CONTRACT DOCUMENTS

LANCASTER COUNTY
N E B R A S K A

Lancaster County Emergency Management
Renovation and Relocation
Bid No. 17-282

Meco-Henne Contracting, Inc.
4140 S. 87th St.
Omaha, NE 68127
402-339-8127

LANCASTER COUNTY, NEBRASKA
CONTRACT TERMS

THIS CONTRACT, made and entered into by and between **Meco-Henne Contracting, Inc., 4140 S. 87th St., Omaha, NE 68127**, hereinafter called the Contractor, and Lancaster County, Nebraska, a political subdivision of the State of Nebraska, hereinafter referred to as the County.

WHEREAS, the County has caused to be prepared, in accordance with law, Specifications, Plans, and other Contract Documents for the Work herein described, and has approved and adopted said documents and has caused to be published an advertisement for and in connection with said Work, to-wit:

Lancaster County Emergency Management Renovation and Relocation, Bid No. 17-282

and

WHEREAS, the Contractor, in response to such advertisement, has submitted to the County, in the manner and at the time specified, a sealed Proposal/Supplier Response in accordance with the terms of said advertisement; and

WHEREAS, the County, in the manner prescribed by law has publicly opened, read aloud, examined, and canvassed the Proposals/Supplier Responses submitted in response to such advertisement, and as a result of such canvass has determined and declared the Contractor to be the lowest responsible bidder for the said Work for the sum or sums named in the Contractor's Proposal/Supplier Response, a copy thereof being attached to and made a part of this Contract.

NOW, THEREFORE, in consideration of the sums to be paid to the Contractor and the mutual covenants herein contained, the Contractor and the County have agreed and hereby agree as follows:

1. The Contractor agrees to (a) furnish all tools, equipment, supplies, superintendence, transportation, and other construction accessories, services, and facilities; (b) furnish all materials, supplies, and equipment specified to be incorporated into and form a permanent part of the complete work; (c) provide and perform all necessary labor in a substantial and workmanlike manner and in accordance with the provisions of the Contract Documents; and (d) execute, construct, and compete all Work included in and covered by the County's award of this Contract to the Contractor, such award being based on the acceptance by the County of the Contractor's Proposal, or part thereof, as follows:

Agreement to full proposal

2. The County agrees to pay to the Contractor for the performance of the Work embraced in this Contract, the Contractor agrees to accept as full compensation therefor, the following sums and prices for all Work covered by and included in the Contract award and designated above, payment thereof to be made in the manner provided by the County:

   The County will pay for products/services, according to the Line Item pricing as listed in Contractors Proposal/Supplier Response, a copy thereof being attached to and made a part of this Contract, for a total of $1,158,000.00.

3. EQUAL EMPLOYMENT OPPORTUNITY: In connection with the carrying out of this project, the Contractor shall not discriminate against any employee, applicant for employment, or any other person because of race, color, religion, sex, national origin, ancestry, disability, age or marital status. The Contractor will take affirmative action to ensure that applicants are employed, and that employees are treated during employment, without regard to their race, color, religion, sex, national origin, ancestry, disability, age or marital status. Such action shall include, but not be limited to, the following: employment, upgrading, demotion or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other compensation; and selection for training, including apprenticeship.

4. E-VERIFY: In accordance with Neb. Rev. Stat. 4-108 through 4-114, the contractor agrees to register with and use a federal immigration verification system, to determine the work eligibility status of new employees performing services within the state of Nebraska. A federal immigration verification system means the electronic verification of the work authorization program of the Illegal Immigration Reform and Immigrant Responsibility Act of 1996, 8 U.S.C. 1324 a, otherwise known as the E-Verify Program, or an equivalent federal program designated by the United States Department of Homeland Security or other federal agency authorized to verify the work eligibility status of a newly hired employee pursuant to the Immigration Reform and Control Act of 1986. The Contractor shall not discriminate against any employee or applicant for employment to be employed in the performance of this section pursuant to the requirements of state law and 8 U.S.C.A 1324b. The contractor shall require any subcontractor to comply with the provisions of this section.

5. GUARANTEE: A performance and payment bonds in the full amount of the contract shall be required for all construction contracts. These bonds shall remain in effect during the guarantee period as stated in the specifications. Once the project is completed, the contractor may submit a maintenance bond in place of the performance bond.

6a. TERMINATION FOR CAUSE:

a) The County may terminate the Contract if the Contractor:
   1. Refuses or fails to supply enough properly skilled workers or proper materials;
   2. Fails to make payment to Subcontractors for materials or labor in accordance with the respective agreements between the Contractor and the Subcontractors;
   3. Disregards laws, ordinances, or rules, regulations or orders of a public authority having jurisdiction; or
   4. Otherwise commits a substantial breach of any provision of the Contract Documents.

b) When any of the above reasons exist, the County without prejudice to any other rights or remedies of the County may (after giving the Contractor and the Contractor's surety, if any, seven days' written notice) terminate employment of the Contractor. In addition the County may (subject to any prior rights of the surety):
   1. Take possession of the site and of all materials, equipment, tools, and construction equipment and machinery thereon owned by the Contractor;
   2. Accept assignment of subcontracts; and
   3. Finish the Work by whatever reasonable method the County may deem expedient.

c) If the Contract is terminated by County as provided in this section, Contractor shall not be entitled to receive any further payment until the expiration of 35 days after Final Completion and acceptance of all Work by County.

d) If the unpaid balance of the Contract Sum exceeds the cost of completing the Work, including all additional costs and expenses made necessary thereby, including costs for County staff time, plus all losses sustained, including any liquidated damages provided under the Contract Documents, such excess shall be paid to Contractor. If such costs, expenses, losses, and liquidated damages exceed the unpaid balance of the Contract Sum, Contractor shall pay such excess to County.

e) If, after termination of the Contractor's right to proceed, it is determined that the Contractor was not in default, or that the delay was excusable, the rights and obligations of the parties will be the same as if the termination has been issued for the convenience of the County.

f) No termination or action taken by County after termination shall prejudice any other rights or remedies of County provided by law or by the Contract Documents upon such termination; and County may proceed against Contractor to recover all losses suffered by County.

6b. TERMINATION BY THE COUNTY FOR CONVENIENCE:

a) The County may at its option, terminate this Contract in whole or in part at any time without cause by written notice thereof to the Contractor.

b) Upon any such termination, the Contractor agrees to waive any claims for damages, including loss of anticipated profits, on account thereof, and as the sole right and remedy of the Contractor, the County shall pay Contractor in accordance with this Paragraph. The provisions of the Contract which by their nature survive final acceptance of the Work, shall remain in full force and effect after such termination to the extent provided in such provisions.

c) Upon receipt of any such notice of termination, the Contractor shall, unless the Notice directs otherwise, immediately:

1. Discontinue the Work to the extent specified by the County;
2. Place no further orders or subcontracts for materials, equipment, services or facilities, except as may be necessary for completion of that portion of the Work, if any, the County has directed not to be discontinued;
3. Promptly make every reasonable effort to procure cancellation upon satisfactory terms as determined by the County of all orders and subcontracts not related to that portion of the Work, if any, the County has directed not to be discontinued;
4. Do only such other activity as may be necessary to preserve and protect work already in progress and to protect materials and plants and equipment on the Project Site or in transit thereto.

d) Upon such termination, the obligations of the Contract shall continue as to portions of the Work already performed and as to bona fide obligations the Contractor assumed prior to the date of termination.

e) Upon termination, the County shall pay the Contractor the full cost of all Work properly done by the Contractor to the date of termination not previously paid for by the County. If at the date of such termination the Contractor has properly prepared or fabricated off site any goods for subsequent incorporation in the Work, the County may direct the Contractor to deliver such goods to the Site or to such other place as the County may reasonably determine, whereupon the County shall pay to the Contractor the cost for such goods and materials.

f) Upon such termination, County shall pay to Contractor the sum of the following:

1. The amount of the Contract Sum allocable to the portion of the Work properly performed by Contractor as of the date of termination, less sums previously paid to Contractor.
2. Previously unpaid costs of any items delivered to the Project site which were fabricated for subsequent incorporation in the Work.
3. Any proven losses with respect to materials and equipment directly resulting from such termination.
4. Reasonable demobilization costs.

g) The above payment shall be the sole and exclusive remedy to which Contractor is entitled in the event of termination of the Contract by County pursuant to this provision; and Contractor will be entitled to no other compensation or damages and expressly waives same.

7. INDEPENDENT CONTRACTOR: It is the express intent of the parties that this contract shall not create an employer-employee relationship. Employees of the Contractor shall not be deemed to be employees of the County and employees of the County shall not be deemed to be employees of the Contractor. The Contractor and the County shall be responsible to their respective employees for all salary and benefits. Neither the Contractor's employees nor the County's employees shall be entitled to any salary, wages, or benefits from the other party, including but not limited to overtime, vacation, retirement benefits, workers' compensation, sick leave or injury leave. Contractor shall also be responsible for maintaining workers' compensation insurance, unemployment insurance for its employees, and for payment of all federal, state, local and any other payroll taxes with respect to its employees' compensation.

8. PERIOD OF PERFORMANCE: The work included in this Contract shall begin as soon as possible from date of executed contract. Substantial completion shall be ten (10) months from Notice to Proceed date. Final completion shall be 30 days from substantial completion date.

9. ASSIGNMENT: Contractor shall not assign its duties and responsibilities under this Contract without the express written permission of the County.

10. The Contract Documents comprise the Contract, and consist of the following:

1. Contract Terms
2. Accepted Proposal
3. Addendums No. 1 through No. 5
4. Technical Specifications
5. General Specifications
6. Plans
7. Instructions to Bidders
8. Insurance Requirements
9. Employee Classification Act Requirements
10. Employee Classification Act Affidavit
11. Construction Bonds
12. Sales Tax Exemption Forms 13 & 17
13. Notice to Bidders

The herein above mentioned Contract Documents form this Contract and are a part of the Contract as if hereto attached. Said documents which are not attached to this document may be viewed at: lincoln.ne.gov - Keyword: Bid - Awarded or Closed bids.

This Contract contains the complete and entire Contract between the parties and may not be altered or amended except in writing executed, making specific references to this Contract, by a duly authorized officer of the Contractor and by a duly authorized official of the County.

The Contractor and the County hereby agree that all the terms and conditions of this Contract shall be binding upon themselves, and their heirs, administrators, executors, legal and personal representatives, successors, and assigns.

IN WITNESS WHEREOF, the Contractor and the County do hereby execute this contract upon completion of signature on:

Vendor Signature Page
Lancaster County Signature Page

Vendor Signature Page

CONTRACT
Lancaster County Emergency Management
Renovation and Relocation
Bid No. 17-282
Lancaster County
Meco-Henne Contracting, Inc.

EXECUTION BY CONTRACTOR

IF A CORPORATION:

Attest:

_____ Seal
Secretary JON A. HENNE

MECO HENNE CONTRACTING INC
Name of Corporation

4140 So. 87th Street Omaha NE 68127
Address

By: _____
Duly Authorized Official

MICHAEL G. EMANUEL PRES.
Legal Title of Official

IF OTHER TYPE OF ORGANIZATION:

_____
Name of Organization

_____
Type of Organization

_____
Address

By: _____
Member

By: _____
Member

IF AN INDIVIDUAL:

_____
Name

_____
Address

_____
Signature

Lancaster County Signature Page

CONTRACT
Lancaster County Emergency Management
Renovation and Relocation
Bid No. 17-282
Lancaster County
Meco-Henne Contracting, Inc.

EXECUTION BY LANCASTER COUNTY, NEBRASKA

Contract Approved as to Form:

_____
Deputy Lancaster County Attorney

The Board of County Commissioners of Lancaster, Nebraska

_____

_____

_____

_____

_____

dated _____

COMMENTARY TO ACCOMPANY CONSTRUCTION BONDS

A. GENERAL INFORMATION

There are two types of construction bonds that are required by statutes for public work in many jurisdictions and are widely used for other projects as well.

Construction Performance Bond
Construction Payment Bond

The Construction Performance Bond is an instrument that is used to assure the availability of funds to complete the construction.

The Construction Payment Bond is an instrument that is used to assure the availability of sufficient funds to pay for labor, materials and equipment used in the construction. For public work the Construction Payment Bond provides rights of recovery for workers and suppliers similar to their rights under the mechanics lien laws applying to private work.

The objective underlying the re-writing of construction bond forms was to make them more understandable to provide guidance to users. The intention was to define the rights and responsibilities of the parties, without changing the traditional rights and responsibilities that have been decided by the courts. The new bond forms provide helpful guidance regarding time periods for various notices and actions and clarify the extent of available remedies.

The concept of pre-default meeting has been incorporated into the Construction Performance Bond. All of the participants favored early and informal resolution of the problems that may precipitate a default, but some Surety companies were reluctant to participate in pre-default settings absent specific authorization in the bond form.

The responsibilities of the Owner and the options available to the Surety when a default occurs are set forth in the Construction Performance Bond. Procedures for making a claim under the Construction Payment Bond are set forth in the form.

EJCDC recommends the use of two separate bonds rather than a combined form. Normally the amount of each bond is 100 percent of the contract amount. The bonds have different purposes and are separate and distinct obligations of the Surety. The Surety Association reports that the usual practice is to charge a single premium for both bonds and there is no reduction in premium for using a combined form or for issuing one bond without the other.

B. COMPLETING THE FORMS

Bonds have important legal consequences; consultation with an attorney and a bond specialist is encouraged with respect to federal, state and local laws applicable to bonds and with respect to completing or modifying the bond forms.

Both bond forms have a similar format and the information to be filled in is ordinarily the same on both bonds. If modification is necessary, the modifications may be different.

The bond forms are prepared for execution by the Contractor and the Surety. Evidence of authority to bind the Surety is usually provided in the form of a power of attorney designating the agent who is authorized to sign on behalf of the Surety. The power of attorney should be filed with the signed bonds.

Each bond must be executed separately since they cover separate and distinct obligations.

Preferably the bond date should be the same date as the contract, but in no case should the bond date precede the date of the contract.

CONSTRUCTION PERFORMANCE BOND

Any singular reference to Contractor, Surety, Owner or other party shall be considered plural where applicable.

Bond No. 134684

CONTRACTOR (Name and Address):

Meco-Henne Contracting, Inc.
4140 S. 87th St.
Omaha, NE 68127

SURETY (Name and Principal Place of Business):

Universal Surety Company
PO Box 80468
Lincoln, NE 68501

Owner (Name and Address):
Lancaster County
555 South 10th St.
Lincoln, NE 68508

CONSTRUCTION CONTRACT
Date: 12/15/17
Amount: **$1,158,000.00**

Description (Name and Location):
For all labor, material and equipment necessary for Lancaster County Emergency Management Renovation and Relocation, Bid No. 17-282

BOND
Date: 12/15/17
Amount: **$1,158,000.00**
Modifications to this Bond Form: None

CONTRACTOR AS PRINCIPAL
Company: (Corp. Seal)

Meco-Henne Contracting, Inc.
4140 S. 87th St.
Omaha, NE 68127

Signature: _____
Name and Title: Michael G. Emanuel
President

SURETY
Company: (Corp. Seal)

Universal Surety Company

Signature: _____
Name and Title: Joan Leu, Attorney-in-Fact

EJCDC NO. 1910-28a (1984 Edition)
Prepared through the joint efforts of The Surety Assoc. of America. Engineers' Joint Contract Documents Committee. The Associated General Contractors of America, and the American Institute of Architects.

1. The Contractor and the Surety, jointly and severally, bind themselves their heirs, executors, administrators, successors and assigns to the Owner for the performance of the Construction Contract, which is incorporated herein by reference.
2. If the Contractor performs the Construction Contract, the Surety and the Contractor shall have no obligation under this Bond, except to participate in conferences as provided in Subparagraph 3.1.
3. If there is no Owner Default, the Surety's obligation under this Bond shall arise after:
   3.1 The Owner has notified the Contractor and the Surety at its address described in Paragraph 10 below, that the Owner is considering declaring a Contractor Default and has requested and attempted to arrange a conference with the Contractor and the Surety to be held not later than fifteen days after receipt of such notice to discuss methods of performing the Construction Contract. If the Owner, the Contractor and the Surety agree, the Contractor shall be allowed a reasonable time to perform the Construction Contract, but such an agreement shall not waive the Owner's right, if any, subsequently to declare a Contractor Default and
   3.2 The Owner has declared a Contractor Default and formally terminated the Contractor's right to complete the contract. Such Contractor Default shall not be declared earlier than twenty days after the Contractor and the Surety have received notice as provided in Sub-paragraph 3.1; and
   3.3 The Owner has agreed to pay the Balance of the Contract Price to the Surety in accordance with the terms of the Construction Contract or to a contractor selected to perform the Construction Contract in accordance with the terms of the contract with the Owner.
4. When the Owner has satisfied the conditions of Paragraph 3, the Surety shall promptly and at the Surety's expense take one of the following actions:
   4.1 Arrange for the Contractor, with consent of the Owner, to perform and complete the Construction Contract, or
   4.2 Undertake to perform and complete the Construction Contract itself, through its agents or through independent contractors: or
   4.3 Obtain bids or negotiated proposals from qualified contractors acceptable to the Owner for a contract for performance and completion of the Construction Contract, arrange for a contract to be prepared for execution by the Owner and the contractor selected with the Owner's concurrence, to be secured with performance and payment bonds executed by a qualified surety equivalent to the bonds issued on the Construction Contract, and pay to the Owner the amount of damages as described in Paragraph 6 in excess of the Balance of the Contract Price incurred by the Owner resulting from the Contractor's default, or
   4.4 Waive its right to perform and complete, arrange for completion, or obtain a new contractor and with reasonable promptness under the circumstances:
      1. After investigation, determine the amount for which it may be liable to the Owner and as soon as practicable after the amount is determined tender payment therefor to the Owner; or
      2. Deny liability in whole or in part and notify the Owner citing reasons therefor.
5. If the Surety does not proceed as provided in Paragraph 4 with reasonable promptness, the Surety shall be deemed to be in default on this Bond fifteen days after receipt of an additional written notice from the Owner to the Surety demanding that the Surety perform its obligations under this Bond, and the Owner shall be entitled to enforce any remedy available to the Owner. If the Surety proceeds as provided in Subparagraph 4.4 and the Owner refuses payment tendered or the Surety has denied liability, in whole or in part, without further notice the Owner shall be entitled to enforce any remedy available to the Owner.
6. After the Owner has terminated the Contractor's right to complete the Construction Contract, and if the Surety elects to act under Subparagraph 4.1, 4.2, or 4.3 above, then the responsibilities of the Surety to the Owner shall not be greater than those of the Contractor under the Construction Contract, and the responsibilities of the Owner to the Surety shall not be greater than those of the Owner under the Construction Contract. To the limit of the amount of this Bond, but subject to commitment by the Owner of the Balance of the Contract Price to mitigation of costs and damages on the Construction Contract, the Surety is obligated without duplication for:
   6.1 The responsibilities of the Contractor for correction of defective work and completion of the Construction Contract;
   6.2 Additional legal, design professional and delay costs resulting from the Contractor's Default, and resulting from the actions or failure to act of the Surety under Paragraph 4; an d
   6.3 Liquidated damages, or if no liquidated damages are specified in the Construction Contract, actual damages caused by delayed performance or non-performance of the Contractor.
7. The Surety shall not be liable to the Owner or others for obligations of the Contractor that are unrelated to the Construction Contract, and the Balance of the Contract Price shall not be reduced or set off on account of any such unrelated obligations. No right of action shall accrue on this Bond to any person or entity other than the Owner or its heirs, executors, administrators, or successors.
8. The Surety hereby waives notice of any change, including changes of time, to the Construction Contract or to related sub-contracts, purchase orders and other obligations.
9. Any proceeding, legal or equitable, under this Bond may be instituted in any court of competent jurisdiction in the location in which the work or part of the work is located and shall be instituted within two years after Contractor Default or within two years after the Contractor ceased working or within two years after the Surety refuses or fails to perform its obligations under this Bond, whichever occurs first. If the provisions of this Paragraph are void or prohibited by law, the minimum period of limitation available to sureties as a defense in the jurisdiction of the suit shall be applicable.
10. Notice to the Surety, the Owner or the Contractor shall be mailed or delivered to the address shown on the signature page.
11. When this Bond has been furnished to comply with a statutory or other legal requirement in the location where the construction was to be performed, any provision in this Bond conflicting with said statutory or legal requirement shall be deemed deleted herefrom and provisions conforming to such statutory or other legal requirement shall be deemed incorporated herein. The intent is that this Bond shall be construed as a statutory bond and not as a common law bond.
12. Definitions.
   12.1 Balance of the Contract Price: The total amount payable by the Owner to the Contractor under the Construction Contract after all proper adjustments have been made, including allowance to the Contractor of any amounts received or to be received by the Owner in settlement of insurance or other claims for damages to which the Contractor is entitled, reduced by all valid and proper payments made to or on behalf of the Contractor under the Construction Contract.
   12.2 Construction Contract: The agreement between the Owner and the Contractor identified on the signature page, including all Contract Documents and changes thereto.
   12.3 Contractor Default: Failure of the Contractor, which has neither been remedied nor waived, to perform or otherwise to comply with the terms of the Construction Contract.
   12.4 Owner Default: Failure of the Owner, which has neither been remedied nor waived, to pay the Contractor as required by the Construction Contract or to perform and complete or comply with the other terms thereof.

CONSTRUCTION PAYMENT BOND

Bond No. 134684

Any singular reference to Contractor, Surety, Owner or other party shall be considered plural where applicable.

CONTRACTOR (Name and Address):

Meco-Henne Contracting, Inc.
4140 S. 87th St.
Omaha, NE 68127

SURETY (Name and Principal Place Of Business):

Universal Surety Company
PO Box 80468
Lincoln, NE 68501

Owner (Name and Address):

Lancaster County
555 South 10th St.
Lincoln, NE 68508

CONSTRUCTION CONTRACT
Date: 12/15/17
Amount: **$1,158,000.00**

Description (Name and Location):
For all labor, material and equipment necessary for Lancaster County Emergency Management Renovation and Relocation, Bid No. 17-282

BOND
Date: 12/15/17
Amount: **$1,158,000.00**

Modifications to this Bond Form: None

CONTRACTOR AS PRINCIPAL
Company: (Corp. Seal)

Meco-Henne Contracting, Inc.
4140 S. 87th St.
Omaha, NE 68127

Signature: _____
Name and Title: Michael G. Emanuel
President

SURETY
Company: (Corp. Seal)

Universal Surety Company

Signature: _____
Name and Title: Joan Leu, Attorney-in-Fact

EJCDC NO. 1910-28B (1984 Edition)
Prepared through the joint efforts of The Surety Assoc. of America. Engineers' Joint Contract Documents Committee. The Associated General Contractors of America, and the American Institute of Architects.

