COORDINATE THE INSTALLATION OF ALL HVAC SYSTEMS WITH THE OWNER PRIOR TO THE DISRUPTION OF HVAC SERVICE TO THE FACILITY.

D. MECHANICAL CONTRACTOR SHALL FURNISH AND INSTALL ANY ADDITIONAL DUCTWORK REQUIRED TO ACCOMODATE NEW ROOF MOUNTED UNITS.

E. MECHANICAL CONTRACTOR SHALL REPLACE EXISTING THERMOSTATS/SENSORS WITH NEW, RE-USE EXISTING CONTROL WIRING.

F. ROOF CURBS SHALL BE GALVANIZED STEEL WITH MITERED AND WELDED CORNERS FURNISHED WITH WOOD NAILER AND 1-1/2-INCH THICK RIGID FIBERGLASS INSULATION ADHERED TO INSIDE WALL. SIZE AS REQUIRED TO SUIT ROOF OPENING AND EQUIPMENT BASE. SECURE ALL EQUIPMENT TO ROOF CURBS WITH CADMIUM PLATED HARDWARE.

G. NEW ROOFTOP UNITS AND ASSOCIATED EXISTING AIR DEVICES SHALL BE BALANCED TO THE AIR VOLUMES SHOWN. REFER TO SPECIFICATIONS.

H. EXISTING EQUIPMENT MODELS SHOWN ARE FROM GREENHECK.

I. REFER TO PLUMBING PLAN FOR NEW ROOF TOP UNIT FOOT PRINT.

KEY NOTES:

1. EXISTING ROOF TOP UNIT TO BE REMOVED AND REPLACED WITH NEW. REFER TO MECHANICAL SCHEDULES FOR UNIT PERFORMANCE. EXISTING ASSOCIATED DUCTWORK, CONTROLS WIRING, AND POWER SHALL REMAIN FOR RE-USE. FURNISH UNIT WITH NEW ROOF CURB. ROOF CURB HEIGHT SHALL BE MINIMUM 8-INCHES ABOVE FINISHED ROOF LEVEL, (MINIMUM 14-INCH ROOF CURB). COORDINATE SIZE OF ROOF CURB WITH ROOFING CONTRACTOR PRIOR TO THE COMMENCEMENT OF WORK.
2. EXISTING GENERAL EXHAUST FAN SHALL BE PROVIDED WITH NEW 14-INCH ROOF CURB. ROOF CURB HEIGHT SHALL BE A MINIMUM OF 8-INCHES ABOVE FINISHED ROOF LEVEL, (MINIMUM 14-INCH ROOF CURB). COORDINATE SIZE OF ROOF CURB WITH ROOFING CONTRACTOR PRIOR TO THE COMMENCEMENT OF WORK.
3. EXISTING ROOF HOOD SHALL BE PROVIDED WITH NEW 14-INCH ROOF CURB. ROOF CURB HEIGHT SHALL BE A MINIMUM OF 8-INCHES ABOVE FINISHED ROOF LEVEL, (MINIMUM 14-INCH ROOF CURB). COORDINATE SIZE OF ROOF CURB WITH ROOFING CONTRACTOR PRIOR TO THE COMMENCEMENT OF WORK.
4. PROVIDE AND INSTALL RETURN AIR OPENING ABOVE CEILING AND FURNISH WITH FIRE SMOKE DAMPER. TIE-IN TO EXISTING FIRE ALARM CONTROL.
5. PROVIDE AND INSTALL RETURN AIR OPENING ABOVE CEILING AND FURNISH WITH FIRE SMOKE DAMPER.

CHANIN ENGINEERING LLC
400 Nolana, Suite N24
McAllen, Texas 78504
PH: (956) 687-9421 FAX: (956) 687-3211
TBPE FIRM REG. NUMBER F-9369

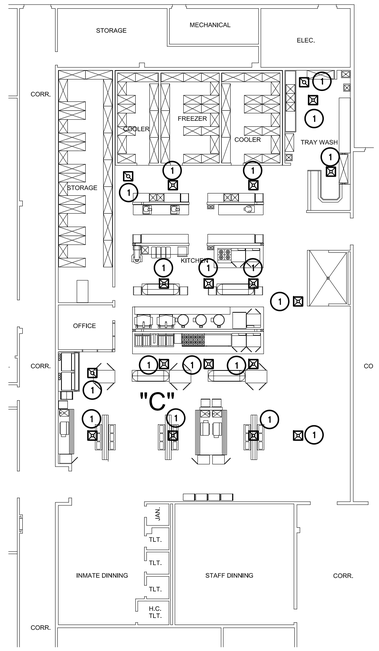
SEAL:
STATE OF TEXAS
LUIS JAVIER PENA
97260
LICENSED PROFESSIONAL ENGINEER
11.15.2013

MEP SOLUTIONS ENGINEERING
MECHANICAL, ELECTRICAL, PLUMBING ENGINEERS
600 E. BEAUMONT AVE. SUITE 2 McALLEN, TX. 78501 (956) 664-2727
TEXAS BOARD OF PROFESSIONAL ENGINEERS REGISTRATION # F-9746

PROJECT:
HIDALGO COUNTY
ADULT DETENTION CENTER and LAW ENFORCEMENT FACILITY REPAIRS and/or REPLACEMENT
Edinburg, Texas

JOB NO. 13159
DATE: 11/15/13
DRAWN BY: L.S.
CHECKED BY:J.P.
REVISION:

DRAWING NO:
M6.0

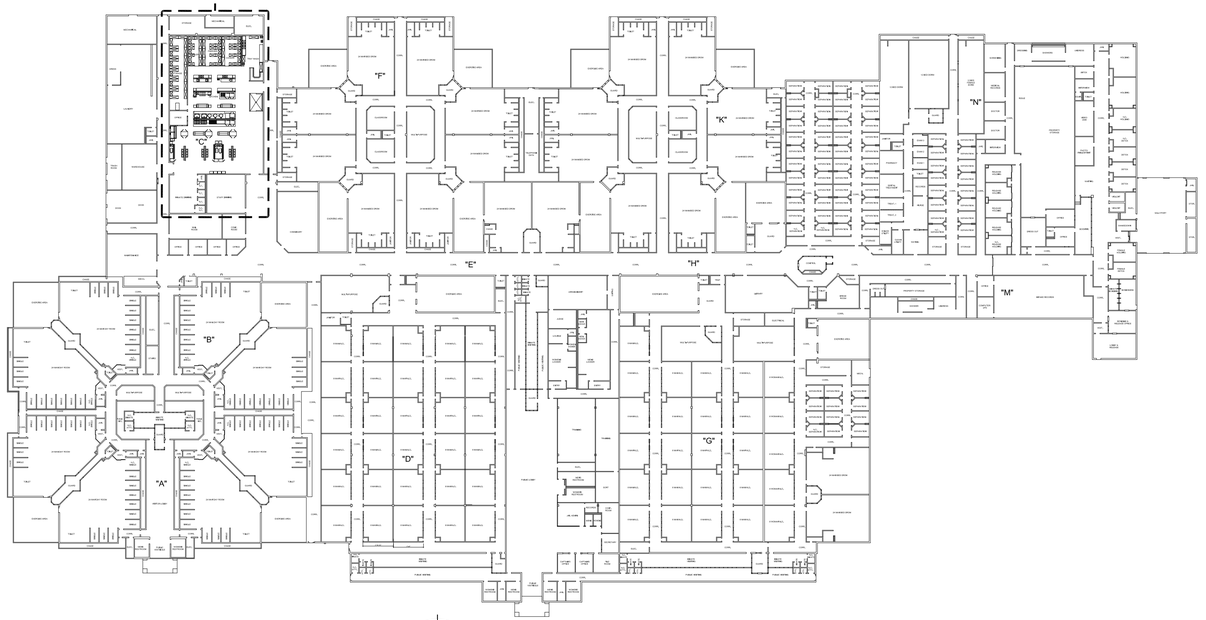


NORTH

B ENLARGED MECHANICAL PLAN

SCALE: 1/16" = 1'-0" ALTERNATE – KITCHEN A.D.C. BLDG

B
M7.0



NORTH

A MECHANICAL PLAN

SCALE: 1" = 50'-0" OVERALL A.D.C. BLDG

M.E.P. GENERAL DEMOLITION NOTES:

A. INFORMATION ON THIS PLAN HAS BEEN OBTAINED FROM EXISTING DRAWINGS AND SITE SURVEY. CONTRACTOR SHALL VERIFY EXISTING CONDITIONS AND BECOME FULLY INFORMED AS TO THE EXTENT OF WORK PRIOR TO BIDDING OR COMMENCING WORK. ANY DISCREPANCIES BETWEEN EXISTING CONDITIONS AND CONSTRUCTION DOCUMENTS SHALL BE REPORTED IMMEDIATELY TO THE ENGINEER AND/OR ARCHITECT.

B. THE CONTRACTOR IS FULLY RESPONSIBLE FOR PERFORMING THE DEMOLITION WORK UNDER THIS SECTION OF THE PROJECT IN FULL COMPLIANCE WITH ALL APPLICABLE LOCAL, STATE, AND FEDERAL CODES. IF THE CONTRACTOR DETERMINES THAT THE CONTRACT DOCUMENTS AND PLANS ARE NOT IN COMPLIANCE WITH THE APPLICABLE CODES, HE SHALL INFORM THE ARCHITECT PRIOR TO CONSTRUCTION START FOR DIRECTION. FAILURE TO DO SO SHALL NOT RELIEVE THE CONTRACTOR OF HIS RESPONSIBILITY TO MEET CODE REQUIREMENTS AND REWORK SHALL BE AT CONTRACTOR'S EXPENSE. APPLICABLE CODES AND STANDARDS ON DEMOLITION WORK SHALL INCLUDE THOSE PUBLISHED BY OSHA AND EPA. APPLICABLE CODES AND STANDARDS ON DEMOLITION WORK SHALL INCLUDE THOSE PUBLISHED BY OSHA AND EPA. AN ASBESTOS SURVEY SHALL BE KEPT ON SITE AT ALL TIMES PER TEXAS DEPARTMENT OF HEALTH REQUIREMENTS

C. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO COMPLETE THE NECESSARY DEMOLITION. CONTRACTOR SHALL PATCH AND REPAIR ALL BUILDING DAMAGE CREATED BY DEMOLITION WORK. PATCHING SHALL BE COMPLETED WITH THE SAME MATERIALS AS THE SURROUNDING AREAS.

D. ALL OPENINGS CUT IN MASONRY AND PLASTER WALLS OR CONCRETE FLOORS SHALL BE CORE-DRILLED OR SAWED WHEN POSSIBLE. CONTRACTOR SHALL CHECK BUILDING CONSTRUCTION WITH STRUCTURAL ENGINEER 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 AS REQUIRED BY DRAWINGS AND SPECIFICATIONS.

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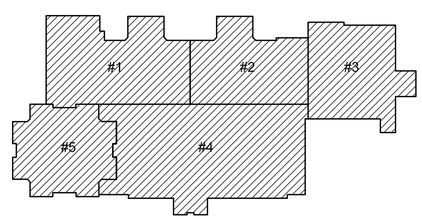
E. MECHANICAL CONTRACTOR SHALL REPLACE EXISTING THERMOSTATS/SENSORS WITH NEW, RE-USE EXISTING CONTROL WIRING.

F. ROOF CURBS SHALL BE GALVANIZED STEEL WITH MITERED AND WELDED CORNERS FURNISHED WITH WOOD NAILER AND 1-1/2-INCH THICK RIGID FIBERGLASS INSULATION ADHERED TO INSIDE WALL. SIZE AS REQUIRED TO SUIT ROOF OPENING AND EQUIPMENT BASE. SECURE ALL EQUIPMENT TO ROOF CURBS WITH CADMIUM PLATED HARDWARE.

G. NEW ROOFTOP UNITS SHALL BE BALANCED TO THE AIR VOLUMES SHOWN ON THE ROOFTOP UNIT SCHEDULE. REFER TO SPECIFICATIONS.

KEY NOTES:

(1) AS AN ALTERNATE, EXISTING SUPPLY AND RETURN AIR DEVICE SHALL BE REPLACED WITH NEW. SUPPLY AIR DEVICES SHALL BE EQUAL TO A TITUS MODEL PAS WITH LAY-IN BORDER AND 12-INCH DIAMETER NECKS. RETURN AIR DEVICES SHALL BE EQUAL TO A TITUS MODEL PAR WITH LAY-IN BORDER. PROVIDE UNIT PRICING FOR EACH AIR DEVICE (TO INCLUDE LABOR) AS OUTLINED IN ARCHITECTURAL SPECIFICATIONS.



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PROJECT:

HIDALGO COUNTY
ADULT DETENTION CENTER and LAW ENFORCEMENT
FACILITY REPAIRS and/or REPLACEMENT
Edinburg, Texas

JOB NO. 13159
DATE: 11/15/13
DRAWN BY: L.S.
CHECKED BY:J.P.
REVISION:

DRAWING NO:

M7.0

ROOF TOP UNIT SCHEDULE – ADULT DETENTION CENTER

ROOF TOP UNIT DESIGNATION	RTU-1	RTU-2	RTU-3	RTU-4	RTU-5	RTU-6	RTU-7	RTU-8	RTU-9	RTU-10
SUPPLY CFM	3000	550	2000	2350	2000	3000	1200	6000	2450	2800
OUTSIDE AIR CFM	1000	50	105	380	390	765	330	1485	380	30
EXTERNAL S.P. ("W.G.)	1.5	0.5	0.75	1.5	0.65	0.5	0.5	1.5	1.5	0.75
MOTOR HP.	3	1	2	2	2	2	1	5	2	3
TOTAL CAPACITY (MBH)	122.29	18.39	51.44	70.79	59.56	103.51	49.63	212.12	78.53	77.78
SENSIBLE CAPACITY (MBH)	91.43	14.53	46.99	60.62	51.33	84.84	35.71	171.99	62.29	64.43
ENTERING AIR (DB/WB)°F	82/67	77/64	76/63	79/65	79/65	81/66	81/67	81/66	78/65	75/63
LEAVING AIR (DB/WB)°F	54.3/53.52	52.97/52.43	55.57/54.55	57.17/55.61	56.34/55.35	54.95/54.45	53.83/53.16	55.15/54.38	55.41/54.49	54.43/53.65
CONDENSER AIR (DB)°F	98	98	98	98	98	98	98	98	98	98
HEATER CAPACITY (KW)	20	7.5	10	10	10	20	10	40	10	10
STAGES	2	1	1	1	1	2	1	4	1	1
VOLTAGE/PHASE	480/3ø	208/1ø	480/3ø	480/3ø	480/3ø	480/3ø	480/3ø	480/3ø	480/3ø	480/3ø
MOCP	40	60	20	25	20	35	20	70	25	25
MANUFACTURER	AAON	AAON	AAON	AAON	AAON	AAON	AAON	AAON	AAON	AAON
MODEL	RN-011	RQ-001	RQ-004	RQ-006	RQ-005	RN-009	RQ-004	RN-018	RN-007	RN-007
UNIT WEIGHT (LBS)	1651	771	883	899	898	1700	845	2567	1109	1126
EFFICIENCY EER (SEER)	12.1	15.6	17.4	12.4	17.45	13.8	17.4	12.4	12.6	12.6
REMARKS	1 THRU 13	1 THRU 13	1 THRU 13	1 THRU 13	1 THRU 13	1 THRU 13	1 THRU 13	1 THRU 13	1 THRU 13	1 THRU 13

REMARKS
1. PROVIDE WITH NEW UNIVERSAL PROGRAMMABLE THERMOSTAT (2-STAGE) WITH AUTO CHANGEOVER AND REMOTE TEMPERATURE SENSOR.
2. PROVIDE WITH SINGLE POINT POWER, DISCONNECT, AND 120-VOLT RECEPTACLE.
3. PROVIDE WITH CURB ADAPTER.
4. PROVIDE WITH HINGED ACCESS DOORS.
5. PROVIDE WITH OUTSIDE AIR HOOD AND 2-POSITION MOTORIZED DAMPER.
6. PROVIDE WITH 6-ROW COIL, MODULATING HOT-GAS REHEAT, AND HUMIDITY CONTROL.
7. PROVIDE WITH CONDENSER COIL HAIL GUARDS.
8. PROVIDE WITH LOW AMBIENT CONTROL TO 35°F.
9. PROVIDE WITH FACTORY APPLIED FULLY DIPPED CONDENSER E-COATING WITH 6,000 HR SALT SPRAY RATING PER ASTM B117-90.
10. EXTERIOR PAINT FINISH SHALL BE CAPABLE WITHSTANDING AT LEAST 2,500 HOURS SALT SPRAY AND FOG ATMOSPHERE PER ASTM B 117-95.
11. PROVIDE UNIT WITH 2-INCH DOUBLE WALL CONSTRUCTION WITH R-13 FOAM INSULATION AND THERMAL BREAK. COMPRESSORS AND CONTROLS SHALL BE HOUSED INSIDE CLIMATE CONTROLLED CABINET.
12. REFER TO SPECIFICATIONS FOR COMPRESSOR REQUIREMENTS.
13. PROVIDE SEPERATE HUMIDITY SENSOR IN RETURN AIR DUCT AND TIE-IN TO DEHUMIDIFICATION CONTROLLER.

ROOF TOP UNIT SCHEDULE – ADULT DETENTION CENTER

ROOF TOP UNIT DESIGNATION	RTU-21	RTU-22	RTU-23	RTU-24	RTU-25	RTU-26	RTU-27	RTU-28	RTU-29	RTU-30
SUPPLY CFM	1350	1950	1500	1650	1500	2000	2300	4600	1510	1200
OUTSIDE AIR CFM	180	510	105	75	150	90	660	300	195	375
EXTERNAL S.P. ("W.G.)	2	1	1	1	1	1	1	1	0.5	0.5
MOTOR HP.	1	2	1	2	1	2	1	5	1	1
TOTAL CAPACITY (MBH)	36.31	70.17	49.41	49.80	49.41	51.44	95.50	127.23	49.44	49.61
SENSIBLE CAPACITY (MBH)	33.43	56.44	39.32	41.73	39.32	46.99	68.60	111.23	41.05	36.95
ENTERING AIR (DB/WB)°F	78/64	81/66	77/64	76/63	77/64	76/63	81/67	76/63	78/64	82/67
LEAVING AIR (DB/WB)°F	56.90/55.57	55.41/54.27	53.98/52.97	53.91/52.89	53.98/53.97	55.77/54.64	54.00/53.19	54.35/53.68	53.57/52.82	53.80/53.13
CONDENSER AIR (DB)°F	98	98	98	98	98	98	98	98	98	98
HEATER CAPACITY (KW)	10	10	10	10	10	10	10	30	10	10
STAGES	1	1	1	1	1	1	1	3	1	1
VOLTAGE/PHASE	480/3ø	480/3ø	480/3ø	480/3ø	480/3ø	480/3ø	480/3ø	480/3ø	480/3ø	480/3ø
MOCP	20	25	20	20	20	20	30	60	20	20
MANUFACTURER	AAON	AAON	AAON	AAON	AAON	AAON	AAON	AAON	AAON	AAON
MODEL	RQ-003	RQ-006	RQ-004	RQ-004	RQ-004	RQ-004	RN-008	RN-011	RQ-004	RQ-004
UNIT WEIGHT (LBS)	765	899	845	883	845	883	1138	1717	845	845
EFFICIENCY EER (SEER)	18.2	12.4	17.4	17.4	17.4	17.4	11.9	12.7	17.4	17.4
REMARKS	1 THRU 13	1 THRU 13	1 THRU 13	1 THRU 13	1 THRU 13	1 THRU 13	1 THRU 13	1 THRU 13	1 THRU 13	1 THRU 13

REMARKS
1. PROVIDE WITH NEW UNIVERSAL PROGRAMMABLE THERMOSTAT (2-STAGE) WITH AUTO CHANGEOVER AND REMOTE TEMPERATURE SENSOR.
2. PROVIDE WITH SINGLE POINT POWER, DISCONNECT, AND 120-VOLT RECEPTACLE.
3. PROVIDE WITH CURB ADAPTER.
4. PROVIDE WITH HINGED ACCESS DOORS.
5. PROVIDE WITH OUTSIDE AIR HOOD AND 2-POSITION MOTORIZED DAMPER.
6. PROVIDE WITH 6-ROW COIL, MODULATING HOT-GAS REHEAT, AND HUMIDITY CONTROL.
7. PROVIDE WITH CONDENSER COIL HAIL GUARDS.
8. PROVIDE WITH LOW AMBIENT CONTROL TO 35°F.
9. PROVIDE WITH FACTORY APPLIED FULLY DIPPED CONDENSER E-COATING WITH 6,000 HR SALT SPRAY RATING PER ASTM B117-90.
10. EXTERIOR PAINT FINISH SHALL BE CAPABLE WITHSTANDING AT LEAST 2,500 HOURS SALT SPRAY AND FOG ATMOSPHERE PER ASTM B 117-95.
11. PROVIDE UNIT WITH 2-INCH DOUBLE WALL CONSTRUCTION WITH R-13 FOAM INSULATION AND THERMAL BREAK. COMPRESSORS AND CONTROLS SHALL BE HOUSED INSIDE CLIMATE CONTROLLED CABINET.
12. REFER TO SPECIFICATIONS FOR COMPRESSOR REQUIREMENTS.
13. PROVIDE SEPERATE HUMIDITY SENSOR IN RETURN AIR DUCT AND TIE-IN TO DEHUMIDIFICATION CONTROLLER.

ROOF TOP UNIT SCHEDULE – ADULT DETENTION CENTER

ROOF TOP UNIT DESIGNATION	RTU-11	RTU-12	RTU-13	RTU-14	RTU-15	RTU-15A	RTU-16	RTU-17	RTU-18	RTU-19	RTU-20
SUPPLY CFM	3600	2300	4400	6300	5000	2500	1200	2850	1900	1600	1625
OUTSIDE AIR CFM	1650	750	420	1125	1275	600	330	380	45	360	30
EXTERNAL S.P. ("W.G.)	0.5	0.75	1	1.5	2	1	0.5	1.5	0.75	1	0.5
MOTOR HP.	3	1	5	5	5	3	1	3	2	1	1
TOTAL CAPACITY (MBH)	183.54	95.65	128.43	210.57	187.89	95.81	49.63	94.86	50.96	52.10	49.26
SENSIBLE CAPACITY (MBH)	126.04	71.05	108.07	170.97	147.95	72.14	35.71	78.08	45.48	42.36	41.18
ENTERING AIR (DB/WB)°F	85/69	82/67	77/64	79/65	81/66	80/66	81/67	78/64	76/63	80/66	75/63
LEAVING AIR (DB/WB)°F	52.37/51.38	53.58/52.98	54.91/54.27	54.72/53.93	54.84/53.68	53.96/53.16	53.83/53.16	53.68/52.83	55.10/54.12	56.63/55.57	53.46/52.67
CONDENSER AIR (DB)°F	98	98	98	98	98	98	98	98	98	98	98
HEATER CAPACITY (KW)	20	10	20	40	30	10	10	10	10	10	10
STAGES	2	1	2	4	3	1	1	1	1	1	1
VOLTAGE/PHASE	480/3ø	480/3ø	480/3ø	480/3ø	480/3ø	480/3ø	480/3ø	480/3ø	480/3ø	480/3ø	480/3ø
MOCP	45	30	40	70	60	30	20	35	20	20	20
MANUFACTURER	AAON	AAON	AAON	AAON	AAON	AAON	AAON	AAON	AAON	AAON	AAON
MODEL	RN-015	RN-008	RN-011	RN-018	RN-015	RN-008	RQ-004	RN-008	RQ-004	RQ-004	RQ-004
UNIT WEIGHT (LBS)	1866	1145	1711	2567	1830	1166	845	1169	883	845	845
EFFICIENCY EER (SEER)	11.6	12.5	12.7	12.4	11.6	12.5	17.4	11.9	17.4	17.4	17.4
REMARKS	1 THRU 13	1 THRU 13	1 THRU 13	1 THRU 13	1 THRU 13	1 THRU 13	1 THRU 13	1 THRU 13	1 THRU 13	1 THRU 13	1 THRU 13

REMARKS
1. PROVIDE WITH NEW UNIVERSAL PROGRAMMABLE THERMOSTAT (2-STAGE) WITH AUTO CHANGEOVER AND REMOTE TEMPERATURE SENSOR.
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ROOF TOP UNIT SCHEDULE – ADULT DETENTION CENTER

ROOF TOP UNIT DESIGNATION	RTU-31	RTU-32	RTU-33	RTU-34	RTU-35	RTU-36	RTU-37	RTU-38	RTU-39	RTU-40
SUPPLY CFM	1400	1200	1400	1200	2300	1400	2400	1400	3200	2400
OUTSIDE AIR CFM	180	240	180	180	420	180	375	30	120	525
EXTERNAL S.P. ("W.G.)	.75	2	.75	0.5	0.5	.75	2	.75	.75	0.5
MOTOR HP.	1	1	1	1	1	1	2	1	2	1
TOTAL CAPACITY (MBH)	51.33	48.27	51.33	36.27	73.02	51.33	73.73	35.93	73.76	94.78
SENSIBLE CAPACITY (MBH)	40.46	36.01	40.46	29.73	60.54	40.46	59.63	31.34	70.30	70.42
ENTERING AIR (DB/WB)°F	82/67	79/65	78/64	78/65	79/65	78/64	78/65	75/63	76/63	80/66
LEAVING AIR (DB/WB)°F	55.92/55.05	53.14/51.66	55.92/55.05	55.60/54.97	54.86/54.36	55.92/55.05	56.24/55.16	55.07/54.45	56.51/55.44	53.18/52.57
CONDENSER AIR (DB)°F	98	98	98	98	98	98	98	98	98	98
HEATER CAPACITY (KW)	10	10	10	10	10	10	10	10	20	10
STAGES	1	1	1	1	1	1	1	1	2	1
VOLTAGE/PHASE	480/3ø	480/3ø	480/3ø	480/3ø	480/3ø	480/3ø	480/3ø	480/3ø	480/3ø	480/3ø
MOCP	20	20	20	20	25	20	25	20	35	30
MANUFACTURER	AAON	AAON	AAON	AAON	AAON	AAON	AAON	AAON	AAON	AAON
MODEL	RQ-004	RQ-004	RQ-004	RQ-003	RN-007	RQ-004	RN-007	RQ-003	RN-007	RN-008
UNIT WEIGHT (LBS)	845	845	845	765	1106	845	1110	765	1111	1148
EFFICIENCY EER (SEER)	17.4	17.4	17.4	18.2	12.4	17.4	12.4	18.2	12.4	11.9
REMARKS	1 THRU 13	1 THRU 13	1 THRU 13	1 THRU 13	1 THRU 13	1 THRU 13	1 THRU 13	1 THRU 13	1 THRU 13	1 THRU 13

REMARKS
1. PROVIDE WITH NEW UNIVERSAL PROGRAMMABLE THERMOSTAT (2-STAGE) WITH AUTO CHANGEOVER AND REMOTE TEMPERATURE SENSOR.
2. PROVIDE WITH SINGLE POINT POWER, DISCONNECT, AND 120-VOLT RECEPTACLE.
3. PROVIDE WITH CURB ADAPTER.
4. PROVIDE WITH HINGED ACCESS DOORS.
5. PROVIDE WITH OUTSIDE AIR HOOD AND 2-POSITION MOTORIZED DAMPER.
6. PROVIDE WITH 6-ROW COIL, MODULATING HOT-GAS REHEAT, AND HUMIDITY CONTROL.
7. PROVIDE WITH CONDENSER COIL HAIL GUARDS.
8. PROVIDE WITH LOW AMBIENT CONTROL TO 35°F.
9. PROVIDE WITH FACTORY APPLIED FULLY DIPPED CONDENSER E-COATING WITH 6,000 HR SALT SPRAY RATING PER ASTM B117-90.
10. EXTERIOR PAINT FINISH SHALL BE CAPABLE WITHSTANDING AT LEAST 2,500 HOURS SALT SPRAY AND FOG ATMOSPHERE PER ASTM B 117-95.
11. PROVIDE UNIT WITH 2-INCH DOUBLE WALL CONSTRUCTION WITH R-13 FOAM INSULATION AND THERMAL BREAK. COMPRESSORS AND CONTROLS SHALL BE HOUSED INSIDE CLIMATE CONTROLLED CABINET.
12. REFER TO SPECIFICATIONS FOR COMPRESSOR REQUIREMENTS.
13. PROVIDE SEPERATE HUMIDITY SENSOR IN RETURN AIR DUCT AND TIE-IN TO DEHUMIDIFICATION CONTROLLER.