1. The Contractor and the Surety, jointly and severally, bind themselves their heirs, executors, administrators, successors and assigns to the Owner to pay for labor, materials and equipment furnished for use in the performance of the Construction Contract, which is incorporated herein by reference.
2. With respect to the Owner, this obligation shall be null and void if the Contractor:
   2.1 Promptly makes payment, directly or indirectly, for all sums due Claimants, and
   2.2 Defends, indemnifies and holds harmless the Owner from all claims, demands, liens or suits by any person or entity who furnished labor, materials or equipment for use in the performance of the Construction Contract, provided the Owner has promptly notified the Contractor and the Surety (at the address described in Paragraph 12) of any claims, demands, liens or suits and tendered defense of such claims, demands, liens or suits to the Contractor and the Surety, and provided there is no Owner Default.
3. With respect to Claimants, this obligation shall be null and void if the Contractor promptly makes payment, directly or indirectly, for all sums due.
4. The Surety shall have no obligation to Claimants under this Bond until:
   4.1 Claimants who do not have a direct contract with the Contractor have given notice to the Surety (at the address described in Paragraph 12) and sent a copy, or notice thereof to the Owner, stating that a claim is being made under this Bond and with substantial accuracy the amount of the claim.
   4.2 Claimants who do not have a direct contract with the Contractor:
      1. Have furnished written notice to the Contractor and sent a copy, or notice thereof, to the Owner, within 90 days after having last performed labor or last furnished materials or equipment included in the claim stating, with substantial accuracy, the amount of the claim and the name of the party to whom the materials were furnished or supplied or for whom the labor was done or performed, and
      2. Have either received a rejection in whole or in part from the Contractor, or not received within 30 days of furnishing the above notice any communication from the Contractor by which the Contractor has indicated the claim will be paid directly or indirectly; and
      3.Not having been paid within the above 30 days, have sent a written notice to the Surety (at the address described in Paragraph 12) and sent a copy, or notice thereof, to the Owner, stating that a claim is being made under this Bond and enclosing a copy of the previous written notice furnished to the Contractor.
5. If a notice required by Paragraph 4 is given by the Owner to the Contractor or to the Surety, that is sufficient compliance.
6. When the Claimant has satisfied the conditions of Paragraph 4, the Surety shall promptly and at the Surety's expense take the following actions:
   6.1 Send an answer to the Claimant, with a copy to the Owner, within 45 days after receipt of the claim, stating the amounts that are undisputed and the basis for challenging any amounts that are disputed.
   6.2 Pay or arrange for payment of any undisputed amounts.
7. The Surety's total obligation shall not exceed the amount of this Bond, and the amount of this Bond shall be credited for any payments made in good faith by the Surety.
8. Amounts owed by the Owner to the Contractor under the Construction Contract shall be used for the performance of the Construction Contract and to satisfy claims, if any, under any Construction Performance Bond. By the Contractor furnishing and the Owner accepting this Bond, they agree that all funds earned by the Contractor in the performance of the Construction Contract are dedicated to satisfy obligations of the Contractor and the Surety under this Bond, subject to the Owner's priority to the funds for the completion of the work.
9. The Surety shall not be liable to the Owner, Claimants or others for obligations of the Contractor that are unrelated to the Construction Contract. The Owner shall not be liable for payment of any costs or expenses of any Claimant under this Bond, and shall have under this Bond no obligations to make payments to, give notices on behalf of, or otherwise have obligations to Claimants under this Bond.
10. The Surety hereby waives notice of any change, including changes of time, to the Construction Contract or to related subcontracts, purchase orders and other obligations.
11. No suite or action shall be commenced by a Claimant under this Bond other than in a court of competent jurisdiction in the location in which the work or part of the work is located or after the expiration of one year from the date (1) on which the Claimant gave the notice required by Subparagraph 4.1 or Clause 4.1 (iii), or (2) on which the last labor or service was performed by anyone or the last materials or equipment were furnished by anyone under the Construction Contract, whichever of (1) or (2) first occurs. If the provisions of this Paragraph are void or prohibited by law, the minimum period of limitation available to sureties as a defense in the jurisdiction of the suit shall be applicable.
12. Notice to the Surety, the Owner or the Contractor shall be mailed or delivered to the address shown on the signature page. Actual receipt of notice by Surety, the Owner or the Contractor, however accomplished, shall be sufficient compliance as of the date received at the address shown on the signature page.
13. When this Bond has been furnished to comply with a statutory or other legal requirement in the location where the construction was to be performed, any provision in this Bond conflicting with said statutory or legal requirement shall be deemed deleted here from and provisions conforming to such statutory or other legal requirement shall be deemed incorporated herein. The intent is, that this Bond shall be construed as a statutory bond and not as a common law bond.
14. Upon request by any person or entity appearing to be a potential beneficiary of this Bond, the Contractor shall promptly furnish a copy of this Bond or shall permit a copy to be made.
15. DEFINITIONS
   15.1 Claimant: An individual or entity having a direct contract with the Contractor or with a subcontractor of the Contractor to furnish labor, materials or equipment for use in the performance of the Contract. The intent of this Bond shall be to include without limitation in the terms "labor, materials, or equipment" that part of water, gas, power, light, heat, oil, gasoline, telephone service or rental equipment used in the Construction Contract, architectural and engineering services required for performance of the work of the Contractor and the Contractor's subcontractors, and all other items for which a mechanic's lien may be asserted in the jurisdiction where the labor, materials or equipment were furnished.
   15.2 Construction Contract: The agreement between the Owner and the Contractor identified on the signature page, including all Contract Documents and changes thereto.
   15.3 Owner Default: Failure of the Owner, which has neither been remedied nor waived, to pay the Contractor as required by the Construction Contract or to perform and complete or comply with the other terms thereof.

(FOR INFORMATION ONLY - NAME, ADDRESS AND TELEPHONE) AGENT OR BROKER: OWNER'S REPRESENTATIVE (ARCHITECT, ENGINEER OR OTHER PARTY)

UNIVERSAL SURETY COMPANY

Lincoln, Nebraska

POWER OF ATTORNEY

KNOW ALL MEN BY THESE PRESENTS:

That the **UNIVERSAL SURETY COMPANY**, a corporation of the State of Nebraska having its principal office in the City of Lincoln, Nebraska, pursuant to the following Bylaw, which was adopted by the Board of Directors of the said Company on July 23, 1981, to wit:

"Article V-Section 6. RESIDENT OFFICERS AND ATTORNEYS-IN-FACT. The President or any Vice President, acting with any Secretary or Assistant Secretary, shall have the authority to appoint Resident Vice Presidents and Attorneys-In-Fact, with the power and authority to sign, execute, acknowledge and deliver on its behalf, as Surety: Any and all undertakings of suretyship and to affix thereto the corporate seal of the corporation. The President or any Vice President, acting with any Secretary or Assistant Secretary, shall also have the authority to remove and revoke the authority of any such appointee at any time."

does hereby make, constitute and appoint

Sharon K. Murray, Firth, Nebraska or David A. Dominiani, Lincoln, Nebraska
or Maura P. Kelly, Council Bluffs, Iowa or Joan Leu, Ralston, Nebraska or Jacqueline L. Drey
or Kevin J. Stenger or David G. Jesse, Omaha, Nebraska

its true and lawful Attorney(s)-in-Fact, to make, execute, seal and deliver for and on its behalf, as Surety:
Any and all undertakings of suretyship

And the execution of such bonds or undertakings in pursuance of these presents, shall be as binding upon said Company, as fully and amply, to all intents and purposes, as if they had been duly executed and acknowledged by the regularly elected officers of the Company at its offices in Lincoln, Nebraska, in their own persons.

The following Resolution was adopted at the Regular Meeting of the Board of Directors of the **UNIVERSAL SURETY COMPANY**, held on July 23, 1981:

"RESOLVED, That the signatures of officers of the Company and the seal of the Company may be affixed by facsimile to any Power of Attorney executed in accordance with Article V-Section 6 of the Company Bylaws: and that any such Power of Attorney bearing such facsimile signatures, including the facsimile signature of a certifying Assistant Secretary and facsimile seal shall be valid and binding upon the Company with respect to any bond, undertaking or contract of suretyship to which it is attached."

All authority hereby conferred shall remain in full force and effect until terminated by the Company.

IN WITNESS WHEREOF, **UNIVERSAL SURETY COMPANY** has caused these presents to be signed by its President and its corporate seal to be hereunto affixed this 4th day of January, 20 16.

UNIVERSAL SURETY COMPANY

Carol J. Clark — Secretary/Treasurer

By Curtis L. Hartter — President

UNIVERSAL SURETY COMPANY CORPORATE SEAL LINCOLN, NEBRASKA

State of Nebraska }
County of } ss. Lancaster

On this 4th day of January, 20 16, before me personally came Curtis L. Hartter, to me known, who being by me duly sworn, did depose and say that (s)he resides in the County of Lancaster, State of Nebraska; that (s)he is the President of the **UNIVERSAL SURETY COMPANY**, the corporation described in and which executed the above instrument; that (s)he knows the seal of the said corporation; that the seal affixed to the said instrument is such corporate seal; that it was so affixed by order of the Board of Directors of said corporation; that (s)he signed (his) (her) name by like order; and that Bylaw, Article V-Section 6, adopted by the Board of Directors of said Company, referred to in the preceding instrument, is now in force.

Tara N. Martin — Notary Public

GENERAL NOTARY - State of Nebraska
TARA N. MARTIN
My Comm. Exp. February 16, 2018

My Commission Expires February 16, 2018.

I, Cheryl A. Brown, Assistant Secretary of **UNIVERSAL SURETY COMPANY**, do hereby certify that the above and foregoing is a true and correct copy of a Power of Attorney executed by said **UNIVERSAL SURETY COMPANY**, which is still in full force and effect.
Signed and sealed at the City of Lincoln, Nebraska this 15 day of December, 2017.

Cheryl A. Brown — Assistant Secretary

UNIVERSAL SURETY COMPANY CORPORATE SEAL LINCOLN, NEBRASKA

Certified Statement Pursuant to Neb. Rev. Stat. § 77-1323

§ 77-1323 *Every person, partnership, limited liability company, association, or corporation furnishing labor or material in the repair, alteration, improvement, erection, or construction of any public improvement shall furnish a certified statement to be attached to the contract that all equipment to be used on the project, except that acquired since the assessment date, has been assessed for taxation for the current year, giving the county where assessed.*

Pursuant to Neb. Rev. Stat. § 77-1323, I, Michael G. Emanuel, do hereby certify that all equipment to be used on Bid No. 17-282, except that equipment acquired since the assessment date, has been assessed for taxation for the current year, in Douglas County, Nebraska.

DATED this 19th day of December, 2017.

By: _____

Title: Michael G. Emanuel
President

STATE OF NEBRASKA)
)ss.
COUNTY OF Douglas)

On December 19, 2017, before me, the undersigned Notary Public duly commissioned for and qualified in said County, personally came Michael G. Emanuel, to me known to be the identical person, whose name is affixed to the foregoing instrument and acknowledged the execution thereof to be his voluntary act and deed.

Witness my hand and notarial seal the day and year last above written.

Christina M. Del Margo
Notary Public

GENERAL NOTARY - State of Nebraska
CHRISTINA M DEL MARGO
My Comm. Exp. June 22, 2021

(S E A L)

EMPLOYEE CLASSIFICATION ACT AFFIDAVIT

For the purposes of complying with THE NEBRASKA EMPLOYEE CLASSIFICATION ACT, Nebraska Revised Statutes 48-2901 to 48-2912,

I, MICHAEL G. EMANUEL, herein below known as the Contractor, state under oath and swear as follows:

1. Each individual performing services for the Contractor is properly classified under the Employee Classification Act.

2.The Contractor has completed a federal I-9 immigration form and has such form on file for each employee performing services.

3. The Contractor has complied with Neb. Rev. Stat. 4-114.

4. The Contractor has no reasonable basis to believe that any individual performing services for the Contractor is an undocumented worker.

5. The Contractor is not barred from contracting with the state or any political subdivision pursuant to Neb. Rev. Stat. 48-2912 of this Act.

6. As the Contractor, I understand that pursuant to the Employee Classification Act a violation of the Act by a contractor is grounds for rescission of the contract by Lancaster County. I understand that pursuant to the Act any contractor who knowingly provides a false affidavit may be subject to criminal penalties and upon a second or subsequent violation shall be barred from contracting with Lancaster County for a period of three years after the date of discovery of the falsehood.

I hereby affirm and swear that the statements and information provided on this affidavit are true, complete and accurate. The undersigned person does hereby agree and represent that he or she is legally capable to sign this affidavit and to lawfully bind the Contractor to this affidavit.

PRINT NAME: MICHAEL G. EMANUEL
(First, Middle, Last)

SIGNATURE: _____

TITLE: PRESIDENT

State of Nebraska)
) ss.
County of Douglas)

This affidavit was signed and sworn to before me, the undersigned Notary Public, on this 19th day of December, 2017.

GENERAL NOTARY - State of Nebraska
CHRISTINA M DEL MARGO
My Comm. Exp. June 22, 2021

Christina M Del Margo
Notary Public

City of Lincoln/Lancaster County (Lincoln Purchasing)
Supplier Response

Bid Information

Bid Creator	Robert Walla Purchasing Agent
Email	rwalla@lincoln.ne.gov
Phone	1 (402) 441-8309
Fax	1 (402) 441-6513
Bid Number	17-282 Addendum 5
Title	Lancaster County Emergency Management Renovation and Relocation
Bid Type	Bid
Issue Date	11/1/2017 10:03 AM (CT)
Close Date	11/29/2017 12:00:00 PM (CT)

Contact Information

Address	Purchasing 440 S. 8th St. Lincoln, NE 68508
Contact	Robert Walla Purchasing Agent
Department	
Building	
	Suite 200
Floor/Room	
Telephone	1 (402) 441-8309
Fax	1 (402) 441-6513
Email	rwalla@lincoln.ne.gov

Ship to Information

Address
Contact
Department
Building
Floor/Room
Telephone
Fax
Email

Supplier Information

Company	MECO-HENNE Contracting, Inc.
Address	4140 S 87th St. Omaha, NE 68127
Contact	James M. Wolz, Sr.
Department	
Building	
Floor/Room	
Telephone	(402) 339-8127
Fax	(402) 339-8147
Email	jwolz@mecohenne.com
Submitted	11/29/2017 11:51:44 AM (CT)
Total	$1,158,000.00

By submitting your response, you certify that you are authorized to represent and bind your company.

Signature James M. Wolz, Sr. Email JWolz@MECOHENNE.com

Supplier Notes

Bid Notes

Bid Activities

Date	Name	Description
11/8/2017 01:00:00 PM (CT)	Pre-Bid Meeting - Wednesday 11/8 at 1:00pm, Youth Service Center, 1200 Radcliff Street	A pre-Bid Meeting will be held at the construction site on Wednesday 11/8 at 1:00pm at the Youth Service Center, 1200 Radcliff Street, Lincoln, NE. This will be the only opportunity to view the job site prior to the bid close.

Bid Messages

Bid Attributes

Please review the following and respond where necessary

#	Name	Note	Response
1	Agreement to Addendum No. 1	Respondent hereby certifies that the change set forth in this addendum has been incorporated in their proposal and is part of their bid. Reason: ELECTRONIC ADDENDUM - NO DOCUMENTS ATTACHED: The prebid time is 1:00pm on Nov. 8th at the Youth Service Center. There was an error on the General Specifications.	Yes
2	Bid Documents	I acknowledge and accept that it is my responsibility as a Bidder to promptly notify the Purchasing Department Staff prior to the close of the bid of any ambiguity, inconsistency or error which I may discover upon examination of the bid documents including, but not limited to the Specifications.	Yes
3	Instructions to Bidders	I acknowledge reading and understanding the Instructions to Bidders.	Yes
4	Specifications	I acknowledge reading and understanding the specifications.	Yes
5	Insurance Requirements and Endorsements	Vendor agrees to provide insurance coverage for each checked box on the Insurance Clause document in the Bid Attachments including the submission of the Certificate of ACORD and the applicable endorsements. Insurance Certificate and required Endorsements are required at time of contract execution by the vendor. Vendors are strongly encouraged to send the insurance requirements and endorsement information to their insurance agent prior to bid close in order to expedite the contract execution process.	Yes
6	Purchase Order, Contract and Delivery Contact	The City/County Purchasing Department issues Purchase Orders and Contracts via email to a designated contact person of the awarded Vendor. This designee will be the primary contact with the department through the delivery of the product/services. Please list the name, email address and phone number of the person who will be the contact person for the contract to be awarded.	James M. Wolz, Sr., JWolz@MECOHENNE.com, 402-339-8127
7	Sample Contract	I acknowledge reading and understanding the sample contract.	Yes
8	Contact	Name of person submitting this bid:	James M. Wolz, Sr.
9	Electronic Signature	Please check here for your electronic signature.	Yes
10	Performance/Payment Bonds	I acknowledge that a Performance Bond and a Payment Bond each in the amount of 100% of the Contract amount will be required with the signed contract upon award of this job.	Yes
11	Drawings	I acknowledge reading and understanding the Project Drawings.	Yes

12	Bid Bond Summission - County	I acknowledge and understand that my bid will not be considered unless a bid bond or certified check in the sum of five percent (5%) of the total amount of the bid is made payable to the order of the Lancaster County Treasurer as a guarantee of good faith prior to the bid opening. The bid security may be scanned and attached to the 'Response Attachments' section of your response or faxed to the Purchasing Office (402)441-6513. The original bond/check must then be received in the Purchasing Office, 440 S. 8th Street, Ste. 200, Lincoln, NE 68508 within three (3) days of bid closing. YOU MUST INDICATE YOUR METHOD OF BID BOND SUBMISSION IN BOX TO RIGHT!	I have scanned and attached my bid bond.
13	Employee Class Act EO	I acknowledge reading and understanding the Employee Classification Act, Executive Order 83319.	Yes
14	U.S. Citizenship Attestation	Is your company legally considered an Individual or Sole Proprietor: YES or NO As a Vendor who is legally considered an Individual or a Sole Proprietor I hereby understand and agree to comply with the requirements of the United States Citizenship Attestation Form, available at: http://www.sos.ne.gov/business/notary/citizenforminfo.html All awarded Vendors who are legally considered an Individual or a Sole Proprietor must complete the form and submit it with contract documents at time of execution. If a Vendor indicates on such attestation form that he or she is a qualified alien, the Vendor agrees to provide the US Citizenship and Immigration Services documentation required to verify the Vendor's lawful presence in the United States using the Systematic Alien Verification for Entitlements (SAVE) Program. Vendor further understands and agrees that lawful presence in the United States is required and the Vendor may be disqualified or the Contract terminated if such lawful presence cannot be verified as required by Neb. Rev. Stat. 4-108.	No
15	Agreement to Addendum No. 2	Respondent hereby certifies that the change set forth in this addendum has been incorporated in their proposal and is part of their bid. Reason: See Bid Attachments section for Addendum information.	Yes
16	Agreement to Addendum No. 3	Respondent hereby certifies that the change set forth in this addendum has been incorporated in their proposal and is part of their bid. Reason: See Bid Attachments section for Addendum information.	Yes
17	Agreement to Addendum No. 4	Respondent hereby certifies that the change set forth in this addendum has been incorporated in their proposal and is part of their bid. Reason: See Bid Attachments section for Addendum information. Bid has been extended to Wednesday November 29, 2017 @ 12:00pm.	Yes
18	Agreement to Addendum No. 5	Respondent hereby certifies that the change set forth in this addendum has been incorporated in their proposal and is part of their bid. Reason: See Bid Attachments section for Addendum information.	Yes

Line Items

#	Qty	UOM	Description	Response
1	1	Lump Sum	Lancaster County Emergency Management Relocation & Renovation	$1,158,000.00
	Item Notes:			
	Supplier Notes:			
			Response Total:	$1,158,000.00

CERTIFICATE OF LIABILITY INSURANCE

DATE (MM/DD/YYYY): 12/14/2017

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AFFIRMATIVELY OR NEGATIVELY AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW. THIS CERTIFICATE OF INSURANCE DOES NOT CONSTITUTE A CONTRACT BETWEEN THE ISSUING INSURER(S), AUTHORIZED REPRESENTATIVE OR PRODUCER, AND THE CERTIFICATE HOLDER.

IMPORTANT: If the certificate holder is an ADDITIONAL INSURED, the policy(ies) must have ADDITIONAL INSURED provisions or be endorsed. If SUBROGATION IS WAIVED, subject to the terms and conditions of the policy, certain policies may require an endorsement. A statement on this certificate does not confer rights to the certificate holder in lieu of such endorsement(s).

PRODUCER	CONTACT NAME: Angie Charf	
The Harry A. Koch Co. P.O. Box 45279 Omaha NE 68145-0279	PHONE (A/C, No, Ext): 402-861-7000	FAX (A/C, No):
	E-MAIL ADDRESS: angie.charf@hakco.com	
	INSURER(S) AFFORDING COVERAGE	NAIC #
	INSURER A : The Phoenix Insurance Co	25623
INSURED MEC64311 Meco-Henne Contracting, Inc. 4140 So. 87th St. Omaha NE 68127	INSURER B : Travelers Property Casualty Co	36161
	INSURER C : Travelers Property Casualty of America	25674
	INSURER D :	
	INSURER E :	
	INSURER F :	

COVERAGES **CERTIFICATE NUMBER:** 2090250838 **REVISION NUMBER:**

THIS IS TO CERTIFY THAT 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 THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

INSR LTR	TYPE OF INSURANCE	ADDL INSD	SUBR WVD	POLICY NUMBER	POLICY EFF (MM/DD/YYYY)	POLICY EXP (MM/DD/YYYY)	LIMITS	
A	X **COMMERCIAL GENERAL LIABILITY** [ ] CLAIMS-MADE [X] OCCUR X 2500 Ded PD/Occ GEN'L AGGREGATE LIMIT APPLIES PER: [ ] POLICY [X] PRO-JECT [ ] LOC [ ] OTHER:			DTCO387M6046PHX17	11/7/2017	11/7/2018	EACH OCCURRENCE DAMAGE TO RENTED PREMISES (Ea occurrence) MED EXP (Any one person) PERSONAL & ADV INJURY GENERAL AGGREGATE PRODUCTS - COMP/OP AGG $	$ 1,000,000 $ 300,000 $ 5,000 $ 1,000,000 $ 2,000,000 $ 2,000,000 $
B	**AUTOMOBILE LIABILITY** X ANY AUTO [ ] OWNED AUTOS ONLY [ ] SCHEDULED AUTOS X HIRED AUTOS ONLY X NON-OWNED AUTOS ONLY			DT810387M6046TIL17	11/7/2017	11/7/2018	COMBINED SINGLE LIMIT (Ea accident) BODILY INJURY (Per person) BODILY INJURY (Per accident) PROPERTY DAMAGE (Per accident) $	$ 1,000,000 $ $ $ $
C	X **UMBRELLA LIAB** X OCCUR **EXCESS LIAB** [ ] CLAIMS-MADE [ ] DED X RETENTION $ 10,000			CUP3K1313341626	11/7/2017	11/7/2018	EACH OCCURRENCE AGGREGATE $	$ 10,000,000 $ 10,000,000 $
B	**WORKERS COMPENSATION AND EMPLOYERS' LIABILITY** Y / N ANYPROPRIETOR/PARTNER/EXECUTIVE OFFICER/MEMBER EXCLUDED? N **(Mandatory in NH)** If yes, describe under DESCRIPTION OF OPERATIONS below	N / A		DTJUB387M604617	11/7/2017	11/7/2018	X PER STATUTE [ ] OTH-ER E.L. EACH ACCIDENT E.L. DISEASE - EA EMPLOYEE E.L. DISEASE - POLICY LIMIT	 $ 500,000 $ 500,000 $ 500,000
B	Installtion Floater			QT6308A130355TIL17	11/7/2017	11/7/2018	$250,000 limit	$1,000 deductible

DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES (ACORD 101, Additional Remarks Schedule, may be attached if more space is required)

Lancaster County is additional insured for general liability and auto liability if required by written contract executed prior to loss.
Waiver of Subrogation applies for workers compnesation if required by written contract executed prior to loss.
30 day NOC (will be endorsed if Meco-Henne Contracting, Inc. is awarded the job)

CERTIFICATE HOLDER

Lancaster County
555 So. 10th Street
Lincoln NE 68508

CANCELLATION

SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, NOTICE WILL BE DELIVERED IN ACCORDANCE WITH THE POLICY PROVISIONS.

AUTHORIZED REPRESENTATIVE

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DT810387M6046TIL17

THIS ENDORSEMENT CHANGES THE POLICY. PLEASE READ IT CAREFULLY.

BUSINESS AUTO EXTENSION ENDORSEMENT

This endorsement modifies insurance provided under the following:

BUSINESS AUTO COVERAGE FORM

GENERAL DESCRIPTION OF COVERAGE – This endorsement broadens coverage. However, coverage for any injury, damage or medical expenses described in any of the provisions of this endorsement may be excluded or limited by another endorsement to the Coverage Part, and these coverage broadening provisions do not apply to the extent that coverage is excluded or limited by such an endorsement. The following listing is a general coverage description only. Limitations and exclusions may apply to these coverages. Read all the provisions of this endorsement and the rest of your policy carefully to determine rights, duties, and what is and is not covered.

A. **BROAD FORM NAMED INSURED**
B. **BLANKET ADDITIONAL INSURED**
C. **EMPLOYEE HIRED AUTO**
D. **EMPLOYEES AS INSURED**
E. **SUPPLEMENTARY PAYMENTS – INCREASED LIMITS**
F. **HIRED AUTO – LIMITED WORLDWIDE COVERAGE – INDEMNITY BASIS**
G. **WAIVER OF DEDUCTIBLE – GLASS**
H. **HIRED AUTO PHYSICAL DAMAGE – LOSS OF USE – INCREASED LIMIT**
I. **PHYSICAL DAMAGE – TRANSPORTATION EXPENSES – INCREASED LIMIT**
J. **PERSONAL PROPERTY**
K. **AIRBAGS**
L. **NOTICE AND KNOWLEDGE OF ACCIDENT OR LOSS**
M. **BLANKET WAIVER OF SUBROGATION**
N. **UNINTENTIONAL ERRORS OR OMISSIONS**

PROVISIONS

A. BROAD FORM NAMED INSURED

The following is added to Paragraph **A.1., Who Is An Insured**, of **SECTION II – COVERED AUTOS LIABILITY COVERAGE**:

Any organization you newly acquire or form during the policy period over which you maintain 50% or more ownership interest and that is not separately insured for Business Auto Coverage. Coverage under this provision is afforded only until the 180th day after you acquire or form the organization or the end of the policy period, whichever is earlier.