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400 Nolana, Suite N24
McAllen, Texas 78504
PH: (956) 687-9421 FAX: (956) 687-3211
WWW.CHANINENGINEERING.COM
TBPE FIRM REG. NUMBER F-9369

SEAL:

STATE OF TEXAS
LUIS JAVIER PENA
97260
LICENSED PROFESSIONAL ENGINEER
11.15.2013

MEP SOLUTIONS ENGINEERING
MECHANICAL, ELECTRICAL, PLUMBING ENGINEERS
600 E. BEAUMONT AVE. SUITE 2 McALLEN, TX. 78501 (956) 664-2727
TEXAS BOARD OF PROFESSIONAL ENGINEERS REGISTRATION # F-9748

PROJECT:
HIDALGO COUNTY
ADULT DETENTION CENTER and LAW ENFORCEMENT FACILITY REPAIRS and/or REPLACEMENT
Edinburg, Texas

JOB NO. 13159
DATE: 11/15/13
DRAWN BY: L.S.
CHECKED BY: J.P.
REVISION:

DRAWING NO:
M8.0

ROOF TOP UNIT SCHEDULE – ADULT DETENTION CENTER

ROOF TOP UNIT DESIGNATION	RTU-41	RTU-42	RTU-43	RTU-44	RTU-45	RTU-46	RTU-47	RTU-48	RTU-49	RTU-50
SUPPLY CFM	2350	1600	1730	2800	2300	6300	2100	3850	550	500
OUTSIDE AIR CFM	90	360	450	90	225	1200	525	379	50	30
EXTERNAL S.P. ("W.G.)	0.65	1	.65	0.5	0.5	1	0.5	0.5	0.5	0.5
MOTOR HP.	2	1	2	2	2	5	2	3	1	1
TOTAL CAPACITY (MBH)	59.53	58.42	68.22	70.47	70.01	192.91	71.15	105.16	18.39	24.1
SENSIBLE CAPACITY (MBH)	54.85	44.99	52.57	65.13	55.51	163.55	58.89	91.85	14.53	17.4
ENTERING AIR (DB/WB)'F	76/63	80/66	81/66	76/63	77/64	79/65	81/66	77/64	77/64	76/63
LEAVING AIR (DB/WB)'F	55.90/54.77	55.10/54.04	53.92/52.86	56.08/54.96	55.04/53.98	55.92/55.07	56.08/55.04	55.22/54.82	52.97/52.43	50.85/50.32
CONDENSER AIR (DB)'F	98	98	98	98	98	98	98	98	98	98
HEATER CAPACITY (KW)	10	10	10	10	10	40	10	20	7.5	5.0
STAGES	1	1	1	1	1	4	1	2	1	1
VOLTAGE/PHASE	480/3ø	480/3ø	480/3ø	480/3ø	480/3ø	480/3ø	480/3ø	480/3ø	208/1ø	460/3ø
MOCP	20	20	25	25	25	70	25	40	60	15
MANUFACTURER	AAON	AAON	AAON	AAON	AAON	AAON	AAON	AAON	AAON	AAON
MODEL	RQ-005	RQ-005	RQ-006	RQ-006	RQ-006	RN-015	RQ-006	RN-009	RQ-001	RQ-002
UNIT WEIGHT (LBS)	898	860	899	899	899	1832	899	1744	717	717
EFFICIENCY EER (SEER)	17.45	17.45	12.4	12.4	12.4	11.3	12.4	13.8	15.6	15.6
REMARKS	1 THRU 13	1 THRU 13	1 THRU 13	1 THRU 13	1 THRU 13	1 THRU 13	1 THRU 13	1 THRU 13	1 THRU 13	1 THRU 13

REMARKS
1. PROVIDE WITH NEW UNIVERSAL PROGRAMMABLE THERMOSTAT (2-STAGE) WITH AUTO CHANGEOVER AND REMOTE TEMPERATURE SENSOR.
2. PROVIDE WITH SINGLE POINT POWER, DISCONNECT, AND 120-VOLT RECEPTACLE.
3. PROVIDE WITH CURB ADAPTER.
4. PROVIDE WITH HINGED ACCESS DOORS.
5. PROVIDE WITH OUTSIDE AIR HOOD AND 2-POSITION MOTORIZED DAMPER.
6. PROVIDE WITH 6-ROW COIL, MODULATING HOT-GAS REHEAT, AND HUMIDITY CONTROL.
7. PROVIDE WITH CONDENSER COIL HAIL GUARDS.
8. PROVIDE WITH LOW AMBIENT CONTROL TO 35'F.
9. PROVIDE WITH FACTORY APPLIED FULLY DIPPED CONDENSER E-COATING WITH 6,000 HR SALT SPRAY RATING PER ASTM B117-90.
10. EXTERIOR PAINT FINISH SHALL BE CAPABLE WITHSTANDING AT LEAST 2,500 HOURS SALT SPRAY AND FOG ATMOSPHERE PER ASTM B 117-95.
11. PROVIDE UNIT WITH 2-INCH DOUBLE WALL CONSTRUCTION WITH R-13 FOAM INSULATION AND THERMAL BREAK. COMPRESSORS AND CONTROLS SHALL BE HOUSED INSIDE CLIMATE CONTROLLED CABINET.
12. REFER TO SPECIFICATIONS FOR COMPRESSOR REQUIREMENTS.
13. PROVIDE SEPERATE HUMIDITY SENSOR IN RETURN AIR DUCT AND TIE-IN TO DEHUMIDIFICATION CONTROLLER.

ROOF TOP UNIT SCHEDULE – LAW ENFORCEMENT CENTER

ROOF TOP UNIT DESIGNATION	RTU-1	RTU-2	RTU-3	RTU-4	RTU-5	RTU-6	RTU-7	RTU-8	RTU-9	RTU-10	RTU-11	RTU-12	RTU-13	RTU-14	RTU-15	RTU-16
SUPPLY CFM	2600	2400	1475	1700	1400	1100	3000	1425	2300	3000	1620	3800	3800	1530	1500	1440
OUTSIDE AIR CFM	300	275	200	170	200	100	750	200	225	750	200	950	950	300	225	225
EXTERNAL S.P. ("W.G.)	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
MOTOR HP.	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
TOTAL CAPACITY (MBH)	70.86	70.42	49.23	50.44	48.74	35.11	103.51	48.90	69.92	103.51	50.45	129.03	129.03	50.81	49.38	49.02
SENSIBLE CAPACITY (MBH)	64.78	61.79	40.49	42.20	39.27	28.37	84.84	39.67	57.76	84.84	42.88	106.54	106.54	41.43	40.89	39.92
ENTERING AIR (DB/WB)'F	78/64	78/64	78/64	77/64	78/64	77/64	81/66	78/64	77/64	81/66	78/64	81/66	81/66	79/65	78/64	78/64
LEAVING AIR (DB/WB)'F	54.7/54.5	53.9/53.7	52.3/52.1	53.8/53.6	51.8/51.6	52.9/52.7	54.4/54.2	52/51.8	53.6/53.4	54.4/54.2	53.3/53.1	54.4/54.4	54.4/54.4	53.6/53.4	52.5/52.3	52.1/51.9
CONDENSER AIR (DB)'F	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98
HEATER CAPACITY (KW)	20	20	10	10	10	10	30	10	20	30	10.0	30.0	30.0	10.0	10.0	10.0
STAGES	2	2	1	1	1	1	2	1	2	2	1	2	2	1	1	1
VOLTAGE/PHASE	480/3ø	480/3ø	480/3ø	480/3ø	480/3ø	480/3ø	480/3ø	480/3ø	480/3ø	480/3ø	480/3ø	480/3ø	480/3ø	480/3ø	480/3ø	480/3ø
MCA/MOCP	34/35	34/35	18/20	18/20	18/20	18/20	49/50	18/20	34/35	49/50	18/20	49/50	49/50	18/20	18/20	18/20
MANUFACTURER	AAON	AAON	AAON	AAON	AAON	AAON	AAON	AAON	AAON	AAON	AAON	AAON	AAON	AAON	AAON	AAON
MODEL	RQ006-3V	RQ006-3V	RQ004-3V	RQ004-3V	RQ004-3V	RQ003-3V	RN009-30	RQ004-3V	RQ006-3V	RN009-30	RQ004-3V	RN011-30	RN011-30	RQ004-3V	RQ004-3V	RQ004-3V
UNIT WEIGHT (LBS)	899	899	845	845	845	845	1700	845	899	1700	845	1708	1708	845	845	845
EFFICIENCY EER (SEER)	9.8	10.2	10.2	11.8	12.1	11.9	12.7	12.0	10.3	12.7	12.0	11.9	11.9	12.3	12	12.0
REMARKS	1 THRU 13	1 THRU 13	1 THRU 13	1 THRU 13	1 THRU 13	1 THRU 13	1 THRU 13	1 THRU 13	1 THRU 13	1 THRU 13	1 THRU 13	1 THRU 13	1 THRU 13	1 THRU 13	1 THRU 13	1 THRU 13

REMARKS
1. PROVIDE WITH NEW UNIVERSAL PROGRAMMABLE THERMOSTAT (2-STAGE) WITH AUTO CHANGEOVER AND REMOTE TEMPERATURE SENSOR.
2. PROVIDE WITH SINGLE POINT POWER, DISCONNECT, AND 120-VOLT RECEPTACLE.
3. PROVIDE WITH NEW MINIMUM 14-INCH ROOF CURB.
4. PROVIDE WITH HINGED ACCESS DOORS.
5. PROVIDE WITH OUTSIDE AIR HOOD AND 2-POSITION MOTORIZED DAMPER.
6. PROVIDE WITH 6-ROW COIL, MODULATING HOT-GAS REHEAT, AND HUMIDITY CONTROL.
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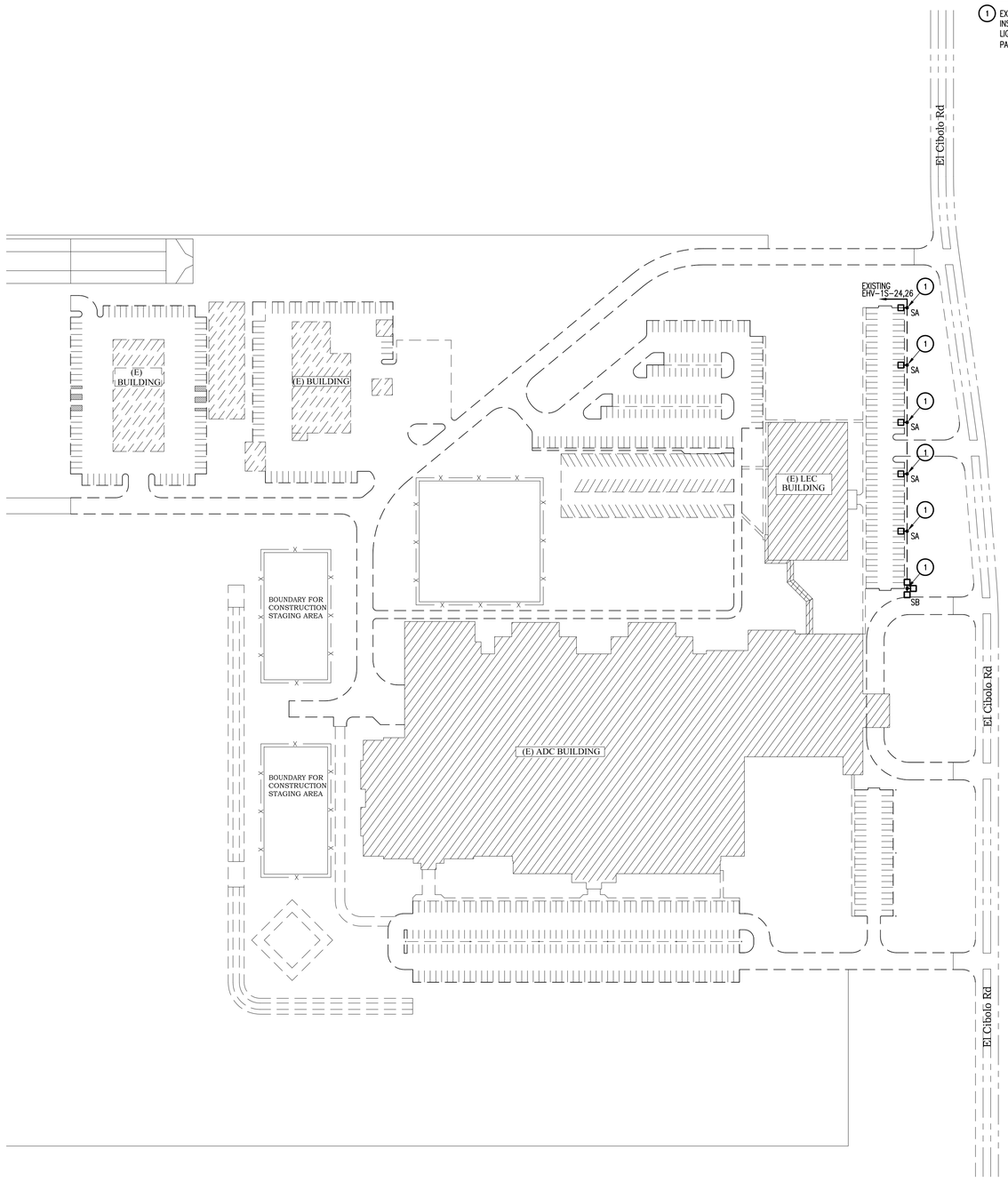
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ADULT DETENTION CENTER and LAW ENFORCEMENT FACILITY REPAIRS and/or REPLACEMENT
Edinburg, Texas

JOB NO. 13159
DATE: 11/15/13
DRAWN BY: L.S.
CHECKED BY:J.P.
REVISION:

DRAWING NO:
M9.0



KEY NOTES:

1. EXISTING LIGHT POLE FIXTURE TO BE REMOVED. FURNISH AND INSTALL NEW LIGHT POLE FIXTURE AND POLE BASE. REFER TO LIGHTING FIXTURE SCHEDULE ON SHEET E16.0. THIS SHALL BE PART OF ALTERNATE #5.

GENERAL DEMOLITION NOTES:

A. INFORMATION ON THIS PLAN HAS BEEN OBTAINED FROM EXISTING DRAWINGS AND SITE SURVEY. CONTRACTOR SHALL VERIFY EXISTING CONDITIONS AND BECOME FULLY INFORMED AS TO THE EXTENT OF WORK PRIOR TO BIDDING OR COMMENCING WORK. ANY DISCREPANCIES BETWEEN EXISTING CONDITIONS AND CONSTRUCTION DOCUMENTS SHALL BE REPORTED IMMEDIATELY TO THE STRUCTURAL ENGINEER.

B. THE CONTRACTOR IS FULLY RESPONSIBLE FOR PERFORMING THE DEMOLITION WORK UNDER THIS SECTION OF THE PROJECT IN FULL COMPLIANCE WITH ALL APPLICABLE LOCAL, STATE, AND FEDERAL CODES. IF THE CONTRACTOR DETERMINES THAT THE CONTRACT DOCUMENTS AND PLANS ARE NOT IN COMPLIANCE WITH THE APPLICABLE CODES, HE SHALL INFORM THE ARCHITECT PRIOR TO CONSTRUCTION START FOR DIRECTION. FAILURE TO DO SO SHALL NOT RELIEVE THE CONTRACTOR OF HIS RESPONSIBILITY TO MEET CODE REQUIREMENTS AND REWORK SHALL BE AT CONTRACTOR'S EXPENSE. APPLICABLE CODES AND STANDARDS ON DEMOLITION WORK SHALL INCLUDE THOSE PUBLISHED BY OSHA AND EPA. APPLICABLE CODES AND STANDARDS ON DEMOLITION WORK SHALL INCLUDE THOSE PUBLISHED BY OSHA AND EPA. AN ASBESTOS SURVEY SHALL BE KEPT ON SITE AT ALL TIMES PER TEXAS DEPARTMENT OF HEALTH REQUIREMENTS

C. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO COMPLETE THE NECESSARY DEMOLITION. CONTRACTOR SHALL PATCH AND REPAIR ALL BUILDING DAMAGE CREATED BY DEMOLITION WORK. PATCHING SHALL BE COMPLETED WITH THE SAME MATERIALS AS THE SURROUNDING AREAS, OR WITH ARCHITECT APPROVED PATCHING MATERIALS.

D. ALL OPENINGS CUT IN MASONRY AND PLASTER WALLS OR CONCRETE FLOORS SHALL BE CORE-DRILLED OR SAWED WHEN POSSIBLE. CONTRACTOR SHALL CHECK BUILDING CONSTRUCTION WITH STRUCTURAL ENGINEER 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 AS REQUIRED BY DRAWINGS AND SPECIFICATIONS.

E. CONTRACTOR SHALL REMOVE AND RETURN ANY AND ALL EXISTING EQUIPMENT/MATERIALS TO OWNER. OWNER SHALL HAVE FULL RIGHT OF OWNERSHIP UNLESS SPECIFIED OTHERWISE. IF THE OWNER WAIVES THIS OPTION, ANY EQUIPMENT, MATERIAL, ETC SHALL BECOME THE PROPERTY OF THE CONTRACTOR.

F. SCHEDULE FOR ALL POWER OUTAGES SHALL BE APPROVED PRIOR TO DEMOLITION.

G. ON ANY WORK SHOWN ON M.E.P. DRAWINGS WHICH REQUIRES DEMOLITION OF BUILDING STRUCTURES AND FINISHES, IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO COMPLETE THE NECESSARY DEMOLITION. CONTRACTOR SHALL PATCH AND REPAIR ALL BUILDING DAMAGE CREATED BY DEMOLITION WORK. PATCHING SHALL BE COMPLETED WITH THE SAME MATERIALS AS THE SURROUNDING AREAS, OR WITH ARCHITECT-APPROVED PATCHING MATERIALS.

H. CONTRACTOR AND OWNER SHALL BE FULLY RESPONSIBLE TO IDENTIFY ANY AND ALL ASBESTOS PRESENT IN THE BUILDING PRIOR TO DEMOLITION AS REQUIRED BY LAW.

I. COORDINATION AMONG OTHER CONSTRUCTION DISCIPLINES PRIOR TO DEMOLITION IS MANDATORY.

GENERAL NOTES:

A. INFORMATION ON THIS PLAN HAS BEEN OBTAINED FROM EXISTING PLANS AND SITE SURVEY. CONTRACTOR SHALL FIELD VERIFY EXISTING CONDITIONS PRIOR TO COMMENCING WORK. ANY DISCREPTANCIES BETWEEN EXISTING CONDITIONS AND CONSTRUCTION DOCUMENTS SHALL BE REPORTED TO THE STRUCTURAL ENGINEER.

B. ALL PENETRATIONS THROUGH FIRE RATED WALLS SHALL HAVE SOUND RETARDING /ABSORBING FIRE STOP MATERIAL.

C. THE ELECTRICAL CONTRACTOR SHALL FIELD VERIFY ALL EQUIPMENT VOLTAGES, AND AMPERAGE RATINGS OF OWNER/CONTRACTOR PROVIDED EQUIPMENT PRIOR TO COMMENCING WORK. THE ELECTRICAL CONTRACTOR SHALL REPORT ANY AND ALL DISCREPANCIES TO THE STRUCTURAL ENGINEER IMMEDIATELY. ALL NECESSARY ELECTRICAL SERVICE CHANGES SHALL BE MADE BEFORE ANY ELECTRICAL EQUIPMENT, DEVICES, CONDUIT AND CONDUCTORS ARE INSTALLED. IT SHALL BE THE ELECTRICAL CONTRACTORS RESPONSIBILITY TO REMOVE AND INSTALL ANY ELECTRICAL EQUIPMENT, DEVICES, CONDUIT AND CONDUCTORS INSTALLED PRIOR TO THIS VERIFICATION.

D. ELECTRICAL CONTRACTOR SHALL KEEP EXISTING FIRE ALARM IN ORERATION UNTIL NEW FIRE ALARM SYSTEM IS FULLY OPERATIONAL.

E. ALL INTERIOR WORK TO BE BETWEEN THE HOURS OF 7PM-2AM.

FIELD VERIFY ALL CONDITIONS

DESIGN DRAWINGS SCHEMATIC. THE CONTRACTOR SHALL VISIT THE SITE PRIOR TO BIDDING OR AWARD OF CONTRACT TO INSPECT EXISTING FEILD CONDITIONS. THIS CONTRACT SHALL INCLUDE ALL LABOR AND MATERIALS NECCESSARY FOR FEILD MODIFICATIONS DUE TO EXISTING CONDITIONS.

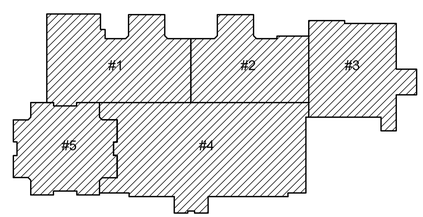
THE CONTRACTOR SHALL CONTACT THE STRUCTURAL ENGINEER PRIOR TO BIDDING FOR INTERPRETATIONS AND CLARIFICATIONS OF THE DESIGN AND INCLUDE IN HIS BID ALL COSTS TO MEET THE DESIGN INTENT. CLARIFICATIONS MADE BY THE STRUCTURAL ENGINEER AFTER BIDDING WILL BE FINAL AND SHALL BE IMPLEMENTED AT CONTRACTORS COST.

BIDDING CONTRACTORS SHALL HAVE A WORKING KNOWLEDGE OF LOCAL CODES AND ORDINANCES AND SHALL INCLUDE IN THEIR BIDS THE COSTS FOR ALL WORK INSTALLED IN STRICT ACCORDANCE WITH GOVERNING CODES, THE PLANS AND SPECIFICATIONS NOT WITHSTANDING. THE CONTRACTOR SHALL ALERT STRUCTURAL ENGINEER OF ANY APPARENT DISCREPANCIES BETWEEN GOVERNING CODES AND DESIGN INTENT.

NORTH

A ELECTRICAL SITE PLAN

SCALE: 1" = 100'-0" A.D.C. & L.E.C. BLDG



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400 Nolana, Suite N2
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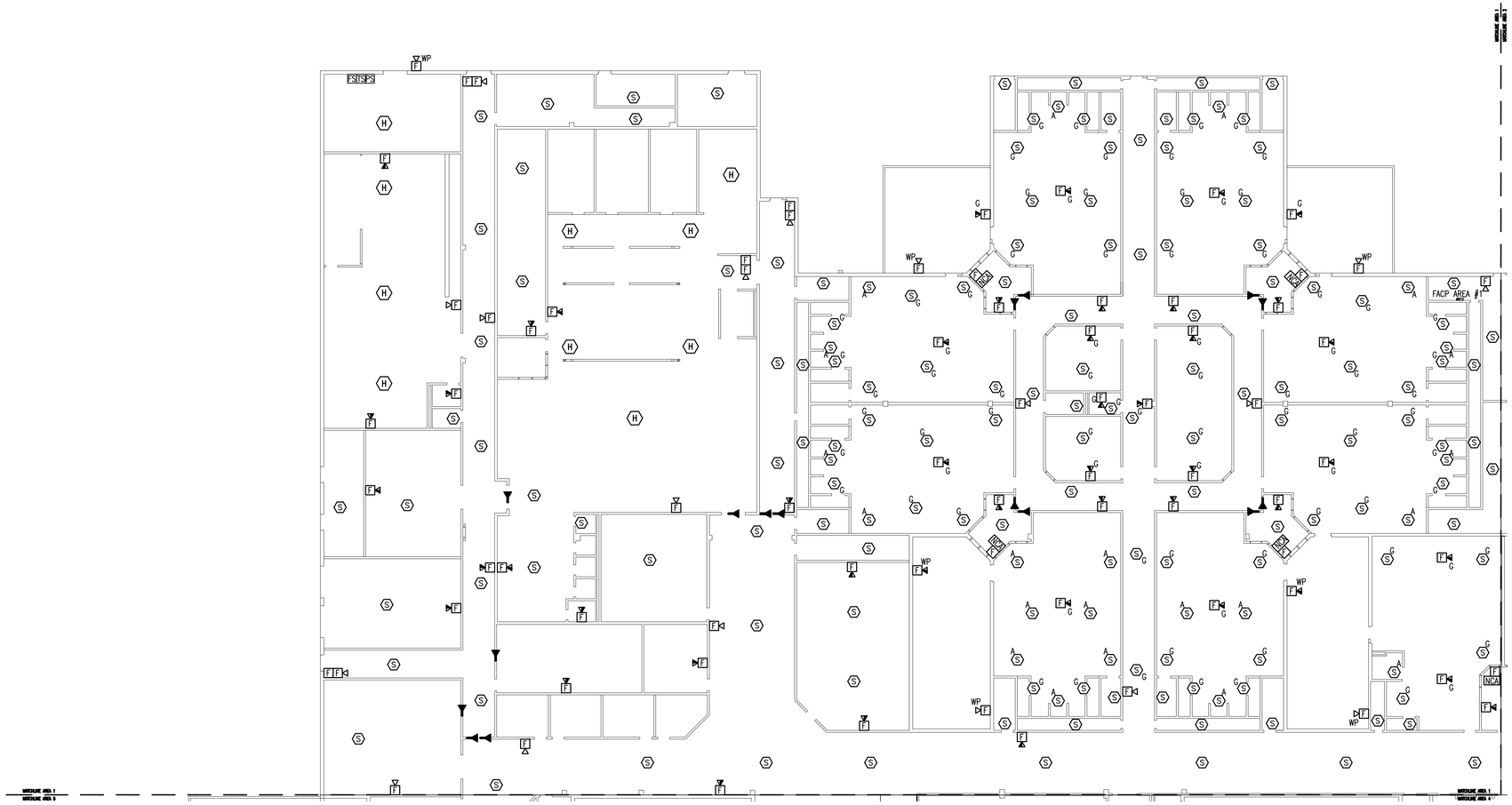
STATE OF TEXAS
ABRAM L. DOMINGUEZ
97393
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GENERAL DEMOLITION NOTES:

A. INFORMATION ON THIS PLAN HAS BEEN OBTAINED FROM EXISTING DRAWINGS AND SITE SURVEY. CONTRACTOR SHALL VERIFY EXISTING CONDITIONS AND BECOME FULLY INFORMED AS TO THE EXTENT OF WORK PRIOR TO BIDDING OR COMMENCING WORK. ANY DISCREPANCIES BETWEEN EXISTING CONDITIONS AND CONSTRUCTION DOCUMENTS SHALL BE REPORTED IMMEDIATELY TO THE STRUCTURAL ENGINEER.

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D. ALL OPENINGS CUT IN MASONRY AND PLASTER WALLS OR CONCRETE FLOORS SHALL BE CORE-DRILLED OR SAWED WHEN POSSIBLE. CONTRACTOR SHALL CHECK BUILDING CONSTRUCTION WITH STRUCTURAL ENGINEER 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 AS REQUIRED BY DRAWINGS AND SPECIFICATIONS.

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F. SCHEDULE FOR ALL POWER OUTAGES SHALL BE APPROVED PRIOR TO DEMOLITION.

G. ON ANY WORK SHOWN ON M.E.P. DRAWINGS WHICH REQUIRES DEMOLITION OF BUILDING STRUCTURES AND FINISHES, IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO COMPLETE THE NECESSARY DEMOLITION. CONTRACTOR SHALL PATCH AND REPAIR ALL BUILDING DAMAGE CREATED BY DEMOLITION WORK. PATCHING SHALL BE COMPLETED WITH THE SAME MATERIALS AS THE SURROUNDING AREAS, OR WITH ARCHITECT-APPROVED PATCHING MATERIALS.

H. CONTRACTOR AND OWNER SHALL BE FULLY RESPONSIBLE TO IDENTIFY ANY AND ALL ASBESTOS PRESENT IN THE BUILDING PRIOR TO DEMOLITION AS REQUIRED BY LAW.

I. COORDINATION AMONG OTHER CONSTRUCTION DISCIPLINES PRIOR TO DEMOLITION IS MANDATORY.

GENERAL NOTES:

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B. ALL PENETRATIONS THROUGH FIRE RATED WALLS SHALL HAVE SOUND RETARDING /ABSORBING FIRE STOP MATERIAL.

C. THE ELECTRICAL CONTRACTOR SHALL FIELD VERIFY ALL EQUIPMENT VOLTAGES, AND AMPERAGE RATINGS OF OWNER/CONTRACTOR PROVIDED EQUIPMENT PRIOR TO COMMENCING WORK. THE ELECTRICAL CONTRACTOR SHALL REPORT ANY AND ALL DISCREPANCIES TO THE STRUCTURAL ENGINEER IMMEDIATELY. ALL NECESSARY ELECTRICAL SERVICE CHANGES SHALL BE MADE BEFORE ANY ELECTRICAL EQUIPMENT, DEVICES, CONDUIT AND CONDUCTORS ARE INSTALLED. IT SHALL BE THE ELECTRICAL CONTRACTORS RESPONSIBILITY TO REMOVE AND INSTALL ANY ELECTRICAL EQUIPMENT, DEVICES, CONDUIT AND CONDUCTORS INSTALLED PRIOR TO THIS VERIFICATION.

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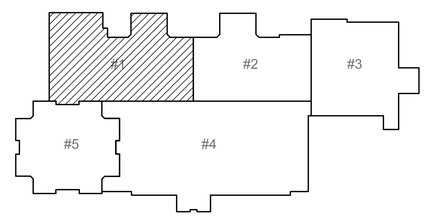
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NORTH

A ELECTRICAL SPECIAL SYSTEMS PLAN

SCALE: 1/16" = 1'-0" AREA #1 A.D.C. BLDG

CHANIN
ENGINEERING LLC
400 Nolana, Suite N24
McAllen, Texas 78504
PH: (956) 687-9421 FAX: (956) 687-3211
TBPE FIRM REG. NUMBER F-9369

SEAL:

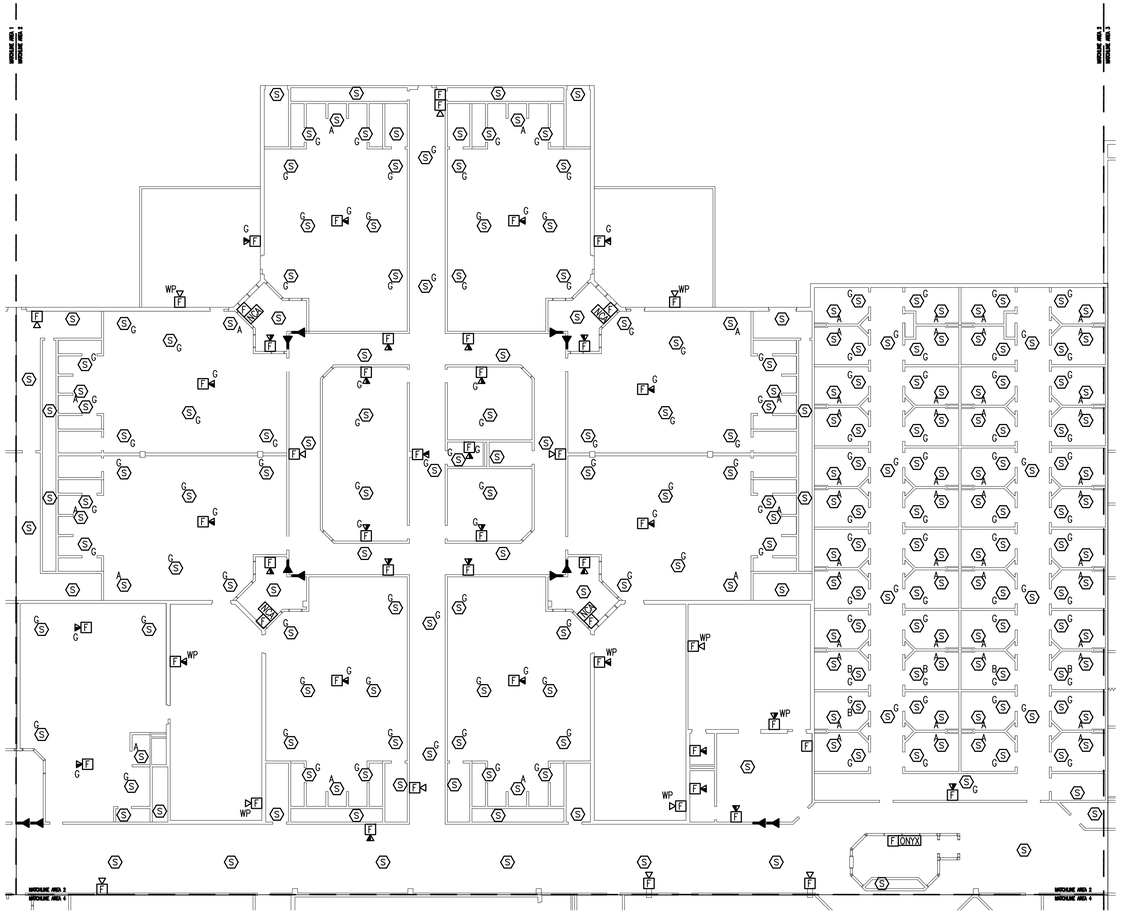
STATE OF TEXAS
ABRAM L. DOMINGUEZ
97393
LICENSED
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11.15.13

MEP SOLUTIONS ENGINEERING
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600 E. BEAUMONT AVE. SUITE 2 McALLEN, TX. 78501 (956) 664-2727
TEXAS BOARD OF PROFESSIONAL ENGINEERS REGISTRATION # F-9748

PROJECT:
HIDALGO COUNTY
ADULT DETENTION CENTER and LAW ENFORCEMENT
FACILITY REPAIRS and/or REPLACEMENT
Edinburg, Texas

JOB NO. 13159
DATE: 11/15/13
DRAWN BY: M.G.
CHECKED BY: A.D.
REVISION:

DRAWING NO:
E1.0



A ELECTRICAL SPECILA SYSTEMS PLAN
SCALE: 1/16" = 1'-0"
AREA #2 A.D.C. BLDG

NORTH

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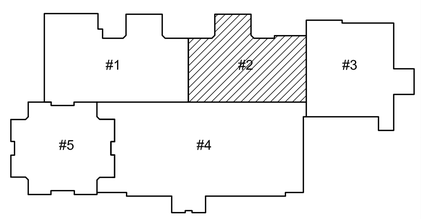
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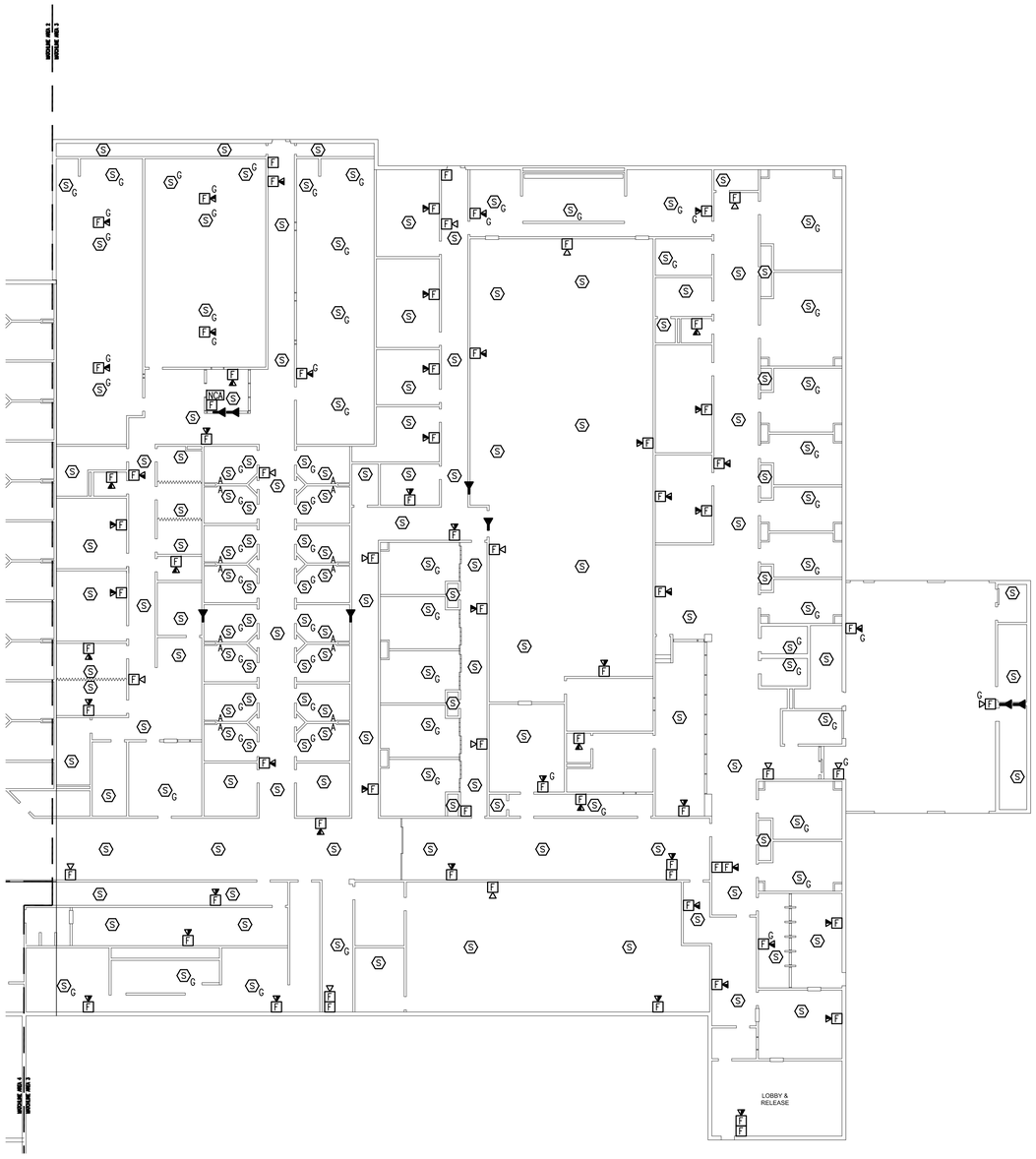
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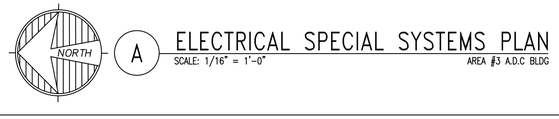
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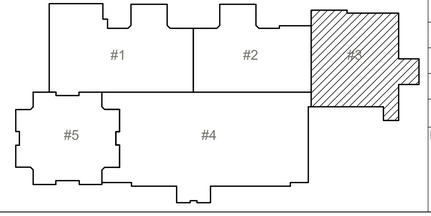
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A ELECTRICAL SPECIAL SYSTEMS PLAN
SCALE: 1/16" = 1'-0"
AREA #3 A.D.C BLDG



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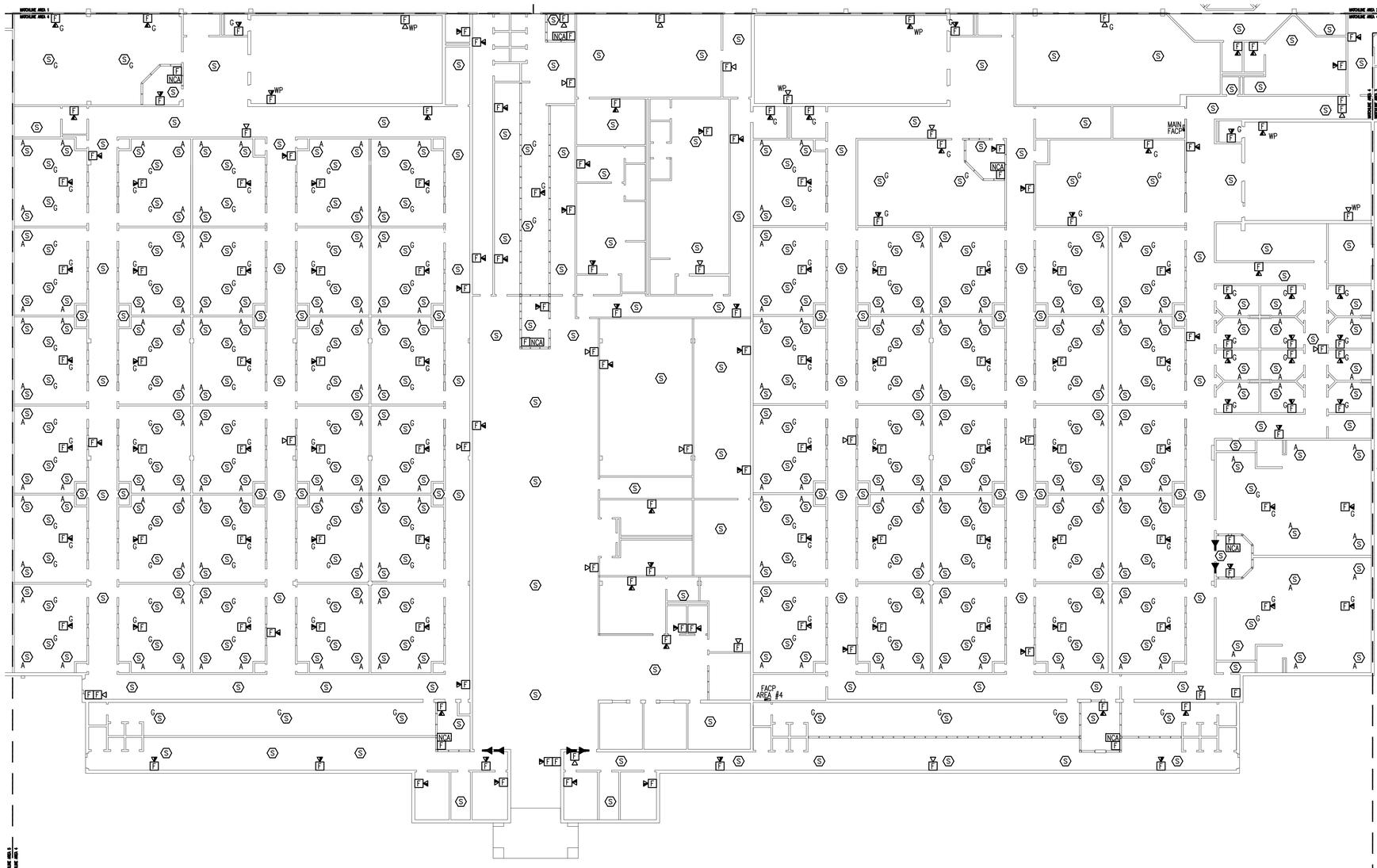
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PROJECT:
HIDALGO COUNTY
ADULT DETENTION CENTER and LAW ENFORCEMENT
FACILITY REPAIRS and/or REPLACEMENT
Edinburg, Texas

JOB NO. 13159
DATE: 11/15/13
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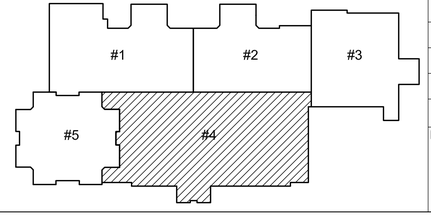
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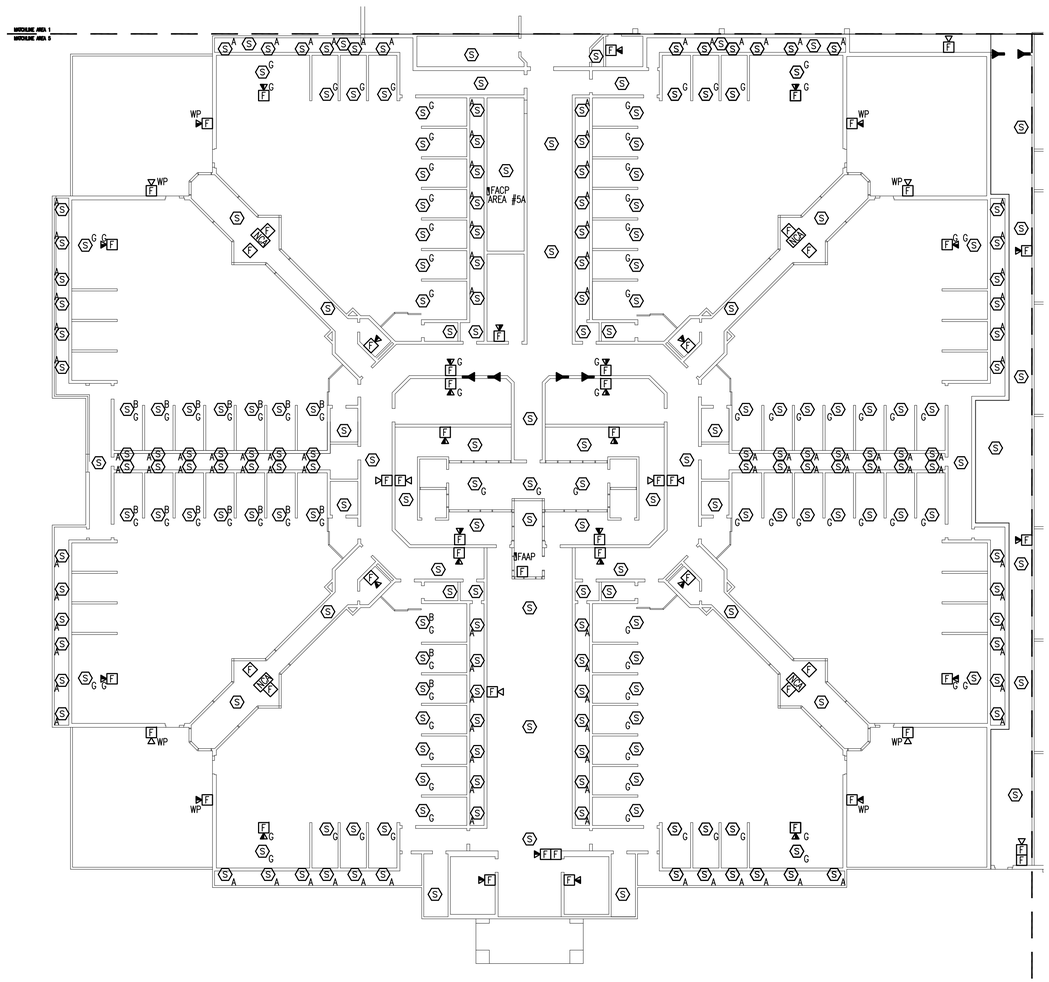
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AREA #5 - 1ST FLR A.D.C. BLDG

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B. THE CONTRACTOR IS FULLY RESPONSIBLE FOR PERFORMING THE DEMOLITION WORK UNDER THIS SECTION OF THE PROJECT IN FULL COMPLIANCE WITH ALL APPLICABLE LOCAL, STATE, AND FEDERAL CODES. IF THE CONTRACTOR DETERMINES THAT THE CONTRACT DOCUMENTS AND PLANS ARE NOT IN COMPLIANCE WITH THE APPLICABLE CODES, HE SHALL INFORM THE ARCHITECT PRIOR TO CONSTRUCTION START FOR DIRECTION. FAILURE TO DO SO SHALL NOT RELIEVE THE CONTRACTOR OF HIS RESPONSIBILITY TO MEET CODE REQUIREMENTS AND REWORK SHALL BE AT CONTRACTOR'S EXPENSE. APPLICABLE CODES AND STANDARDS ON DEMOLITION WORK SHALL INCLUDE THOSE PUBLISHED BY OSHA AND EPA. APPLICABLE CODES AND STANDARDS ON DEMOLITION WORK SHALL INCLUDE THOSE PUBLISHED BY OSHA AND EPA. AN ASBESTOS SURVEY SHALL BE KEPT ON SITE AT ALL TIMES PER TEXAS DEPARTMENT OF HEALTH REQUIREMENTS

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D. ALL OPENINGS CUT IN MASONRY AND PLASTER WALLS OR CONCRETE FLOORS SHALL BE CORE-DRILLED OR SAWED WHEN POSSIBLE. CONTRACTOR SHALL CHECK BUILDING CONSTRUCTION WITH STRUCTURAL ENGINEER 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 AS REQUIRED BY DRAWINGS AND SPECIFICATIONS.

E. CONTRACTOR SHALL REMOVE AND RETURN ANY AND ALL EXISTING EQUIPMENT/MATERIALS TO OWNER. OWNER SHALL HAVE FULL RIGHT OF OWNERSHIP UNLESS SPECIFIED OTHERWISE. IF THE OWNER WAIVES THIS OPTION, ANY EQUIPMENT, MATERIAL, ETC SHALL BECOME THE PROPERTY OF THE CONTRACTOR.

F. SCHEDULE FOR ALL POWER OUTAGES SHALL BE APPROVED PRIOR TO DEMOLITION.

G. ON ANY WORK SHOWN ON M.E.P. DRAWINGS WHICH REQUIRES DEMOLITION OF BUILDING STRUCTURES AND FINISHES, IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO COMPLETE THE NECESSARY DEMOLITION. CONTRACTOR SHALL PATCH AND REPAIR ALL BUILDING DAMAGE CREATED BY DEMOLITION WORK. PATCHING SHALL BE COMPLETED WITH THE SAME MATERIALS AS THE SURROUNDING AREAS, OR WITH ARCHITECT-APPROVED PATCHING MATERIALS.

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D. ELECTRICAL CONTRACTOR SHALL KEEP EXISTING FIRE ALARM IN ORERATION UNTIL NEW FIRE ALARM SYSTEM IS FULLY OPERATIONAL.

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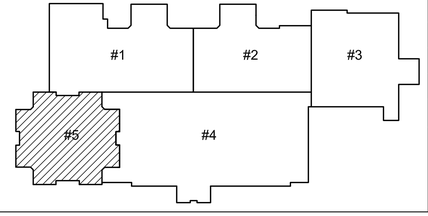
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400 Nolana, Suite N2
McAllen, Texas 78504
PH: (956) 687-9421 FAX: (956) 687-3211
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TBPE FIRM REG. NUMBER F-9369

SEAL:

STATE OF TEXAS
ABRAM L. DOMINGUEZ
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LICENSED
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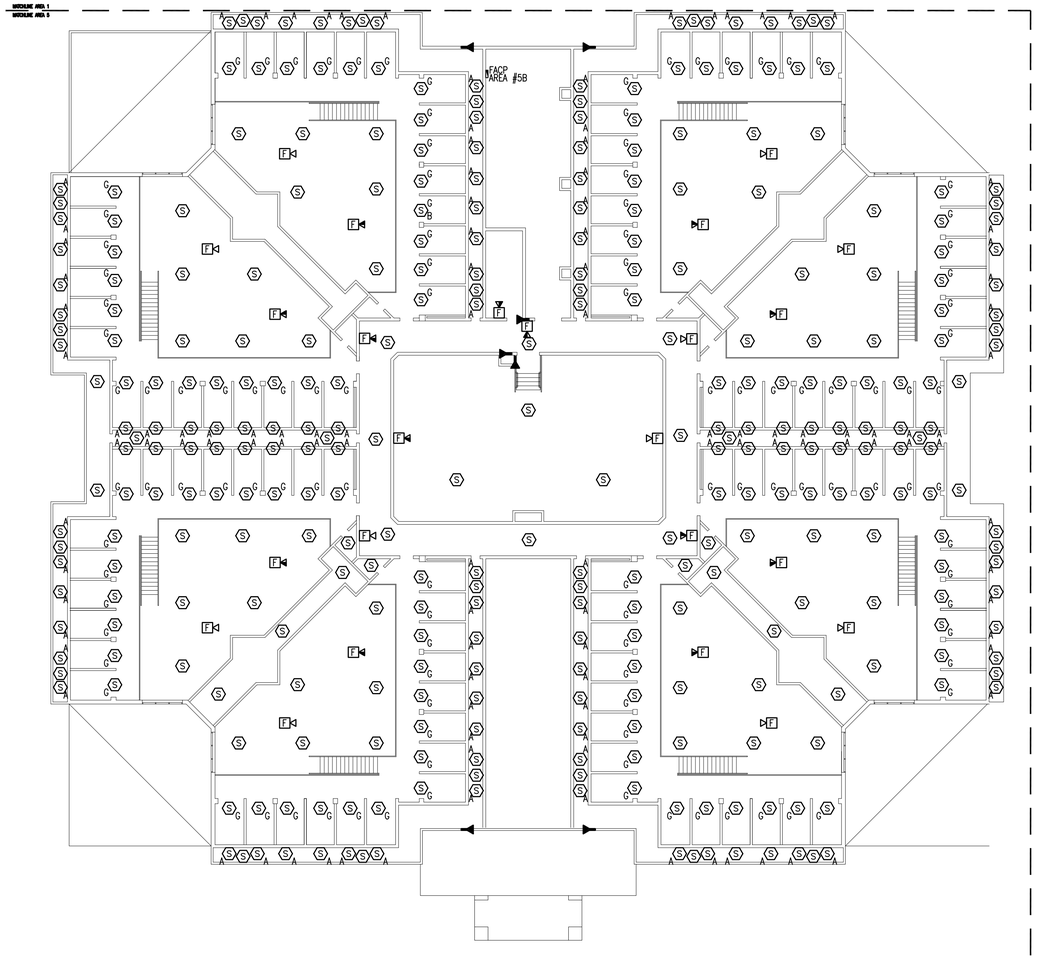
DRAWN BY: M.G.