B. BLANKET ADDITIONAL INSURED

The following is added to Paragraph **c.** in **A.1., Who Is An Insured**, of **SECTION II – COVERED AUTOS LIABILITY COVERAGE**:

Any person or organization who is required under a written contract or agreement between you and that person or organization, that is signed and executed by you before the "bodily injury" or "property damage" occurs and that is in effect during the policy period, to be named as an additional insured is an "insured" for Covered Autos Liability Coverage, but only for damages to which this insurance applies and only to the extent that person or organization qualifies as an "insured" under the Who Is An Insured provision contained in Section II.

C. EMPLOYEE HIRED AUTO

1. The following is added to Paragraph **A.1., Who Is An Insured**, of **SECTION II – COVERED AUTOS LIABILITY COVERAGE**:

   An "employee" of yours is an "insured" while operating an "auto" hired or rented under a contract or agreement in an "employee's" name, with your permission, while performing duties related to the conduct of your business.

2. The following replaces Paragraph **b.** in **B.5., Other Insurance**, of **SECTION IV – BUSINESS AUTO CONDITIONS**:

   b. For Hired Auto Physical Damage Coverage, the following are deemed to be covered "autos" you own:

   (1) Any covered "auto" you lease, hire, rent or borrow; and

   (2) Any covered "auto" hired or rented by your "employee" under a contract in an "employee's" name, with your

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permission, while performing duties related to the conduct of your business.

However, any "auto" that is leased, hired, rented or borrowed with a driver is not a covered "auto".

D. EMPLOYEES AS INSURED

The following is added to Paragraph **A.1.**, **Who Is An Insured**, of **SECTION II – COVERED AUTOS LIABILITY COVERAGE**:

Any "employee" of yours is an "insured" while using a covered "auto" you don't own, hire or borrow in your business or your personal affairs.

E. SUPPLEMENTARY PAYMENTS – INCREASED LIMITS

1. The following replaces Paragraph **A.2.a.(2)**, of **SECTION II – COVERED AUTOS LIABILITY COVERAGE**:

   (2) Up to $3,000 for cost of bail bonds (including bonds for related traffic law violations) required because of an "accident" we cover. We do not have to furnish these bonds.

2. The following replaces Paragraph **A.2.a.(4)**, of **SECTION II – COVERED AUTOS LIABILITY COVERAGE**:

   (4) All reasonable expenses incurred by the "insured" at our request, including actual loss of earnings up to $500 a day because of time off from work.

F. HIRED AUTO – LIMITED WORLDWIDE COVERAGE – INDEMNITY BASIS

The following replaces Subparagraph **(5)** in Paragraph **B.7.**, **Policy Period, Coverage Territory**, of **SECTION IV – BUSINESS AUTO CONDITIONS**:

(5) Anywhere in the world, except any country or jurisdiction while any trade sanction, embargo, or similar regulation imposed by the United States of America applies to and prohibits the transaction of business with or within such country or jurisdiction, for Covered Autos Liability Coverage for any covered "auto" that you lease, hire, rent or borrow without a driver for a period of 30 days or less and that is not an "auto" you lease, hire, rent or borrow from any of your "employees", partners (if you are a partnership), members (if you are a limited liability company) or members of their households.

(a) With respect to any claim made or "suit" brought outside the United States of America, the territories and possessions of the United States of America, Puerto Rico and Canada:

(i) You must arrange to defend the "insured" against, and investigate or settle any such claim or "suit" and keep us advised of all proceedings and actions.

(ii) Neither you nor any other involved "insured" will make any settlement without our consent.

(iii) We may, at our discretion, participate in defending the "insured" against, or in the settlement of, any claim or "suit".

(iv) We will reimburse the "insured" for sums that the "insured" legally must pay as damages because of "bodily injury" or "property damage" to which this insurance applies, that the "insured" pays with our consent, but only up to the limit described in Paragraph **C.**, Limits Of Insurance, of SECTION II – COVERED AUTOS LIABILITY COVERAGE.

(v) We will reimburse the "insured" for the reasonable expenses incurred with our consent for your investigation of such claims and your defense of the "insured" against any such "suit", but only up to and included within the limit described in Paragraph **C.**, Limits Of Insurance, of SECTION II – COVERED AUTOS LIABILITY COVERAGE, and not in addition to such limit. Our duty to make such payments ends when we have used up the applicable limit of insurance in payments for damages, settlements or defense expenses.

(b) This insurance is excess over any valid and collectible other insurance available to the "insured" whether primary, excess, contingent or on any other basis.

(c) This insurance is not a substitute for required or compulsory insurance in any country outside the United States, its territories and possessions, Puerto Rico and Canada.

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You agree to maintain all required or compulsory insurance in any such country up to the minimum limits required by local law. Your failure to comply with compulsory insurance requirements will not invalidate the coverage afforded by this policy, but we will only be liable to the same extent we would have been liable had you complied with the compulsory insurance requirements.

(d) It is understood that we are not an admitted or authorized insurer outside the United States of America, its territories and possessions, Puerto Rico and Canada. We assume no responsibility for the furnishing of certificates of insurance, or for compliance in any way with the laws of other countries relating to insurance.

G. WAIVER OF DEDUCTIBLE – GLASS

The following is added to Paragraph **D., Deductible**, of **SECTION III – PHYSICAL DAMAGE COVERAGE**:

No deductible for a covered "auto" will apply to glass damage if the glass is repaired rather than replaced.

H. HIRED AUTO PHYSICAL DAMAGE – LOSS OF USE – INCREASED LIMIT

The following replaces the last sentence of Paragraph **A.4.b., Loss Of Use Expenses**, of **SECTION III – PHYSICAL DAMAGE COVERAGE**:

However, the most we will pay for any expenses for loss of use is $65 per day, to a maximum of $750 for any one "accident".

I. PHYSICAL DAMAGE – TRANSPORTATION EXPENSES – INCREASED LIMIT

The following replaces the first sentence in Paragraph **A.4.a., Transportation Expenses**, of **SECTION III – PHYSICAL DAMAGE COVERAGE**:

We will pay up to $50 per day to a maximum of $1,500 for temporary transportation expense incurred by you because of the total theft of a covered "auto" of the private passenger type.

J. PERSONAL PROPERTY

The following is added to Paragraph **A.4., Coverage Extensions**, of **SECTION III – PHYSICAL DAMAGE COVERAGE**:

Personal Property

We will pay up to $400 for "loss" to wearing apparel and other personal property which is:

(1) Owned by an "insured"; and

(2) In or on your covered "auto".

This coverage applies only in the event of a total theft of your covered "auto".

No deductibles apply to this Personal Property coverage.

K. AIRBAGS

The following is added to Paragraph **B.3., Exclusions**, of **SECTION III – PHYSICAL DAMAGE COVERAGE**:

Exclusion **3.a.** does not apply to "loss" to one or more airbags in a covered "auto" you own that inflate due to a cause other than a cause of "loss" set forth in Paragraphs **A.1.b.** and **A.1.c.**, but only:

a. If that "auto" is a covered "auto" for Comprehensive Coverage under this policy;

b. The airbags are not covered under any warranty; and

c. The airbags were not intentionally inflated.

We will pay up to a maximum of $1,000 for any one "loss".

L. NOTICE AND KNOWLEDGE OF ACCIDENT OR LOSS

The following is added to Paragraph **A.2.a.**, of **SECTION IV – BUSINESS AUTO CONDITIONS**:

Your duty to give us or our authorized representative prompt notice of the "accident" or "loss" applies only when the "accident" or "loss" is known to:

(a) You (if you are an individual);

(b) A partner (if you are a partnership);

(c) A member (if you are a limited liability company);

(d) An executive officer, director or insurance manager (if you are a corporation or other organization); or

(e) Any "employee" authorized by you to give notice of the "accident" or "loss".

M. BLANKET WAIVER OF SUBROGATION

The following replaces Paragraph **A.5., Transfer Of Rights Of Recovery Against Others To Us**, of **SECTION IV – BUSINESS AUTO CONDITIONS**:

5. Transfer Of Rights Of Recovery Against Others To Us

We waive any right of recovery we may have against any person or organization to the extent required of you by a written contract signed and executed prior to any "accident" or "loss", provided that the "accident" or "loss" arises out of operations contemplated by

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such contract. The waiver applies only to the person or organization designated in such contract.

N. UNINTENTIONAL ERRORS OR OMISSIONS

The following is added to Paragraph **B.2., Concealment, Misrepresentation, Or Fraud**, of **SECTION IV – BUSINESS AUTO CONDITIONS**:

The unintentional omission of, or unintentional error in, any information given by you shall not prejudice your rights under this insurance. However this provision does not affect our right to collect additional premium or exercise our right of cancellation or non-renewal.

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DTCO387M6046PHX17

THIS ENDORSEMENT CHANGES THE POLICY. PLEASE READ IT CAREFULLY.

BLANKET ADDITIONAL INSURED – AUTOMATIC STATUS IF REQUIRED BY WRITTEN CONTRACT (CONTRACTORS)

This endorsement modifies insurance provided under the following:

COMMERCIAL GENERAL LIABILITY COVERAGE PART

1. The following is added to **SECTION II – WHO IS AN INSURED**:

   Any person or organization that:

   a. You agree in a "written contract requiring insurance" to include as an additional insured on this Coverage Part; and

   b. Has not been added as an additional insured for the same project by attachment of an endorsement under this Coverage Part which includes such person or organization in the endorsement's schedule;

   is an insured, but:

   a. Only with respect to liability for "bodily injury", "property damage" or "personal injury"; and

   b. Only as described in Paragraph **(1)**, **(2)** or **(3)** below, whichever applies:

   (1) If the "written contract requiring insurance" specifically requires you to provide additional insured coverage to that person or organization by the use of:

   (a) The Additional Insured – Owners, Lessees or Contractors – (Form B) endorsement CG 20 10 11 85; or

   (b) Either or both of the following: the Additional Insured – Owners, Lessees or Contractors – Scheduled Person Or Organization endorsement CG 20 10 10 01, or the Additional Insured – Owners, Lessees or Contractors – Completed Operations endorsement CG 20 37 10 01;

   the person or organization is an additional insured only if the injury or damage arises out of "your work" to which the "written contract requiring insurance" applies;

   (2) If the "written contract requiring insurance" specifically requires you to provide additional insured coverage to that person or organization by the use of:

   (a) The Additional Insured – Owners, Lessees or Contractors – Scheduled Person or Organization endorsement CG 20 10 07 04 or CG 20 10 04 13, the Additional Insured – Owners, Lessees or Contractors – Completed Operations endorsement CG 20 37 07 04 or CG 20 37 04 13, or both of such endorsements with either of those edition dates; or

   (b) Either or both of the following: the Additional Insured – Owners, Lessees or Contractors – Scheduled Person Or Organization endorsement CG 20 10, or the Additional Insured – Owners, Lessees or Contractors – Completed Operations endorsement CG 20 37, without an edition date of such endorsement specified;

   the person or organization is an additional insured only if the injury or damage is caused, in whole or in part, by acts or omissions of you or your subcontractor in the performance of "your work" to which the "written contract requiring insurance" applies; or

   (3) If neither Paragraph **(1)** nor **(2)** above applies:

   (a) The person or organization is an additional insured only if, and to the extent that, the injury or damage is caused by acts or omissions of you or your subcontractor in the performance of "your work" to which the "written contract requiring insurance" applies; and

   (b) The person or organization does not qualify as an additional insured with respect to the independent acts or omissions of such person or organization.

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2. The insurance provided to the additional insured by this endorsement is limited as follows:
   a. If the Limits of Insurance of this Coverage Part shown in the Declarations exceed the minimum limits of liability required by the "written contract requiring insurance", the insurance provided to the additional insured will be limited to such minimum required limits of liability. For the purposes of determining whether this limitation applies, the minimum limits of liability required by the "written contract requiring insurance" will be considered to include the minimum limits of liability of any Umbrella or Excess liability coverage required for the additional insured by that "written contract requiring insurance". This endorsement will not increase the limits of insurance described in Section **III** – Limits Of Insurance.
   b. The insurance provided to the additional insured does not apply to "bodily injury", "property damage" or "personal injury" arising out of the rendering of, or failure to render, any professional architectural, engineering or surveying services, including:
      (1) The preparing, approving, or failing to prepare or approve, maps, shop drawings, opinions, reports, surveys, field orders or change orders, or the preparing, approving, or failing to prepare or approve, drawings and specifications; and
      (2) Supervisory, inspection, architectural or engineering activities.
   c. The insurance provided to the additional insured does not apply to "bodily injury" or "property damage" caused by "your work" and included in the "products-completed operations hazard" unless the "written contract requiring insurance" specifically requires you to provide such coverage for that additional insured during the policy period.
3. The insurance provided to the additional insured by this endorsement is excess over any valid and collectible other insurance, whether primary, excess, contingent or on any other basis, that is available to the additional insured. However, if the "written contract requiring insurance" specifically requires that this insurance apply on a primary basis or a primary and non-contributory basis, this insurance is primary to other insurance available to the additional insured under which that person or organization qualifies as a named insured, and we will not share with that other insurance. But the insurance provided to the additional insured by this endorsement still is excess over any valid and collectible other insurance, whether primary, excess, contingent or on any other basis, that is available to the additional insured when that person or organization is an additional insured, or is any other insured that does not qualify as a named insured, under such other insurance.
4. As a condition of coverage provided to the additional insured by this endorsement:
   a. The additional insured must give us written notice as soon as practicable of an "occurrence" or an offense which may result in a claim. To the extent possible, such notice should include:
      (1) How, when and where the "occurrence" or offense took place;
      (2) The names and addresses of any injured persons and witnesses; and
      (3) The nature and location of any injury or damage arising out of the "occurrence" or offense.
   b. If a claim is made or "suit" is brought against the additional insured, the additional insured must:
      (1) Immediately record the specifics of the claim or "suit" and the date received; and
      (2) Notify us as soon as practicable.

      The additional insured must see to it that we receive written notice of the claim or "suit" as soon as practicable.
   c. The additional insured must immediately send us copies of all legal papers received in connection with the claim or "suit", cooperate with us in the investigation or settlement of the claim or defense against the "suit", and otherwise comply with all policy conditions.
   d. The additional insured must tender the defense and indemnity of any claim or "suit" to any provider of other insurance which would cover the additional insured for a loss we cover under this endorsement. However, this condition does not affect whether the insurance provided to the additional insured by this endorsement is primary to other insurance available to the additional insured which covers that person or organization as a named insured as described in Paragraph **3.** above.
5. The following is added to the **DEFINITIONS** Section:

   "Written contract requiring insurance" means that part of any written contract or agreement under which you are required to include a person or or-

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ganization as an additional insured on this Coverage Part, provided that the "bodily injury" and "property damage" occurs, and the "personal injury" is caused by an offense committed, during the policy period and:

a. After the signing and execution of the contract or agreement by you; and

b. While that part of the contract or agreement is in effect.

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TRAVELERS
ONE TOWER SQUARE
HARTFORD CT 06183

WORKERS COMPENSATION
AND
EMPLOYERS LIABILITY POLICY

ENDORSEMENT WC 00 03 13 (00) - 001

POLICY NUMBER: UB-7J96150A-17-26-G

WAIVER OF OUR RIGHT TO RECOVER FROM OTHERS ENDORSEMENT

We have the right to recover our payments from anyone liable for an injury covered by this policy. We will not enforce our right against the person or organization named in the Schedule. (This agreement applies only to the extent that you perform work under a written contract that requires you to obtain this agreement from us.)

This agreement shall not operate directly or indirectly to benefit any one not named in the Schedule.

SCHEDULE

DESIGNATED PERSON:

DESIGNATED ORGANIZATION:

ANY PERSON OR ORGANIZATION FOR WHICH THE INSURED HAS AGREED BY WRITTEN CONTRACT EXECUTED PRIOR TO LOSS TO FURNISH THIS WAIVER.

General Specifications
LANCASTER COUNTY EMERGENCY MANAGEMENT RELOCATION/RENOVATION

1. SUPPLEMENTAL INSTRUCTIONS

1.1 Lancaster County, hereinafter referred to as Owners, are requesting bids from qualified companies, hereinafter referred to as Vendor(s) to perform construction services at the Youth Service Center for the remodel/renovation of the building to add the County Emergency Management division.
- 1.1.1 The proposed construction site is located at the Youth Service Center, 1200 Radcliff St., Lincoln, NE.
- 1.1.2 Work on this project will include all general and specialized construction work described in the specifications, bid documents and drawings.
- 1.1.3 Refer to specifications, documents, and drawings in the Ebid system for a complete list of all work included in the scope of the project.

1.2 Vendor shall submit their bid and all supporting material via Ebid as requested in these General Specifications and the Ebid documents.

1.3 All inquiries regarding these specifications shall be directed via e-mail or faxed request to Bob Walla, Purchasing Agent (rwalla@lincoln.ne.gov) .
- 1.3.1 These inquiries and/or responses shall be distributed to prospective bidders electronically as an addenda.
- 1.3.2 The Owners shall only reply to written inquiries received within five (5) calendar days of bid opening.
- 1.3.3 Vendors must not contact any PBC Staff, elected officials or the Architect/Engineer during the bid and award process.
  - 1.3.3.1 Failure to comply with this request may result in the rejection of Vendor bid.
- 1.3.4 Vendors requesting product substitutions during the bidding process shall complete the Procurement Substitution Request Form found within the specifications under Section 002600-A, and submit the form via email as instructed above.

1.4 The Vendor shall include all costs associated with the labor, supervision, materials, supplies, permits and licenses required to perform the services requested in these Specifications, Technical Specs, Drawings, and all other Ebid documents.
- 1.4.1 Project software administered by General Contractor will be used for purposes of managing communication and documents during the construction stage. Refer to Section 013100 “Project Management and Coordination” for requirements for establishing, administering, and using this web-based project software.
  - 1.4.1.1 The cost of the Submittal Exchange service will be paid for by the General Contractor. Current pricing can be obtained by contacting Sarah Stanley with Submittal Exchange at sarah.stanley@texturacorp.com or 1-515-393-2257.

1.5 The Owners will execute a firm-fixed contract to a General Contractor for the work to be performed under the terms of an awarded contract.
- 1.5.1 The Owners reserve the right to allow adjustments to the contract should there be a substantial change in the nature of the work involved.
  - 1.5.1.1 Such adjustments must be made in accordance with the forms attached to the Technical Specifications.

1.6 Any deviation from these Specifications or any other bid document must be documented on Company Letterhead and attached to the Supplier Response section of your ebid response.

1.7 A bid bond is required in the amount of 5% of the total bid amount at time of bid submission.

1.8 A Performance and Payment bond in the full amount of the contract will be required at time of contract award.

1.9 Work may be performed at the jobsite during operating hours which are from 7am - 5pm, Monday - Friday.
- 1.9.1 Work outside of these days and times shall be subject to approval of the Owner.

1.10 Payments shall be made by the Owners through the Construction Administrator and Owner Representative for documented work completed during the project.

1.11 The Construction Administrator for this project will be Sinclair Hille Architects.

1.12 The Owners Representative for this project will be Kerin Peterson.

1.13 The Facility Director at the YSC is Michelle Schindler.

1.13 A Prebid meeting will be held at the site on Wednesday, November 1, 2017 at 10:00. Vendors will meet at the entrance of the Youth Service Center, 1200 Radcliff, Lincoln, NE.

2. WORK RESTRICTIONS

2.1 Work Restrictions, General: Comply with restrictions on construction operations.
- 2.1.1 Comply with limitations of authorities having jurisdiction in the facility.

2.2 On-Site Work Hours: Limit work in the existing building to normal business working hours of 7:00 a.m. to 5:00 p.m., Monday through Friday, unless otherwise indicated.
- 2.2.1 Weekend Hours: Upon request of the Owners
- 2.2.2 Hours for Utility Shutdowns: Coordinate with Owner prior to shutdowns.
- 2.2.3 Hours for Core Drilling: Coordinate with Owner prior to core drilling

2.3 Retain "Existing Utility Interruptions" Paragraph below for existing utilities. Coordinate with requirements for temporary utilities specified in Section 015000 "Temporary Facilities and Controls."

2.4 Existing Utility Interruptions: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after providing temporary utility services according to requirements indicated:
- 2.4.1 Vendor must notify Construction Administrator, Facility Director, and Owners Representative not less than seven days in advance of proposed utility interruptions.
- 2.4.2 Obtain Facility Director and Owners Representative written permission before proceeding with utility interruptions.

2.5 Noise, Vibration, and Odors: Coordinate operations that may result in high levels of noise and vibration, odors, or other disruption to Owner.
- 2.5.1 Vendor must notify Owners Representative not less than seven (7) days in advance of proposed disruptive operations.
- 2.5.2 Obtain Facility Director and Owners Representative written permission before proceeding with disruptive operations.

2.6 Nonsmoking Building: Smoking is not permitted within the building or within 25 feet of entrances, operable windows, or outdoor-air intakes.

2.7 Controlled Substances: Use of tobacco products and other controlled substances on Project site is not permitted.

3. COORDINATION WITH OCCUPANTS

3.1 Owner shall occupy the premises during entire construction period, with the exception of areas under construction. Vendor must cooperate with Owner during construction operations to minimize conflicts and facilitate Owner usage and perform the work so as not to interfere with Owner's operations.
- 3.1.1 Vendor must maintain existing exits unless otherwise indicated.

3.2 Vendor must maintain access to existing walkways, corridors, and other adjacent occupied or used facilities. Do not close or obstruct walkways, corridors, or other occupied or used facilities without written permission from Owners Representative or Facility Director.

3.3 Provide not less than 72 hours' notice to Owner Representative or Facility Director of activities that will affect Owner's operations.

4. ACCESS TO SITE

4.1 Use of Site: Limit use of Project site to work in areas indicated. Do not disturb portions of Project site beyond areas in which the Work is indicated.
- 4.1.1 Limits: Confine construction operations to areas of work and locations on property designated for storage of materials.
- 4.1.2 Driveways, Walkways and Entrances: Keep driveways, loading areas, and entrances serving premises clear and available to Owner, Owner's employees, and emergency vehicles at all times. Do not use these areas for parking or storage of materials.
- 4.1.3 Building Tenants will require access in and out of the building entrances located in the work area.
  - 4.1.3.1 Schedule deliveries to minimize use of driveways and entrances by construction operations.
  - 4.1.3.2 Schedule deliveries to minimize space and time requirements for storage of materials and equipment on-site.

4.2 Condition of Existing Building: Maintain portions of existing building affected by construction operations in a weathertight condition throughout construction period. Repair damage caused by construction operations.

5. QUALIFICATIONS OF THE BIDDER

5.1 The Owner may investigate as deemed necessary to determine the ability of the Vendor to perform the required work, and the Vendor shall furnish to the Owners all such information and data for this purpose.

5.2 No Vendor will be considered who is not at the present time providing construction services, and who cannot clearly demonstrate to the satisfaction of the Owners, his/her ability to satisfactorily perform the work in accordance with the requirements of this specification and standards of the industry.

5.3 Vendor shall provide at least three current references for other customers where similar services have been provided at time of bid response or upon request.

5.3.1 Vendors who have provided similar types of services to the Owners in the last five (5) years may not be required to provide such information unless requested by the Owners.

5.3.2 Reference responses may be attached to the Response Attachment section of the Ebid response.

6. REMOVAL, DISPOSAL AND SITE RESTORATION

6.1 The Vendor shall remove from the site and dispose of all material, debris, installation materials and adhesives in accordance with all Local, State and Federal regulations.

6.1.1 Vendors are strongly encouraged to recycle metal, concrete and any other material in order to reduce the amount of waste going to the City Landfill.

7. CONSTRUCTION REQUIREMENTS

7.1 Vendor must comply with requirements including the following list of improvements as detailed in the Technical Specifications and Drawings.

7.2 The Vendor is responsible for obtaining and paying of all fees and charges associated with permits or licenses required to complete the work for this project.

7.3 Vendor shall comply with City of Lincoln Building Codes and Standards throughout the completion of the project.

7.4 Vendors will be given a location to park vehicles and stage equipment during the term of the project.

7.5 Vendor will be responsible for supplying and maintaining portable restroom facilities for workers during the construction project if required.