CHECKED BY:A.D.

REVISION:

DRAWING NO:

E5.0



NORTH

A ELECTRICAL SPECIAL SYSTEMS PLAN
SCALE: 1/16" = 1'-0"
AREA #5 - 2ND FLR A.D.C. BLDG

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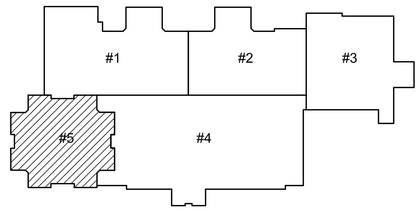
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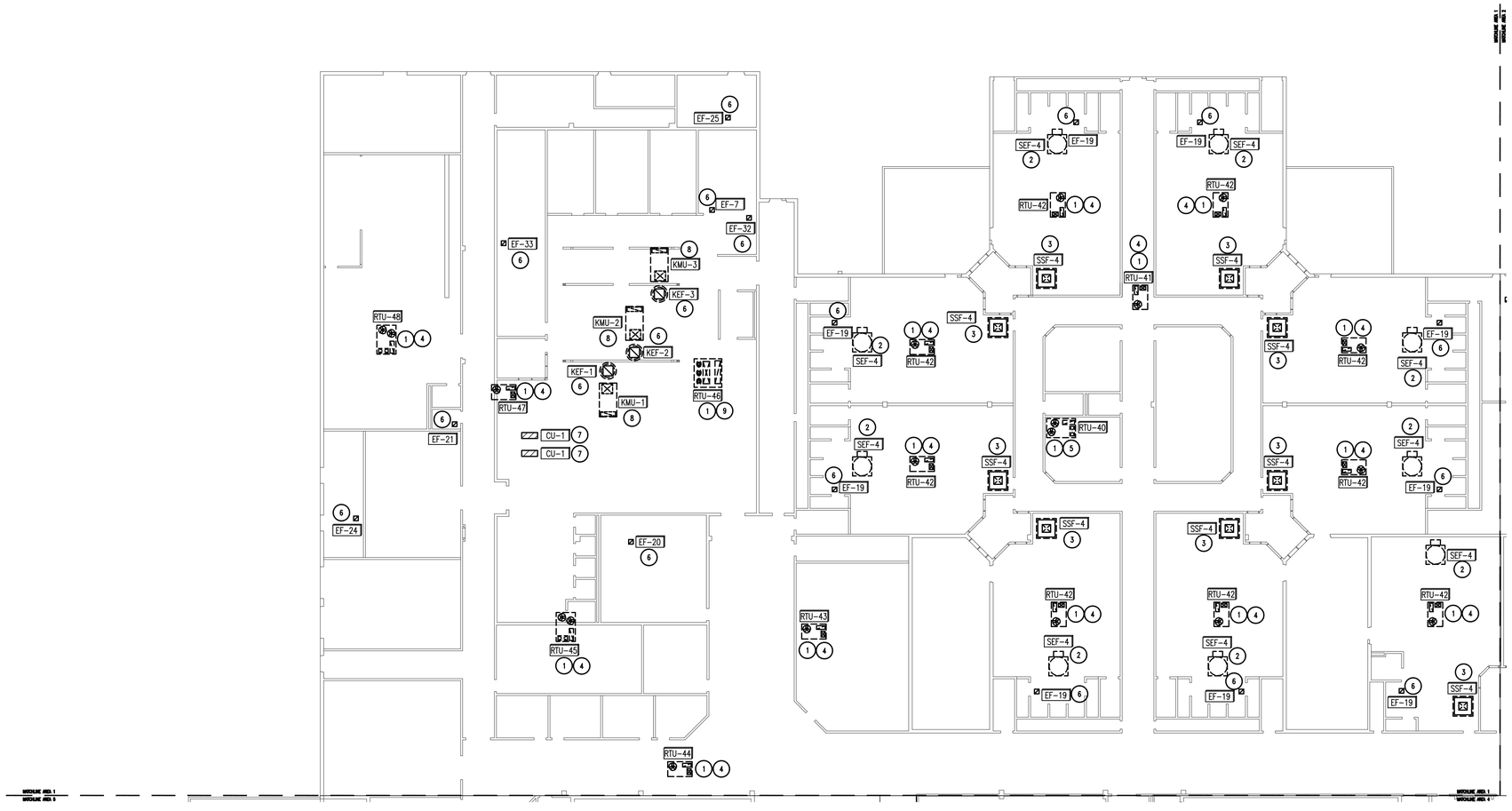
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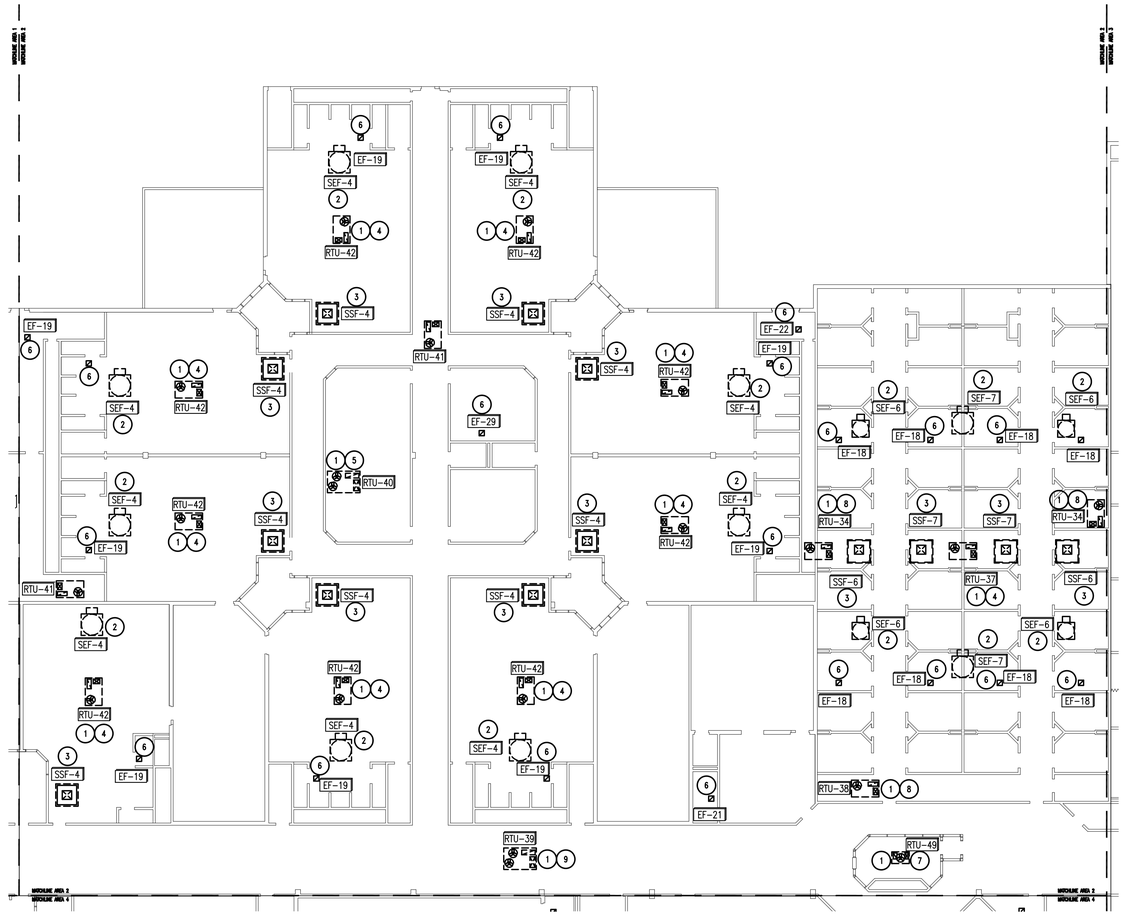
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EF-25
EF-7
EF-32
EF-33
KMU-3
KEF-3
KMU-2
KEF-2
KEF-1
KMU-1
RTU-48
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CU-1
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KEY NOTES:

1. FURNISH AND INSTALL FIRE ALARM DUCT SMOKE DETECTOR AT SUPPLY AND RETURN AIR STREAM OF ROOF TOP UNITS.
2. SMOKE EXHAUST FAN SHALL BE INTERLOCKED WITH FIRE ALARM SYSTEM SUCH THAT DAMPER OPENS WHEN FAN IS ENERGIZED.
3. SMOKE SUPPLY FAN SHALL BE INTERLOCKED WITH FIRE ALARM SYSTEM SUCH THAT DAMPER OPENS WHEN FAN IS ENERGIZED.
4. ELECTRICAL CONTRACTOR SHALL EXTEND EXISTING ELECTRICAL SERVICE TO NEW ROOF TOP UNIT. EXISTING CIRCUIT TO REMAIN FOR RE-USE.
5. ELECTRICAL CONTRACTOR SHALL EXTEND EXISTING ELECTRICAL SERVICE TO NEW ROOF TOP UNIT. EXISTING CIRCUIT TO REMAIN FOR RE-USE. FURNISH AND INSTALL NEW 30 AMP, 3POLE CIRCUIT BREAKER AT EXISTING PANEL TO MATCH NEW NAME PLATE RATING OF ROOF TOP UNIT. MATCH AIC RATING.
6. ELECTRICAL CONTRACTOR SHALL EXTEND EXISTING ELECTRICAL SERVICE TO EXISTING EXHAUST FAN. EXISTING CIRCUIT TO REMAIN FOR RE-USE.
7. ELECTRICAL CONTRACTOR SHALL REMOVE EXISTING (WIRE) FEEDER TO ROOF TOP UNIT. EXISTING CIRCUIT TO REMAIN FOR RE-USE. FURNISH AND INSTALL NEW 60 AMP, 2 POLE CIRCUIT BREAKER AT EXISTING PANEL TO MATCH NEW NAME PLATE RATING OF ROOF TOP UNIT. MATCH AIC RATING. ROUTE 2#4, #8G, 1"C.
8. ELECTRICAL CONTRACTOR SHALL REMOVE EXISTING (WIRE) FEEDER TO ROOF TOP UNIT. EXISTING CIRCUIT TO REMAIN FOR RE-USE. FURNISH AND INSTALL NEW 20 AMP, 3 POLE CIRCUIT BREAKER AT EXISTING PANEL TO MATCH NEW NAME PLATE RATING OF ROOF TOP UNIT. MATCH AIC RATING. ROUTE 3#12, #12G, 1/2"C.
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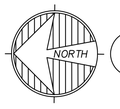
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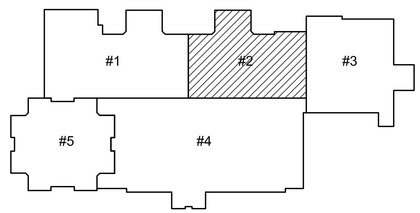
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A ELECTRICAL – MECHANICAL EQUIPMENT LOCATION PLAN
SCALE: 1/16" = 1'-0"
AREA #2 A.D.C. BLDG



CHANIN ENGINEERING LLC
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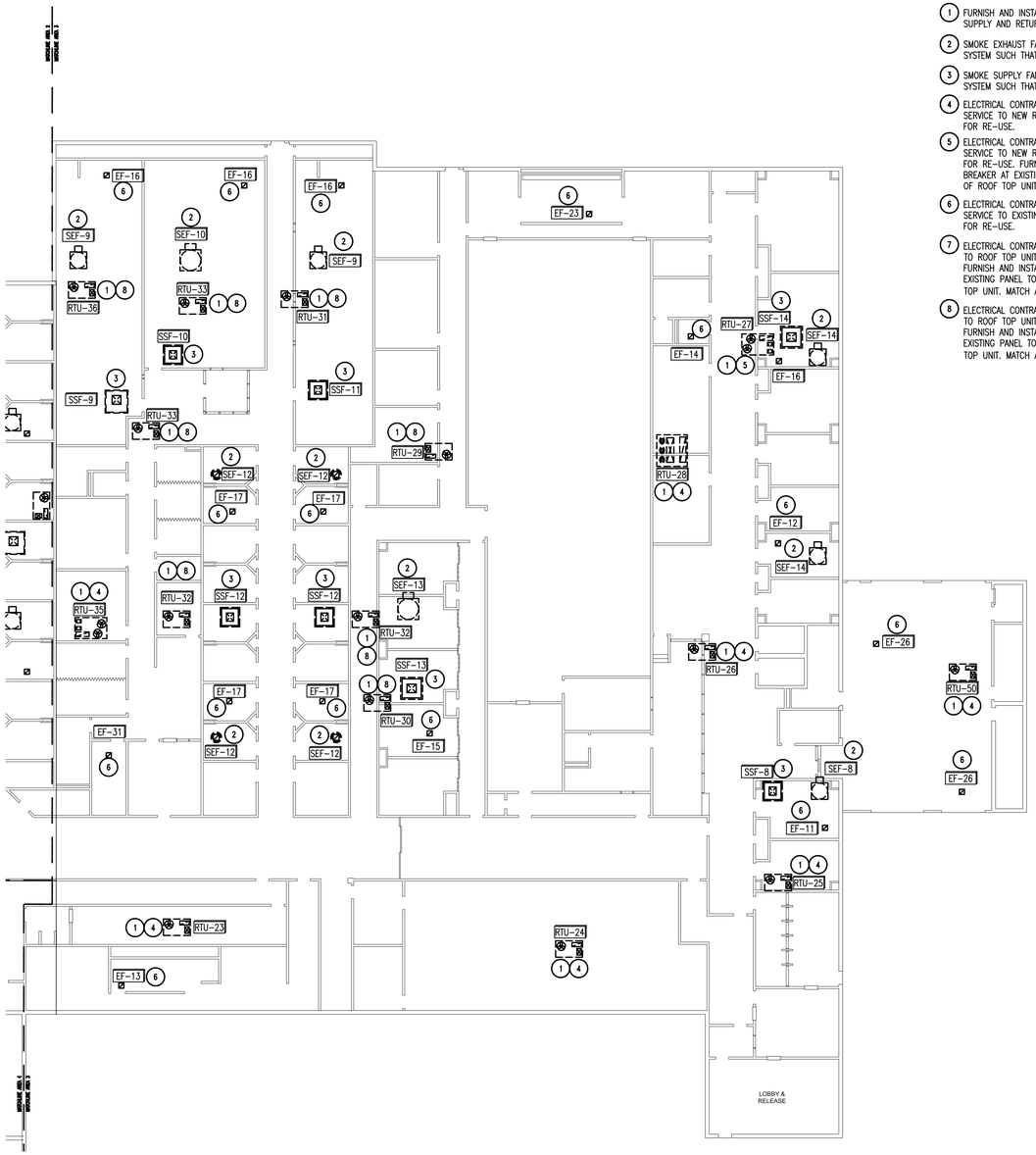
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5. ELECTRICAL CONTRACTOR SHALL EXTEND EXISTING ELECTRICAL SERVICE TO NEW ROOF TOP UNIT. EXISTING CIRCUIT TO REMAIN FOR RE-USE. FURNISH AND INSTALL NEW 30 AMP, 3POLE CIRCUIT BREAKER AT EXISTING PANEL TO MATCH NEW NAME PLATE RATING OF ROOF TOP UNIT. MATCH AIC RATING.
6. ELECTRICAL CONTRACTOR SHALL EXTEND EXISTING ELECTRICAL SERVICE TO EXISTING EXHAUST FAN. EXISTING CIRCUIT TO REMAIN FOR RE-USE.
7. ELECTRICAL CONTRACTOR SHALL REMOVE EXISTING (WIRE) FEEDER TO ROOF TOP UNIT. EXISTING CIRCUIT TO REMAIN FOR RE-USE. FURNISH AND INSTALL NEW 60 AMP, 2 POLE CIRCUIT BREAKER AT EXISTING PANEL TO MATCH NEW NAME PLATE RATING OF ROOF TOP UNIT. MATCH AIC RATING. ROUTE 2#4, #8G, 1"C.
8. ELECTRICAL CONTRACTOR SHALL REMOVE EXISTING (WIRE) FEEDER TO ROOF TOP UNIT. EXISTING CIRCUIT TO REMAIN FOR RE-USE. FURNISH AND INSTALL NEW 20 AMP, 3 POLE CIRCUIT BREAKER AT EXISTING PANEL TO MATCH NEW NAME PLATE RATING OF ROOF TOP UNIT. MATCH AIC RATING. ROUTE 3#12, #12G, 1/2"C.

GENERAL DEMOLITION NOTES:

A. INFORMATION ON THIS PLAN HAS BEEN OBTAINED FROM EXISTING DRAWINGS AND SITE SURVEY. CONTRACTOR SHALL VERIFY EXISTING CONDITIONS AND BECOME FULLY INFORMED AS TO THE EXTENT OF WORK PRIOR TO BIDDING OR COMMENCING WORK. ANY DISCREPANCIES BETWEEN EXISTING CONDITIONS AND CONSTRUCTION DOCUMENTS SHALL BE REPORTED IMMEDIATELY TO THE STRUCTURAL ENGINEER.

B. THE CONTRACTOR IS FULLY RESPONSIBLE FOR PERFORMING THE DEMOLITION WORK UNDER THIS SECTION OF THE PROJECT IN FULL COMPLIANCE WITH ALL APPLICABLE LOCAL, STATE, AND FEDERAL CODES. IF THE CONTRACTOR DETERMINES THAT THE CONTRACT DOCUMENTS AND PLANS ARE NOT IN COMPLIANCE WITH THE APPLICABLE CODES, HE SHALL INFORM THE ARCHITECT PRIOR TO CONSTRUCTION START FOR DIRECTION. FAILURE TO DO SO SHALL NOT RELIEVE THE CONTRACTOR OF HIS RESPONSIBILITY TO MEET CODE REQUIREMENTS AND REWORK SHALL BE AT CONTRACTOR'S EXPENSE. APPLICABLE CODES AND STANDARDS ON DEMOLITION WORK SHALL INCLUDE THOSE PUBLISHED BY OSHA AND EPA. APPLICABLE CODES AND STANDARDS ON DEMOLITION WORK SHALL INCLUDE THOSE PUBLISHED BY OSHA AND EPA. AN ASBESTOS SURVEY SHALL BE KEPT ON SITE AT ALL TIMES PER TEXAS DEPARTMENT OF HEALTH REQUIREMENTS

C. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO COMPLETE THE NECESSARY DEMOLITION. CONTRACTOR SHALL PATCH AND REPAIR ALL BUILDING DAMAGE CREATED BY DEMOLITION WORK. PATCHING SHALL BE COMPLETED WITH THE SAME MATERIALS AS THE SURROUNDING AREAS, OR WITH ARCHITECT APPROVED PATCHING MATERIALS.

D. ALL OPENINGS CUT IN MASONRY AND PLASTER WALLS OR CONCRETE FLOORS SHALL BE CORE-DRILLED OR SAWED WHEN POSSIBLE. CONTRACTOR SHALL CHECK BUILDING CONSTRUCTION WITH STRUCTURAL ENGINEER 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 AS REQUIRED BY DRAWINGS AND SPECIFICATIONS.

E. CONTRACTOR SHALL REMOVE AND RETURN ANY AND ALL EXISTING EQUIPMENT/MATERIALS TO OWNER. OWNER SHALL HAVE FULL RIGHT OF OWNERSHIP UNLESS SPECIFIED OTHERWISE. IF THE OWNER WAIVES THIS OPTION, ANY EQUIPMENT, MATERIAL, ETC SHALL BECOME THE PROPERTY OF THE CONTRACTOR.

F. SCHEDULE FOR ALL POWER OUTAGES SHALL BE APPROVED PRIOR TO DEMOLITION.

G. ON ANY WORK SHOWN ON M.E.P. DRAWINGS WHICH REQUIRES DEMOLITION OF BUILDING STRUCTURES AND FINISHES, IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO COMPLETE THE NECESSARY DEMOLITION. CONTRACTOR SHALL PATCH AND REPAIR ALL BUILDING DAMAGE CREATED BY DEMOLITION WORK. PATCHING SHALL BE COMPLETED WITH THE SAME MATERIALS AS THE SURROUNDING AREAS, OR WITH ARCHITECT-APPROVED PATCHING MATERIALS.

H. CONTRACTOR AND OWNER SHALL BE FULLY RESPONSIBLE TO IDENTIFY ANY AND ALL ASBESTOS PRESENT IN THE BUILDING PRIOR TO DEMOLITION AS REQUIRED BY LAW.

I. COORDINATION AMONG OTHER CONSTRUCTION DISCIPLINES PRIOR TO DEMOLITION IS MANDATORY.

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B. ALL PENETRATIONS THROUGH FIRE RATED WALLS SHALL HAVE SOUND RETARDING /ABSORBING FIRE STOP MATERIAL.

C. THE ELECTRICAL CONTRACTOR SHALL FIELD VERIFY ALL EQUIPMENT VOLTAGES, AND AMPERAGE RATINGS OF OWNER/CONTRACTOR PROVIDED EQUIPMENT PRIOR TO COMMENCING WORK. THE ELECTRICAL CONTRACTOR SHALL REPORT ANY AND ALL DISCREPANCIES TO THE STRUCTURAL ENGINEER IMMEDIATELY. ALL NECESSARY ELECTRICAL SERVICE CHANGES SHALL BE MADE BEFORE ANY ELECTRICAL EQUIPMENT, DEVICES, CONDUIT AND CONDUCTORS ARE INSTALLED. IT SHALL BE THE ELECTRICAL CONTRACTORS RESPONSIBILITY TO REMOVE AND INSTALL ANY ELECTRICAL EQUIPMENT, DEVICES, CONDUIT AND CONDUCTORS INSTALLED PRIOR TO THIS VERIFICATION.

D. ELECTRICAL CONTRACTOR SHALL KEEP EXISTING FIRE ALARM IN ORERATION UNTIL NEW FIRE ALARM SYSTEM IS FULLY OPERATIONAL.

E. ALL INTERIOR WORK TO BE BETWEEN THE HOURS OF 7PM-2AM.

F. SMOKE DETECTORS SHALL BE COMPATIBLE WITH ENVIRONMENT IN WHICH INSTALLED.

FIELD VERIFY ALL CONDITIONS

DESIGN DRAWINGS SCHEMATIC. THE CONTRACTOR SHALL VISIT THE SITE PRIOR TO BIDDING OR AWARD OF CONTRACT TO INSPECT EXISTING FEILD CONDITIONS. THIS CONTRACT SHALL INCLUDE ALL LABOR AND MATERIALS NECCESSARY FOR FEILD MODIFICATIONS DUE TO EXISTING CONDITIONS.

THE CONTRACTOR SHALL CONTACT THE STRUCTURAL ENGINEER PRIOR TO BIDDING FOR INTERPRETATIONS AND CLARIFICATIONS OF THE DESIGN AND INCLUDE IN HIS BID ALL COSTS TO MEET THE DESIGN INTENT. CLARIFICATIONS MADE BY THE STRUCTURAL ENGINEER AFTER BIDDING WILL BE FINAL AND SHALL BE IMPLEMENTED AT CONTRACTORS COST.

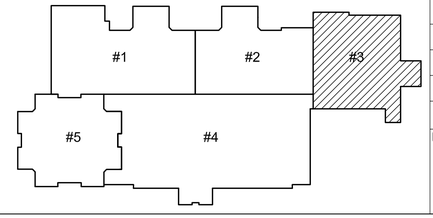
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NORTH

A ELECTRICAL - MECHANICAL EQUIPMENT LOCATION PLAN

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

AREA #3 A.D.C. BLDG



CHANIN ENGINEERING LLC
400 Nolana, Suite N2
McAllen, Texas 78504
PH: (956) 687-5421 FAX: (956) 687-3211
TBPE FIRM REG. NUMBER F-9369

SEAL:

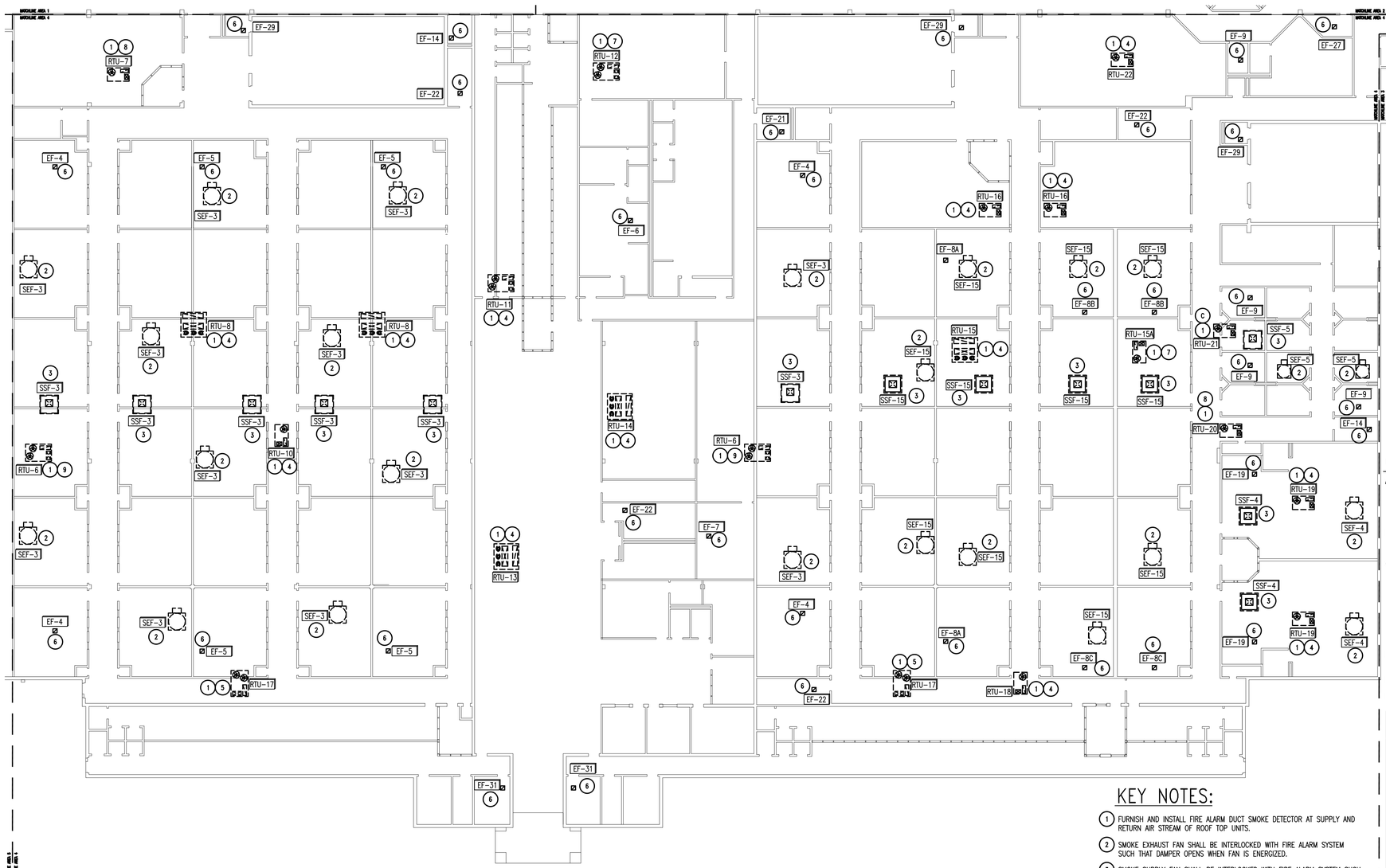
STATE OF TEXAS
ABRAM L. DOMINGUEZ
97393
LICENSED
PROFESSIONAL ENGINEER
11.15.13

MEP SOLUTIONS ENGINEERING
MECHANICAL, ELECTRICAL, PLUMBING ENGINEERS
600 E. BEAUMONT AVE. SUITE 2 McALLEN, TX. 78501 (956) 664-2727
TEXAS BOARD OF PROFESSIONAL ENGINEERS REGISTRATION # F-9748

PROJECT:
HIDALGO COUNTY
ADULT DETENTION CENTER and LAW ENFORCEMENT
FACILITY REPAIRS and/or REPLACEMENT
Edinburg, Texas

JOB NO. 13159
DATE: 11/15/13
DRAWN BY: M.G.
CHECKED BY:A.D.
REVISION:

DRAWING NO:
E9.0



A ELECTRICAL – MECHANICAL EQUIPMENT LOCATION PLAN

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

AREA #4 A.D.C. BLDG

GENERAL DEMOLITION NOTES:

A. INFORMATION ON THIS PLAN HAS BEEN OBTAINED FROM EXISTING DRAWINGS AND SITE SURVEY. CONTRACTOR SHALL VERIFY EXISTING CONDITIONS AND BECOME FULLY INFORMED AS TO THE EXTENT OF WORK PRIOR TO BIDDING OR COMMENCING WORK. ANY DISCREPANCIES BETWEEN EXISTING CONDITIONS AND CONSTRUCTION DOCUMENTS SHALL BE REPORTED IMMEDIATELY TO THE STRUCTURAL ENGINEER.

B. THE CONTRACTOR IS FULLY RESPONSIBLE FOR PERFORMING THE DEMOLITION WORK UNDER THIS SECTION OF THE PROJECT IN FULL COMPLIANCE WITH ALL APPLICABLE LOCAL, STATE, AND FEDERAL CODES. IF THE CONTRACTOR DETERMINES THAT THE CONTRACT DOCUMENTS AND PLANS ARE NOT IN COMPLIANCE WITH THE APPLICABLE CODES, HE SHALL INFORM THE ARCHITECT PRIOR TO CONSTRUCTION START FOR DIRECTION. FAILURE TO DO SO SHALL NOT RELIEVE THE CONTRACTOR OF HIS RESPONSIBILITY TO MEET CODE REQUIREMENTS AND REWORK SHALL BE AT CONTRACTOR'S EXPENSE. APPLICABLE CODES AND STANDARDS ON DEMOLITION WORK SHALL INCLUDE THOSE PUBLISHED BY OSHA AND EPA. APPLICABLE CODES AND STANDARDS ON DEMOLITION WORK SHALL INCLUDE THOSE PUBLISHED BY OSHA AND EPA. AN ASBESTOS SURVEY SHALL BE KEPT ON SITE AT ALL TIMES PER TEXAS DEPARTMENT OF HEALTH REQUIREMENTS

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D. ALL OPENINGS CUT IN MASONRY AND PLASTER WALLS OR CONCRETE FLOORS SHALL BE CORE-DRILLED OR SAWED WHEN POSSIBLE. CONTRACTOR SHALL CHECK BUILDING CONSTRUCTION WITH STRUCTURAL ENGINEER 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 AS REQUIRED BY DRAWINGS AND SPECIFICATIONS.

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F. SCHEDULE FOR ALL POWER OUTAGES SHALL BE APPROVED PRIOR TO DEMOLITION.

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D. ELECTRICAL CONTRACTOR SHALL KEEP EXISTING FIRE ALARM IN ORERATION UNTIL NEW FIRE ALARM SYSTEM IS FULLY OPERATIONAL.

E. ALL INTERIOR WORK TO BE BETWEEN THE HOURS OF 7PM-2AM.

F. SMOKE DETECTORS SHALL BE COMPATIBLE WITH ENVIRONMENT IN WHICH INSTALLED.

FIELD VERIFY ALL CONDITIONS

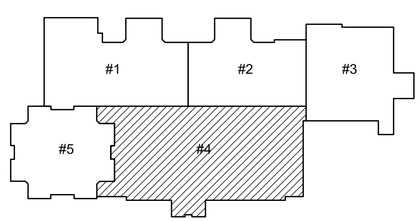
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KEY NOTES:

1. FURNISH AND INSTALL FIRE ALARM DUCT SMOKE DETECTOR AT SUPPLY AND RETURN AIR STREAM OF ROOF TOP UNITS.
2. SMOKE EXHAUST FAN SHALL BE INTERLOCKED WITH FIRE ALARM SYSTEM SUCH THAT DAMPER OPENS WHEN FAN IS ENERGIZED.
3. SMOKE SUPPLY FAN SHALL BE INTERLOCKED WITH FIRE ALARM SYSTEM SUCH THAT DAMPER OPENS WHEN FAN IS ENERGIZED.
4. ELECTRICAL CONTRACTOR SHALL EXTEND EXISTING ELECTRICAL SERVICE TO NEW ROOF TOP UNIT. EXISTING CIRCUIT TO REMAIN FOR RE-USE.
5. ELECTRICAL CONTRACTOR SHALL REMOVE EXISTING (WIRE) FEEDER TO ROOF TOP UNIT. EXISTING CIRCUIT TO REMAIN FOR RE-USE. FURNISH AND INSTALL NEW 35 AMP, 2 POLE CIRCUIT BREAKER AT EXISTING PANEL TO MATCH NEW NAME PLATE RATING OF ROOF TOP UNIT. MATCH AIC RATING. ROUTE 2#8, #10G, 3/4"C.
6. ELECTRICAL CONTRACTOR SHALL EXTEND EXISTING ELECTRICAL SERVICE TO EXISTING EXHAUST FAN. EXISTING CIRCUIT TO REMAIN FOR RE-USE.
7. ELECTRICAL CONTRACTOR SHALL EXTEND EXISTING ELECTRICAL SERVICE TO NEW ROOF TOP UNIT. EXISTING CIRCUIT TO REMAIN FOR RE-USE. FURNISH AND INSTALL NEW 30 AMP, 3POLE CIRCUIT BREAKER AT EXISTING PANEL TO MATCH NEW NAME PLATE RATING OF ROOF TOP UNIT. MATCH AIC RATING.
8. ELECTRICAL CONTRACTOR SHALL REMOVE EXISTING (WIRE) FEEDER TO ROOF TOP UNIT. EXISTING CIRCUIT TO REMAIN FOR RE-USE. FURNISH AND INSTALL NEW 20 AMP, 3 POLE CIRCUIT BREAKER AT EXISTING PANEL TO MATCH NEW NAME PLATE RATING OF ROOF TOP UNIT. MATCH AIC RATING. ROUTE 3#12, #12G, 1/2"C.
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CHANIN ENGINEERING LLC
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McAllen, Texas 78504
PH: (956) 687-9421 FAX: (956) 687-3211
TBPE FIRM REG. NUMBER F-9369

SEAL:

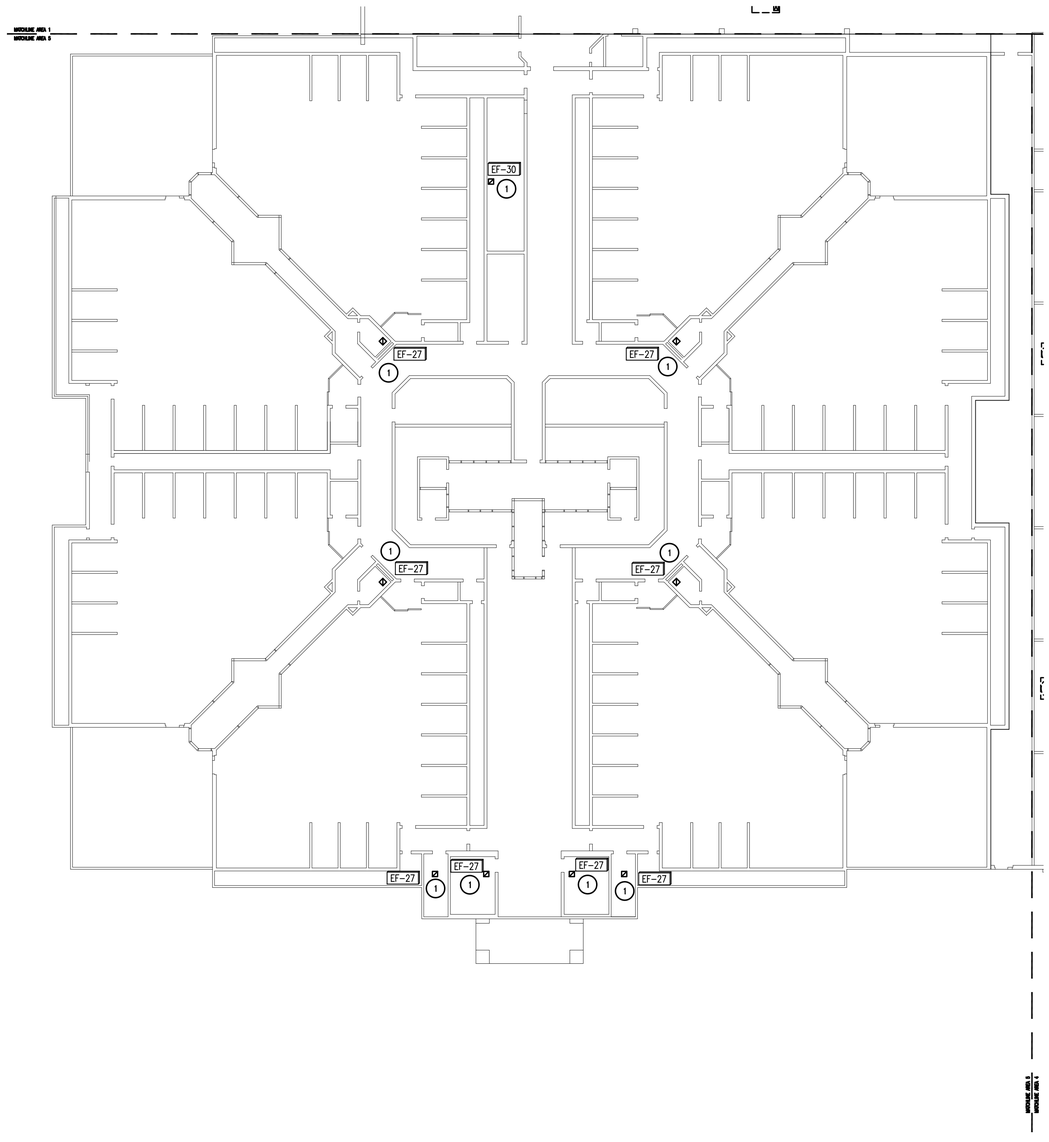
STATE OF TEXAS
ABRAM L. DOMINGUEZ
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PROJECT:
HIDALGO COUNTY
ADULT DETENTION CENTER and LAW ENFORCEMENT
FACILITY REPAIRS and/or REPLACEMENT
Edinburg, Texas

JOB NO. 13159
DATE: 11/15/13
DRAWN BY: M.G.
CHECKED BY:A.D.
REVISION:

DRAWING NO:
E10.0



KEY NOTES:

1. ELECTRICAL CONTRACTOR SHALL EXTEND EXISTING ELECTRICAL SERVICE TO EXISTING EXHAUST FAN. EXISTING CIRCUIT TO REMAIN FOR RE-USE.

GENERAL DEMOLITION NOTES:

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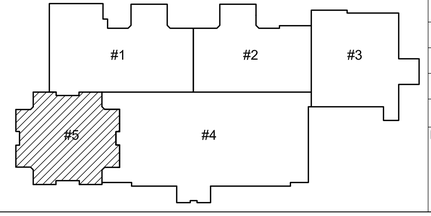
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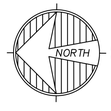
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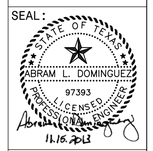
A ELECTRICAL - MECHANICAL EQUIPMENT LOCATION PLAN

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

AREA #5 - 1ST FLR A.D.C. BLDG

CHANIN ENGINEERING LLC
400 Nolana, Suite N2
McAllen, Texas 78504
PH: (956) 687-9421 FAX: (956) 687-3211
WWW.CHANINENGINEERING.COM
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SEAL:



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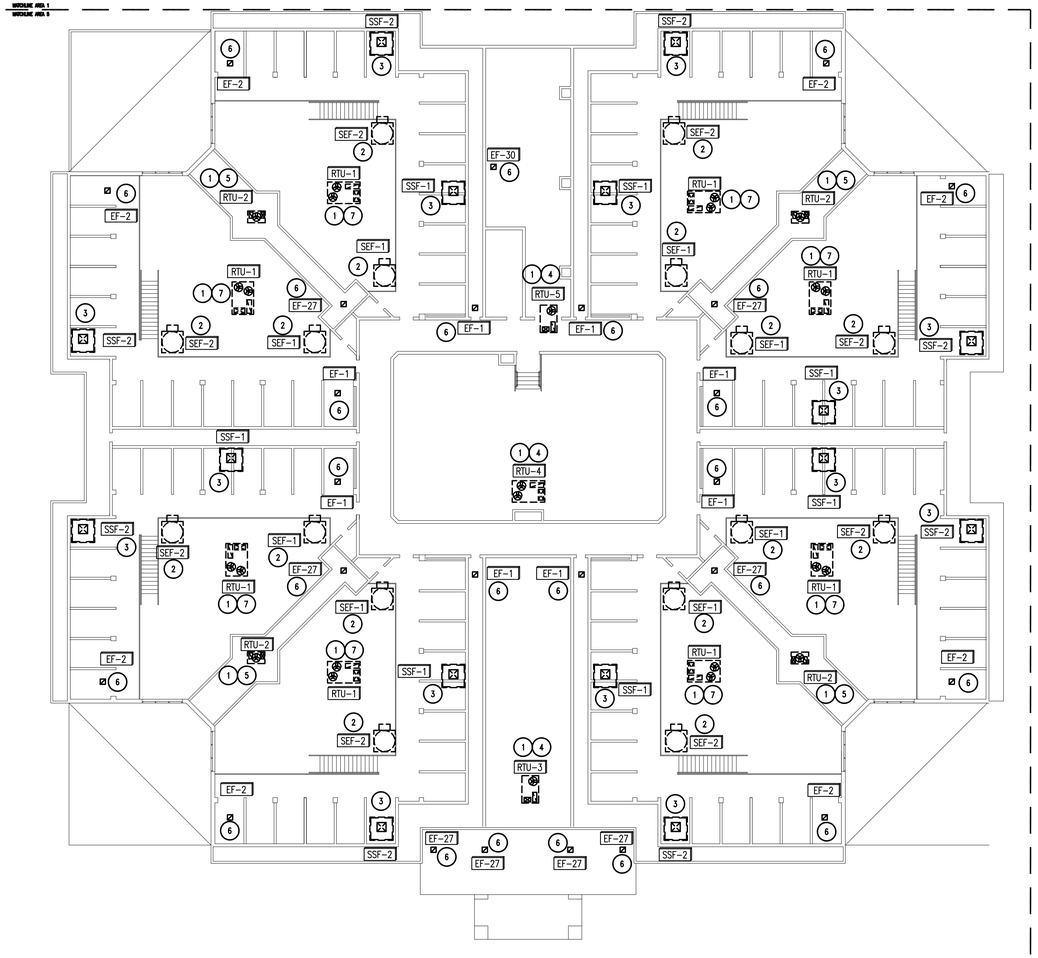
DRAWN BY: M.G.

CHECKED BY:A.D.

REVISION:

DRAWING NO:

E11.0



NORTH

A ELECTRICAL – MECHANICAL EQUIPMENT LOCATION PLAN

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

AREA #5 – 2ND FLR A.D.C. BLDG

KEY NOTES:

1. FURNISH AND INSTALL FIRE ALARM DUCT SMOKE DETECTOR AT SUPPLY AND RETURN AIR STREAM OF ROOF TOP UNITS.
2. SMOKE EXHAUST FAN SHALL BE INTERLOCKED WITH FIRE ALARM SYSTEM SUCH THAT DAMPER OPENS WHEN FAN IS ENERGIZED.
3. SMOKE SUPPLY FAN SHALL BE INTERLOCKED WITH FIRE ALARM SYSTEM SUCH THAT DAMPER OPENS WHEN FAN IS ENERGIZED.
4. ELECTRICAL CONTRACTOR SHALL EXTEND EXISTING ELECTRICAL SERVICE TO NEW ROOF TOP UNIT. EXISTING CIRCUIT TO REMAIN FOR RE-USE.
5. ELECTRICAL CONTRACTOR SHALL REMOVE EXISTING (WIRE) FEEDER TO ROOF TOP UNIT. EXISTING CIRCUIT TO REMAIN FOR RE-USE. FURNISH AND INSTALL NEW 60 AMP, 2 POLE CIRCUIT BREAKER AT EXISTING PANEL TO MATCH NEW NAME PLATE RATING OF ROOF TOP UNIT. MATCH AIC RATING. ROUTE 2#4, #8G, 1"C.
6. ELECTRICAL CONTRACTOR SHALL EXTEND EXISTING ELECTRICAL SERVICE TO EXISTING EXHAUST FAN. EXISTING CIRCUIT TO REMAIN FOR RE-USE.
7. ELECTRICAL CONTRACTOR SHALL REMOVE EXISTING (WIRE) FEEDER TO ROOF TOP UNIT. EXISTING CIRCUIT TO REMAIN FOR RE-USE. FURNISH AND INSTALL NEW 40 AMP, 3 POLE CIRCUIT BREAKER AT EXISTING PANEL TO MATCH NEW NAME PLATE RATING OF ROOF TOP UNIT. MATCH AIC RATING. ROUTE 3#8, #10G, 3/4"C.

GENERAL DEMOLITION NOTES:

A. INFORMATION ON THIS PLAN HAS BEEN OBTAINED FROM EXISTING DRAWINGS AND SITE SURVEY. CONTRACTOR SHALL VERIFY EXISTING CONDITIONS AND BECOME FULLY INFORMED AS TO THE EXTENT OF WORK PRIOR TO BIDDING OR COMMENCING WORK. ANY DISCREPANCIES BETWEEN EXISTING CONDITIONS AND CONSTRUCTION DOCUMENTS SHALL BE REPORTED IMMEDIATELY TO THE STRUCTURAL ENGINEER.

B. THE CONTRACTOR IS FULLY RESPONSIBLE FOR PERFORMING THE DEMOLITION WORK UNDER THIS SECTION OF THE PROJECT IN FULL COMPLIANCE WITH ALL APPLICABLE LOCAL, STATE, AND FEDERAL CODES. IF THE CONTRACTOR DETERMINES THAT THE CONTRACT DOCUMENTS AND PLANS ARE NOT IN COMPLIANCE WITH THE APPLICABLE CODES, HE SHALL INFORM THE ARCHITECT PRIOR TO CONSTRUCTION START FOR DIRECTION. FAILURE TO DO SO SHALL NOT RELIEVE THE CONTRACTOR OF HIS RESPONSIBILITY TO MEET CODE REQUIREMENTS AND REWORK SHALL BE AT CONTRACTOR'S EXPENSE. APPLICABLE CODES AND STANDARDS ON DEMOLITION WORK SHALL INCLUDE THOSE PUBLISHED BY OSHA AND EPA. APPLICABLE CODES AND STANDARDS ON DEMOLITION WORK SHALL INCLUDE THOSE PUBLISHED BY OSHA AND EPA. AN ASBESTOS SURVEY SHALL BE KEPT ON SITE AT ALL TIMES PER TEXAS DEPARTMENT OF HEALTH REQUIREMENTS

C. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO COMPLETE THE NECESSARY DEMOLITION. CONTRACTOR SHALL PATCH AND REPAIR ALL BUILDING DAMAGE CREATED BY DEMOLITION WORK. PATCHING SHALL BE COMPLETED WITH THE SAME MATERIALS AS THE SURROUNDING AREAS, OR WITH ARCHITECT APPROVED PATCHING MATERIALS.

D. ALL OPENINGS CUT IN MASONRY AND PLASTER WALLS OR CONCRETE FLOORS SHALL BE CORE-DRILLED OR SAWED WHEN POSSIBLE. CONTRACTOR SHALL CHECK BUILDING CONSTRUCTION WITH STRUCTURAL ENGINEER 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 AS REQUIRED BY DRAWINGS AND SPECIFICATIONS.

E. CONTRACTOR SHALL REMOVE AND RETURN ANY AND ALL EXISTING EQUIPMENT/MATERIALS TO OWNER. OWNER SHALL HAVE FULL RIGHT OF OWNERSHIP UNLESS SPECIFIED OTHERWISE. IF THE OWNER WAIVES THIS OPTION, ANY EQUIPMENT, MATERIAL, ETC SHALL BECOME THE PROPERTY OF THE CONTRACTOR.

F. SCHEDULE FOR ALL POWER OUTAGES SHALL BE APPROVED PRIOR TO DEMOLITION.

G. ON ANY WORK SHOWN ON M.E.P. DRAWINGS WHICH REQUIRES DEMOLITION OF BUILDING STRUCTURES AND FINISHES, IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO COMPLETE THE NECESSARY DEMOLITION. CONTRACTOR SHALL PATCH AND REPAIR ALL BUILDING DAMAGE CREATED BY DEMOLITION WORK. PATCHING SHALL BE COMPLETED WITH THE SAME MATERIALS AS THE SURROUNDING AREAS, OR WITH ARCHITECT-APPROVED PATCHING MATERIALS.

H. CONTRACTOR AND OWNER SHALL BE FULLY RESPONSIBLE TO IDENTIFY ANY AND ALL ASBESTOS PRESENT IN THE BUILDING PRIOR TO DEMOLITION AS REQUIRED BY LAW.

I. COORDINATION AMONG OTHER CONSTRUCTION DISCIPLINES PRIOR TO DEMOLITION IS MANDATORY.

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B. ALL PENETRATIONS THROUGH FIRE RATED WALLS SHALL HAVE SOUND RETARDING /ABSORBING FIRE STOP MATERIAL.

C. THE ELECTRICAL CONTRACTOR SHALL FIELD VERIFY ALL EQUIPMENT VOLTAGES, AND AMPERAGE RATINGS OF OWNER/CONTRACTOR PROVIDED EQUIPMENT PRIOR TO COMMENCING WORK. THE ELECTRICAL CONTRACTOR SHALL REPORT ANY AND ALL DISCREPANCIES TO THE STRUCTURAL ENGINEER IMMEDIATELY. ALL NECESSARY ELECTRICAL SERVICE CHANGES SHALL BE MADE BEFORE ANY ELECTRICAL EQUIPMENT, DEVICES, CONDUIT AND CONDUCTORS ARE INSTALLED. IT SHALL BE THE ELECTRICAL CONTRACTORS RESPONSIBILITY TO REMOVE AND INSTALL ANY ELECTRICAL EQUIPMENT, DEVICES, CONDUIT AND CONDUCTORS INSTALLED PRIOR TO THIS VERIFICATION.

D. ELECTRICAL CONTRACTOR SHALL KEEP EXISTING FIRE ALARM IN ORERATION UNTIL NEW FIRE ALARM SYSTEM IS FULLY OPERATIONAL.

E. ALL INTERIOR WORK TO BE BETWEEN THE HOURS OF 7PM-2AM.

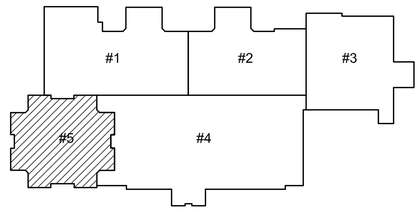
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BIDDING CONTRACTORS SHALL HAVE A WORKING KNOWLEDGE OF LOCAL CODES AND ORDINANCES AND SHALL INCLUDE IN THEIR BIDS THE COSTS FOR ALL WORK INSTALLED IN STRICT ACCORDANCE WITH GOVERNING CODES, THE PLANS AND SPECIFICATIONS NOT WITHSTANDING. THE CONTRACTOR SHALL ALERT STRUCTURAL ENGINEER OF ANY APPARENT DISCREPANCIES BETWEEN GOVERNING CODES AND DESIGN INTENT.