7.6 Vendor takes full responsibility for all of their employees and any subcontractors who are hired to work on the project.

7.7 All work related to the construction shall be included in the lump sum amount for the bid item as listed in the final contract document.

7.8 Any deviation to the Technical Specifications, General Specifications, or Plans and Drawings must be addressed as part of the bid response prior to bid closing.

7.8.1 Any deviation which may arise during construction must be addressed and approved by the Construction Administrator/Owner's Representative prior to completion of work, with a contract amendment being issued as necessary.

7.9 The materials, products and equipment described in the bid establish a standard of required function dimension appearance and quality to be met by any proposed substitution.

7.9.1 Any request for substitution of the products listed must be submitted to the Purchasing Department prior to bid closing.

7.9.2 Requests for substitutions will be addressed via an addendum to all Vendors through the ebid system.

7.9.3 No substitutions will be considered after the contract award unless specifically provided for in contract documents.

7.10 SECURITY REQUIREMENTS FOR FACILITY

7.10.1 Employee Identification: Provide identification tags for Contractor personnel working on project site. Require personnel to use identification tags at all times.

7.10.2 Employee Screening: Comply with Owner's requirements for drug and background screening of Contractor personnel working on Project site.

7.10.2.1 Maintain a list of approved screened personnel with Owner's representative.

7.10.2.2 The County reserves the right to not allow specific Contractor staff on site who may be a risk to the security of the facility as determined by the screening process.

8. CONTRACTOR INSURANCE

8.1 The awarded Vendor shall furnish the Owners with a Certificate of Insurance ACORD and associated endorsements in the kinds and minimum amounts as detailed in the attached "Insurance Requirements for all Contracts" at time of award.

8.2 All certificates of insurance and endorsements shall be filed with the Owners on the standard ACORD Certificate of Insurance form showing specific limits of insurance coverage required and showing City of Lincoln/Lancaster County Public Building Commission as "Named Additional Insured" as pertains to these services.

8.3 **Vendors are strongly encouraged to send the insurance requirements and endorsement information to their Insurance Agent during the bid process in order to ensure contract execution within 10 days of award notice.**

9. PROJECT COMPLETION AND WARRANTY

9.1 Substantial completion of the project shall be ten (10) months from the notice to proceed.

9.1.1 Substantial completion shall encompass all of the work at the site for occupancy as outlined in the Technical Specifications.

9.2 Final completion of the project shall be 30 days from date of substantial completion.

9.1.1 Final completion shall encompass all of the work at the site for a total dollar amount agreed to in the final contract document.

9.3 Vendor must complete the project according to the agreed upon contract completion date which will be listed in the contract documents.

9.3.1 Failure to complete the project by the contract date shall result in the charging of liquidated damages according to the following terms:

9.3.2 If the Contractor fails to complete the Work in a timely manner, according to the Contract (allowing for any approved extensions of time), the Contractor shall pay Liquidated Damages for each day that the Work remains incomplete. The Owners shall deduct the amount of Liquidated Damages due from the money due the Contractor prior to final payment. If the remaining amount due the Contractor is less than the total amount of Liquidated Damages, the Contractor shall pay the difference within 10 days. If the Contractor fails to pay such difference, the Owners shall have the right to recover the difference from the Contractor or his Surety.

9.3.2.1 Unless specifically amended or modified by special provision, the daily amount of the Liquidated Damages shall be as follows:

1. Contract Sum up to and including $100,000: $300/day
2. Contract Sum more than $100,000 up to and including $500,000: $500/day
3. Contract Sum more than $500,000 up to and including $1,000,000: $750/day
4. Contract Sum more than $1,000,000: $1,000/day

9.3.2.2 The Liquidated Damages provided herein are not considered punitive. The Contractor agrees that such damages are predetermined and reasonable amounts to compensate for the detriment to the public and to defray expenses incurred by the Owners due to the delay in the completion of the Work.

9.3.3 Delays caused by the Owners or other factors not in the control of the Vendor may result in an extension of the project and an amendment to the contract.

9.4 All work performed under the terms of this bid and subsequent contract documents shall be guaranteed for a minimum period of one year from date of final completion of the project or longer according to the terms of the manufacturers standard agreement.

9.5 Job shall be completed according to industry standards with approval of completion and final payment being made by the Construction Administrator and the Owner's Representative.

10. EVALUATION CRITERIA

10.1 Evaluation of bids will consist of the following:

10.1.1 Total price of contract and other pricing factors that will amount to the best value to the Owners.

10.1.2 Ability to provide labor and services as required in this Specification and all other bid documents.

10.1.3 Deviations from these Specifications and all other bid documents.

10.1.4 References

D A T E

October 25, 2017

L A N C A S T E R
C O U N T Y
B I D #17-282

Project Manual and
Specification for the
Construction of the

Lancaster County
Emergency Management
Relocation / Renovation

Lincoln, NE

Lancaster County Emergency Management Relocation / Renovation
Lancaster County Bid # 17-282

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MEI	262200	DRY-TYPE TRANSFORMERS	4
MEI	262416	PANELBOARDS	5
MEI	262726	WIRING DEVICES	5
MEI	262816	DISCONNECT SWITCHES	4
MEI	263213	PACKAGED ENGINE GENERATORS	17
MEI	264313	SURGE PROTECTIVE DEVICES (SPD'S)	4
MEI	265100	LIGHTING AND LIGHTING CONTROL	10
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	DIVISION 27 – COMMUNICATIONS		
MEI	271500	COMMUNICATION CABLING SYSTEMS	14
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MEI	281300	ACCESS CONTROL	11

The following key represents the team members responsible for preparation of the individual specification sections as identified in the column titled "Author".

MEI Morrissey Engineering, Inc. (*Project # 17109*)
SHA Sinclair Hille Architects (*Project # 17004*)
VOS Voss & Associates Inc.

END OF TABLE OF CONTENTS

DOCUMENT 000107 - SEALS PAGE

1.1 CONTACT WITH DESIGN PROFESSIONALS DURING BIDDING IS PROHIBITED

A. As requested by Mr. Robert Walla with the Lincoln Purchasing Division, contractors, suppliers, and bidders shall NOT have any direct contact with any of the design professionals or owner's representatives during the bidding process. All inquiries are to be made directly through the purchasing division in compliance with their on-line bidding policies and procedures.

1.2 DESIGN PROFESSIONALS OF RECORD

A. Coordinating Professional:

1. David E. Quade.
2. A-3466.
3. Responsible for verifying that all design disciplines involved with the project worked in coordination with one another and that any changes made to the design have been approved by the corresponding discipline so that life, health, safety and welfare have not been compromised.

B. Architect:

1. David E. Quade.
2. A-3466.
3. Responsible for Divisions 1 – 49 Sections except where indicated as prepared by other design professionals of record. Refer to the attached Architect's Seals Page for complete list of Drawings and Specifications attributed to this professional.

C. Structural Engineer:

1. Kyle W. Ruse
2. E-12232
3. Responsible for: Refer to the attached Structural Engineer's Seals Page for complete list of Drawings and Specifications attributed to this professional.

D. Mechanical Engineer:

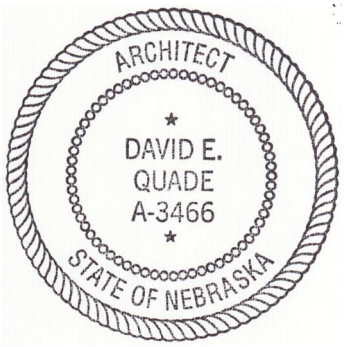
1. Ronald S. Feuerbach
2. E-5195
3. Responsible for: Refer to the attached Mechanical Engineer's Seals Page for complete list of Drawings and Specifications attributed to this professional.

E. Electrical Engineer:

1. Jeffrey R. Hemje
2. E-11817
3. Responsible for: Refer to the attached Electrical Engineer's Seals Page for complete list of Drawings and Specifications attributed to this professional.

END OF DOCUMENT 000107

COORDINATING PROFESSIONAL'S SEALS PAGE



I, David E. Quade, am the Coordinating Professional on the Sandhills Cyber Center project.

David E. Quade	A-3466
Name (Printed)	Registration Number

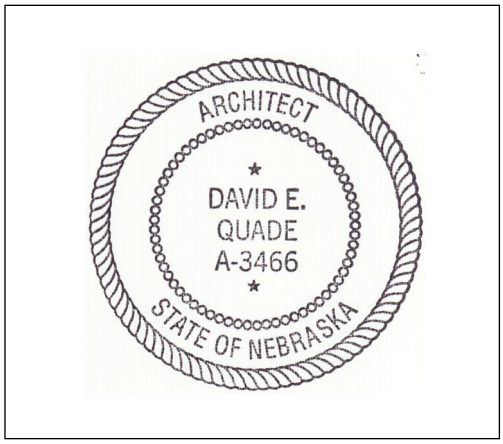
Signature

Disciplines Coordinated:

Architectural
Structural
Mechanical
Electrical

Date Issued	September 8, 2017

ARCHITECT'S SEALS PAGE



I hereby certify that the portion of this technical submission described below was prepared by me or under my direct supervision and responsible charge. I am a duly registered architect under the laws of the State of Nebraska.

David Quade	A-3466
Name (Printed)	Registration Number

Signature

Drawings covered by this Seal:

Cover, G100, LS100, AD100, A100, A101, A200, A300, A400, A600, A700, A900

Sections covered by this Seal:

All Division 1 and 2 Sections
Sections 034500
All Division 6 through Division 12 Sections

Date Issued September 8, 2017

STRUCTURAL ENGINEER'S SEALS PAGE

I hereby certify that the portion of this technical submission described below was prepared by me or under my direct supervision and responsible charge. I am a duly registered structural engineer under the laws of the State of Nebraska.

Kyle W. Ruse	E-12232
Name	Registration Number

Drawings covered by this Seal:

S100, S200, S201, S300

Sections covered by this Seal:

033000, 034100, 042000, 051200, 055000

Date Issued	September 8, 2017

MECHANICAL ENGINEER'S SEALS PAGE

I hereby certify that the portion of this technical submission described below was prepared by me or under my direct supervision and responsible charge. I am a duly registered mechanical engineer under the laws of the State of Nebraska.

Ronald S. Feuerbach	E-5195
Name	Registration Number

Drawings covered by this Seal:

MD100, MD200, M100, M101, M200, M300, M400, M500, M501, M600

Sections covered by this Seal:

All Division 21 through Division 23 Sections

Date Issued September 8, 2017

ELECTRICAL ENGINEER'S SEALS PAGE

I hereby certify that the portion of this technical submission described below was prepared by me or under my direct supervision and responsible charge. I am a duly registered electrical engineer under the laws of the State of Nebraska.

Jeffrey R. Hemje	E-11817
Name	Registration Number

Drawings covered by this Seal:

ED100, E100, E200, E300, E400, E500, E501, E600

Sections covered by this Seal:

All Division 26 through Division 28 sections

Date Issued	September 8, 2017

DOCUMENT 000115 - LIST OF DRAWING SHEETS

1.1 LIST OF DRAWINGS

A. List of Drawings: Drawings consist of the following Contract Drawings and other drawings of type indicated:

COVER SHEET

001	COVER	Cover Sheet

GENERAL

002	G100	Drawing Standards and Wall Types

LIFE SAFETY

003	LS100	Code Summary and Life Safety Plan

ARCHITECTURAL

004	AD100	Demolition Plan
005	A100	Floor Plan
006	A101	Roof Plan
007	A200	Exterior Elevations and Site Plans
008	A300	Wall Sections
009	A400	Plan and Section Details
010	A600	Interior Elevations, Frame Types and Schedules
011	A700	Reflected Ceiling Plan
012	A900	Fixture, Furnishing and Equipment Plan

STRUCTURAL

013	S100	Structural General Notes and Design Data
014	S200	Footing and Foundation Plan
015	S201	Roof Framing Plan
016	S300	Structural Details

MECHANICAL

017	MD100	Floor Plan – Mechanical Demolition
018	MD200	Floor Plan – Plumbing Demolition
019	M100	Floor Plan - HVAC
020	M101	Roof Plan - Mechanical
021	M200	Floor Plan – Mechanical Piping & Plumbing
022	M300	Enlarged Penthouse Plan - Mechanical
023	M400	Mechanical Details
024	M500	Mechanical Schedules
025	M501	Plumbing Fixture Schedule
026	M600	Mechanical Schematics

ELECTRICAL

027	ED100	Electrical Demolition

028	E000	Site Plan - Electrical
029	E100	Floor Plan - Lighting
030	E200	Floor Plan - Power
031	E300	Floor Plan – Special Systems
032	E400	Electrical Schedules
033	E500	Electrical Details
034	E501	Electrical Details
035	E600	Telecom Details

END OF DOCUMENT 000115

SECTION 002113 – GENERAL INSTRUCTIONS TO BIDDERS

Project is to be bid through the Lancaster County E-Bid process. Refer to the Lincoln Finance Departments Purchasing Division website for instructions and requirements associated with on-line bids.

As requested by Mr. Robert Walla with the Lincoln Purchasing Division, contractors, suppliers, and bidders shall NOT have any direct contact with any of the design professionals or owner's representatives during the bidding process. All inquiries are to be made directly through the purchasing division in compliance with their on-line bidding policies and procedures.

END OF SECTION 002113

Procurement Substitution Request (Prior to Bid)

Project Name: Lancaster County Emergency Management Agency Renovation

Date: Lancaster County Bid #.: 17-282

Request for Substitution will be considered upon receipt of this completed form. Form must be submitted for consideration.

We request the following substitution for consideration instead of the specified item for the above project:

Section Number: _____ Specified Item: _____

Proposed Substitution: _____

Attach complete technical data, including laboratory tests if applicable. Include any changes to drawings and/or specifications required by proposed substitution.

Include with this form a point-by-point comparative chart identifying significant similarities to specified–**REQUIRED BY A/E**

Reasons for not providing specified item: _____

_____

Proposed substitution affects other parts of Work: ☐ No ☐ Yes; explain _____

_____

(Substitution Request Forms submitted without adequate documentation will be returned without review)

The Undersigned certifies:

- Proposed substitution has been fully investigated & determined to be equal or superior in all respects to specified product.
- Proposed substitution does not require extensive revisions to the Contract Documents.
- Proposed substitution is consistent with the Contract Documents and will produce indicated results.
- Proposed substitution provides specified warranty.
- Proposed substitution will have no adverse effect on other trades.
- Proposed substitution has received necessary approvals of authorities having jurisdiction.
- Proposed substitution does not affect dimensions, functional clearances and is compatible with other portions of the Work.
- Coordination, installation, and changes in the Work as necessary for accepted substitution will be complete in all respects.
- Same maintenance service and source of replacement parts, as applicable, is available.
- Cost data as stated above is complete. Claims for additional costs or time that may subsequently become apparent because of failure of proposed substitution to produce indicated results are to be waived.

Authorized Signature: _____ Date: _____

A/E's REVIEW AND ACTION

☐ Substitution approved – Make submittals in accordance with Specification Section 013300

☐ Substitution approved as noted – Make submittals in accordance with Specification Section 013300

☐ Substitution rejected – Use specified materials

☐ Substitution request received to late – Use specified materials

☐ Substitution returned without review – Insufficient information

Additional comments:

_____

Architect Signature _____ Owner's Representative Signature _____

Date: _____ Date: _____

SECTION 011000 - SUMMARY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Work covered by Contract Documents.
2. Work by Owner.
3. Access to site.
4. Coordination with occupants.
5. Work restrictions.
6. Specification and Drawing conventions.

B. Related Requirements:

1. Section 015000 "Temporary Facilities and Controls" for limitations and procedures governing temporary use of Owner's facilities.

1.3 WORK COVERED BY CONTRACT DOCUMENTS

A. The Work of Project is defined by the Contract Documents and consists of the following:

1. The project involves the relocation of the Lancaster County Emergency Management Agency (LCEMA) from their existing facilities in downtown Lincoln into a portion of a vacant wing at the Youth Services Center in south Lincoln. The approximate area of renovation is around 5,000sf.

   The LCEMA requires an ICC 500-2014 compliant storm shelter. The existing Youth Services Center structure does not comply so the extent of work will involve the removal of approximately 2,600sf of existing roof and associated structural framing, existing slab-on-grade, and excavation of soil within the boundary of the existing exterior wall assembly. The new ICC 500-2014 compliant shelter will require new footings, independent, fully grouted load-bearing masonry walls, a precast structural roof with concrete topping and a new roof assembly.

   Interior renovation of the remaining space will also include a complete interior gut that includes carpet, ceiling assemblies, interior CMU partition walls and other interior finishes. New finishes will include new CMU partitions, light gauge framing with painted GWB finishes, carpet and tile floors, raised access flooring and new suspended ceiling assemblies.

   The existing mechanical system will be reconfigured and routed to accommodate the new finishes and a new emergency backup system will be provided for the ICC 500 compliant

portion of the project as well as new data services and electrical specific for the LCEMA space.

Minimal sitework will be required. Extent of work includes modifications to the existing security fencing, removal of some existing pavement and addition of other paving along with grading work as necessary to provide a new independent accessible entrance for the LCEMA on the north side of the building. Additional site work will be required for the installation of a new emergency generator within the secured fence area.

B. Type of Contract:

1. Project will be constructed under a single prime contract.

1.4 WORK BY OWNER

A. General: Cooperate fully with Owner so work may be carried out smoothly, without interfering with or delaying work under this Contract or work by Owner. Coordinate the Work of this Contract with work performed by Owner.

B. Preceding Work: Owner will perform the following construction operations at Project site. Those operations are scheduled to be substantially complete before work under this Contract begins.

1. Removal and salvage of any existing materials. Scope of this work will be as defined by the Youth Services Center with salvaged materials retained by the Youth Services Center.

1.5 OTHER WORK

A. A/V Scope of Work: Existing audio video equipment will be relocated from the current LCEMA facility and re-installed into the new facility by Electronic Contracting Company who has been currently providing A/V services to the Owner.

1. The costs associated with this scope of work are to be included as part of the overall project bid submitted by the General Contractor. For costs, contact:

Electronic Contracting Company
Matt Thorne
1.800.366.5320
mthorne@eccoinc.com

1.6 SPECIFICATION AND DRAWING CONVENTIONS

A. Specification Content: The Specifications use certain conventions for the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations. These conventions are as follows:

1. Imperative mood and streamlined language are generally used in the Specifications. The words "shall," "shall be," or "shall comply with," depending on the context, are implied where a colon (:) is used within a sentence or phrase.
2. Specification requirements are to be performed by Contractor unless specifically stated otherwise.

B. Division 01 General Requirements: Requirements of Sections in Division 01 apply to the Work of all Sections in the Specifications.

C. Drawing Coordination: Requirements for materials and products identified on Drawings are described in detail in the Specifications. One or more of the following are used on Drawings to identify materials and products:

1. Terminology: Materials and products are identified by the typical generic terms used in the individual Specifications Sections.
2. Abbreviations: Materials and products are identified by abbreviations scheduled on Drawings.
3. Keynoting: Materials and products are identified by reference keynotes referencing Specification Section numbers found in this Project Manual.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 011000

SECTION 012500 - SUBSTITUTION PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes administrative and procedural requirements for substitutions and comparable products.

B. Related Sections:

1. Refer to Section 002600 “Procurement Substitution Procedures” for substitution requests submitted prior to acceptance of bids.
2. Divisions 02 through 49 Sections for specific requirements and limitations for substitutions.

1.3 DEFINITIONS

A. Substitutions: Changes in products, materials, equipment, and methods of construction from those required by the Contract Documents and proposed by Contractor.

1. Substitutions for Cause: Changes proposed by Contractor that are required due to changed Project conditions, such as unavailability of product, regulatory changes, or unavailability of required warranty terms.
2. Substitutions for Convenience: Changes proposed by Contractor or Owner that are not required in order to meet other Project requirements but may offer advantage to Contractor or Owner.

B. Comparable Product: Product that is demonstrated and approved through submittal process 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.

1.4 SUBMITTALS

A. Substitution or Comparable Product Requests received after Award of Contract: 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. Request Form:Submit completed “Substitution Request After Award of Contract” form found at the end of this section to Architect for consideration.
2. Documentation: Show compliance with requirements for substitutions and the following, as applicable:

a. Statement indicating why specified product or fabrication or installation cannot be provided, if applicable.
b. Coordination information, including a list of changes or modifications needed to other parts of the Work and to construction performed by Owner and separate contractors that will be necessary to accommodate proposed substitution.
c. Detailed comparison of significant qualities of proposed substitution with those of the Work specified. Include annotated copy of applicable specification section. Significant qualities may include attributes such as performance, weight, size, durability, visual effect, sustainable design characteristics, warranties, and specific features and requirements indicated. Indicate deviations, if any, from the Work specified.
d. Product Data, including drawings and descriptions of products and fabrication and installation procedures.
e. Samples, where applicable or requested.
f. Certificates and qualification data, where applicable or requested.
g. List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners.
h. Material test reports from a qualified testing agency indicating and interpreting test results for compliance with requirements indicated.
i. Research reports evidencing compliance with building code in effect for Project, from ICC-ES.
j. Detailed comparison of Contractor's construction schedule using proposed substitution with products specified for the Work, including effect on the overall Contract Time. If specified product or method of construction cannot be provided within the Contract Time, include letter from manufacturer, on manufacturer's letterhead, stating date of receipt of purchase order, lack of availability, or delays in delivery.
k. Cost information, including a proposal of change, if any, in the Contract Sum.
l. Contractor's certification that proposed substitution complies with requirements in the Contract Documents except as indicated in substitution request, is compatible with related materials, and is appropriate for applications indicated.
m. Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of failure of proposed substitution to produce indicated results.

3. Architect's Action: If necessary, Architect will request additional information or documentation for evaluation within seven days of receipt of a request for substitution. Architect will notify Contractor through Construction Manager of acceptance or rejection of proposed substitution within 15 days of receipt of request, or seven days of receipt of additional information or documentation, whichever is later.

a. Forms of Acceptance: Change Order, Construction Change Directive, Architect certified copy of Contractor’s completed “Substitution Request after Award of Contract” form, or Architect's Supplemental Instructions for minor changes in the Work.
b. Use product specified if Architect does not issue a decision on use of a proposed substitution within time allocated.

1.5 QUALITY ASSURANCE

A. Compatibility of Substitutions (and Comparable products): Investigate and document compatibility of proposed substitution (and comparable products) with related products and materials. Engage qualified testing agency to perform compatibility tests recommended by manufacturers.

1.6 PROCEDURES

A. Coordination: Modify or adjust affected work as necessary to integrate work of the approved substitutions.

1. When a substituted (or comparable) equipment, material, product, etc. requires a change in the assembly, connection, hookup, etc. of another trade, the Contractor shall be responsible for the entire cost of all other changes required to make the substituted (or comparable) equipment, material, product, etc. a complete and operable system.

PART 2 - PRODUCTS

2.1 SUBSTITUTIONS

A. Substitutions for Cause: Submit requests for substitution immediately upon discovery of need for change, but not later than 21 calendar days prior to time required for preparation and review of related submittals.

1. Conditions: Architect will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Architect will return requests without action, except to record noncompliance with these requirements:

a. Requested substitution is consistent with the Contract Documents and will produce indicated results.
b. Substitution request is fully documented and properly submitted.
c. Requested substitution will not adversely affect Contractor's construction schedule.
d. Requested substitution has received necessary approvals of authorities having jurisdiction.
e. Requested substitution is compatible with other portions of the Work.
f. Requested substitution has been coordinated with other portions of the Work.
g. Requested substitution provides specified warranty.
h. 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.

B. Substitutions for Convenience: Architect will consider requests for substitution if received within 60 days after the Notice to Proceed. Requests received after that time may be considered or rejected at discretion of Architect.

1. Conditions: Architect will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Architect will return requests without action, except to record noncompliance with these requirements:

a. 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 Architect for redesign and evaluation services, increased cost of other construction by Owner, and similar considerations.
b. Requested substitution does not require extensive revisions to the Contract Documents.

c. Requested substitution is consistent with the Contract Documents and will produce indicated results.
d. Substitution request is fully documented and properly submitted.
e. Requested substitution will not adversely affect Contractor's construction schedule.
f. Requested substitution has received necessary approvals of authorities having jurisdiction.
g. Requested substitution is compatible with other portions of the Work.
h. Requested substitution has been coordinated with other portions of the Work.
i. Requested substitution provides specified warranty.
j. 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.