CHANIN ENGINEERING LLC
400 Nolana, Suite N4
McAllen, Texas 78504
PH: (956) 687-9421 FAX: (956) 687-3211
TBPE FIRM REG. NUMBER F-9369

SEAL:

STATE OF TEXAS
ABRAM L. DOMINGUEZ
97393
LICENSED
PROFESSIONAL ENGINEER
11.15.13

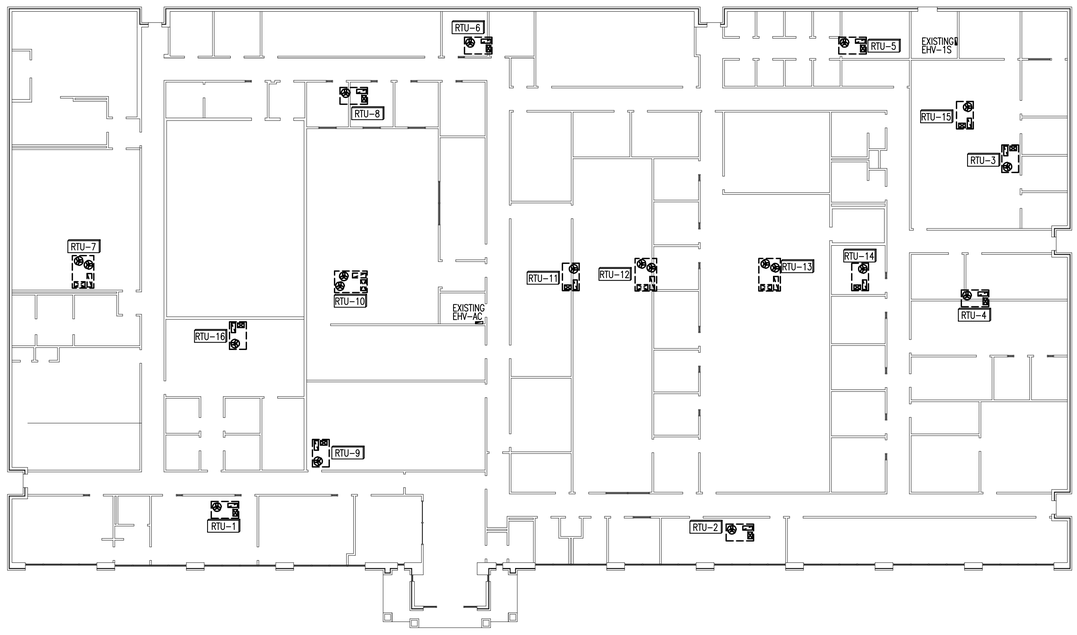
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MECHANICAL, ELECTRICAL, PLUMBING ENGINEERS
600 E. BEAUMONT AVE. SUITE 2 McALLEN, TX. 78501 (956) 664-2727
TEXAS BOARD OF PROFESSIONAL ENGINEERS REGISTRATION # F-9748

PROJECT:

HIDALGO COUNTY
ADULT DETENTION CENTER and LAW ENFORCEMENT FACILITY REPAIRS and/or REPLACEMENT
Edinburg, Texas

JOB NO. 13159
DATE: 11/15/13
DRAWN BY: M.G.
CHECKED BY:A.D.
REVISION:
DRAWING NO:

E12.0



NORTH

A ELECTRICAL – MECHANICAL EQUIPMENT LOCATION PLAN

SCALE: 1/16" = 1'-0" L.E.C. BLDG

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E. ALL INTERIOR WORK TO BE BETWEEN THE HOURS OF 7PM-2AM.

F. SMOKE DETECTORS SHALL BE COMPATIBLE WITH ENVIRONMENT IN WHICH INSTALLED.

G. FOR MECHANICAL EQUIPMENT CONNECTION SCHEDULE. REFER TO DETAIL C /SHEET E16.0.

H. REFER TO SHEET M6.0 FOR FIRE SMOKE DAMPERS. TIE INTO FIRE ALARM SYSTEM.

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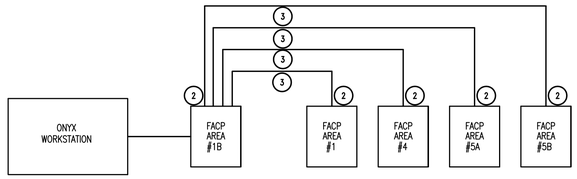
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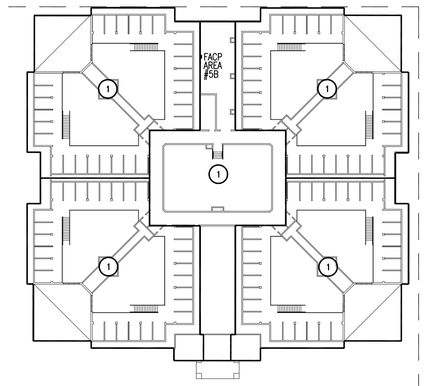
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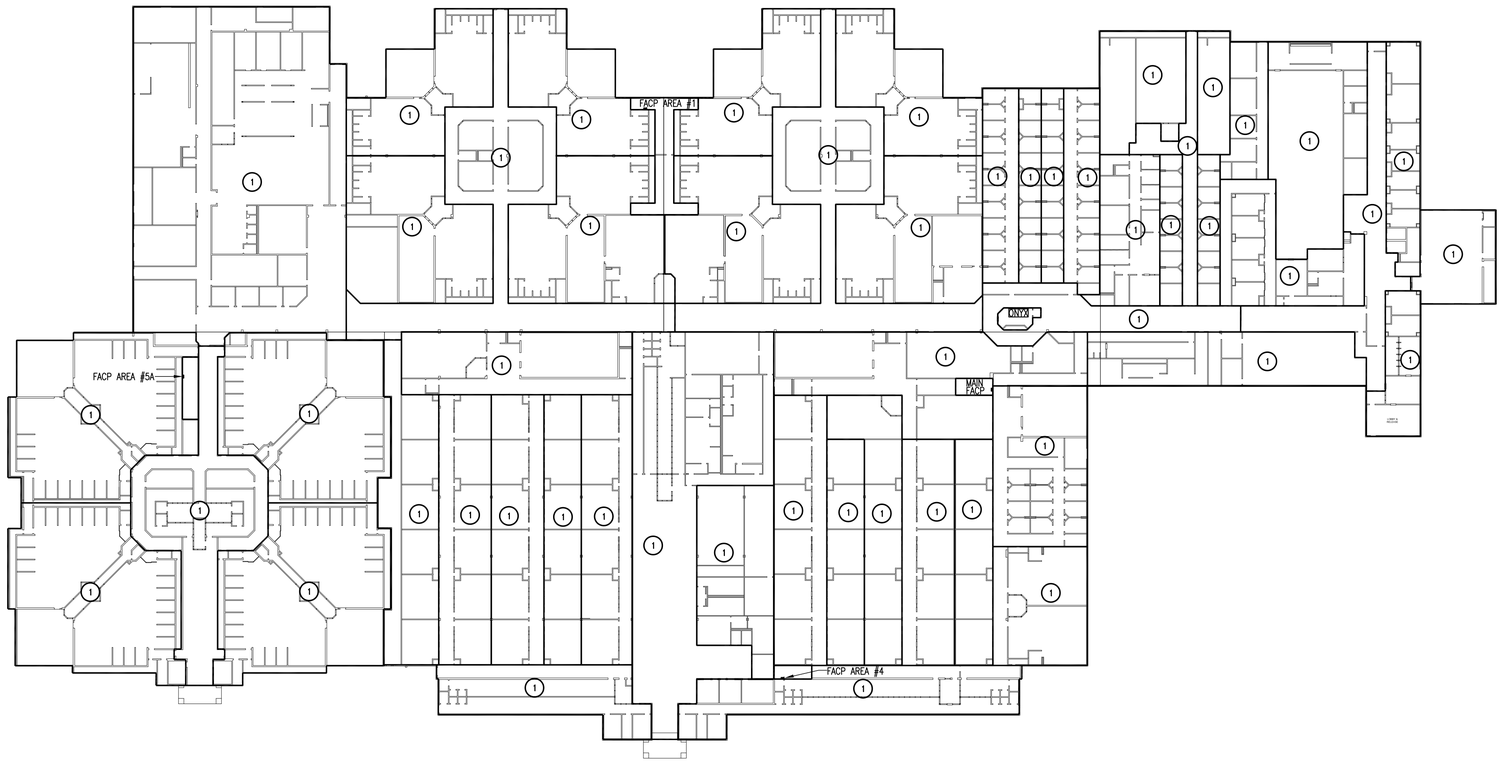


C ELECTRICAL FIRE ALARM DIAGRAM
SCALE: NTS



NORTH

B ELECTRICAL SPECIAL SYSTEMS PLAN
SCALE: 1" = 40'-0" OVERALL AREA A.D.C. BLDG



NORTH

A ELECTRICAL SPECIAL SYSTEMS PLAN
SCALE: 1" = 40'-0" OVERALL AREA A.D.C BLGD

KEY NOTES:

1. FURNISH AND INSTALL NOTIFIER 150-X FAULT ISOLATOR MODULE FOR HIGHLIGHTED AREA. A MAXIMUM OF 25 DEVICES IN-BETWEEN ISOLATORS.
2. FURNISH AND INSTALL NOTIFIER NCM-F FIBER OPTIC NETWORK CONTROL MODULE.
3. FURNISH AND INSTALL 6 STRAND ARMORED- INNER/OUTER RATED FIBER BETWEEN FIRE ALARM CONTROL PANELS.

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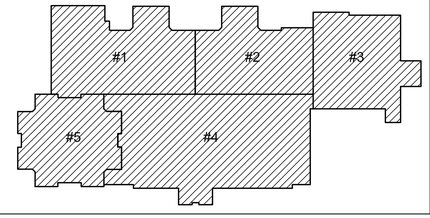
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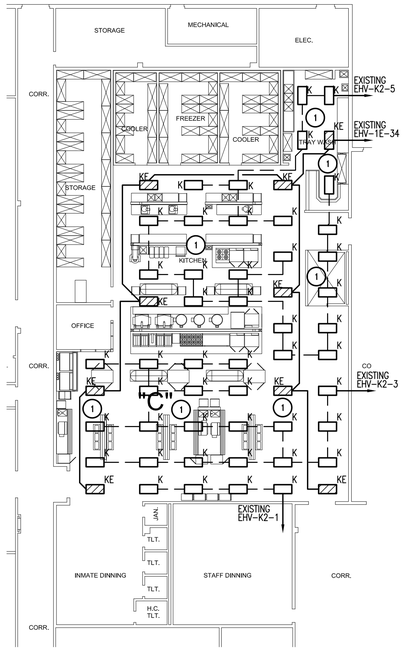
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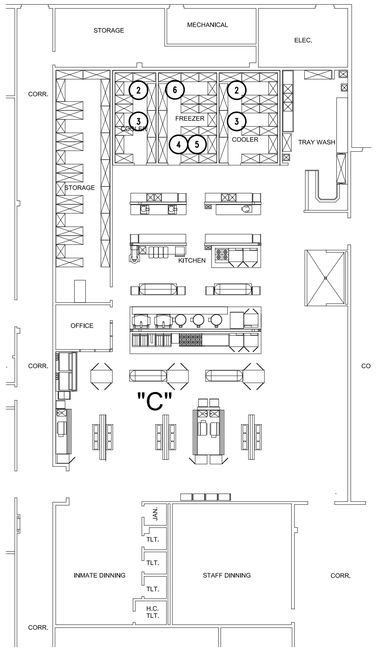


NORTH

B ENLARGED ELECTRICAL LIGHTING PLAN

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

ALTERNATE – KITCHEN A.D.C. BLDG



NORTH

C ENLARGED ELECTRICAL POWER PLAN

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

ALTERNATE – KITCHEN A.D.C. BLDG

KEY NOTES:

1. EXISTING KITCHEN LIGHT FIXTURES TO BE REMOVE. FURNISH AND INSTALL NEW LIGHT FIXTURES, REFER TO ELECTRICAL LIGHTING FIXTURE SCHDULE ON SHEET E16.0.

   EXISTING REMOTE COOLER FOR COOLER TO BE REMOVE. FURNISH AND INSTALL NEW REMOTE CONDENSER FOR COOLER. COORDINATE EXACT LOCATION AND BREAKER/DISCONNECT/WIRING SIZE WITH EQUIPMENT INSTALLER.

3. EXISTING EVAPORATOR COIL AND LIGHTING FOR COOLER TO BE REMOVE. FURNISH AND INSTALL NEW EVAPORATOR COIL AND LIGHTING FOR COOLER. COORDINATE EXACT LOCATION AND BREAKER/WIRING SIZE WITH EQUIPMENT INSTALLER.

4. EXISTING 120V CONNECTION FOR WALK-IN LIGHTS AND DOOR HEATER FOR FREEZER TO BE REMOVED. FURNISH AND INSTALL NEW 120V CONNECTION FOR WALK-IN LIGHTS AND DOOR HEATER FOR FREEZER VERIFY CONNECTION AND SIZE WITH EQUIPMENT INSTALLER.

5. EXISTING EVAPORATOR COIL FOR FREEZER TO BE REMOVE. FURNISH AND INSTALL NEW EVAPORATOR COIL FOR FREEZER COORDINATE EXACT LOCATION AND BREAKER/WIRING SIZE WITH EQUIPMENT INSTALLER.

6. EXISTING REMOTE CONDENSER FOR FREEZER TO BE REMOVE. FURNISH AND INSTALL NEW REMOTE CONDENSER FOR FREEZER COORDINATE EXACT LOCATION AND BREAKER/DISCONNECT/WIRING SIZE WITH EQUIPMENT INSTALLER.

GENERAL DEMOLITION NOTES:

A. INFORMATION ON THIS PLAN HAS BEEN OBTAINED FROM EXISTING DRAWINGS AND SITE SURVEY. CONTRACTOR SHALL VERIFY EXISTING CONDITIONS AND BECOME FULLY INFORMED AS TO THE EXTENT OF WORK PRIOR TO BIDDING OR COMMENCING WORK. ANY DISCREPANCIES BETWEEN EXISTING CONDITIONS AND CONSTRUCTION DOCUMENTS SHALL BE REPORTED IMMEDIATELY TO THE STRUCTURAL ENGINEER.

B. THE CONTRACTOR IS FULLY RESPONSIBLE FOR PERFORMING THE DEMOLITION WORK UNDER THIS SECTION OF THE PROJECT IN FULL COMPLIANCE WITH ALL APPLICABLE LOCAL, STATE, AND FEDERAL CODES. IF THE CONTRACTOR DETERMINES THAT THE CONTRACT DOCUMENTS AND PLANS ARE NOT IN COMPLIANCE WITH THE APPLICABLE CODES, HE SHALL INFORM THE ARCHITECT PRIOR TO CONSTRUCTION START FOR DIRECTION. FAILURE TO DO SO SHALL NOT RELIEVE THE CONTRACTOR OF HIS RESPONSIBILITY TO MEET CODE REQUIREMENTS AND REWORK SHALL BE AT CONTRACTOR'S EXPENSE. APPLICABLE CODES AND STANDARDS ON DEMOLITION WORK SHALL INCLUDE THOSE PUBLISHED BY OSHA AND EPA. APPLICABLE CODES AND STANDARDS ON DEMOLITION WORK SHALL INCLUDE THOSE PUBLISHED BY OSHA AND EPA. AN ASBESTOS SURVEY SHALL BE KEPT ON SITE AT ALL TIMES PER TEXAS DEPARTMENT OF HEALTH REQUIREMENTS

C. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO COMPLETE THE NECESSARY DEMOLITION. CONTRACTOR SHALL PATCH AND REPAIR ALL BUILDING DAMAGE CREATED BY DEMOLITION WORK. PATCHING SHALL BE COMPLETED WITH THE SAME MATERIALS AS THE SURROUNDING AREAS, OR WITH ARCHITECT APPROVED PATCHING MATERIALS.

D. ALL OPENINGS CUT IN MASONRY AND PLASTER WALLS OR CONCRETE FLOORS SHALL BE CORE-DRILLED OR SAWED WHEN POSSIBLE. CONTRACTOR SHALL CHECK BUILDING CONSTRUCTION WITH STRUCTURAL ENGINEER 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 AS REQUIRED BY DRAWINGS AND SPECIFICATIONS.

E. CONTRACTOR SHALL REMOVE AND RETURN ANY AND ALL EXISTING EQUIPMENT/MATERIALS TO OWNER. OWNER SHALL HAVE FULL RIGHT OF OWNERSHIP UNLESS SPECIFIED OTHERWISE. IF THE OWNER WAIVES THIS OPTION, ANY EQUIPMENT, MATERIAL, ETC SHALL BECOME THE PROPERTY OF THE CONTRACTOR.

F. SCHEDULE FOR ALL POWER OUTAGES SHALL BE APPROVED PRIOR TO DEMOLITION.

G. ON ANY WORK SHOWN ON M.E.P. DRAWINGS WHICH REQUIRES DEMOLITION OF BUILDING STRUCTURES AND FINISHES, IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO COMPLETE THE NECESSARY DEMOLITION. CONTRACTOR SHALL PATCH AND REPAIR ALL BUILDING DAMAGE CREATED BY DEMOLITION WORK. PATCHING SHALL BE COMPLETED WITH THE SAME MATERIALS AS THE SURROUNDING AREAS, OR WITH ARCHITECT-APPROVED PATCHING MATERIALS.

H. CONTRACTOR AND OWNER SHALL BE FULLY RESPONSIBLE TO IDENTIFY ANY AND ALL ASBESTOS PRESENT IN THE BUILDING PRIOR TO DEMOLITION AS REQUIRED BY LAW.

I. COORDINATION AMONG OTHER CONSTRUCTION DISCIPLINES PRIOR TO DEMOLITION IS MANDATORY.

GENERAL NOTES:

A. INFORMATION ON THIS PLAN HAS BEEN OBTAINED FROM EXISTING PLANS AND SITE SURVEY. CONTRACTOR SHALL FIELD VERIFY EXISTING CONDITIONS PRIOR TO COMMENCING WORK. ANY DISCREPTANCIES BETWEEN EXISTING CONDITIONS AND CONSTRUCTION DOCUMENTS SHALL BE REPORTED TO THE STRUCTURAL ENGINEER.

B. ALL PENETRATIONS THROUGH FIRE RATED WALLS SHALL HAVE SOUND RETARDING /ABSORBING FIRE STOP MATERIAL.

C. THE ELECTRICAL CONTRACTOR SHALL FIELD VERIFY ALL EQUIPMENT VOLTAGES, AND AMPERAGE RATINGS OF OWNER/CONTRACTOR PROVIDED EQUIPMENT PRIOR TO COMMENCING WORK. THE ELECTRICAL CONTRACTOR SHALL REPORT ANY AND ALL DISCREPANCIES TO THE STRUCTURAL ENGINEER IMMEDIATELY. ALL NECESSARY ELECTRICAL SERVICE CHANGES SHALL BE MADE BEFORE ANY ELECTRICAL EQUIPMENT, DEVICES, CONDUIT AND CONDUCTORS ARE INSTALLED. IT SHALL BE THE ELECTRICAL CONTRACTORS RESPONSIBILITY TO REMOVE AND INSTALL ANY ELECTRICAL EQUIPMENT, DEVICES, CONDUIT AND CONDUCTORS INSTALLED PRIOR TO THIS VERIFICATION.

D. ELECTRICAL CONTRACTOR SHALL KEEP EXISTING FIRE ALARM IN ORERATION UNTIL NEW FIRE ALARM SYSTEM IS FULLY OPERATIONAL.

E. ALL INTERIOR WORK TO BE BETWEEN THE HOURS OF 7PM-2AM.

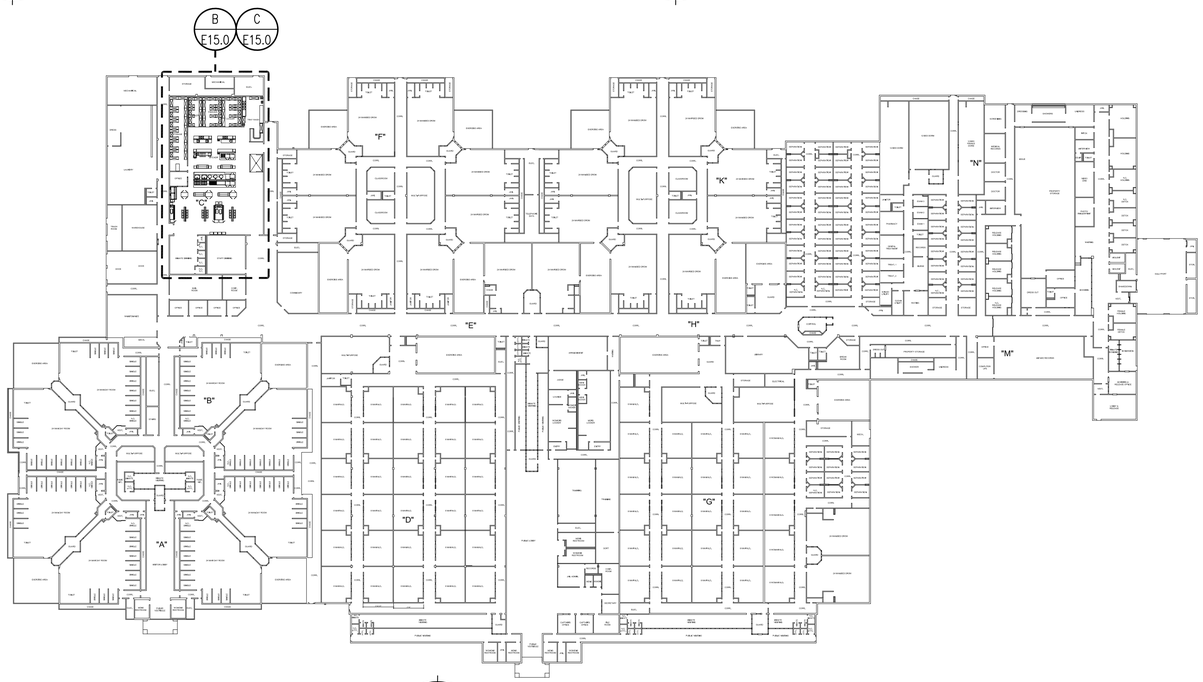
F. SMOKE DETECTORS SHALL BE COMPATIBLE WITH ENVIRONMENT IN WHICH INSTALLED.

FIELD VERIFY ALL CONDITIONS

DESIGN DRAWINGS SCHEMATIC. THE CONTRACTOR SHALL VISIT THE SITE PRIOR TO BIDDING OR AWARD OF CONTRACT TO INSPECT EXISTING FEILD CONDITIONS. THIS CONTRACT SHALL INCLUDE ALL LABOR AND MATERIALS NECCESSARY FOR FEILD MODIFICATIONS DUE TO EXISTING CONDITIONS.

THE CONTRACTOR SHALL CONTACT THE STRUCTURAL ENGINEER PRIOR TO BIDDING FOR INTERPRETATIONS AND CLARIFICATIONS OF THE DESIGN AND INCLUDE IN HIS BID ALL COSTS TO MEET THE DESIGN INTENT. CLARIFICATIONS MADE BY THE STRUCTURAL ENGINEER AFTER BIDDING WILL BE FINAL AND SHALL BE IMPLEMENTED AT CONTRACTORS COST.

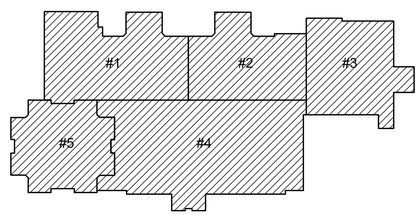
BIDDING CONTRACTORS SHALL HAVE A WORKING KNOWLEDGE OF LOCAL CODES AND ORDINANCES AND SHALL INCLUDE IN THEIR BIDS THE COSTS FOR ALL WORK INSTALLED IN STRICT ACCORDANCE WITH GOVERNING CODES, THE PLANS AND SPECIFICATIONS NOT WITHSTANDING. THE CONTRACTOR SHALL ALERT STRUCTURAL ENGINEER OF ANY APPARENT DISCREPANCIES BETWEEN GOVERNING CODES AND DESIGN INTENT.



NORTH

A ELECTRICAL PLAN

SCALE: 1" = 50'-0" OVERALL A.D.C. BLDG



CHANIN ENGINEERING LLC
400 Nolana, Suite N2
McAllen, Texas 78504
PH: (956) 687-9421 FAX: (956) 687-3211
TBPE FIRM REG. NUMBER F-9369

SEAL:

STATE OF TEXAS
ABRAM L. DOMINGUEZ
97393
LICENSED
PROFESSIONAL ENGINEER
11.15.2013

MEP SOLUTIONS ENGINEERING
MECHANICAL, ELECTRICAL, PLUMBING ENGINEERS
600 E. BEAUMONT AVE. SUITE 2 McALLEN, TX. 78501 (956) 664-2727
TEXAS BOARD OF PROFESSIONAL ENGINEERS REGISTRATION # F-9748

PROJECT:

HIDALGO COUNTY
ADULT DETENTION CENTER and LAW ENFORCEMENT
FACILITY REPAIRS and/or REPLACEMENT
Edinburg, Texas

JOB NO. 13159
DATE: 11/15/13
DRAWN BY: M.G.
CHECKED BY:A.D.
REVISION:
DRAWING NO:
E15.0

ELECTRICAL LEGEND

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

SYMBOL	DESCRIPTION	MNTG. HT. UNO (SEE NOTE 1)
F	FIRE ALARM PULL STATION	48" AFF
F	FIRE ALARM AUDIBLE/VISUAL SIGNAL	80" AFF
F	FIRE ALARM AUDIBLE SIGNAL	80" AFF
F	FIRE ALARM VISUAL SIGNAL	80" AFF
S	SPEAKER VOICE EVAC SYSTEM	80" AFF
S H S	FIRE ALARM SMOKE DETECTOR CEILING OR WALL MOUNTED	80" AFF
H H	HEAT DETECTOR CEILING OR WALL MOUNTED	–
D	DUCT SMOKE DETECTOR	–
FACP	FIRE ALARM CONTROL PANEL – NOTIFIER NF52–3030	–
NCA	FIRE ALARM NETWORK CONTROL ANNUNCIATOR – NOTIFIER NCA–2	–
FS	FIRE ALARM SPRINKLER FLOW SWITCH	–
TS	FIRE ALARM SPRINKLER TAMPER SWITCH	–
PS	FIRE ALARM SPRINKLER PRESSURE SWITCH	–
	FIRE SMOKE DAMPER ACTUATED BY FIRE ALARM CONTROL PANEL	–
S G	FIRE ALARM SMOKE DETECTOR CEILING OR WALL MOUNTED WITH GUARD	–
S A	FIRE ALARM SMOKE DETECTOR ABOVE CIELING	–
F G	FIRE ALARM AUDIBLE/VISUAL SIGNAL WITH GUARD	–
F G	FIRE ALARM VISUAL SIGNAL WITH GUARD	–
ONYX	ONYX WORKSTATION – NOTIFIER SERIES UNINET 2000	–
	2'x4' FLUORESCENT LIGHT FIXTURE	SEE FIX. SCH.
	2'x4' FLUORESCENT LIGHT FIXTURE ON BATTERY PACK	SEE FIX. SCH.

UG	UNDERGROUND	UNO(U.N.O.)	UNLESS NOTED OTHERWISE
ABS	ABOVE BACK SPLASH	BFC	GROUND FAULT INTERRUPTER
AFF	ABOVE FINISHED FLOOR	GFI	BELOW FINISHED CEILING
WP	WEATHERPROOF	CB	CIRCUIT BREAKER
C	CONDUIT	EX	EXISTING

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.