2.2 COMPARABLE PRODUCTS

A. Conditions for Consideration: Architect will consider Contractor's request for comparable product when the following conditions are satisfied. If the following conditions are not satisfied, Architect may return requests without action, except to record noncompliance with these requirements:

1. Evidence that the proposed product does not require 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. Evidence that the proposed product has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors that may be affected.
3. Evidence that the proposed product will not adversely affect Contractor's construction schedule.
4. Evidence that the proposed product has received necessary approvals of authorities having jurisdiction.
5. 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.
6. Evidence that proposed product provides specified warranty.
7. List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners, if requested.
8. Samples, if requested.

PART 3 - EXECUTION (Not Used)

END OF SECTION 012500

Substitution Request after Award of Contract

SINCLAIR hille architects

Project:

General Contractor: Date:

From: To:

Architect's Project No: Re:

Request for Substitution will be considered upon receipt of this completed form.
Substitutions made without completing this form and obtaining Architect's approval will be considered defective work.

General Contractor proposes the following substitution in accordance with the requirements of the Contract Documents:

Specification References: _____ Drawing References: _____

Proposed Substitution: _____

_____

_____

_____

History: ☐ New product ☐ 2-5 years old ☐ 5-10 years old ☐ More than 10 years old

List all deviations from specified requirements: _____

_____

_____

_____

☐ Yes, included with this form is a point-by-point comparative chart identifying significant similarities to specified

REQUIRED BY A/E

Reasons for not providing specified item: _____

_____

_____

_____

Similar Installation:

Project: _____ Architect: _____

Address: _____ Owner: _____

Date Installed: _____

Proposed substitution affects other parts of Work: ☐ No ☐ Yes;

Explain _____

_____

_____

Impact on specified Guarantees/Warranties: ☐ No ☐ Yes;

Explain _____

_____

Savings to Owner for accepting substitution: ☐ No ☐ Yes; ($ _____)

Proposed substitution changes Contract Time: ☐ No ☐ Yes;

Explain _____

_____

Supporting Data Attached: ☐ Drawings ☐ Product Data ☐ Samples ☐ Tests ☐ Reports ☐ _____

(Substitution Request Forms submitted without adequate documentation will be returned without review)

The Undersigned certifies:

- Proposed substitution has been fully investigated & determined to be equal or superior in all respects to specified product.
- Proposed substitution does not require extensive revisions to the Contract Documents.
- Proposed substitution is consistent with the Contract Documents and will produce indicated results.
- Proposed substitution provides specified warranty.
- Proposed substitution will have no adverse effect on other trades and will not affect or delay project schedule.
- Proposed substitution has received necessary approvals of authorities having jurisdiction.
- Proposed substitution does not affect dimensions, functional clearances and is compatible with other portions of the Work.
- Coordination, installation, and changes in the Work as necessary for accepted substitution will be complete in all respects.
- Same maintenance service and source of replacement parts, as applicable, is available.
- Cost data as stated above is complete. Claims for additional costs or time that may subsequently become apparent because of failure of proposed substitution to produce indicated results are to be waived.
- Payment will be made by the Contractor for changes to building design, including A/E design, detailing, and construction costs caused by the substitution.

Response Date: _____ List date by which response by Architect is requested to maintain project schedule. (Use specified product if Architect cannot make a decision on use of the proposed substitution within time allocated).

General Contactor Authorized Signature: _____ Date:_____

(Signature signifies General Contractor's acceptance of responsibility for accuracy and completeness of information.)

A/E's REVIEW AND ACTION

☐ Substitution approved – Make submittals in accordance with Specification Section 013300

☐ Substitution approved as noted – Make submittals in accordance with Specification Section 013300

☐ Substitution rejected – Use specified materials

☐ Substitution request received to late – Use specified materials

☐ Substitution returned without review – Insufficient information

Additional comments: _____

_____

_____

_____

_____

_____

_____

Architect Signature: _____ Date: _____

Owner's Representative Signature: _____ Date: _____

SECTION 012600 - CONTRACT MODIFICATION PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes administrative and procedural requirements for handling and processing Contract modifications.

B. Related Sections include the following:

1. Division 01 Section "Substitution Procedures" for administrative procedures for handling requests for substitutions made after Contract award.

1.3 MINOR CHANGES IN THE WORK

A. Architect will issue supplemental instructions authorizing minor changes in the Work, not involving adjustment to the Contract Sum or the Contract Time, on form included at end of Part 3, “Architect Supplemental Instructions”.

1.4 PROPOSAL REQUESTS

A. Owner-Initiated or Architect-Initiated Proposal Requests: Architect will issue a detailed description of proposed changes in the Work that may require adjustment to the Contract Sum or the Contract Time on form included at end of Part 3, “Proposal Request”. If necessary, the description will include supplemental or revised Drawings and Specifications.

1. Work Change Proposal Requests issued by Architect are not instructions either to stop work in progress or to execute the proposed change.
2. Within 10 working days after receipt of Proposal Request, submit a quotation estimating cost adjustments to the Contract Sum and the Contract Time necessary to execute the change.

    a. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
    b. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
    c. Include costs of labor and supervision directly attributable to the change.
    d. Include an updated Contractor's Construction Schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.
    e. Quotation Form: Use forms acceptable to Architect.

B. Contractor-Initiated Proposals: If latent or changed conditions require modifications to the Contract, Contractor may initiate a claim by submitting a request for a change to Architect.

1. Include a statement outlining reasons for the change and the effect of the change on the Work. Provide a complete description of the proposed change. Indicate the effect of the proposed change on the Contract Sum and the Contract Time.
2. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
3. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
4. Include costs of labor and supervision directly attributable to the change.
5. Include an updated Contractor's Construction Schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.
6. Comply with requirements in Division 01 Section "Substitution Procedures" if the proposed change requires substitution of one product or system for product or system specified.

C. Proposal Request Form: Use Facsimile of form provided at end of Part 3, “Contractor Initiated Proposal”.

1.5 ADMINISTRATIVE CHANGE ORDERS

A. Unit-Price Adjustment: See Division 01 Section "Unit Prices" for administrative procedures for preparation of Change Order Proposal for adjusting the Contract Sum to reflect measured scope of unit-price work.

1.6 CHANGE ORDER PROCEDURES

A. On Owner's approval of a Work Changes Proposal Request, Architect will issue a Change Order for signatures of Owner and Contractor on form included at end of Part 3, “Change Order”.

1. Owner’s process for approving any modification to the authorized contract amount or time will need to be processed through the County Board. Final revisions to contract will be issued by the County Purchasing Department in order to ensure all documentation remains updated throughout the project.

1.7 CONSTRUCTION CHANGE DIRECTIVE

A. Construction Change Directive: Architect may issue a Construction Change Directive on form included at end of Part 3, “Construction Change Directive”. Construction Change Directive instructs Contractor to proceed with a change in the Work, for subsequent inclusion in a Change Order.

1. Construction Change Directive contains a complete description of change in the Work. It also designates method to be followed to determine change in the Contract Sum or the Contract Time.

B. Documentation: Maintain detailed records on a time and material basis of work required by the Construction Change Directive.

1. After completion of change, submit an itemized account and supporting data necessary to substantiate cost and time adjustments to the Contract.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 012600

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Architect's Supplemental Instructions

Project: ASI No:

Contractor: Date of Issuance:

Contract For: Architect's Project No:

The Work shall be carried out in accordance with the following supplemental instructions issued in accordance with the Contract Documents without change in Contract Sum or Contract Time. Proceeding with the Work in accordance with these instructions indicates your acknowledgment that there will be no change in the Contract Sum or Contract Time.

Description:

Attachments:

Issued By: Date:

Sinclair Hille Architects

SINCLAIR hille architects

Proposal Request

Project:

PR Number:

Architect's Project No:

Date of Issuance:

Contractor:

Reference No.'s:

This is not authorization to proceed with these changes. A detailed breakout including deducts and/or additional items should be provided for review.

Description:

Attachments:

All work shall be in accordance with the terms, stipulations, and conditions of the original contract.

Issued by:

Sinclair Hille Architects

Date:

General Contractor Initiated Proposal

SINCLAIR hille architects

Project:	General Contractor Initiated Proposal No:
General Contractor:	Date:
From:	To:
Architect's Project No:	Re:

General Contractor initiated modifications will be considered upon receipt of this completed form. Modifications made without completing this form and obtaining Architect's approval will be considered defective work.

The General Contractor proposes the following modification in accordance with the requirements of the Contract Documents:

Specification References: _____ Drawing References: _____

Proposed modification: _____

_____

_____

_____

_____

_____

_____

Reasons for the modification: _____

_____

_____

_____

_____

_____

_____

Proposed modification affects other parts of Work: ☐ No ☐ Yes; explain _____

_____

_____

_____

_____

_____

_____

Proposed modification changes Contract Sum: ☐ No ☐ Yes; ☐ Add ☐ Deduct ($ _____)

☐ Yes, included with this form is a detailed summary of cost showing total charges and credits to be made–**REQUIRED BY A/E**

Proposed modification changes Contract Time: ☐ No ☐ Yes; explain _____

Supporting Data Attached: ☐ Drawings ☐ Product Data ☐ Samples ☐ Tests ☐ Reports ☐ _____

The Undersigned certifies:

- Proposed modification has been fully investigated and determined to be equal or superior in all respects to specified product.
- Proposed modification does not require extensive revisions to the Contract Documents.
- Proposed modification is consistent with the Contract Documents and will produce indicated results.
- Proposed modification will have no adverse effect on other trades and will not affect or delay project schedule.
- Proposed modification has received necessary approvals of authorities having jurisdiction.
- Proposed modification does not affect dimensions, functional clearances and is compatible with other portions of the Work.
- Coordination, installation, and changes in the Work as necessary for accepted modification will be complete in all respects.
- Same maintenance service and source of replacement parts, as applicable, is available.
- Cost data as stated above is complete. Claims for additional costs or time that may subsequently become apparent because of failure of proposed modification to produce indicated results are to be waived.

Response Date: _____ List date by which response by Architect is requested to maintain project schedule. (Allow not less than 10 working days for Architect's review).

General Contractor Authorized Signature: _____ Date:_____

(Signature signifies General Contractor's acceptance of responsibility for accuracy and completeness of information.)

A/E's REVIEW AND ACTION

☐ Proposal approved – pending receipt of fully executed Change Order should modification require a change to Contract Sum or Time.

☐ Proposal approved as noted – pending receipt of fully executed Change Order should modification require a change to Contract Sum or Time.

☐ Proposal rejected

☐ Proposal returned without review – Insufficient information

Additional comments: _____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

Signed by: _____ Date: _____

Change Order

SINCLAIR hille architects

Project:	Change Order No.
	Initiation Date:
	Architect's Project No.:
Contractor:	Contract for:
	Construction Date:

You are directed to make the following changes in this Contract:

COR #	Description	RFI / PR / ASI	Add Ded	Amount
			$	
			$	
			$	
			$	
			$	
			$	
			$	
			$	

The original contract sum was	$	
Net change by previously authorized Change Orders	$	
The Contract Sum prior to this Change Order was	$	0.00
The Contract Sum will be **increased, decreased, unchanged** by this Change Order	$	0.00
The New Contract Sum including this Change Order will be	$	**0.00**

The Contract time will be **changed, unchanged**

The Date of Substantial Completion as of the date of this Change Order therefore is **00/00/14**

Not valid until signed by both the Owner and Architect.

Signature of the Contractor indicates his agreement herewith, including any adjustment in the Contract Sum or Contract Time.

Architect	Owner	Contractor
Sinclair Hille Architects 700 Q Street Lincoln, NE 68508		
By_____	By_____	By_____
Date_____	Date_____	Date_____

Construction Change Directive

SINCLAIR hille architects

Project:

Directive No:

Date:

Architect's Project No:

To (Contractor):

Contract for:

Contract Date:

You are directed to make the following changes in this Contract:

Proposed Adjustments

1. The proposed basis of adjustment to the Contract Sum is:
   - ___ Lump sum **increase decrease** of **$_____**.
   - ___ Unit Price of **$_____** per _____.
   - ___ as provided in Subparagraph 7.3.6 of AIA Document A201, 1997 edition.
   - ___ as follows:

2. The Contract Time is proposed to **be adjusted remain unchanged**. The proposed adjustment, if any, is **an increase of ___ days a decrease of ___ days**.

When signed by the Owner and Architect and received by the Contractor, this document becomes effective IMMEDIATELY as a Construction Change Directive, and the Contractor shall proceed with the change(s) described above.

Signature by the Contractor indicates the Contractor's agreement with the proposed adjustments in Contract Sum and Contract Time set forth in this Construction Change Directive.

Architect	**Owner**	**Contractor**
Sinclair Hille Architects 700 Q St Lincoln, NE 68508		
By_____	By_____	By_____
Date_____	Date_____	Date_____

SECTION 012900 - PAYMENT PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 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 01 Section "Unit Prices" for administrative requirements governing use of unit prices.
2. Division 01 Section "Contract Modification Procedures" for administrative procedures for handling changes to the Contract.

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. Coordinate line items in the Schedule of Values with other required administrative forms and schedules, including the following:

a. Application for Payment forms with Continuation Sheets.
b. Submittals Schedule.
c. Items required to be indicated as separate activities in Contractor's construction schedule.

2. Submit the Schedule of Values to Architect at earliest possible date but no later than seven calendar 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 Architect.
c. Architect's project number.
d. Contractor's name and address.
e. Date of submittal.

2. Arrange schedule of values consistent with format of AIA Document G703.

3. Provide a breakdown of the Contract Sum in enough detail to facilitate continued evaluation of Applications for Payment and progress reports. Coordinate with Project Manual table of contents. Provide multiple line items for principal subcontract amounts in excess of five percent of the Contract Sum.

4. Round amounts to nearest whole dollar; total shall equal the Contract Sum.
5. Provide a separate line item in the Schedule of Values for each part of the Work where Applications for Payment may include materials or equipment purchased or fabricated and stored, but not yet installed.

   a. Differentiate between items stored on-site and items stored off-site. If required, include evidence of insurance.

6. Provide separate line items in the Schedule of Values for initial cost of materials, for each subsequent stage of completion, and for total installed value of that part of the Work.
7. Each item in the Schedule of Values and Applications for Payment shall be complete. Include total cost and proportionate share of general overhead and profit for each item.

   a. Temporary facilities and other major cost items that are not direct cost of actual work-in-place may be shown either as separate line items in the Schedule of Values or distributed as general overhead expense, at Contractor's option.

8. Schedule Updating: Update the Schedule of Values to include each fully executed Change Order as a new line item on the next Applications for Payment.

1.5 APPLICATIONS FOR PAYMENT

A. Each Application for Payment following the initial Application for Payment shall be consistent with previous applications and payments as certified by Architect and paid for by Owner.

   1. Initial Application for Payment, Application for Payment at time of Substantial Completion, and final Application for Payment involve additional requirements.

B. Payment Application Times: The date for each progress payment is indicated in the Agreement between Owner and Contractor. The period of construction work covered by each Application for Payment is the period indicated in the Agreement.

C. Application for Payment Forms: Use AIA Document G702 and AIA Document G703 Continuation Sheetsas 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 for work completed following previous Application for Payment, whether or not payment has been received. Include only amounts for work completed at time of Application for Payment.
3. Include amounts of fully executed Change Orders and Construction Change Directives issued before last day of construction period covered by application.
4. Indicate separate amounts for work being carried out under Owner requested project acceleration.

E. Stored Materials: Include in Application for Payment amounts applied for materials or equipment purchased or fabricated and stored, but not yet installed. Differentiate between items stored on-site and items stored off-site.

1. Provide certificate of insurance, evidence of transfer of title to Owner, and consent of surety to payment, for stored materials.
2. Provide supporting documentation that verifies amount requested, such as paid invoices. Match amount requested with amounts indicated on documentation; do not include overhead and profit on stored materials.
3. Provide summary documentation for stored materials indicating the following:

    a. Value of materials previously stored and remaining stored as of date of previous Applications for Payment.
    b. Value of previously stored materials put in place after date of previous Application for Payment and on or before date of current Application for Payment.
    c. Value of materials stored since date of previous Application for Payment and remaining stored as of date of current Application for Payment.

F. 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.

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. Combined Contractor's construction schedule (preliminary if not final) incorporating Work of multiple contracts, with indication of acceptance of schedule by each Contractor.
5. Products list (preliminary of not final).
6. Schedule of unit prices.
7. Submittals Schedule (preliminary if not final).
8. List of Contractor's staff assignments.
9. List of Contractor's principal consultants.
10. Copies of building permits.
11. Copies of authorizations and licenses from authorities having jurisdiction for performance of the Work.
12. Initial progress report.
13. Report of preconstruction conference.
14. Certificates of insurance and insurance policies.
15. Performance and payment bonds.
16. Data needed to acquire Owner's insurance.
17. Initial settlement survey and damage report if required.

H. Application for Payment at Substantial Completion: After Architect issues the Certificate of Substantial Completion, submit an Application for Payment showing 100 percent completion for portion of the Work claimed as substantially complete.

1. Include documentation supporting claim that the Work is substantially complete and a statement showing an accounting of changes to the Contract Sum.
2. This application shall reflect Certificate(s) of Partial Substantial Completion issued previously for Owner occupancy of designated portions of the Work.

I. Final Payment Application: After completing Project closeout requirements, submit final Application for Payment with releases and supporting documentation not previously submitted and accepted, including, but not limited, to the following:

1. Evidence of completion of Project closeout requirements.
2. Insurance certificates for products and completed operations where required and proof that taxes, fees, and similar obligations were paid.
3. Updated final statement, accounting for final changes to the Contract Sum.
4. AIA Document G706, "Contractor's Affidavit of Payment of Debts and Claims."
5. AIA Document G706A, "Contractor's Affidavit of Release of Liens."
6. AIA Document G707, "Consent of Surety to Final Payment."
7. Evidence that claims have been settled.
8. Final meter readings for utilities, a measured record of stored fuel, and similar data as of date of Substantial Completion or when Owner took possession of and assumed responsibility for corresponding elements of the Work.
9. Final, liquidated damages settlement statement.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 012900

SECTION 013100 - PROJECT MANAGEMENT AND COORDINATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes administrative provisions for coordinating construction operations on Project including, but not limited to, the following:

1. General coordination procedures.
2. Coordination drawings.
3. RFIs.
4. Digital project management procedures.
5. Project meetings.

B. Each contractor shall participate in coordination requirements. Certain areas of responsibility are assigned to a specific contractor.

C. Related Requirements:

1. Section 013200 "Construction Progress Documentation" for preparing and submitting Contractor's construction schedule.
2. Section 017300 "Execution" for procedures for coordinating general installation and field-engineering services, including establishment of benchmarks and control points.
3. Section 017700 "Closeout Procedures" for coordinating closeout of the Contract.

1.3 DEFINITIONS

A. RFI: Request for Information. Request from Owner, Architect, or Contractor seeking information required by or clarifications of the Contract Documents.

1.4 INFORMATIONAL SUBMITTALS

A. Subcontract List: Prepare a written summary identifying individuals or firms proposed for each portion of the Work, including those who are to furnish products or equipment fabricated to a special design. Include the following information in tabular form:

1. Name, address, telephone number, and email address of entity performing subcontract or supplying products.
2. Number and title of related Specification Section(s) covered by subcontract.
3. Drawing number and detail references, as appropriate, covered by subcontract.

B. Key Personnel Names: Within 10 working days of starting construction operations, submit a list of key personnel assignments, including superintendent and other personnel in attendance at

Project site. Identify individuals and their duties and responsibilities; list addresses and telephone numbers, including home, office, and cellular telephone numbers and e-mail addresses. Provide names, addresses, and telephone numbers of individuals assigned as alternates in the absence of individuals assigned to Project.

1. Post copies of list in project meeting room, in temporary field office, and by each temporary telephone. Keep list current at all times.

1.5 GENERAL COORDINATION PROCEDURES

A. Coordination: Coordinate construction operations included in different Sections of the Specifications to ensure efficient and orderly installation of each part of the Work. Coordinate construction operations, included in different Sections that depend on each other for proper installation, connection, and operation.

1. Schedule construction operations in sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.
2. Coordinate installation of different components to ensure maximum performance and accessibility for required maintenance, service, and repair.
3. Make adequate provisions to accommodate items scheduled for later installation.

B. Prepare memoranda for distribution to each party involved, outlining special procedures required for coordination. Include such items as required notices, reports, and list of attendees at meetings.

1. Prepare similar memoranda for Owner and separate contractors if coordination of their Work is required.

C. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities and activities of other contractors to avoid conflicts and to ensure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:

1. Preparation of Contractor's Construction Schedule.
2. Preparation of the Schedule of Values.
3. Installation and removal of temporary facilities and controls.
4. Delivery and processing of submittals.
5. Progress meetings.
6. Preinstallation conferences.
7. Project closeout activities.
8. Startup and adjustment of systems.

1.6 COORDINATION DRAWINGS

A. Coordination Drawings, General: Prepare coordination drawings according to requirements in individual Sections, and additionally where installation is not completely shown on Shop Drawings, where limited space availability necessitates coordination, or if coordination is required to facilitate integration of products and materials fabricated or installed by more than one entity.

1. Content: Project-specific information, drawn accurately to scale large enough to indicate and resolve conflicts. Do not base Coordination Drawings on standard printed data. Include the following information, as applicable:

    a. Use applicable Drawings as a basis for preparation of coordination drawings. Prepare sections, elevations, and details as needed to describe relationship of various systems and components.
    b. Coordinate the addition of trade-specific information to the coordination drawings by multiple contractors in a sequence that best provides for coordination of the information and resolution of conflicts between installed components before submitting for review.
    c. Indicate functional and spatial relationships of components of architectural, structural, civil, mechanical, and electrical systems.
    d. Indicate space requirements for routine maintenance and for anticipated replacement of components during the life of the installation.
    e. Show location and size of access doors required for access to concealed dampers, valves, and other controls.
    f. Indicate required installation sequences.
    g. Indicate dimensions shown on the Drawings. Specifically note dimensions that appear to be in conflict with submitted equipment and minimum clearance requirements. Provide alternate sketches to Architect indicating proposed resolution of such conflicts. Minor dimension changes and difficult installations will not be considered changes to the Contract.

B. Coordination Drawing Organization: Organize coordination drawings as follows:

1. Floor Plans and Reflected Ceiling Plans: Show architectural and structural elements, and mechanical, plumbing, fire-protection, fire-alarm, and electrical Work. Show locations of visible ceiling-mounted devices relative to acoustical ceiling grid. Supplement plan drawings with section drawings where required to adequately represent the Work.
2. Plenum Space: Indicate subframing for support of ceiling and wall systems, mechanical and electrical equipment, and related Work. Locate components within ceiling plenum to accommodate layout of light fixtures indicated on Drawings. Indicate areas of conflict between light fixtures and other components.
3. Mechanical Rooms: Provide coordination drawings for mechanical rooms showing plans and elevations of mechanical, plumbing, fire-protection, fire-alarm, and electrical equipment.
4. Structural Penetrations: Indicate penetrations and openings required for all disciplines.
5. Slab Edge and Embedded Items: Indicate slab edge locations and sizes and locations of embedded items for metal fabrications, sleeves, anchor bolts, bearing plates, angles, door floor closers, slab depressions for floor finishes, curbs and housekeeping pads, and similar items.
6. Mechanical and Plumbing Work: Show the following:

    a. Sizes and bottom elevations of ductwork, piping, and conduit runs, including insulation, bracing, flanges, and support systems.
    b. Dimensions of major components, such as dampers, valves, diffusers, access doors, cleanouts and electrical distribution equipment.
    c. Fire-rated enclosures around ductwork.

7. Electrical Work: Show the following:

    a. Runs of vertical and horizontal conduit 1-1/4 inches (32 mm) in diameter and larger.
    b. Light fixture, exit light, emergency battery pack, smoke detector, and other fire-alarm locations.

c. Panel board, switch board, switchgear, transformer, busway, generator, and motor control center locations.
d. Location of pull boxes and junction boxes, dimensioned from column center lines.

8. Fire-Protection System: Show the following:

a. Locations of standpipes, mains piping, branch lines, pipe drops, and sprinkler heads.

9. Review: Architect will review coordination drawings to confirm that the Work is being coordinated, but not for the details of the coordination, which are Contractor's responsibility. If Architect determines that coordination drawings are not being prepared in sufficient scope or detail, or are otherwise deficient, Architect will so inform Contractor, who shall make changes as directed and resubmit.

C. Coordination Digital Data Files: Prepare coordination digital data files according to the following requirements:

1. File Submittal Format: Submit or post coordination drawing files using Portable Data File (PDF) format.

1.7 REQUEST FOR INFORMATION (RFI)

A. General: Immediately on discovery of the need for additional information or interpretation of the Contract Documents, Contractor shall prepare and submit an RFI in the form specified.

1. Architect will return RFI's submitted to Architect by other entities controlled by Contractor with no response.
2. By submission of the RFI the Contractor acknowledges that they have fully read and understand their responsibilities stipulated in Supplementary General Conditions, paragraph 3.2 and attests to the fact that having carefully reviewed the Contract Documents and coordinated the Work with the appropriate trades and reviewed field conditions, that the information requested couldn't be reasonably obtained from such efforts.
3. Coordinate and submit RFIs in a prompt manner so as to avoid delays in Contractor's work or work of subcontractors.

B. Content of the RFI: Include a detailed, legible description of item needing interpretation and the following:

1. Project name.
2. Project number
3. Date.
4. Name of Contractor.
5. Name of Architect and Construction Manager.
6. RFI number, numbered sequentially.
7. RFI subject
8. Specification Section number and title and related paragraphs, as appropriate.
9. Drawing number and detail references, as appropriate.
10. Field dimensions and conditions, as appropriate.
11. Contractor's suggested solution(s). If Contractor's solution(s) impact the Contract Time or the Contract Sum, Contractor shall state impact in the RFI.
12. Contractor's signature.

13. Attachments: Include sketches, descriptions, measurements, photos, Product Data, Shop Drawings, coordination drawings and other information necessary to fully describe items needing interpretation.

    a. Include dimensions, thicknesses, structural grid references, and details of affected materials, assemblies, and attachments on attached sketches.

C. RFI Forms Use Form at end of Part 3, “Request for Information” or a form pre-approved by Architect.

1. Electronic communication in reference to any particular RFI shall contain the following information in the subject line: Contractor may elect to submit RFI forms and attachments to Architect electronically.

    a. Project identifier, followed by the RFI number and a brief subject descriptor. Follow the example below.

        1) Cyber – RFI 000 – Subject of the RFI.

D. Architect's Action: Architect will review each RFI, determine action required, and respond. Allow seven working days for Architect's response for each RFI. RFIs received by Architect after 1:00 p.m. will be considered as received the following working day.

1. The following Contractor-generated RFIs will be returned without action:

    a. Requests for approval of submittals.
    b. Requests for approval of substitutions.
    c. Requests for approval of Contractor means and methods.
    d. Requests for coordination information already indicated in the Contract Documents.
    e. Requests for adjustments in the Contract Time or the Contract Sum.
    f. Requests for interpretation of Architect's actions on submittals.
    g. Incomplete RFIs or inaccurately prepared RFIs.

2. Architect's action may include a request for additional information, in which case Architect's time for response date from time of receipt of additional information.
3. Architect's action on RFIs that may result in a change to the Contract Time or the Contract Sum may be eligible for Contractor to submit a Change Proposal according to Division 01 Section "Contract Modification Procedures."

    a. If Contractor believes the RFI response warrants change in the Contract Time or the Contract Sum, notify Architect in writing within 10 calendar days of issuance of the RFI response.

E. RFI Log: Prepare, maintain, and submit a tabular log of RFIs organized by the RFI number. Submit log at progress meetings. Include the following:

1. Project name.
2. Name and address of Contractor.
3. Name and address of Architect.
4. RFI number including RFIs that were returned without action or withdrawn.
5. RFI description.
6. Date the RFI was submitted.
7. Date Architect's response was issued.

F. On receipt of Architect's action, update the RFI log and immediately distribute the RFI response to affected parties. Review response and notify Architect within seven calendar days if Contractor disagrees with response.

1. Identification of related Minor Change in the Work, Construction Change Directive, and Proposal Request, as appropriate.

1.8 DIGITAL PROJECT MANAGEMENT PROCEDURES

A. Architect's Data Files Not Available: Architect will not provide Architect's BIM model or CAD drawing digital data files for Contractor's use during construction.

B. Project Web Site (Submittal Exchange): Electronic communications and construction related documentation will be managed electronically using Submittal Exchange, which is a secure online system for exchanging, reviewing, and archiving construction submittals, RFI's and other design and construction communications electronically.

1. The cost of the service (and training) will be paid for by the General Contractor.
2. Project participates will be required to attend a training session to learn how to use the software.

C. On completion of Project, provide four complete archive copy(ies) of Project Web site files to Owner and to Architect in a digital storage format acceptable to Architect.

D. PDF Document Preparation: Where PDFs are required to be submitted to Architect, prepare as follows:

1. Assemble complete submittal package into a single indexed file incorporating submittal requirements of a single Specification Section and transmittal form with links enabling navigation to each item.
2. Name file with submittal number or other unique identifier, including revision identifier.
3. Certifications: Where digitally submitted certificates and certifications are required, provide a digital signature with digital certificate on where indicated.

1.9 PROJECT MEETINGS

A. General: Schedule and conduct meetings and conferences at Project site, unless otherwise indicated.

1. Attendees: Inform participants and others involved, and individuals whose presence is required, of date and time of each meeting. Notify Owner and Architect of scheduled meeting dates and times.
2. Agenda: Prepare the meeting agenda. Distribute the agenda to all invited attendees.
3. Minutes: Record significant discussions and agreements achieved. Distribute the meeting minutes to everyone concerned, including Owner and Architect, within three days of the meeting.

B. Preinstallation Conferences: Conduct a preinstallation conference at Project site before each construction activity that requires coordination with other construction.

1. Attendees: Installer and representatives of manufacturers and fabricators involved in or affected by the installation and its coordination or integration with other materials and

installations that have preceded or will follow, shall attend the meeting. Advise Architect of scheduled meeting dates.

2. Agenda: Review progress of other construction activities and preparations for the particular activity under consideration, including requirements for the following:

    a. Contract Documents.
    b. Options.
    c. Related RFIs.
    d. Related Change Orders.
    e. Purchases.
    f. Deliveries.
    g. Submittals.
    h. Review of mockups.
    i. Possible conflicts.
    j. Compatibility requirements.
    k. Time schedules.
    l. Weather limitations.
    m. Manufacturer's written recommendations.
    n. Warranty requirements.
    o. Compatibility of materials.
    p. Acceptability of substrates.
    q. Temporary facilities and controls.
    r. Space and access limitations.
    s. Regulations of authorities having jurisdiction.
    t. Testing and inspecting requirements.
    u. Installation procedures.
    v. Coordination with other work.
    w. Required performance results.
    x. Protection of adjacent work.
    y. Protection of construction and personnel.

3. Record significant conference discussions, agreements, and disagreements, including required corrective measures and actions.
4. Reporting: Distribute minutes of the meeting to each party present and to parties who should have been present.
5. Do not proceed with installation if the conference cannot be successfully concluded. Initiate whatever actions are necessary to resolve impediments to performance of the Work and reconvene the conference at earliest feasible date.

C. Progress Meetings: Conduct progress meetings at monthly intervals.

1. Coordinate dates of meetings with preparation of payment requests.
2. Attendees: In addition to representatives of Owner, Construction Manager~~,~~ and Architect, each contractor, subcontractor, supplier, and other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.
3. Agenda: Review and correct or approve minutes of previous progress meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.

    a. Contractor's Construction Schedule: Review progress since the last meeting. Determine whether each activity is on time, ahead of schedule, or behind schedule, in relation to Contractor's Construction Schedule. Determine how construction behind schedule will be expedited; secure commitments from parties

involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.

1) Review schedule for next period.

b. Review present and future needs of each entity present, including the following:

1) Interface requirements.
2) Sequence of operations.
3) Status of submittals.
4) Deliveries.
5) Off-site fabrication.
6) Access.
7) Site utilization.
8) Temporary facilities and controls.
9) Progress cleaning.
10) Quality and work standards.
11) Status of correction of deficient items.
12) Field observations.
13) Status of RFI's
14) Status of proposal requests.
15) Pending changes
16) Status of Change Orders.
17) Pending claims and disputes
18) Documentation of information for payment requests.

4. Minutes: Record and distribute the meeting minutes to each party present and to parties requiring information.

a. Schedule Updating: Revise Contractor's Construction Schedule after each progress meeting where revisions to the schedule have been made or recognized. Issue revised schedule concurrently with the report of each meeting.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 013100

Request for Information

SINCLAIR hille architects

Project: RFI No:

Date:

Architect's Project No:

Contractor: To:

Contractor request for interpretation will be considered upon receipt of this completed RFI form.

By submission of this form the Contractor acknowledges that they have fully read and understand their responsibilities stipulated in Supplementary General Conditions, paragraph 3.2 and attests to the fact that having carefully reviewed the Contract Documents and coordinated the Work with the appropriate trades and reviewed field conditions, that the information requested couldn't be reasonably obtained from such efforts.

Description of Requested information:

Specification References: _____ Drawing References: _____ Submittal References: _____

Contractor's suggested method of resolving issue: Sketches and/or pages attached: ☐ Yes ☐ No

Potential impact on Contract time or Contractor sum: _____

Response Date: _____ List date by which response by Architect is requested to maintain project schedule. Submit RFI in a prompt manner so as to avoid delays in Contractor's work or work of subcontractor. Allow a minimum of seven working days for Architect's response.

Signed: _____, Project Superintendent
Signature signifies acceptance of responsibility for accuracy and completeness of information.

ARCHITECT/ENGINEER RESPONSE

Notations listed below indicate the Architect's action on method proposed by the Contractor to resolve issue or remarks in response to RFI when no Contractor recommendation has been provided. If Contractor believes the RFI response warrants change in the Contract Time or the Contract Sum, the Contractor shall notify Architect in writing within 10 calendar days of the issuance of the RFI response.

Sketches and/or Pages Attached: ☐ Yes ☐ No

By: _____ Date:_____

Architect/Engineer

SECTION 013200 - CONSTRUCTION PROGRESS DOCUMENTATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes administrative and procedural requirements for documenting the progress of construction during performance of the Work, including the following:

1. Startup construction schedule.
2. Contractor's construction schedule.
3. Construction schedule updating reports.
4. Daily construction reports.
5. Material location reports.
6. Site condition reports.
7. Special reports.

B. Related Requirements:

1. Section 013300 "Submittal Procedures" for submitting schedules and reports.

1.3 INFORMATIONAL SUBMITTALS

A. Format for Submittals: Submit required submittals in the following format:

1. Working electronic copy of schedule file, where indicated.
2. PDF electronic file.

B. Contractor's Construction Schedule: Initial schedule, of size required to display entire schedule for entire construction period.

1. Submit an electronic copy of schedule, labeled to comply with requirements for submittals. Include type of schedule (initial or updated) and date on label.

C. Construction Schedule Updating Reports: Submit with Applications for Payment.

1.4 QUALITY ASSURANCE

A. Prescheduling Conference: Conduct conference at Project site to comply with requirements in Section 013100 "Project Management and Coordination." Review methods and procedures related to the preliminary construction schedule and Contractor's construction schedule, including, but not limited to, the following:

1. Review software limitations and content and format for reports.
2. Verify availability of qualified personnel needed to develop and update schedule.

3. Discuss constraints, including phasing, area separations, interim milestones, and partial Owner occupancy.
4. Review delivery dates for Owner-furnished products.
5. Review submittal requirements and procedures.
6. Review time required for review of submittals and resubmittals.
7. Review requirements for tests and inspections by independent testing and inspecting agencies.
8. Review time required for Project closeout and Owner startup procedures.
9. Review and finalize list of construction activities to be included in schedule.
10. Review procedures for updating schedule.

1.5 COORDINATION

A. Coordinate Contractor's construction schedule with the schedule of values, submittal schedule, progress reports, payment requests, and other required schedules and reports.

1. Secure time commitments for performing critical elements of the Work from entities involved.
2. Coordinate each construction activity in the network with other activities and schedule them in proper sequence.

PART 2 - PRODUCTS

2.1 CONTRACTOR'S CONSTRUCTION SCHEDULE, GENERAL

A. Time Frame: Extend schedule from date established for commencement of the Work to date of final completion.

1. Contract completion date shall not be changed by submission of a schedule that shows an early completion date, unless specifically authorized by Change Order.

B. Activities: Treat each story or separate area as a separate numbered activity for each main element of the Work. Comply with the following:

1. Activity Duration: Define activities so no activity is longer than 20 days, unless specifically allowed by Architect.
2. Submittal Review Time: Include review and resubmittal times indicated in Section 013300 "Submittal Procedures" in schedule. Coordinate submittal review times in Contractor's construction schedule with submittal schedule.
3. Substantial Completion: Indicate completion in advance of date established for Substantial Completion, and allow time for Architect's administrative procedures necessary for certification of Substantial Completion.
4. Punch List and Final Completion: Include not more than 45 days for completion of punch list items and final completion.

C. Constraints: Include constraints and work restrictions indicated in the Contract Documents and as follows in schedule, and show how the sequence of the Work is affected.

1. Phasing: Arrange list of activities on schedule by phase.
2. Work Stages: Indicate important stages of construction for each major portion of the Work, including, but not limited to, the following:

a. Submittals.

b. Purchases.
c. Mockups.
d. Fabrication.
e. Deliveries.
f. Installation.
g. Tests and inspections.

D. Milestones: Include milestones indicated in the Contract Documents in schedule, including, but not limited to, the Notice to Proceed, Substantial Completion, and final completion.

E. Upcoming Work Summary: Prepare summary report indicating activities scheduled to occur or commence prior to submittal of next schedule update. Summarize the following issues:

1. Unresolved issues.
2. Unanswered Requests for Information.
3. Rejected or unreturned submittals.
4. Notations on returned submittals.
5. Pending modifications affecting the Work and Contract Time.

F. Recovery Schedule: When periodic update indicates the Work is 14 or more calendar days behind the current approved schedule, submit a separate recovery schedule indicating means by which Contractor intends to regain compliance with the schedule. Indicate changes to working hours, working days, crew sizes, and equipment required to achieve compliance, and date by which recovery will be accomplished.

2.2 CONTRACTOR'S CONSTRUCTION SCHEDULE (GANTT CHART)

A. Gantt-Chart Schedule: Submit a comprehensive, fully developed, horizontal, Gantt-chart-type, Contractor's construction schedule within 30 days of date established for the Notice to Proceed. Base schedule on the startup construction schedule and additional information received since the start of Project.

B. Preparation: Indicate each significant construction activity separately. Identify first workday of each week with a continuous vertical line.

1. For construction activities that require three months or longer to complete, indicate an estimated completion percentage in 10 percent increments within time bar.

2.3 REPORTS

A. Daily Construction Reports: Prepare a daily construction report recording the following information concerning events at Project site:

1. List of subcontractors at Project site.
2. List of separate contractors at Project site.
3. Approximate count of personnel at Project site.
4. Equipment at Project site.
5. Material deliveries.
6. High and low temperatures and general weather conditions, including presence of rain or snow.
7. Accidents.
8. Meetings and significant decisions.
9. Unusual events (see special reports).

10. Stoppages, delays, shortages, and losses.
11. Meter readings and similar recordings.
12. Emergency procedures.
13. Orders and requests of authorities having jurisdiction.
14. Change Orders received and implemented.
15. Construction Change Directives received and implemented.
16. Services connected and disconnected.
17. Equipment or system tests and startups.
18. Partial completions and occupancies.
19. Substantial Completions authorized.

B. Site Condition Reports: Immediately on discovery of a difference between site conditions and the Contract Documents, prepare and submit a detailed report. Submit with a Request for Information. Include a detailed description of the differing conditions, together with recommendations for changing the Contract Documents.

2.4 SPECIAL REPORTS

A. General: Submit special reports directly to Owner within one day(s) of an occurrence. Distribute copies of report to parties affected by the occurrence.

B. Reporting Unusual Events: When an event of an unusual and significant nature occurs at Project site, whether or not related directly to the Work, prepare and submit a special report. List chain of events, persons participating, response by Contractor's personnel, evaluation of results or effects, and similar pertinent information. Advise Owner in advance when these events are known or predictable.

PART 3 - EXECUTION

3.1 CONTRACTOR'S CONSTRUCTION SCHEDULE

A. Contractor's Construction Schedule Updating: At monthly intervals, update schedule to reflect actual construction progress and activities.

1. Revise schedule immediately after each meeting or other activity where revisions have been recognized or made. Issue updated schedule concurrently with the report of each such meeting.

B. Distribution: Distribute copies of approved schedule to Architect Owner, separate contractors, testing and inspecting agencies, and other parties identified by Contractor with a need-to-know schedule responsibility.

1. Post copies in Project meeting rooms and temporary field offices.
2. When revisions are made, distribute updated schedules to the same parties and post in the same locations. Delete parties from distribution when they have completed their assigned portion of the Work and are no longer involved in performance of construction activities.

END OF SECTION 013200

SECTION 013300 - SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes requirements for the submittal schedule and administrative and procedural requirements for submitting Shop Drawings, Product Data, Samples, and other submittals.

B. Related Requirements:

1. Division 01 Section "Payment Procedures" for submitting Applications for Payment and the schedule of values.
2. Division 01 Section "Operation and Maintenance Data" for submitting operation and maintenance manuals.
3. Division 01 Section "Project Record Documents" for submitting record Drawings, record Specifications, and record Product Data.
4. Division 01 Section "Demonstration and Training" for submitting video recordings of demonstration of equipment and training of Owner's personnel.

1.3 DEFINITIONS

A. Action Submittals: Written and graphic information and physical samples that require Architect's responsive action. Action submittals are those submittals indicated in individual Specification Sections as "action submittals."

B. Informational Submittals: Written and graphic information and physical samples that do not require Architect's responsive action. Submittals may be rejected for not complying with requirements. Informational submittals are those submittals indicated in individual Specification Sections as "informational submittals."

C. File Transfer Protocol (FTP): Communications protocol that enables transfer of files to and from another computer over a network and that serves as the basis for standard Internet protocols. An FTP site is a portion of a network located outside of network firewalls within which internal and external users are able to access files.

D. Portable Document Format (PDF): An open standard file format licensed by Adobe Systems used for representing documents in a device-independent and display resolution-independent fixed-layout document format.

1.4 ACTION SUBMITTALS

A. Submittal Schedule: Submit a schedule of submittals, arranged in chronological order by dates required by construction schedule. Include time required for review, ordering, manufacturing,

fabrication, and delivery when establishing dates. Include additional time required for making corrections or revisions to submittals noted by Architect and additional time for handling and reviewing submittals required by those corrections.

1. Coordinate submittal schedule with list of subcontracts, the schedule of values, and Contractor's construction schedule.
2. Final Submittal: Submit concurrently with the first complete submittal of Contractor's construction schedule.

    a. Submit revised submittal schedule to reflect changes in current status and timing for submittals.

3. Format: Arrange the following information in a tabular format:

    a. Scheduled date for first submittal.
    b. Specification Section number and title.
    c. Submittal category: Action; informational.
    d. Name of subcontractor.
    e. Description of the Work covered.
    f. Scheduled date for Architect's final release or approval.
    g. Scheduled date of fabrication.

1.5 SUBMITTAL ADMINISTRATIVE REQUIREMENTS

A. Architect's and Consultant’s Digital Data Files: Electronic digital data files of the Contract Drawings will **NOT** be provided by the Architect for Contractor’s use in preparing submittals.

B. Coordination: Coordinate preparation and processing of submittals with performance of construction activities.

1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
2. Submit all submittal items required for each Specification Section concurrently unless partial submittals for portions of the Work are indicated on approved submittal schedule.
3. Submit action submittals and informational submittals required by the same Specification Section as separate packages under separate transmittals.
4. Coordinate transmittal of different types of submittals for related parts of the Work so processing will not be delayed because of need to review submittals concurrently for coordination.

    a. Architect reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.

C. Processing Time: Allow time for submittal review, including time for resubmittals, as follows. Time for review shall commence on Architect's receipt of submittal. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing, including resubmittals.

1. Initial Review: Allow 15 calendar days for initial review of each submittal. Allow additional time if coordination with subsequent submittals is required. Architect will advise Contractor when a submittal being processed must be delayed for coordination.
2. Intermediate Review: If intermediate submittal is necessary, process it in same manner as initial submittal.
3. Resubmittal Review: Allow 15 calendar days for review of each resubmittal.

4. Sequential Review: Where sequential review of submittals by Architect's consultants, Owner, or other parties is indicated, allow 21 calendar days for initial review of each submittal.

D. Submittal Exchange: All submittals will be managed electronically using Submittal Exchange, a web based product for tracking construction forms and submittals. Paper submittals will not be accepted. Deliver material samples as required under separate cover with reference to electronic submittal.

1. The cost of the service will be paid for by the Construction Manager.
2. Project participants will be required to attend a training session to learn how to use the software.
3. Contractor may still be required to submit one paper copy of key product shop drawings for the benefit of review and mark-up.

    a. Contractor’s mark-ups should be made to the paper copy submittal prior to distribution to the Architect.
    b. Submittal should be simultaneously uploaded to Submittal Exchange and will be replaced with an electronic version of the marked up copy once the Architect’s review has been completed.
    c. Once initial list of submittals has been generated, Architect will notify Contractor of which submittals may require a paper copy submittal for review.

E. Electronic Submittals: Identify and incorporate information in each electronic submittal file as follows:

1. Assemble complete submittal package into a single indexed file incorporating submittal requirements of a single Specification Section and transmittal form with links enabling navigation to each item.
2. Name file with submittal number or other unique identifier, including revision identifier.

    a. File name shall use project identifier and Specification Section number followed by a hyphen and then a sequential number (e.g., Cyber-061000-01). Resubmittals shall include the suffix "hypehn R" followed by a sequential number (e.g., Cyber-061000-01-R1).

3. Transmittal Form for Electronic Submittals: Provide locations on the form for the following information:

    a. Project name.
    b. Date.
    c. Name and address of Architect.
    d. Name of Construction Manager.
    e. Name of Contractor.
    f. Name of firm or entity that prepared submittal.
    g. Names of subcontractor, manufacturer, and supplier.
    h. Category and type of submittal.
    i. Submittal purpose and description.
    j. Specification Section number and title.
    k. Specification paragraph number or drawing designation and generic name for each of multiple items.
    l. Drawing number and detail references, as appropriate.
    m. Location(s) where product is to be installed, as appropriate.
    n. Related physical samples submitted directly.
    o. Indication of full or partial submittal.
    p. Transmittal number, numbered consecutively.

q. Submittal and transmittal distribution record.
r. Other necessary identification.
s. Remarks.

F. Options: Identify options requiring selection by Architect.

G. Deviations and Additional Information: On an attached separate sheet, prepared on Contractor's letterhead, record relevant information, requests for data, revisions other than those requested by Architect on previous submittals, and deviations from requirements in the Contract Documents, including minor variations and limitations. Include same identification information as related submittal.

1. Highlight, encircle or otherwise specifically identify deviations from the Contract Documents on submittals. In absence of such written notice the Architect's approval shall not apply.

H. Resubmittals: Make resubmittals in same form and number of copies as initial submittal.

1. Note date and content of previous submittal.
2. Note date and content of revision in label or title block and clearly indicate extent of revision.
3. Resubmit submittals until they are marked "Reviewed" or "Furnish as Corrected" or similar action indicated in the Architect/Engineer review comments.

I. Distribution: Furnish copies of final submittals to manufacturers, subcontractors, suppliers, fabricators, installers, authorities having jurisdiction, and others as necessary for performance of construction activities. Show distribution on transmittal forms.

J. Use for Construction: Retain complete copies of submittals on Project site. Use only final action submittals that are marked "Reviewed" or "Furnish as Corrected" or similar action indicated in the Architect/Engineer review comments.

PART 2 - PRODUCTS

2.1 SUBMITTAL PROCEDURES

A. General Submittal Procedure Requirements: Prepare and submit submittals required by individual Specification Sections. Types of submittals are indicated in individual Specification Sections.

1. Post electronic submittals as PDF electronic files directly to Submittal Exchange specifically established for Project.

a. Architect, will return annotated file. Annotate and retain one copy of file as an electronic Project record document file.

2. Certificates and Certifications Submittals: Provide a statement that includes signature of entity responsible for preparing certification. Certificates and certifications shall be signed by an officer or other individual authorized to sign documents on behalf of that entity.

a. Provide a digital signature with digital certificate on electronically submitted certificates and certifications where indicated.

B. Product Data: Collect information into a single submittal for each element of construction and type of product or equipment.

1. If information must be specially prepared for submittal because standard published data are not suitable for use, submit as Shop Drawings, not as Product Data.
2. Mark each copy of each submittal to show which products and options are applicable.
3. Include the following information, as applicable:

a. Manufacturer's catalog cuts.
b. Manufacturer's product specifications.
c. Standard color charts.
d. Statement of compliance with specified referenced standards.
e. Testing by recognized testing agency.
f. Application of testing agency labels and seals.
g. Notation of coordination requirements.
h. Availability and delivery time information.