A ELECTRICAL LEGEND
SCALE: NTS

LIGHTING FIXTURE SCHEDULE

TYPE	DESCRIPTION	MANUFACTURER & MODEL #	LAMPS/TEMP/VA	VOLTAGE	REMARKS
K	2' X 4' LAY–IN TROFFER WITH NOMINAL 0.125" THICK INVERTED PATTERN 12 ACRYLIC LENS AND GASKETING BETWEEN LENS/DOOR, DOOR/FRAME	LITHONIA #2SPG332A12125VMVOLTGEB10ISABC COOPER #2GC–332A125INV–UNV–EB82–G3–U OR EQUAL BY HUBBLE	3–F32T8 3500K 88	120/277	1
KE	2' X 4' LAY–IN TROFFER WITH NOMINAL 0.125" THICK INVERTED PATTERN 12 ACRYLIC LENS AND GASKETING BETWEEN LENS/DOOR, DOOR/FRAME	LITHONIA #2SPG332A12125VMVOLTGEB10ISABC COOPER #2GC–332A125INV–UNV–EL–FBP240HU–EB82–G3–U OR EQUAL BY HUBBLE	3–F32T8 3500K 88	120/277	1
SA	SINGLE HEAD ARM MOUNTED AREA LIGHT WITH FLAT LENS WITH TYPE III DISTRIBUTION MOUNTED ON 30' POLE, 24" PEDESTAL DARK BRONZE, MATCH EXISTING FIXTURE	STONCO #MCL3400MAX WITH KW #SSP30–5.0–7–DB–DM10–BC FIELD VERIFY EXISTING VOLTAGE	1–400MH 470	FIELD VERIFY	
SB	THREE HEAD ARM MOUNTED AREA LIGHT WITH FLAT LENS WITH TYPE III DISTRIBUTION MOUNTED ON 30' POLE, 24" PEDESTAL DARK BRONZE, MATCH EXISTING FIXTURE	STONCO #MCL3400MAX WITH KW #SSP30–5.0–7–DB–DM10–BC FIELD VERIFY EXISTING VOLTAGE	3–400MH 1410	FIELD VERIFY	

B ELECTRICAL LIGHTING FIXTURE SCHEDULE
SCALE: NTS A.D.C. & L.E.C. BLDG

MECHANICAL EQUIPMENT CONNECTION SCHEDULE

MECHANICAL EQUIPMENT				DISCONNECTING MEANS AND/OR BRANCH CIRCUIT SIZE
UNIT DESIGNATION	CIRCUIT DESIGNATION	LOCATION	NOTES	
RTU–1	EHV–AC–1,3,5	ROOF	1,2	3#8, #10G, 3/4"C
RTU–2	EHV–AC–2,4,6	ROOF	1,2	3#8, #10G, 3/4"C
RTU–3	EHV–AC–7,9,11	ROOF	1,2	3#12, #12G, 3/4"C
RTU–4	EHV–AC–38,40,42	ROOF	1,2	3#12, #12G, 3/4"C
RTU–5	EHV–AC–13,15,17	ROOF	1,2	3#12, #12G, 3/4"C
RTU–6	EHV–AC–8,10,12	ROOF	1,2	3#12, #12G, 3/4"C
RTU–7	EHV–AC–19,21,23	ROOF	1,2	3#6, #10G, 3/4"C
RTU–8	EHV–AC–14,16,18	ROOF	1,2	3#12, #12G, 3/4"C
RTU–9	EHV–AC–25,27,29	ROOF	1,2	3#8, #10G, 3/4"C
RTU–10	EHV–1S–37,39,41	ROOF	1,2	3#6, #10G, 3/4"C
RTU–11	EHV–AC–31,33,35	ROOF	1,2	3#12, #12G, 3/4"C
RTU–12	EHV–AC–20,22,24	ROOF	1,2	3#6, #10G, 3/4"C
RTU–13	EHV–AC–387,39,41	ROOF	1,2	3#6, #10G, 3/4"C
RTU–14	EHV–AC–26,28,30	ROOF	1,2	3#12, #12G, 3/4"C
RTU–15	EHV–AC–32,34,36	ROOF	1,2	3#12, #12G, 3/4"C
RTU–16	EHV–1S–38,40,42	ROOF	1,2	3#12, #12G, 3/4"C

GENERAL NOTES:
A. ALL DISCONNECTS AND COMBINATION STARTERS ARE NEMA 1 ENCLOSED, UNO.
B. ELECTRICAL CONTRACTOR SHALL COORDINATE WITH DIV. 15 AND FURNISH AND INSTALL POWER FOR CONTROLS.

NOTES:
1. FURNISH AND INSTALL DUCT SMOKE DETECTOR AT SUPPLY & RETURN DUCT. FURNISH AND INSTALL RELAY FOR SHUT DOWN CONTROL.

C ELECTRICAL – MECHANICAL EQUIPMENT CONNECTION SCHEDULE
SCALE: NTS L.E.C. BLDG

EXISTING PANELBOARD EHV–AC

VOLTAGE: 480Y/277 VOLT 3 PHASE 4 WIRE — LOCATION: ROOM
400 A MAIN LUGS ONLY — MOUNTING: SURFACE
BUSES: MAIN – 400 A; NEUTRAL – 100%; EQUIPMENT GROUND — Isc = 22,000 A RMS SYM AVAILABLE

VA:L	VA:R	VA:O	LOAD	BKR	CKT	PH	CKT	BKR	LOAD	VA:L	VA:R	VA:O
		7538	RTU–1	35/3*	1	A	2	35/3*	RTU–2			7538
		7538	*	–	3	B	4	–	*			7538
		7538	*	–	5	C	6	–	*			7538
		3991	RTU–3	20/3*	7	A	8	20/3*	RTU–6			3991
		3991	*	–	9	B	10	–	*			3991
		3991	*	–	11	C	12	–	*			3991
		3991	RTU–5	20/3*	13	A	14	20/3*	RTU–8			3991
		3991	*	–	15	B	16	–	*			3991
		3991	*	–	17	C	18	–	*			3991
		10863	RTU–7	50/3*	19	A	20	50/3*	RTU–12			10863
		10863	*	–	21	B	22	–	*			10863
		10863	*	–	23	C	24	–	*			10863
		7538	RTU–9	35/3*	25	A	26	20/3*	RTU–14			3991
		7538	*	–	27	B	28	–	*			3991
		7538	*	–	29	C	30	–	*			3991
		3991	RTU–11	20/3*	31	A	32	20/3*	RTU–15			3991
		3991	*	–	33	B	34	–	*			3991
		3991	*	–	35	C	36	–	*			3991
		10863	RTU–13	50/3*	37	A	38	20/3*	RTU–4			3991
		10863	*	–	39	B	40	–	*			3991
		10863	*	–	41	C	42	–	*			3991

*=FURNISH AND INSTALL CIRCUIT BREAKER AS INDICATED. MATCH AIC RATING.

VA:L (LIGHTING)			CONNECTED		DEMAND
VA:R (RECEPTACLES)			CONNECTED		DEMAND
VA:O (OTHER)		261393	CONNECTED	261393	DEMAND
VA: TOTAL		261393	CONNECTED	261393	DEMAND
AMPS: TOTAL		314	CONNECTED	314	DEMAND

L	R	O		TOTAL			
		87131	VA CONNECTED TO A PHASE	87131	VA =	315	AMPS CONNECTED TO A PHASE @ 277 VOLTS
		87131	VA CONNECTED TO B PHASE	87131	VA =	315	AMPS CONNECTED TO B PHASE @ 277 VOLTS
		87131	VA CONNECTED TO C PHASE	87131	VA =	315	AMPS CONNECTED TO C PHASE @ 277 VOLTS
		261393	TOTAL	261393	VA		

EXISTING PANELBOARD EHV–1S

VOLTAGE: 480Y/277 VOLT 3 PHASE 4 WIRE — LOCATION: ROOM
225 A MAIN LUGS ONLY — MOUNTING: SURFACE
BUSES: MAIN – 225 A; NEUTRAL – 100%; EQUIPMENT GROUND — Isc = 14,000 A RMS SYM AVAILABLE

VA:L	VA:R	VA:O	LOAD	BKR	CKT	PH	CKT	BKR	LOAD	VA:L	VA:R	VA:O
2439			EXISTING LIGHTING	20/1	1	A	2	20/1	EXISTING LIGHTING	2554		
2514			EXISTING LIGHTING	20/1	3	B	4	20/1	EXISTING LIGHTING	2466		
2439			EXISTING LIGHTING	20/1	5	C	6	20/1	EXISTING LIGHTING	2522		
1936			EXISTING LIGHTING	20/1	7	A	8	20/1	EXISTING LIGHTING	1381		
1464			EXISTING LIGHTING	20/1	9	B	10	20/1	EXISTING LIGHTING	1293		
1346			EXISTING LIGHTING	20/1	11	C	12	20/1	EXISTING LIGHTING	1293		
1605			EXISTING LIGHTING	20/1	13	A	14	20/1	EXISTING LIGHTING	1584		
1522			EXISTING LIGHTING	20/1	15	B	16	20/1	EXISTING LIGHTING	1202		
1522			EXISTING LIGHTING	20/1	17	C	18	20/1	EXISTING LIGHTING	1430		
1672			EXISTING LIGHTING	20/1	19	A	20	20/1	EXISTING EXTERIOR LIGHTING	2600		
			SPARE	20/1	21	B	22	20/1	EXISTING EXTERIOR LIGHTING	2340		
			SPARE	20/1	23	C	24	20/1	EXISTING EXTERIOR LIGHTING	2100		
			SPARE	20/1	25	A	26	20/1	EXISTING EXTERIOR LIGHTING	2050		
			SPARE	20/1	27	B	28	20/1	EXISTING EXTERIOR LIGHTING	1600		
			SPARE	20/1	29	C	30	20/1	EXISTING EXTERIOR LIGHTING	1000		
			SPARE	20/1	31	A	32	30/3	EXISTING WH			4982
			SPARE	20/1	33	B	34	–	*			4982
			SPARE	20/1	35	C	36	–	*			4982
		10863	RTU–10	50/3*	37	A	38	20/3*	RTU–16			3991
		10863	*	–	39	B	40	–	*			3991
		10863	*	–	41	C	42	–	*			3991

*=FURNISH AND INSTALL CIRCUIT BREAKER AS INDICATED. MATCH AIC RATING.

VA:L (LIGHTING)		45874	CONNECTED	57343	DEMAND
VA:R (RECEPTACLES)			CONNECTED		DEMAND
VA:O (OTHER)		59508	CONNECTED	59508	DEMAND
VA: TOTAL		105382	CONNECTED	116851	DEMAND
AMPS: TOTAL		127	CONNECTED	141	DEMAND

L	R	O		TOTAL			
17821		19836	VA CONNECTED TO A PHASE	37657	VA =	136	AMPS CONNECTED TO A PHASE @ 277 VOLTS
14401		19836	VA CONNECTED TO B PHASE	34237	VA =	124	AMPS CONNECTED TO B PHASE @ 277 VOLTS
13652		19836	VA CONNECTED TO C PHASE	33488	VA =	121	AMPS CONNECTED TO C PHASE @ 277 VOLTS
45874		59508	TOTAL	105382	VA		

D ELECTRICAL PANEL SCHEDULES
SCALE: NTS L.E.C. BLDG

CHANIN ENGINEERING LLC
400 Nolana, Suite N24
McAllen, Texas 78504
PH: (956) 687-5421 FAX: (956) 687-3211
www.chaninengineering.com
TBPE FIRM REG. NUMBER F-9369

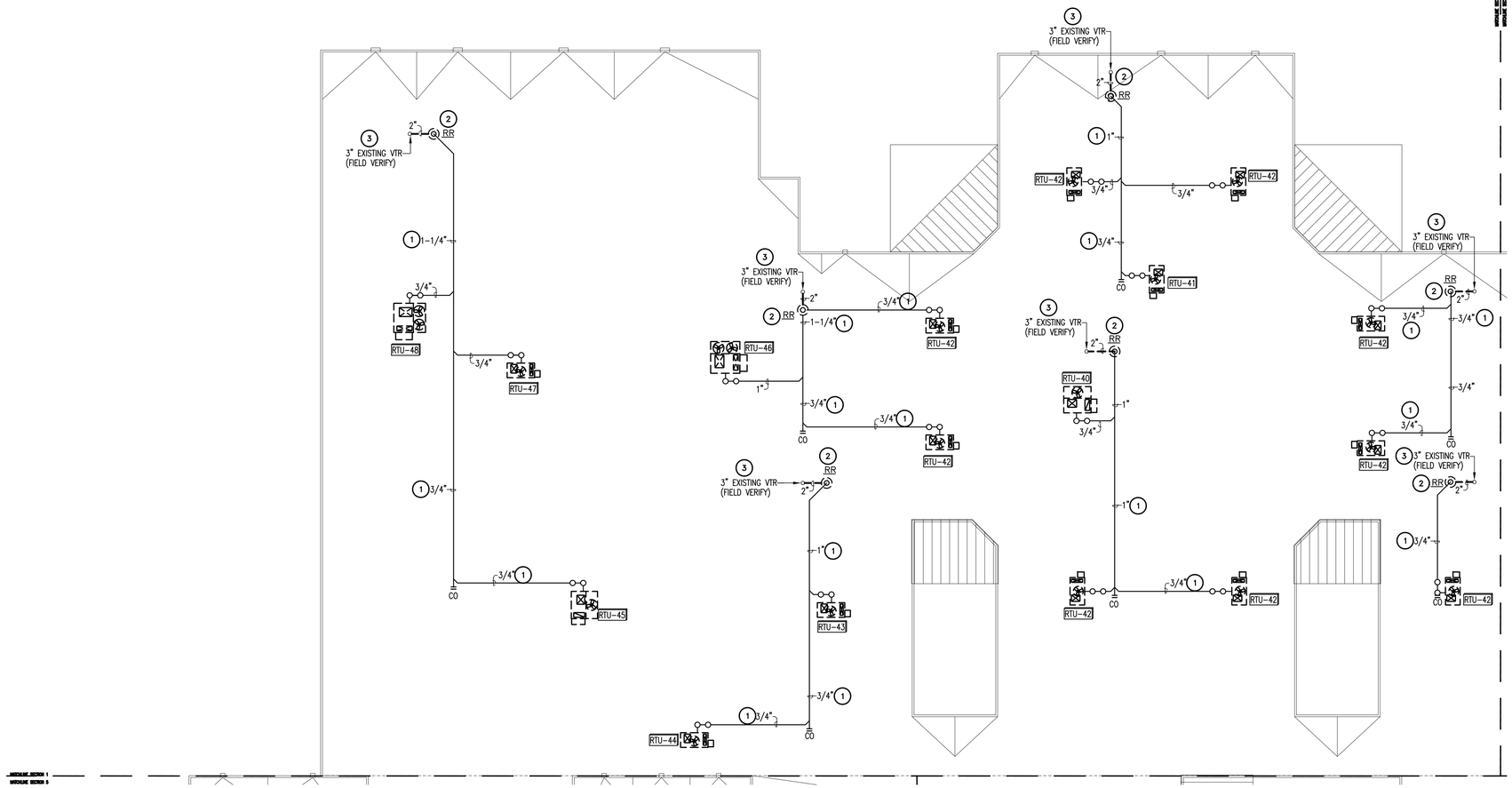
SEAL:
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600 E. BEAUMONT AVE. SUITE 2 McALLEN, TX. 78501 (956) 664-2727
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Edinburg, Texas

JOB NO. 13159
DATE: 11/15/13
DRAWN BY: M.G.
CHECKED BY:A.D.
REVISION:

DRAWING NO:
E16.0



GENERAL NOTES:

(A) INFORMATION ON THIS PLAN HAS BEEN OBTAINED FROM EXISTING DRAWINGS AND SITE SURVEY. CONTRACTOR SHALL FIELD VERIFY EXISTING CONDITIONS PRIOR TO COMMENCING WORK. ANY DISCREPANCIES BETWEEN EXISTING CONDITIONS AND CONSTRUCTION DOCUMENTS SHALL BE REPORTED TO THE ENGINEER.

(B) PLUMBING CONTRACTOR SHALL ADHERE TO ALL CITY CODES, STATE CODES AND LOCAL CODES THAT HAVE AUTHORITY OVER THIS PROJECT.

(C) PLUMBING CONTRACTOR TO COORDINATE WITH MECHANICAL CONTRACTOR FOR ANY INSTALLATION OF PIPING AND DUCTWORK PRIOR TO BEGINNING OF CONSTRUCTION

(D) EACH ROOF TOP UNIT SHALL BE PROVIDED WITH A FIELD FABRICATED P-TRAP. REFER TO DETAIL.

(E) COPPER CONDENSATE DRAIN LINES SHALL BE ROUTED ON THE ROOF AND FURNISHED WITH INSULATION AND ALUMINUM JACKET.

(F) PLUMBING CONTRACTOR SHALL OFFSET CONDENSATE DRAIN LINES AS REQUIRED TO AVOID CONFLICTS WITH EXISTING ROOF MOUNTED EQUIPMENTS.

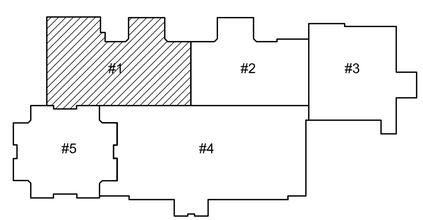
KEY NOTES: ○

1. INSULATE COPPER CONDENSATE DRAIN LINE AND PROVIDE PIPE SUPPORTS MAXIMUM 10'-0" O.C. SPACING. ROUTE AND TERMINATE AT NEAREST ROOF RECEPTOR. PIPE SUPPORTS SHALL BE EQUAL TO MIRO INDUSTRIES MODEL "3-RAH-7".
2. COORDINATE ROOF RECEPTOR DRAIN LOCATION AND REQUIREMENTS WITH MECHANICAL CONTRACTOR FOR FINAL EQUIPMENT LOCATIONS PRIOR TO COMMENCEMENT OF WORK TO AVOID CONFLICT. ROOF RECEPTER BODY, TRAP, AND BRANCH CONNECTION TO VENT SHALL BE CAST IRON (OR PLENUM RATED) AND SHALL BE INSULATED.
3. PLUMBING CONTRACTOR SHALL VERIFY POINT OF CONNECTION TO BUILDING UTILITIES PRIOR TO BID TO AVOID CONFLICT. ANY DISCREPANCIES FOUND BY THE PLUMBING CONTRACTOR SHALL BE REPORTED TO THE ENGINEER/ARCHITECT IMMEDIATELY AND PRIOR TO ANY INSTALLATION. FAILURE TO COMPLY SHALL MAKE ALL CORRECTIONS AND/OR MODIFICATIONS THE FULL RESPONSIBILITY OF THE CONTRACTOR.

PLUMBING CONTRACTOR SHALL COORDINATE DOMESTIC WATER AND SANITARY SEWER LINE DIRECTION OF FLOW, SIZE, INVERT, AND POINT OF CONNECTION WITH EXISTING CONDITIONS PRIOR TO INSTALLATION OF ROUGH-IN TO AVOID CONFLICT. ANY DISCREPANCIES FOUND BY THE PLUMBING CONTRACTOR SHALL BE REPORTED TO THE ENGINEER/ARCHITECT IMMEDIATELY AND PRIOR TO ANY INSTALLATION. FAILURE TO COMPLY SHALL MAKE ALL CORRECTIONS AND/OR MODIFICATIONS THE FULL RESPONSIBILITY OF THE CONTRACTOR.

NORTH

A ROOF CONDENSATE PLAN
SCALE: 1/16" = 1'-0"



CHANIN ENGINEERING LLC
400 Nolana, Suite N2
McAllen, Texas 78504
PH: (956) 687-9421 FAX: (956) 687-3211
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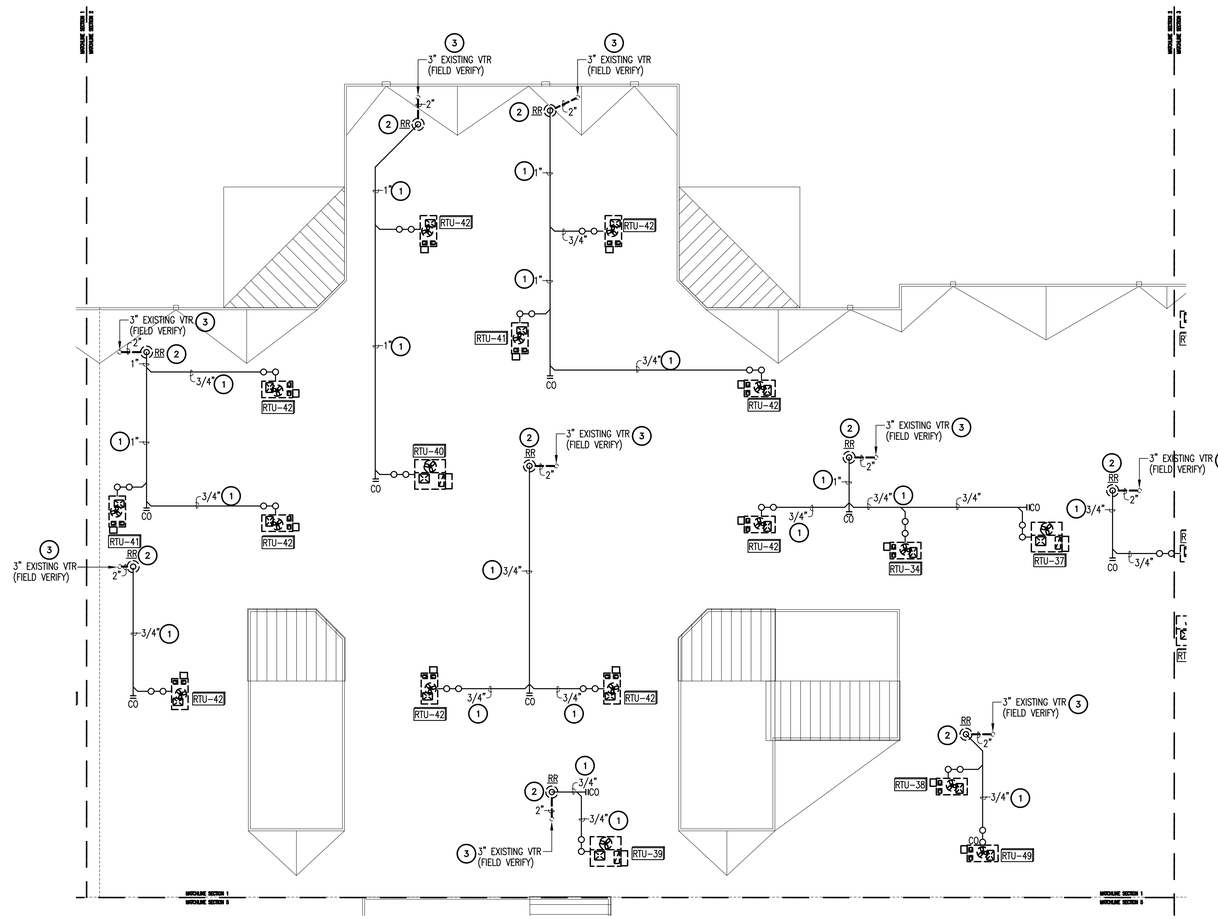
SEAL:
STATE OF TEXAS
LUIS JAVIER PENA
97260
LICENSED PROFESSIONAL ENGINEER
11.15.2013

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MECHANICAL, ELECTRICAL, PLUMBING ENGINEERS
600 E. BEAUMONT AVE. SUITE 2 McALLEN, TX. 78501 (956) 664-2727
TEXAS BOARD OF PROFESSIONAL ENGINEERS REGISTRATION # F-9748

PROJECT:
HIDALGO COUNTY
ADULT DETENTION CENTER and LAW ENFORCEMENT FACILITY REPAIRS and/or REPLACEMENT
Edinburg, Texas

JOB NO. 13159
DATE: 11/15/13
DRAWN BY: L.S.
CHECKED BY:J.P.
REVISION:

DRAWING NO:
P1.0



GENERAL NOTES:

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(D) EACH ROOF TOP UNIT SHALL BE PROVIDED WITH A FIELD FABRICATED P-TRAP. REFER TO DETAIL.

(E) COPPER CONDENSATE DRAIN LINES SHALL BE ROUTED ON THE ROOF AND FURNISHED WITH INSULATION AND ALUMINUM JACKET.

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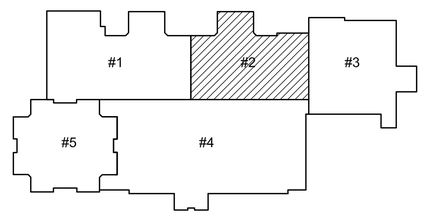
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1. INSULATE COPPER CONDENSATE DRAIN LINE AND PROVIDE PIPE SUPPORTS MAXIMUM 10'-0" O.C. SPACING. ROUTE AND TERMINATE AT NEAREST ROOF RECEPTOR. PIPE SUPPORTS SHALL BE EQUAL TO MIRO INDUSTRIES MODEL "3-RAH-7".
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NORTH

A ROOF CONDENSATE PLAN
SCALE: 1/16" = 1'-0"



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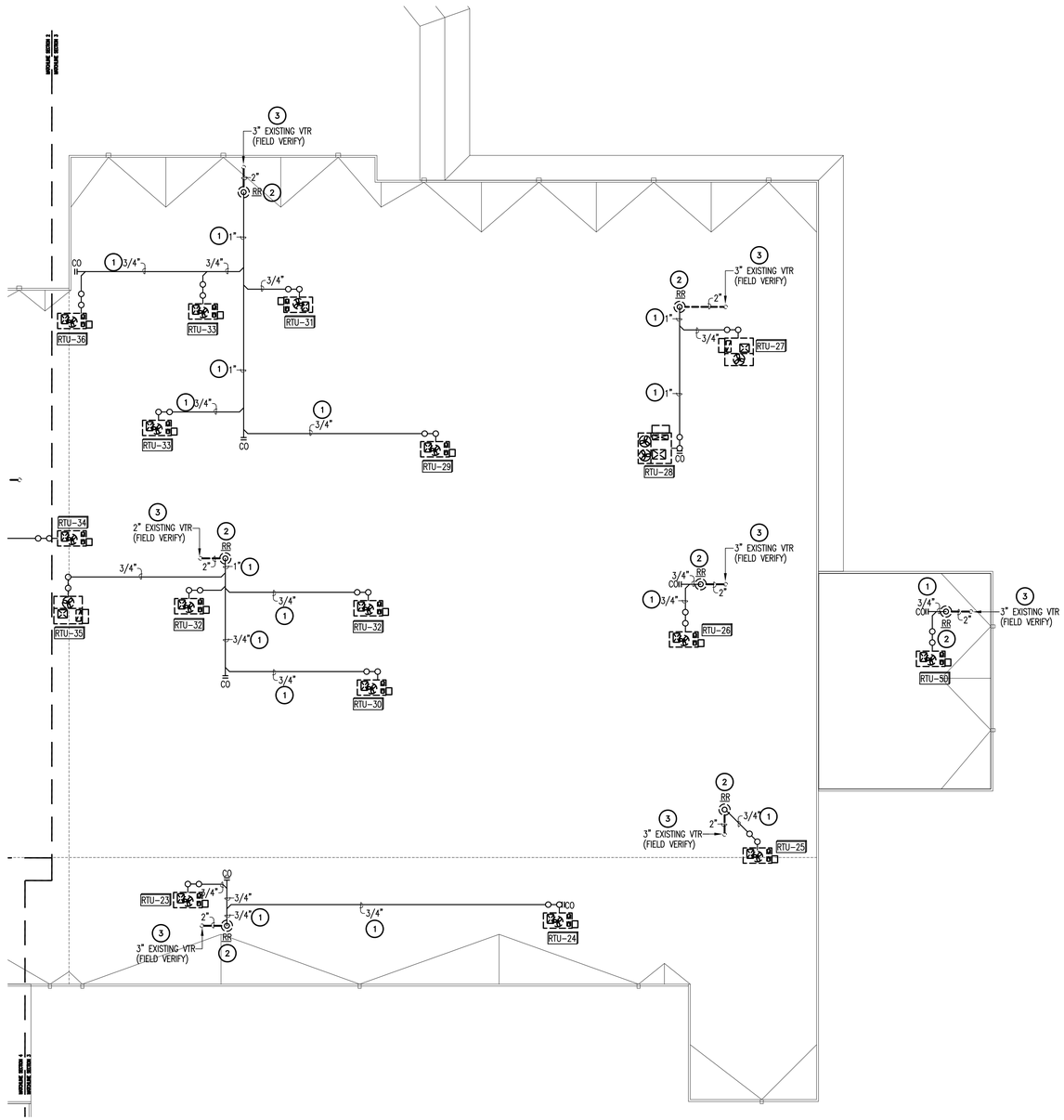
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Edinburg, Texas

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REVISION:
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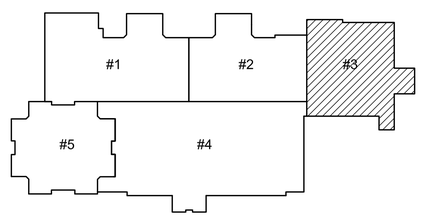
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NORTH

A ROOF CONDENSATE PLAN
SCALE: 1/16" = 1'-0"



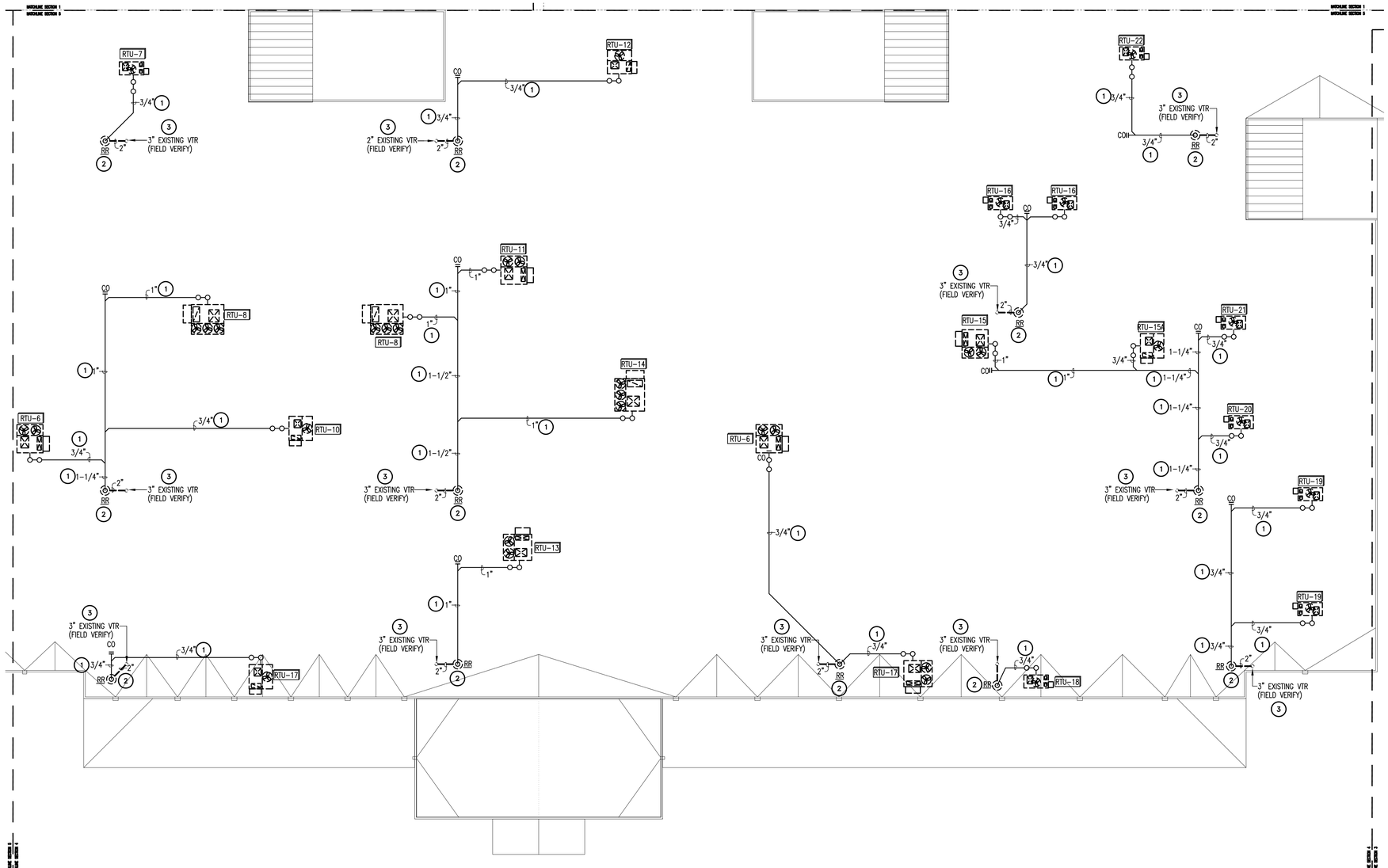
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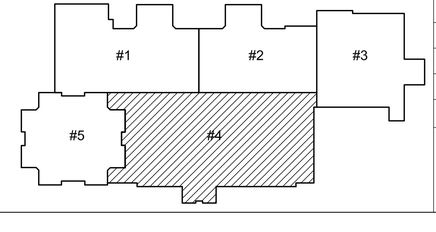
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PROJECT:
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FACILITY REPAIRS and/or REPLACEMENT
Edinburg, Texas

JOB NO. 13159
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CHECKED BY:J.P.
REVISION:
DRAWING NO:
P3.0



A ROOF CONDENSATE PLAN
SCALE: 1/16" = 1'-0"



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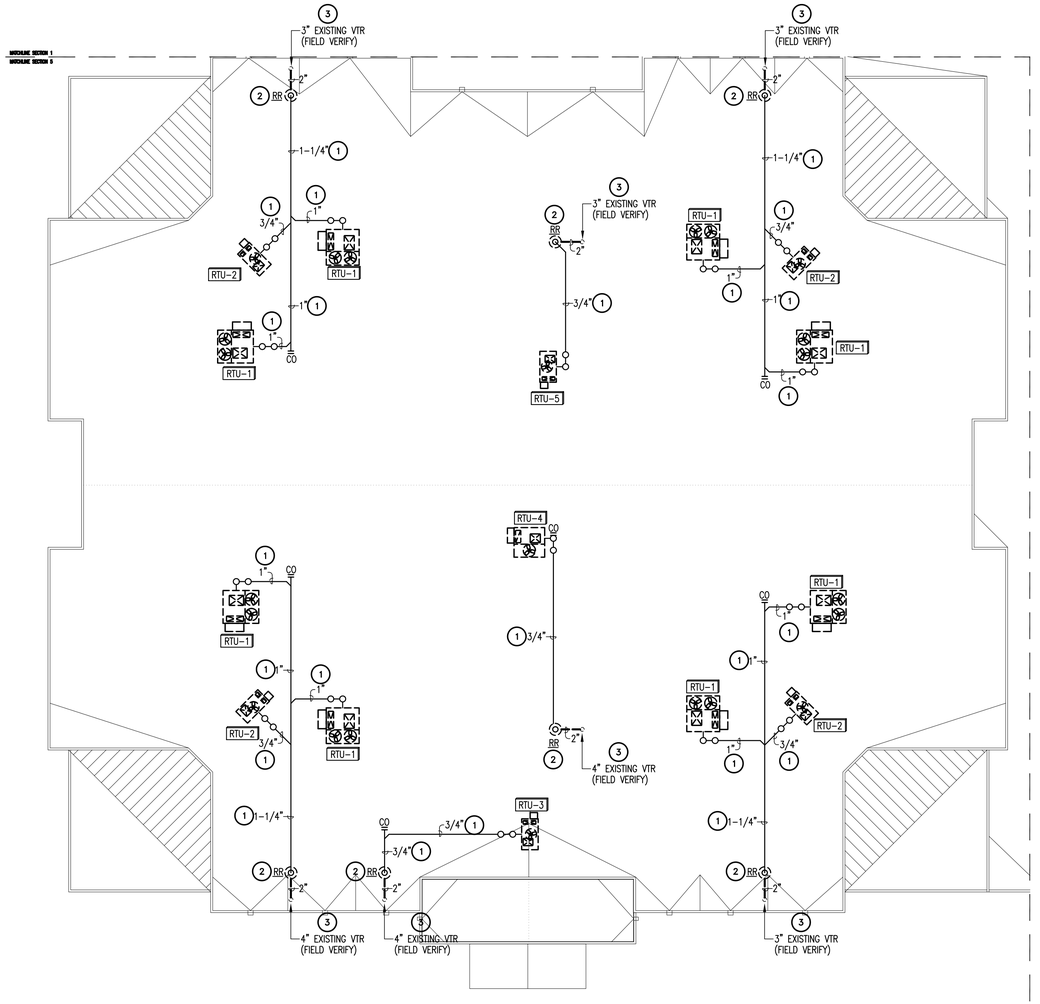
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CHECKED BY:J.P.
REVISION:
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P4.0



A ROOF CONDENSATE PLAN
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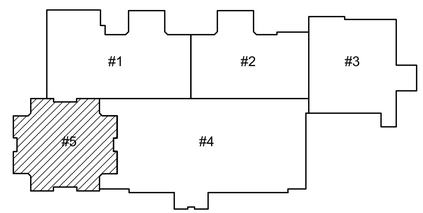
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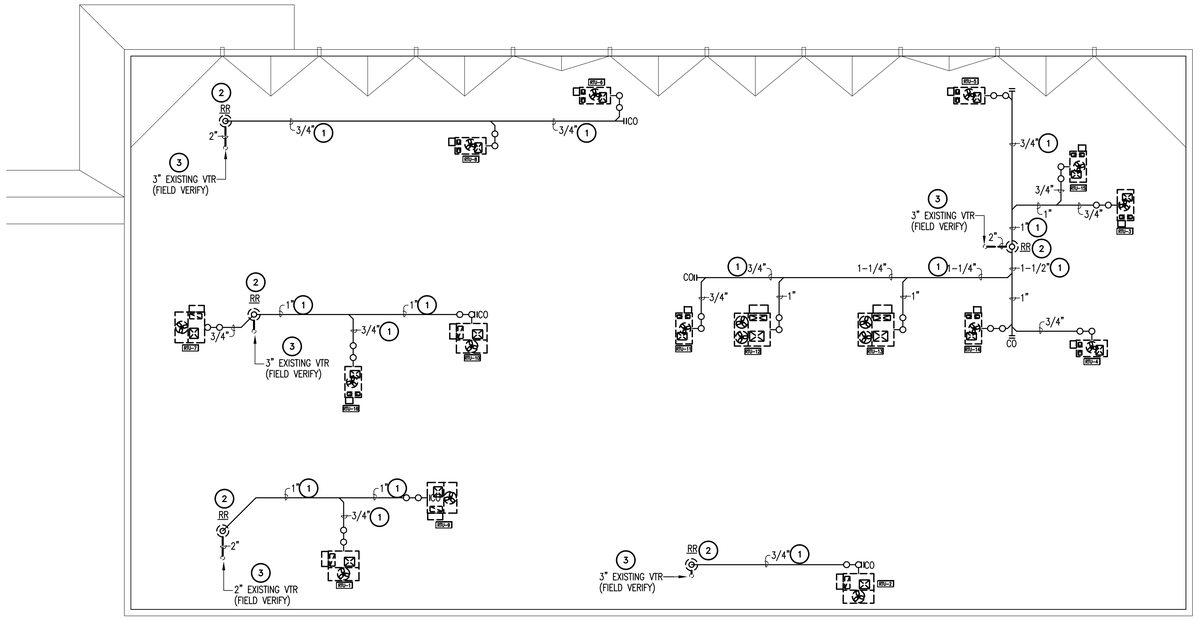
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PROJECT:
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ADULT DETENTION CENTER and LAW ENFORCEMENT
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Edinburg, Texas

JOB NO. 13159
DATE: 11/15/13
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CHECKED BY:J.P.
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NORTH

A PLUMBING - ROOF CONDENSATE PLAN

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

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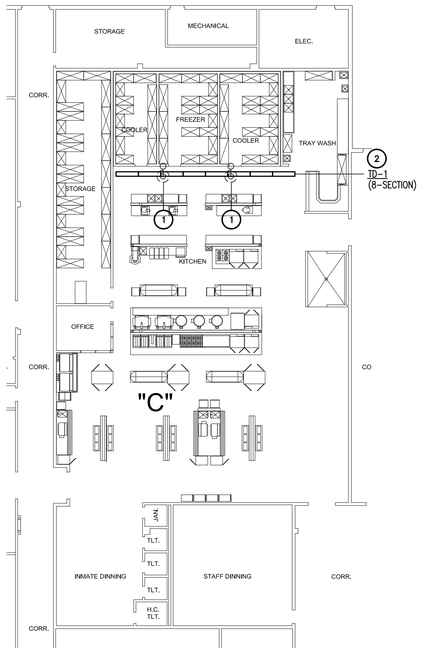
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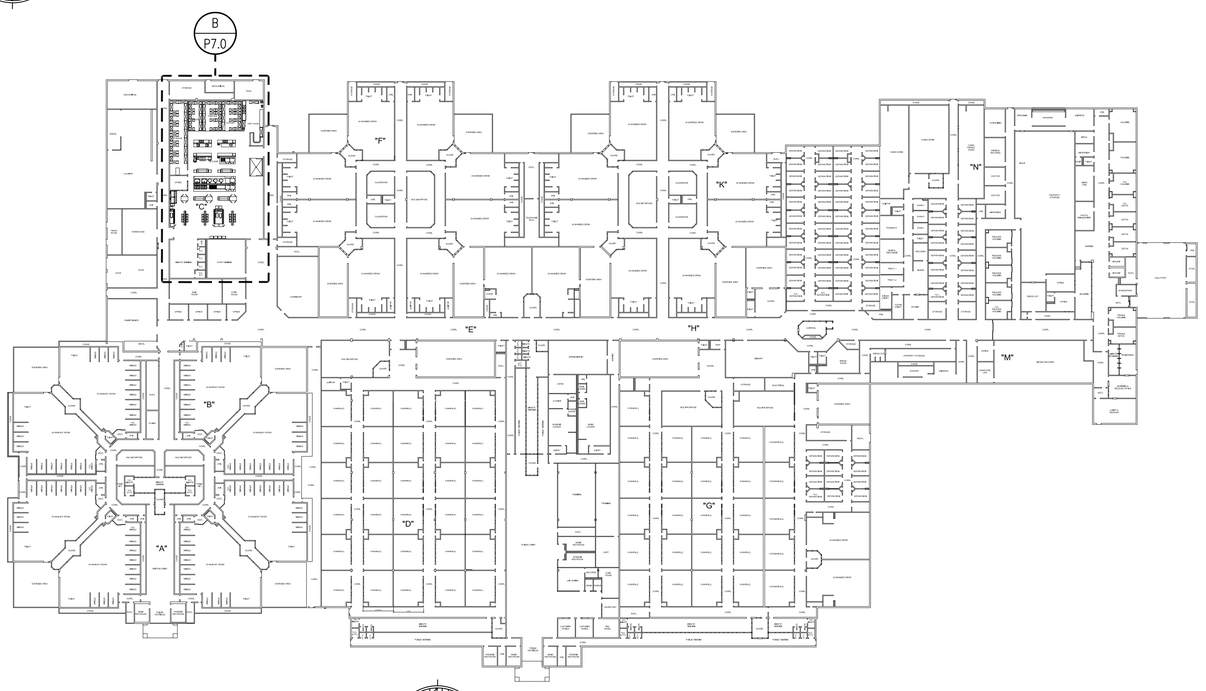
P6.0



NORTH

B ENLARGED PLUMBING PLAN

SCALE: 1/16" = 1'-0" ALTERNATE – KITCHEN A.D.C. BLDG



NORTH

A PLUMBING PLAN

SCALE: 1" = 50'-0" OVERALL A.D.C. BLDG

GENERAL DEMOLITION NOTES:

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B. THE CONTRACTOR IS FULLY RESPONSIBLE FOR PERFORMING THE DEMOLITION WORK UNDER THIS SECTION OF THE PROJECT IN FULL COMPLIANCE WITH ALL APPLICABLE LOCAL, STATE, AND FEDERAL CODES. IF THE CONTRACTOR DETERMINES THAT THE CONTRACT DOCUMENTS AND PLANS ARE NOT IN COMPLIANCE WITH THE APPLICABLE CODES, HE SHALL INFORM THE ARCHITECT PRIOR TO CONSTRUCTION START FOR DIRECTION. FAILURE TO DO SO SHALL NOT RELIEVE THE CONTRACTOR OF HIS RESPONSIBILITY TO MEET CODE REQUIREMENTS AND REWORK SHALL BE AT CONTRACTOR'S EXPENSE. APPLICABLE CODES AND STANDARDS ON DEMOLITION WORK SHALL INCLUDE THOSE PUBLISHED BY OSHA AND EPA. AN ASBESTOS SURVEY SHALL BE KEPT ON SITE AT ALL TIMES PER TEXAS DEPARTMENT OF HEALTH REQUIREMENTS.

C. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO COMPLETE THE NECESSARY DEMOLITION. CONTRACTOR SHALL PATCH AND REPAIR ALL BUILDING DAMAGE CREATED BY DEMOLITION WORK. PATCHING SHALL BE COMPLETED WITH THE SAME MATERIALS AS THE SURROUNDING AREAS, OR WITH ARCHITECT APPROVED PATCHING MATERIALS.

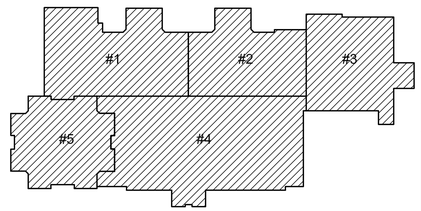
D. ALL OPENINGS CUT IN MASONRY AND PLASTER WALLS OR CONCRETE FLOORS SHALL BE CORE-DRILLED OR SAWED WHEN POSSIBLE. CONTRACTOR SHALL CHECK BUILDING CONSTRUCTION WITH STRUCTURAL ENGINEER BEFORE MAKING PENETRATIONS TO AVOID CUTTING THROUGH STRUCTURAL BEAMS AND REINFORCING. CONTRACTOR SHALL INFORM THE ENGINEER IF REINFORCING IS CUT OR DAMAGED WHILE MAKING OPENINGS 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.

E. CONTRACTOR SHALL REMOVE AND RETURN ANY AND ALL EXISTING EQUIPMENT/MATERIALS TO OWNER. OWNER SHALL HAVE FULL RIGHT OF OWNERSHIP UNLESS SPECIFIED OTHERWISE. IF THE OWNER WAIVES THIS OPTION, ANY EQUIPMENT, MATERIAL, ETC SHALL BECOME THE PROPERTY OF THE CONTRACTOR.

PLUMBING DEMOLITION KEY NOTES:

1. AS AN ALTERNATE, REMOVE EXISTING FLOOR DRAIN; EXISTING SEWER/VENT SERVICE SHALL REMAIN FOR RE-USE. REFER TO ARCHITECTURAL SPECIFICATIONS FOR ALTERNATES.
2. UNDER THE SAME ALTERNATE, RECONNECT NEW PLUMBING FIXTURE TO EXISTING SEWER/VENT SERVICE. REFER TO ARCHITECTURAL SPECIFICATIONS FOR ALTERNATES.

PLUMBING CONTRACTOR SHALL COORDINATE DOMESTIC WATER AND SANITARY SEWER LINE DIRECTION OF FLOW, SIZE, INVERT, AND POINT OF CONNECTION WITH EXISTING CONDITIONS PRIOR TO INSTALLATION OF ROUGH-IN TO AVOID CONFLICT. ANY DISCREPANCIES FOUND BY THE PLUMBING CONTRACTOR SHALL BE REPORTED TO THE ENGINEER/ARCHITECT IMMEDIATELY AND PRIOR TO ANY INSTALLATION. FAILURE TO COMPLY SHALL MAKE ALL CORRECTIONS AND/OR MODIFICATIONS THE FULL RESPONSIBILITY OF THE CONTRACTOR.



CHANIN
ENGINEERING LLC
400 Nolana, Suite N24
McAllen, Texas 78504
PH: (956) 687-4421 FAX: (956) 687-3211
WWW.CHANINENGINEERING.COM
TBPE FIRM REG. NUMBER F-9369

SEAL:

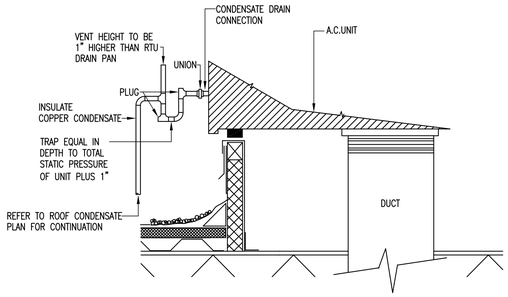
STATE OF TEXAS
LUIS JAVIER PENA
97260
LICENSED PROFESSIONAL ENGINEER
11.15.2013

MEP SOLUTIONS ENGINEERING
MECHANICAL, ELECTRICAL, PLUMBING ENGINEERS
600 E. BEAUMONT AVE. SUITE 2 McALLEN, TX. 78501 (956) 664-2727
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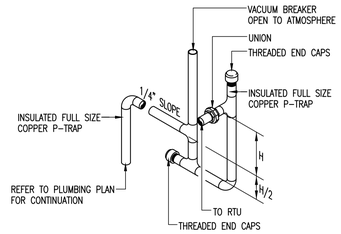
HIDALGO COUNTY
ADULT DETENTION CENTER and LAW ENFORCEMENT
FACILITY REPAIRS and/or REPLACEMENT
Texas
Edinburg,

JOB NO. 13159
DATE: 11/15/13
DRAWN BY: L.S.
CHECKED BY:J.P.
REVISION:
DRAWING NO:
P7.0



A ROOF TOP UNIT CONDENSATE CONNECTION DETAIL

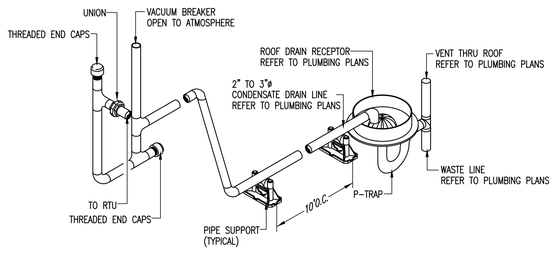
SCALE: N.T.S.



NOTE:
(1) H= FAN INLET PRESSURE (IN. W.C.) + 1-IN.
(2) CONDENSATE LINE SHALL BE INSULATED AND FURNISHED WITH ALUMINUM JACKET, (REFER TO SPECS.).

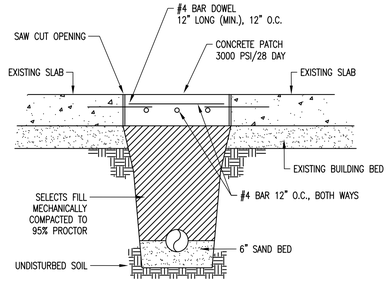
B RTU CONDENSATE P-TRAP DETAIL

SCALE: N.T.S.



C ROOF DRAIN RECEPTOR DETAIL

SCALE: N.T.S.



D SAW CUT DETAIL

SCALE: N.T.S.

PLUMBING FIXTURE SCHEDULE

MARK	FIXTURE TYPE	CONNECTION SIZE				DESCRIPTION
		SEWER	VENT	CW	HW	
RR	ROOF RECEPTOR	2"	3" 2"	–	–	CAST IRON COATED, C.I. INTERNAL DOME STRAINER, SMALL SUMP WITH ROOF FLANGE, AND BOTTOM OUTLET, EQUAL TO JOSAM MODEL NO. "25540-3-Y" ROOF DRAIN COMPLETE WITH PILLOW BLOCK PIPE STAND MODEL NO. "3-R-4".
TD-1	TRENCH DRAIN	4"	2"	–	–	ZURN MODEL "Z-895-RFS" STAINLESS STEEL TRENCH DRAINAGE SYSTEM WITH CRATE LOCKDOWN ASSEMBLY, REINFORCED SLOTTED STAINLESS STEEL GRATE.

PLUMBING SYMBOL LEGEND

SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
—•—	DOMESTIC COLD WATER LINE		BALL VALVE		UNION	CW	COLD WATER
—••—	DOMESTIC HOT WATER LINE		BALANCING VALVE		BRANCH – TOP CONNECTION	DN	DOWN
—•••—	DOMESTIC HOT WATER RETURN LINE		CHECK VALVE		PIPE RISER	F.F.E.	FINISH FLOOR ELEVATION
—TW—	DOMESTIC TEMPERED WATER LINE		GATE VALVE		PIPE DROP	FU	FIXTURE UNITS
— —	SANITARY SEWER VENT LINE	FCO	FLOOR CLEANOUT		THERMOMETER	GW	GREASE WASTE
	SANITARY WASTE LINE	YCO	YARD CLEANOUT		DIRECTION OF FLOW	I.E.	INVERT ELEVATION
—CD—	CONDENSATE LINE		FLOOR SINK	CV	CALIBRATING VALVE	HW	HOT WATER
—GW—	GREASE WASTE LINE		FLOOR DRAIN	WCO	WALL CLEANOUT	SS	SANITARY SEWER
—GAS—	GAS LINE		ROOF DRAIN	P-1	PLUMBING RISER DESIGNATION	TP	TRAP PRIMER
—AIR—	AIR LINE		POINT OF CONNECTION	02 P-3.1	PLUMBING DETAIL REFERENCE	TYP	TYPICAL
—AW—	ACID WASTE LINE		WALL HYDRANT	ABV. CLG.	ABOVE CEILING	UND. LAV.	UNDER LAVATORY
—RD—	ROOF DRAIN LINE		HOSE BIBB	B.F.F.	BELOW FINISH FLOOR	V	VENT
—OD—	OVERFLOW DRAIN LINE	WHA	WATER HAMMER ARRESTOR	CO	CLEAN OUT	VTR	VENT THRU ROOF

NOTE: NOT ALL SYMBOLS MAY BE USED ON THIS PROJECT

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