4. For equipment, include the following in addition to the above, as applicable:

a. Wiring diagrams showing factory-installed wiring.
b. Printed performance curves.
c. Operational range diagrams.
d. Clearances required to other construction, if not indicated on accompanying Shop Drawings.

5. Submit Product Data before or concurrent with Samples.
6. Submit Product Data in the following format:

a. PDF electronic file.

C. Shop Drawings: Prepare Project-specific information, drawn accurately to scale. Do not base Shop Drawings on reproductions of the Contract Documents or standard printed data, unless submittal based on Architect's digital data drawing files is otherwise permitted pursuant to section 013300, paragraph 1.5.

1. Preparation: Fully illustrate requirements in the Contract Documents. Include the following information, as applicable:

a. Identification of products.
b. Schedules.
c. Compliance with specified standards.
d. Notation of coordination requirements.
e. Notation of dimensions established by field measurement.
f. Relationship and attachment to adjoining construction clearly indicated.
g. Seal and signature of professional engineer if specified.

2. Submit Shop Drawings in the following format:

a. PDF electronic file.

D. Samples: Submit Samples for review of kind, color, pattern, and texture for a check of these characteristics with other elements and for a comparison of these characteristics between submittal and actual component as delivered and installed.

1. Transmit Samples that contain multiple, related components such as accessories together in one submittal package.
2. Identification: Attach label on unexposed side of Samples that includes the following:

    a. Generic description of Sample.
    b. Product name and name of manufacturer.
    c. Sample source.
    d. Number and title of applicable Specification Section.
    e. Specification paragraph number and generic name of each item.

3. For projects where electronic submittals are required, provide corresponding electronic submittal of Sample transmittal, digital image file illustrating Sample characteristics, and identification information for record.
4. Disposition: Maintain sets of approved Samples at Project site, available for quality-control comparisons throughout the course of construction activity. Sample sets may be used to determine final acceptance of construction associated with each set.

    a. Samples that may be incorporated into the Work are indicated in individual Specification Sections. Such Samples must be in an undamaged condition at time of use.
    b. Samples not incorporated into the Work, or designated to be retained by the Architect or designated as Owner's property, are the property of Contractor.

5. Samples for Initial Selection: Submit manufacturer's color charts consisting of units or sections of units showing the full range of colors, textures, and patterns available.

    a. Number of Samples: Submit two full set(s) of available choices where color, pattern, texture, or similar characteristics are required to be selected from manufacturer's product line. Architect, may elect to retain the full sample sets and return submittal with options selected.

6. Samples for Verification: Submit full-size units or Samples of size indicated, prepared from same material to be used for the Work, cured and finished in manner specified, and physically identical with material or product proposed for use, and that show full range of color and texture variations expected. Samples include, but are not limited to, the following: partial sections of manufactured or fabricated components; small cuts or containers of materials; complete units of repetitively used materials; swatches showing color, texture, and pattern; color range sets; and components used for independent testing and inspection.

    a. Number of Samples: Submit three sets of Samples. Architect will retain two Sample sets; remainder will be returned.

        1) Submit a single Sample where assembly details, workmanship, fabrication techniques, connections, operation, and other similar characteristics are to be demonstrated.
        2) If variation in color, pattern, texture, or other characteristic is inherent in material or product represented by a Sample, submit at least three sets of paired units that show approximate limits of variations.

E. Product Schedule: As required in individual Specification Sections, prepare a written summary indicating types of products required for the Work and their intended location. Include the following information in tabular form:

1. Type of product. Include unique identifier for each product indicated in the Contract Documents or assigned by Contractor if none is indicated.
2. Manufacturer and product name, and model number if applicable.
3. Number and name of room or space.
4. Location within room or space.
5. Submit product schedule in the following format:

    a. PDF electronic file.

F. Coordination Drawing Submittals: Comply with requirements specified in Division 01 Section "Project Management and Coordination."

G. Contractor's Construction Schedule: Comply with requirements specified in Division 01 Section "Construction Progress Documentation."

H. Application for Payment and Schedule of Values: Comply with requirements specified in Division 01 Section "Payment Procedures."

I. Test and Inspection Reports and Schedule of Tests and Inspections Submittals: Comply with requirements specified in Division 01 Section "Quality Requirements."

J. Closeout Submittals and Maintenance Material Submittals: Comply with requirements specified in Division 01 Section "Closeout Procedures."

K. Maintenance Data: Comply with requirements specified in Division 01 Section "Operation and Maintenance Data."

L. Qualification Data: Prepare written information that demonstrates capabilities and experience of firm or person. Include lists of completed projects with project names and addresses, contact information of architects and owners, and other information specified.

M. Welding Certificates: Prepare written certification that welding procedures and personnel comply with requirements in the Contract Documents. Submit record of Welding Procedure Specification and Procedure Qualification Record on AWS forms. Include names of firms and personnel certified.

N. Installer Certificates: Submit written statements on manufacturer's letterhead certifying that Installer complies with requirements in the Contract Documents and, where required, is authorized by manufacturer for this specific Project.

O. Manufacturer Certificates: Submit written statements on manufacturer's letterhead certifying that manufacturer complies with requirements in the Contract Documents. Include evidence of manufacturing experience where required.

P. Product Certificates: Submit written statements on manufacturer's letterhead certifying that product complies with requirements in the Contract Documents.

Q. Material Certificates: Submit written statements on manufacturer's letterhead certifying that material complies with requirements in the Contract Documents.

R. Material Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting test results of material for compliance with requirements in the Contract Documents.

S. Product Test Reports: Submit written reports indicating that current product produced by manufacturer complies with requirements in the Contract Documents. Base reports on evaluation of tests performed by manufacturer and witnessed by a qualified testing agency, or on comprehensive tests performed by a qualified testing agency.

T. Research Reports: Submit written evidence, from a model code organization acceptable to authorities having jurisdiction, that product complies with building code in effect for Project. Include the following information:

1. Name of evaluation organization.
2. Date of evaluation.
3. Time period when report is in effect.
4. Product and manufacturers' names.
5. Description of product.
6. Test procedures and results.
7. Limitations of use.

U. Compatibility Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of compatibility tests performed before installation of product. Include written recommendations for primers and substrate preparation needed for adhesion.

V. Field Test Reports: Submit written reports indicating and interpreting results of field tests performed either during installation of product or after product is installed in its final location, for compliance with requirements in the Contract Documents.

W. Design Data: Prepare and submit written and graphic information, including, but not limited to, performance and design criteria, list of applicable codes and regulations, and calculations. Include list of assumptions and other performance and design criteria and a summary of loads. Include load diagrams if applicable. Provide name and version of software, if any, used for calculations. Include page numbers.

2.2 DELEGATED-DESIGN SERVICES

A. Performance and Design Criteria: Where professional design services or certifications by a design professional are specifically required of Contractor by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated.

1. If criteria indicated are not sufficient to perform services or certification required, submit a written request for additional information to Architect.

B. Delegated-Design Services Certification: In addition to Shop Drawings, Product Data, and other required submittals, submit digitally signed PDF electronic file of certificate, signed and sealed by the responsible design professional, for each product and system specifically assigned to Contractor to be designed or certified by a design professional.

1. Indicate that products and systems comply with performance and design criteria in the Contract Documents. Include list of codes, loads, and other factors used in performing these services.

PART 3 - EXECUTION

3.1 CONTRACTOR'S REVIEW

A. Action and Informational Submittals: Review each submittal and check for coordination with other Work of the Contract and for compliance with the Contract Documents. Note corrections and field dimensions. Mark with approval stamp before submitting to Architect.

1. The Contractor shall direct specific attention, in writing or on resubmittal shop drawings, product data, samples or similar submittals, to revisions other than those requested by the Architect. In absence of such written notice the Architect's approval shall not apply to such revisions.

B. Project Closeout and Maintenance Material Submittals: See requirements in Division 01 Section "Closeout Procedures."

C. Approval Stamp: Stamp each submittal with a uniform, approval stamp. Include Project name and location, submittal number, Specification Section title and number, name of reviewer, date of Contractor's approval, and statement certifying that submittal has been reviewed, checked, and approved for compliance with the Contract Documents.

1. By approving shop drawings, product data, samples and other types of submittals, the Contractor represents to the Architect that the Contractor has determined and verified materials, field measurements and field construction criteria related thereto and has checked and coordinated the information within such submittals with other Work and of the Contract Documents.

3.2 ARCHITECT'S ACTION

A. General: Architect will not review submittals that have not been reviewed completely by the Contractor for compliance with the Contract Documents or that do not bear Contractor's approval stamp and will return the submittal to the Contractor for resubmission.

1. If in the sole good faith opinion of the Architect, the Architect deems there is evidence that the Contractor did not review, check, correct or has not otherwise identified deviations from the Contract Documents prior to submitting the submittal to the Architect, the Architect will return the submittal to the Contractor without review to allow the Contractor to complete their review prior to resubmission to the Architect [and Construction Manager].
2. The Contractor shall not be relieved of responsibility for deviations from requirements of the Contact Documents by Architect's approval of submittal unless the Contractor has specifically informed the Architect in writing of such deviation at the time of submittal and (1) the Architect has given written approval to specific deviation as a minor change in the Work or (2) a change order or construction change directive has been issued authorizing the deviation.
3. The Contactor shall not be relieved of responsibility for errors or omissions contained within submittal by the Architect's approval thereof.

B. Action Submittals: Architect will review each submittal only for general conformance with the design concept of the project and general compliance with the information given in the Contract Documents, make marks to indicate corrections or modifications required, and return submittal to the Contractor with a shop drawing review form appropriately marked to indicate action taken, as follows

1. Reviewed: Where the submittal is marked “Reviewed” (or similar action indicated in Architect’s consultants review comments), the Work covered by the submittal may proceed provided it complies with requirements of the Contract Documents. Final acceptance will depend on that compliance.

    a. Review of such submittals is not conducted for the purposes of determining the accuracy and completeness of other details such as dimensions and quantities, or for substantiating instructions for installation or performance of equipment or systems, all of which remain the responsibility of the Contractor as required by the Contract Documents.

2. Furnish as corrected: Where the submittal is marked “Furnish as corrected” (or similar action indicated in Architect’s consultants review comments), the Work covered by the submittal may proceed provided it complies both with the Architect’s and Architect’s consultants notations and/or corrections on the submittal and the Contract Documents. Final acceptance will depend on that compliance.

    a. Review of such submittals is not conducted for the purposes of determining the accuracy and completeness of other details such as dimensions and quantities, or for substantiating instructions for installation or performance of equipment or systems, all of which remain the responsibility of the Contractor as required by the Contract Documents.

3. Revise and resubmit: Where the submittal is marked “Revise and resubmit” (or similar action indicated in Architect’s consultants review comments), do not proceed with the Work covered by the submittal, including purchasing, fabrication, delivery or other activity for the product submitted. Revise or prepare a new submittal according to Architect’s and/or Architect’s consultant’s notations and/or corrections and resubmit to Architect for further consideration.

    a. Do not use, or allow others to use, submittals marked “revise and resubmit” at the project site or elsewhere where work is in progress.

4. Rejected: Where the submittal is marked “Rejected” (or similar action indicated in Architect’s consultants review comments), do not proceed with the Work covered by the submittal. Prepare a new submittal for a product that complies with the Contract Documents and submit to Architect for further consideration.

    a. Do not use, or allow others to use, submittals marked “Rejected” at the project site or elsewhere where work is in progress.

5. Incomplete: Where the submittal is marked “Incomplete”, do not proceed with the Work covered by the submittal. Prepare additional information requested, or required by the Contract Documents and submit to Architect for further consideration.
6. Returned Without Action: If the submittal is primarily for record purposes, special processing, or other contractor activity or not required by the Contract Documents, the submittal may be returned marked “Returned Without Action”.
7. Returned Without Review: Items submitted and not reviewed completely by the Contractor for compliance with the Contract Documents before submitting to Architect or does not bear the Contractor’s approval stamp will be returned marked “Returned Without Review” to allow the Contractor to complete their review and make marks to indicate corrections or other modifications required and return the corrected submittal to the Architect for further consideration.

C. Informational Submittals: Architect will review each submittal and will not return it, or will return it if it does not comply with requirements. Architect will forward each submittal to appropriate party.

D. Partial submittals prepared for a portion of the Work will be reviewed when use of partial submittals has received prior approval from Architect.

E. Incomplete submittals are unacceptable, will be considered nonresponsive, and will be returned for resubmittal without review.

F. Submittals not required by the Contract Documents may be returned by the Architect without action.

END OF SECTION 013300

SECTION 014000 - QUALITY REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes administrative and procedural requirements for quality assurance and quality control.

B. Testing and inspection 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 quality-control requirements for individual work results are specified in their respective Specification Sections. Requirements in individual Sections may also cover production of standard products.
2. Specified tests, inspections, and related actions do not limit Contractor's other quality-assurance and quality-control procedures that facilitate compliance with the Contract Document requirements.
3. Requirements for Contractor to provide quality-assurance and quality-control services required by Architect, Owner, Construction Manager, or authorities having jurisdiction are not limited by provisions of this Section.
4. Specific test and inspection requirements are not specified in this Section.

C. Related Requirements:

1. Divisions 02 through 49 Sections for specific test and inspection requirements.

1.3 DEFINITIONS

A. Experienced: When used with an entity or individual, "experienced" unless otherwise further described means having successfully completed a minimum of five previous projects similar in nature, size, and extent to this Project; being familiar with special requirements indicated; and having complied with requirements of authorities having jurisdiction.

B. Field Quality-Control Tests: Tests and inspections that are performed on-site for installation of the Work and for completed Work.

C. 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, assembly, and similar operations.

1. Use of trade-specific terminology in referring to a trade or entity does not require that certain construction activities be performed by accredited or unionized individuals, or that requirements specified apply exclusively to specific trade(s).

D. Preconstruction Testing: Tests and inspections performed specifically for Project before products and materials are incorporated into the Work, to verify performance or compliance with specified criteria.

E. Product Tests: Tests and inspections that are performed by a nationally recognized testing laboratory (NRTL) according to 29 CFR 1910.7, by a testing agency accredited according to NIST's National Voluntary Laboratory Accreditation Program (NVLAP), or by a testing agency qualified to conduct product testing and acceptable to authorities having jurisdiction, to establish product performance and compliance with specified requirements.

F. Source Quality-Control Tests: Tests and inspections that are performed at the source; for example, plant, mill, factory, or shop.

G. Testing Agency: An entity engaged to perform specific tests, inspections, or both. Testing laboratory shall mean the same as testing agency.

H. 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.

I. 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. Contractor's quality-control services do not include contract administration activities performed by Architect or Construction Manager.

1.4 DELEGATED-DESIGN SERVICES

A. Performance and Design Criteria: Where professional design services or certifications by a design professional are specifically required of Contractor by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated.

1. If criteria indicated are not sufficient to perform services or certification required, submit a written request for additional information to Architect.

1.5 CONFLICTING REQUIREMENTS

A. Conflicting Standards and Other Requirements: If compliance with two or more standards or requirements are specified and the standards or requirements establish different or conflicting requirements for minimum quantities or quality levels, comply with the most stringent requirement. Refer conflicting requirements that are different, but apparently equal, to Architect for direction 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 Architect for a decision before proceeding.

1.6 ACTION SUBMITTALS

A. Delegated-Design Services Submittal: In addition to Shop Drawings, Product Data, and other required submittals, submit a statement signed and sealed by the responsible design professional, for each product and system specifically assigned to Contractor to be designed or certified by a design professional, indicating that the products and systems are in compliance with performance and design criteria indicated. Include list of codes, loads, and other factors used in performing these services.

1.7 INFORMATIONAL SUBMITTALS

A. Permits, Licenses, and Certificates: For Owner's record, 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.

1.8 REPORTS AND DOCUMENTS

A. Test and Inspection Reports: Prepare and submit certified written reports specified in other Sections. Include the following:

1. Date of issue.
2. Project title and number.
3. Name, address, telephone number, and email address 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 inspection.
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.

B. Manufacturer's Technical Representative's Field Reports: Prepare written information documenting manufacturer's technical representative's tests and inspections specified in other Sections. Include the following:

1. Name, address, telephone number, and email address of technical representative making report.
2. Statement on condition of substrates and their acceptability for installation of product.
3. Statement that products at Project site comply with requirements.
4. Summary of installation procedures being followed, whether they comply with requirements and, if not, what corrective action was taken.
5. Results of operational and other tests and a statement of whether observed performance complies with requirements.
6. Statement whether conditions, products, and installation will affect warranty.
7. Other required items indicated in individual Specification Sections.

C. Factory-Authorized Service Representative's Reports: Prepare written information documenting manufacturer's factory-authorized service representative's tests and inspections specified in other Sections. Include the following:

1. Name, address, telephone number, and email address of factory-authorized service representative making report.
2. Statement that equipment complies with requirements.
3. Results of operational and other tests and a statement of whether observed performance complies with requirements.
4. Statement whether conditions, products, and installation will affect warranty.
5. Other required items indicated in individual Specification Sections.

1.9 QUALITY ASSURANCE

A. General: Qualifications paragraphs in this article establish the minimum qualification levels required; individual Specification Sections specify additional requirements.

B. 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. As applicable, procure products from manufacturers able to meet qualification requirements, warranty requirements, and technical or factory-authorized service representative requirements.

C. 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.

D. Installer Qualifications: A firm or individual experienced in installing, erecting, applying, 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.

E. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of the system, assembly, or product that are similar in material, design, and extent to those indicated for this Project.

F. Testing Agency Qualifications: An NRTL, an NVLAP, or an independent agency with the experience and capability to conduct testing and inspection indicated, as documented according to ASTM E 329; and with additional qualifications specified in individual Sections; and, where required by authorities having jurisdiction, that is acceptable to authorities.

G. Manufacturer's Technical Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to observe and inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.

H. Factory-Authorized Service Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.

1.10 QUALITY CONTROL

A. Contractor Responsibilities: Tests and inspections not explicitly assigned to Owner are Contractor's responsibility. Perform additional quality-control activities required to verify that the Work complies with requirements, whether specified or not.

1. 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.
2. 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.

3. Notify testing agencies at least 24 hours in advance of time when Work that requires testing or inspecting will be performed.
4. Where quality-control services are indicated as Contractor's responsibility, submit a certified written report, in duplicate, of each quality-control service.
5. Testing and inspecting requested by Contractor and not required by the Contract Documents are Contractor's responsibility.
6. Submit additional copies of each written report directly to authorities having jurisdiction, when they so direct.

B. Retesting/Reinspecting: 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.

C. Testing Agency Responsibilities: Cooperate with Architect, Construction Manager, and Contractor in performance of duties. Provide qualified personnel to perform required tests and inspections.

1. Notify Architect, Construction Manager, and Contractor promptly of irregularities or deficiencies observed in the Work during performance of its services.
2. Determine the locations 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 duties of Contractor.

D. Manufacturer's Field Services: Where indicated, engage a factory-authorized service representative to inspect field-assembled components and equipment installation, including service connections. Report results in writing as specified in Section 013300 "Submittal Procedures."

E. Manufacturer's Technical Services: Where indicated, engage a manufacturer's technical representative to observe and inspect the Work. Manufacturer's technical representative's services include participation in preinstallation conferences, examination of substrates and conditions, verification of materials, observation of Installer activities, inspection of completed portions of the Work, and submittal of written reports.

F. Associated Contractor Services: Cooperate with agencies and representatives 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.
3. Adequate quantities of representative samples of materials that require testing and inspection. Assist agency in obtaining samples.
4. Facilities for storage and field curing of test samples.
5. Delivery of samples to testing agencies.
6. Preliminary design mix proposed for use for material mixes that require control by testing agency.
7. Security and protection for samples and for testing and inspection equipment at Project site.

G. Coordination: Coordinate sequence of activities to accommodate required quality-assurance and quality-control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspection.

1. Schedule times for tests, inspections, obtaining samples, and similar activities.

H. Schedule of Tests and Inspections: Prepare a schedule of tests, inspections, and similar quality-control services required by the Contract Documents. Coordinate and submit concurrently with Contractor's Construction Schedule. Update as the Work progresses.

1. Distribution: Distribute schedule to Owner, Architect, Construction Manager, testing agencies, and each party involved in performance of portions of the Work where tests and inspections are required.

1.11 SPECIAL TESTS AND INSPECTIONS

A. Special Tests and Inspections: Conducted by a qualified testing agency as required by authorities having jurisdiction, as indicated in individual Specification Sections, and as follows:

1. Notifying Architect, Construction Manager, and Contractor promptly of irregularities and deficiencies observed in the Work during performance of its services.
2. Submitting a certified written report of each test, inspection, and similar quality-control service to Architect, through Construction Manager, with copy to Contractor and to authorities having jurisdiction.
3. Submitting a final report of special tests and inspections at Substantial Completion, which includes a list of unresolved deficiencies.
4. Interpreting tests and inspections and stating in each report whether tested and inspected work complies with or deviates from the Contract Documents.
5. Retesting and reinspecting corrected work.

B. Unless otherwise indicated, cost of these quality control services shall be the responsibility of the General Contractor.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 TEST AND INSPECTION LOG

A. Test and Inspection Log: 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 Architect.
4. Identification of testing agency or special inspector conducting test or inspection.

B. Maintain log at Project site. Post changes and revisions as they occur. Provide access to test and inspection log for Architect's and Construction Manager's reference during normal working hours.

1. Submit log at Project closeout as part of Project Record Documents.

3.2 REPAIR AND PROTECTION

A. General: On completion of testing, inspection, 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 or matching existing substrates and finishes. Restore patched areas and extend restoration into adjoining areas with durable seams that are as invisible as possible. Comply with the Contract Document requirements for cutting and patching in Section 017300 "Execution."

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 014000

SECTION 014200 - REFERENCES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 DEFINITIONS

A. "Approved": When used to convey Architect's action on Contractor's submittals, applications, and requests, "approved" is limited to Architect's duties and responsibilities as stated in the Conditions of the Contract.

B. "Directed": A command or instruction by Architect. Other terms including "requested," "authorized," "selected," "required," and "permitted" have the same meaning as "directed."

C. "Indicated": Requirements expressed by graphic representations or in written form on Drawings, in Specifications, and in other Contract Documents. Other terms including "shown," "noted," "scheduled," and "specified" have the same meaning as "indicated."

D. "Regulations": Laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, and rules, conventions, and agreements within the construction industry that control performance of the Work.

E. "Furnish": Supply and deliver to Project site, ready for unloading, unpacking, assembly, installation, and similar operations.

F. "Install": Operations at Project site including unloading, temporarily storing, unpacking, assembling, erecting, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, and similar operations.

G. "Provide": Furnish and install, complete and ready for the intended use.

H. "Project Site": Space available for performing construction activities. The extent of Project site is shown on Drawings and may or may not be identical with the description of the land on which Project is to be built.

1.3 INDUSTRY STANDARDS

A. Applicability of Standards: Unless the Contract Documents include more stringent requirements, applicable construction industry standards have the same force and effect as if bound or copied directly into the Contract Documents to the extent referenced. Such standards are made a part of the Contract Documents by reference.

B. Publication Dates: Comply with standards in effect as of date of the Contract Documents unless otherwise indicated.

C. Copies of Standards: Each entity engaged in construction on Project should be familiar with industry standards applicable to its construction activity. Copies of applicable standards are not bound with the Contract Documents.

1. Where copies of standards are needed to perform a required construction activity, obtain copies directly from publication source.

1.4 ABBREVIATIONS AND ACRONYMS

A. Industry Organizations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. This information is subject to change and is believed to be accurate as of the date of the Contract Documents.

1. AABC - Associated Air Balance Council; www.aabc.com.
2. AAMA - American Architectural Manufacturers Association; www.aamanet.org.
3. AASHTO - American Association of State Highway and Transportation Officials; www.transportation.org.
4. AATCC - American Association of Textile Chemists and Colorists; www.aatcc.org.
5. ABMA - American Bearing Manufacturers Association; www.americanbearings.org.
6. ABMA - American Boiler Manufacturers Association; www.abma.com.
7. ACI - American Concrete Institute; (Formerly: ACI International); www.abma.com.
8. ACPA - American Concrete Pipe Association; www.concrete-pipe.org.
9. AEIC - Association of Edison Illuminating Companies, Inc. (The); www.aeic.org.
10. AF&PA - American Forest & Paper Association; www.afandpa.org.
11. AGA - American Gas Association; www.aga.org.
12. AHAM - Association of Home Appliance Manufacturers; www.aham.org.
13. AHRI - Air-Conditioning, Heating, and Refrigeration Institute (The); www.ahrinet.org.
14. AI - Asphalt Institute; www.asphaltinstitute.org.
15. AIA - American Institute of Architects (The); www.aia.org.
16. AISC - American Institute of Steel Construction; www.aisc.org.
17. AISI - American Iron and Steel Institute; www.steel.org.
18. AITC - American Institute of Timber Construction; www.aitc-glulam.org.
19. AMCA - Air Movement and Control Association International, Inc.; www.amca.org.
20. ANSI - American National Standards Institute; www.ansi.org.
21. AOSA - Association of Official Seed Analysts, Inc.; www.aosaseed.com.
22. APA - APA - The Engineered Wood Association; www.apawood.org.
23. APA - Architectural Precast Association; www.archprecast.org.
24. API - American Petroleum Institute; www.api.org.
25. ARI - Air-Conditioning & Refrigeration Institute; (See AHRI).
26. ARI - American Refrigeration Institute; (See AHRI).
27. ARMA - Asphalt Roofing Manufacturers Association; www.asphaltroofing.org.
28. ASCE - American Society of Civil Engineers; www.asce.org.
29. ASCE/SEI - American Society of Civil Engineers/Structural Engineering Institute; (See ASCE).
30. ASHRAE - American Society of Heating, Refrigerating and Air-Conditioning Engineers; www.ashrae.org.
31. ASME - ASME International; (American Society of Mechanical Engineers); www.asme.org.
32. ASSE - American Society of Safety Engineers (The); www.asse.org.
33. ASSE - American Society of Sanitary Engineering; www.asse-plumbing.org.
34. ASTM - ASTM International; www.astm.org.
35. ATIS - Alliance for Telecommunications Industry Solutions; www.atis.org.
36. AWEA - American Wind Energy Association; www.awea.org.
37. AWI - Architectural Woodwork Institute; www.awinet.org.

38. AWPA - American Wood Protection Association; www.awpa.com.
39. AWS - American Welding Society; www.aws.org.
40. AWWA - American Water Works Association; www.awwa.org.
41. BHMA - Builders Hardware Manufacturers Association; www.buildershardware.com.
42. BIA - Brick Industry Association (The); www.gobrick.com.
43. BICSI - BICSI, Inc.; www.bicsi.org.
44. BIFMA - BIFMA International; (Business and Institutional Furniture Manufacturer's Association); www.bifma.org.
45. CEA - Consumer Electronics Association; www.ce.org.
46. CFFA - Chemical Fabrics and Film Association, Inc.; www.chemicalfabricsandfilm.com.
47. CFSEI - Cold-Formed Steel Engineers Institute; www.cfsei.org.
48. CGA - Compressed Gas Association; www.cganet.com.
49. CIMA - Cellulose Insulation Manufacturers Association; www.cellulose.org.
50. CISCA - Ceilings & Interior Systems Construction Association; www.cisca.org.
51. CISPI - Cast Iron Soil Pipe Institute; www.cispi.org.
52. CLFMI - Chain Link Fence Manufacturers Institute; www.chainlinkinfo.org.
53. CPA - Composite Panel Association; www.pbmdf.com.
54. CRI - Carpet and Rug Institute (The); www.carpet-rug.org.
55. CRRC - Cool Roof Rating Council; www.coolroofs.org.
56. CRSI - Concrete Reinforcing Steel Institute; www.crsi.org.
57. CSA - CSA International; (Formerly: IAS - International Approval Services); www.csa-international.org.
58. CSI - Construction Specifications Institute (The); www.csinet.org.
59. CSSB - Cedar Shake & Shingle Bureau; www.cedarbureau.org.
60. CTI - Cooling Technology Institute; (Formerly: Cooling Tower Institute); www.cti.org.
61. CWC - Composite Wood Council; (See CPA).
62. DASMA - Door and Access Systems Manufacturers Association; www.dasma.com.
63. DHI - Door and Hardware Institute; www.dhi.org.
64. ECA - Electronic Components Association; (See ECIA).
65. ECAMA - Electronic Components Assemblies & Materials Association; (See ECIA).
66. ECIA - Electronic Components Industry Association; www.eciaonline.org.
67. EIA - Electronic Industries Alliance; (See TIA).
68. EIMA - EIFS Industry Members Association; www.eima.com.
69. EJMA - Expansion Joint Manufacturers Association, Inc.; www.ejma.org.
70. ESD - ESD Association; (Electrostatic Discharge Association); www.esda.org.
71. ESTA - Entertainment Services and Technology Association; (See PLASA).
72. EVO - Efficiency Valuation Organization; www.evo-world.org.
73. FCI - Fluid Controls Institute; www.fluidcontrolsinstitute.org.
74. FM Approvals - FM Approvals LLC; www.fmglobal.com.
75. FM Global - FM Global; (Formerly: FMG - FM Global); www.fmglobal.com.
76. FSA - Fluid Sealing Association; www.fluidsealing.com.
77. FSC - Forest Stewardship Council U.S.; www.fscus.org.
78. GA - Gypsum Association; www.gypsum.org.
79. GANA - Glass Association of North America; www.glasswebsite.com.
80. GS - Green Seal; www.greenseal.org.
81. HI - Hydraulic Institute; www.pumps.org.
82. HI/GAMA - Hydronics Institute/Gas Appliance Manufacturers Association; (See AHRI).
83. HMMA - Hollow Metal Manufacturers Association; (See NAAMM).
84. HPVA - Hardwood Plywood & Veneer Association; www.hpva.org.
85. HPW - H. P. White Laboratory, Inc.; www.hpwhite.com.
86. IAPSC - International Association of Professional Security Consultants; www.iapsc.org.
87. IAS - International Accreditation Service; www.iasonline.org.
88. IAS - International Approval Services; (See CSA).
89. ICBO - International Conference of Building Officials; (See ICC).
90. ICC - International Code Council; www.iccsafe.org.
91. ICEA - Insulated Cable Engineers Association, Inc.; www.icea.net.

92. ICPA - International Cast Polymer Alliance; www.icpa-hq.org.
93. ICRI - International Concrete Repair Institute, Inc.; www.icri.org.
94. IEC - International Electrotechnical Commission; http://www.iec.ch.
95. IEEE - Institute of Electrical and Electronics Engineers, Inc. (The); www.ieee.org.
96. IES - Illuminating Engineering Society; (Formerly: Illuminating Engineering Society of North America); www.ies.org.
97. IESNA - Illuminating Engineering Society of North America; (See IES).
98. IEST - Institute of Environmental Sciences and Technology; www.iest.org.
99. IGMA - Insulating Glass Manufacturers Alliance; www.igmaonline.org.
100. IGSHPA - International Ground Source Heat Pump Association; www.igshpa.okstate.edu.
101. ILI - Indiana Limestone Institute of America, Inc.; www.iliai.com.
102. Intertek - Intertek Group; (Formerly: ETL SEMCO; Intertek Testing Service NA); www.intertek.com.
103. ISA - International Society of Automation (The); (Formerly: Instrumentation, Systems, and Automation Society); www.isa.org.
104. ISAS - Instrumentation, Systems, and Automation Society (The); (See ISA).
105. ISFA - International Surface Fabricators Association; (Formerly: International Solid Surface Fabricators Association); www.isfanow.org.
106. ISO - International Organization for Standardization; www.iso.org.
107. ISSFA - International Solid Surface Fabricators Association; (See ISFA).
108. ITU - International Telecommunication Union; www.itu.int/home.
109. KCMA - Kitchen Cabinet Manufacturers Association; www.kcma.org.
110. LMA - Laminating Materials Association; (See CPA).
111. LPI - Lightning Protection Institute; www.lightning.org.
112. MBMA - Metal Building Manufacturers Association; www.mbma.com.
113. MCA - Metal Construction Association; www.metalconstruction.org.
114. MFMA - Maple Flooring Manufacturers Association, Inc.; www.maplefloor.org.
115. MFMA - Metal Framing Manufacturers Association, Inc.; www.metalframingmfg.org.
116. MHIA - Material Handling Industry of America; www.mhia.org.
117. MIA - Marble Institute of America; www.marble-institute.com.
118. MMPA - Moulding & Millwork Producers Association; www.wmmpa.com.
119. MPI - Master Painters Institute; www.paintinfo.com.
120. MSS - Manufacturers Standardization Society of The Valve and Fittings Industry Inc.; www.mss-hq.org.
121. NAAMM - National Association of Architectural Metal Manufacturers; www.naamm.org.
122. NACE - NACE International; (National Association of Corrosion Engineers International); www.nace.org.
123. NADCA - National Air Duct Cleaners Association; www.nadca.com.
124. NAIMA - North American Insulation Manufacturers Association; www.naima.org.
125. NBGQA - National Building Granite Quarries Association, Inc.; www.nbgqa.com.
126. NBI - New Buildings Institute; www.newbuildings.org.
127. NCMA - National Concrete Masonry Association; www.ncma.org.
128. NEBB - National Environmental Balancing Bureau; www.nebb.org.
129. NECA - National Electrical Contractors Association; www.necanet.org.
130. NeLMA - Northeastern Lumber Manufacturers Association; www.nelma.org.
131. NEMA - National Electrical Manufacturers Association; www.nema.org.
132. NETA - InterNational Electrical Testing Association; www.netaworld.org.
133. NFPA - National Fire Protection Association; www.nfpa.org.
134. NFPA - NFPA International; (See NFPA).
135. NFRC - National Fenestration Rating Council; www.nfrc.org.
136. NHLA - National Hardwood Lumber Association; www.nhla.com.
137. NLGA - National Lumber Grades Authority; www.nlga.org.
138. NOMMA - National Ornamental & Miscellaneous Metals Association; www.nomma.org.
139. NRCA - National Roofing Contractors Association; www.nrca.net.
140. NRMCA - National Ready Mixed Concrete Association; www.nrmca.org.
141. NSF - NSF International; www.nsf.org.

142. NSPE - National Society of Professional Engineers; www.nspe.org.
143. NSSGA - National Stone, Sand & Gravel Association; www.nssga.org.
144. NTMA - National Terrazzo & Mosaic Association, Inc. (The); www.ntma.com.
145. NWFA - National Wood Flooring Association; www.nwfa.org.
146. PCI - Precast/Prestressed Concrete Institute; www.pci.org.
147. PDI - Plumbing & Drainage Institute; www.pdionline.org.
148. RCSC - Research Council on Structural Connections; www.boltcouncil.org.
149. RFCI - Resilient Floor Covering Institute; www.rfci.com.
150. RIS - Redwood Inspection Service; www.redwoodinspection.com.
151. SAE - SAE International; www.sae.org.
152. SCTE - Society of Cable Telecommunications Engineers; www.scte.org.
153. SDI - Steel Deck Institute; www.sdi.org.
154. SDI - Steel Door Institute; www.steeldoor.org.
155. SEI/ASCE - Structural Engineering Institute/American Society of Civil Engineers; (See ASCE).
156. SIA - Security Industry Association; www.siaonline.org.
157. SJI - Steel Joist Institute; www.steeljoist.org.
158. SMA - Screen Manufacturers Association; www.smainfo.org.
159. SMACNA - Sheet Metal and Air Conditioning Contractors' National Association; www.smacna.org.
160. SPFA - Spray Polyurethane Foam Alliance; www.sprayfoam.org.
161. SPIB - Southern Pine Inspection Bureau; www.spib.org.
162. SPRI - Single Ply Roofing Industry; www.spri.org.
163. SRCC - Solar Rating & Certification Corporation; www.solar-rating.org.
164. SSINA - Specialty Steel Industry of North America; www.ssina.com.
165. SSPC - SSPC: The Society for Protective Coatings; www.sspc.org.
166. STI - Steel Tank Institute; www.steeltank.com.
167. SWI - Steel Window Institute; www.steelwindows.com.
168. SWPA - Submersible Wastewater Pump Association; www.swpa.org.
169. TCNA - Tile Council of North America, Inc.; www.tileusa.com.
170. TIA/EIA - Telecommunications Industry Association/Electronic Industries Alliance; (See TIA).
171. TMS - The Masonry Society; www.masonrysociety.org.
172. TPI - Truss Plate Institute; www.tpinst.org.
173. TPI - Turfgrass Producers International; www.turfgrasssod.org.
174. TRI - Tile Roofing Institute; www.tileroofing.org.
175. UL - Underwriters Laboratories Inc.; www.ul.com.
176. UNI - Uni-Bell PVC Pipe Association; www.uni-bell.org.
177. USGBC - U.S. Green Building Council; www.usgbc.org.
178. WASTEC - Waste Equipment Technology Association; www.wastec.org.
179. WCMA - Window Covering Manufacturers Association; www.wcmanet.org.
180. WDMA - Window & Door Manufacturers Association; www.wdma.com.
181. WI - Woodwork Institute; www.wicnet.org.
182. WWPA - Western Wood Products Association; www.wwpa.org.

B. Code Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. This information is believed to be accurate as of the date of the Contract Documents.

1. DIN - Deutsches Institut fur Normung e.V.; www.din.de.
2. IAPMO - International Association of Plumbing and Mechanical Officials; www.iapmo.org.
3. ICC - International Code Council; www.iccsafe.org.
4. ICC-ES - ICC Evaluation Service, LLC; www.icc-es.org.

C. Federal Government Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the

following list. Information is subject to change and is up to date as of the date of the Contract Documents.

1. COE - Army Corps of Engineers; www.usace.army.mil.
2. CPSC - Consumer Product Safety Commission; www.cpsc.gov.
3. DOC - Department of Commerce; National Institute of Standards and Technology; www.nist.gov.
4. DOD - Department of Defense; www.quicksearch.dla.mil.
5. DOE - Department of Energy; www.energy.gov.
6. EPA - Environmental Protection Agency; www.epa.gov.
7. FAA - Federal Aviation Administration; www.faa.gov.
8. FG - Federal Government Publications; www.gpo.gov/fdsys.
9. GSA - General Services Administration; www.gsa.gov.
10. HUD - Department of Housing and Urban Development; www.hud.gov.
11. LBL - Lawrence Berkeley National Laboratory; Environmental Energy Technologies Division; www.eetd.lbl.gov.
12. OSHA - Occupational Safety & Health Administration; www.osha.gov.
13. SD - Department of State; www.state.gov.
14. TRB - Transportation Research Board; National Cooperative Highway Research Program; The National Academies; www.trb.org.
15. USDA - Department of Agriculture; Agriculture Research Service; U.S. Salinity Laboratory; www.ars.usda.gov.
16. USDA - Department of Agriculture; Rural Utilities Service; www.usda.gov.
17. USDOJ - Department of Justice; Office of Justice Programs; National Institute of Justice; www.ojp.usdoj.gov.
18. USP - U.S. Pharmacopeial Convention; www.usp.org.
19. USPS - United States Postal Service; www.usps.com.

D. Standards and Regulations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the standards and regulations in the following list. This information is subject to change and is believed to be accurate as of the date of the Contract Documents.

1. CFR - Code of Federal Regulations; Available from Government Printing Office; www.gpo.gov/fdsys.
2. DOD - Department of Defense; Military Specifications and Standards; Available from DLA Document Services; www.quicksearch.dla.mil.
3. DSCC - Defense Supply Center Columbus; (See FS).
4. FED-STD - Federal Standard; (See FS).
5. FS - Federal Specification; Available from DLA Document Services; www.quicksearch.dla.mil.

    a. Available from Defense Standardization Program; www.dsp.dla.mil.
    b. Available from General Services Administration; www.gsa.gov.
    c. Available from National Institute of Building Sciences/Whole Building Design Guide; www.wbdg.org/ccb.

6. MILSPEC - Military Specification and Standards; (See DOD).
7. USAB - United States Access Board; www.access-board.gov.
8. USATBCB - U.S. Architectural & Transportation Barriers Compliance Board; (See USAB).

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 014200

SECTION 015000 - TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes requirements for temporary utilities, support facilities, and security and protection facilities.

B. Related Requirements:

1. Section 011000 "Summary" for work restrictions and limitations on utility interruptions.
2. Section 312319 "Dewatering" for disposal of ground water at Project site.

1.3 USE CHARGES

A. General: Installation and removal of and use charges for temporary facilities shall be included in the Contract Sum unless otherwise indicated. Allow other entities engaged in the Project to use temporary services and facilities without cost, including, but not limited to, Owner's construction forces, Architect, testing agencies, and authorities having jurisdiction.

B. Water Service: Pay water-service use charges for water used by all entities for construction operations.

C. Electric Power Service: Pay electric-power-service use charges for electricity used by all entities for construction operations.

1.4 INFORMATIONAL SUBMITTALS

A. Fire-Safety Program: Show compliance with requirements of NFPA 241 and authorities having jurisdiction. Indicate Contractor personnel responsible for management of fire-prevention program.

B. Moisture- and Mold-Protection Plan: Describe procedures and controls for protecting materials and construction from water absorption and damage and mold.

1.5 QUALITY ASSURANCE

A. Electric Service: Comply with NECA, NEMA, and UL standards and regulations for temporary electric service. Install service to comply with NFPA 70.

B. Tests and Inspections: Arrange for authorities having jurisdiction to test and inspect each temporary utility before use. Obtain required certifications and permits.

1.6 PROJECT CONDITIONS

A. Temporary Use of Permanent Facilities: Engage Installer of each permanent service to assume responsibility for operation, maintenance, and protection of each permanent service during its use as a construction facility before Owner's acceptance, regardless of previously assigned responsibilities.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Chain-Link Fencing: Minimum 2-inch (50-mm), 0.148-inch- (3.8-mm-) thick, galvanized-steel, chain-link fabric fencing; minimum 6 feet (1.8 m) high with galvanized-steel pipe posts; minimum 2-3/8-inch- (60-mm-) OD line posts and 2-7/8-inch- (73-mm-) OD corner and pull posts.

B. Portable Chain-Link Fencing: Minimum 2-inch (50-mm), 0.148-inch- (3.8-mm-) thick, galvanized-steel, chain-link fabric fencing; minimum 6 feet (1.8 m) high with galvanized-steel pipe posts; minimum 2-3/8-inch- (60-mm-) OD line posts and 2-7/8-inch- (73-mm-) OD corner and pull posts, with 1-5/8-inch- (42-mm-) OD top and bottom rails. Provide concrete or galvanized-steel bases for supporting posts.

C. Polyethylene Sheet: Reinforced, fire-resistive sheet, 10-mil (0.25-mm) minimum thickness, with flame-spread rating of 15 or less per ASTM E 84 and passing NFPA 701 Test Method 2.

D. Dust-Control Adhesive-Surface Walk-off Mats: Provide mats minimum 36 by 60 inches (914 by 1624 mm).

2.2 TEMPORARY FACILITIES

A. Common-Use Field Office: Of sufficient size to accommodate needs of Owner, Architect, Construction Manager, and construction personnel office activities and to accommodate Project meetings specified in other Division 01 Sections. Keep office clean and orderly. Furnish and equip offices as follows:

1. Furniture required for Project-site documents including file cabinets, plan tables, plan racks, and bookcases.
2. Conference room of sufficient size to accommodate meetings of 10 individuals. Provide electrical power service and 120-V ac duplex receptacles, with no fewer than one receptacle on each wall. Furnish room with conference table, chairs, and 4-foot- (1.2-m-) square tack and marker boards.
3. Drinking water.
4. Heating and cooling equipment necessary to maintain a uniform indoor temperature of 68 to 72 deg F (20 to 22 deg C).
5. Lighting fixtures capable of maintaining average illumination of 20 fc (215 lx) at desk height.

B. Storage and Fabrication Sheds: Provide sheds sized, furnished, and equipped to accommodate materials and equipment for construction operations.

1. Store combustible materials apart from building.

2.3 EQUIPMENT

A. Fire Extinguishers: Portable, UL rated; with class and extinguishing agent as required by locations and classes of fire exposures.

B. HVAC Equipment: Unless Owner authorizes use of permanent HVAC system, provide vented, self-contained, liquid-propane-gas or fuel-oil heaters with individual space thermostatic control.

1. Use of gasoline-burning space heaters, open-flame heaters, or salamander-type heating units is prohibited.
2. Heating Units: Listed and labeled for type of fuel being consumed, by a qualified testing agency acceptable to authorities having jurisdiction, and marked for intended location and application.
3. Permanent HVAC System: If Owner authorizes use of permanent HVAC system for temporary use during construction, provide filter with MERV of 8 at each return-air grille in system and remove at end of construction.

PART 3 - EXECUTION

3.1 TEMPORARY FACILITIES, GENERAL

A. Conservation: Coordinate construction and use of temporary facilities with consideration given to conservation of energy, water, and materials. Coordinate use of temporary utilities to minimize waste.

1. Salvage materials and equipment involved in performance of, but not actually incorporated into, the Work. See other Sections for disposition of salvaged materials that are designated as Owner's property.

3.2 INSTALLATION, GENERAL

A. Locate facilities where they will serve Project adequately and result in minimum interference with performance of the Work. Relocate and modify facilities as required by progress of the Work.

1. Locate facilities to limit site disturbance as specified in Section 011000 "Summary."

B. Provide each facility ready for use when needed to avoid delay. Do not remove until facilities are no longer needed or are replaced by authorized use of completed permanent facilities.

3.3 TEMPORARY UTILITY INSTALLATION

A. General: Install temporary service or connect to existing service.

1. Arrange with utility company, Owner, and existing users for time when service can be interrupted, if necessary, to make connections for temporary services.

B. Sewers and Drainage: Provide temporary utilities to remove effluent lawfully.

1. Connect temporary sewers to municipal system as directed by authorities having jurisdiction.

C. Water Service: Install water service and distribution piping in sizes and pressures adequate for construction.

D. Sanitary Facilities: Provide temporary toilets, wash facilities, and drinking water for use of construction personnel. Comply with requirements of authorities having jurisdiction for type, number, location, operation, and maintenance of fixtures and facilities.

E. Temporary Heating and Cooling: Provide temporary heating and cooling required by construction activities for curing or drying of completed installations or for protecting installed construction from adverse effects of low temperatures or high humidity. Select equipment that will not have a harmful effect on completed installations or elements being installed.

1. Provide temporary dehumidification systems when required to reduce ambient and substrate moisture levels to level required to allow installation or application of finishes and their proper curing or drying.

F. Electric Power Service: Connect to Owner's existing electric power service. Maintain equipment in a condition acceptable to Owner.

G. Lighting: Provide temporary lighting with local switching that provides adequate illumination for construction operations, observations, inspections, and traffic conditions.

1. Install and operate temporary lighting that fulfills security and protection requirements without operating entire system.

H. Telephone Service: Provide temporary telephone service in common-use facilities for use by all construction personnel.

1. Provide additional telephone lines for the following:

a. Provide a dedicated telephone line for each facsimile machine in each field office.

2. At each telephone, post a list of important telephone numbers.

a. Police and fire departments.
b. Ambulance service.
c. Contractor's home office.
d. Contractor's emergency after-hours telephone number.
e. Architect's office.
f. Engineers' offices.
g. Owner's office.
h. Principal subcontractors' field and home offices.

3. Provide superintendent with cellular telephone or portable two-way radio for use when away from field office.

I. Electronic Communication Service: Provide a desktop computer in the primary field office adequate for use by Architect and Owner to access Project electronic documents and maintain electronic communications.

3.4 SUPPORT FACILITIES INSTALLATION

A. General: Comply with the following:

1. Provide construction for temporary offices, shops, and sheds located within construction area or within 30 feet (9 m) of building lines that is noncombustible according to ASTM E 136. Comply with NFPA 241.
2. Maintain support facilities until Architect schedules Substantial Completion inspection. Remove before Substantial Completion. Personnel remaining after Substantial Completion will be permitted to use permanent facilities, under conditions acceptable to Owner.

B. Traffic Controls: Comply with requirements of authorities having jurisdiction.

1. Protect existing site improvements to remain including curbs, pavement, and utilities.
2. Maintain access for fire-fighting equipment and access to fire hydrants.

C. Parking: Existing parking is available for use during construction but the extent and location shall be coordinated with the existing Youth Services Center personnel.

D. Dewatering Facilities and Drains: Comply with requirements of authorities having jurisdiction. Maintain Project site, excavations, and construction free of water.

1. Dispose of rainwater in a lawful manner that will not result in flooding Project or adjoining properties or endanger permanent Work or temporary facilities.
2. Remove snow and ice as required to minimize accumulations.

E. Project Signs: Provide Project signs as indicated. Unauthorized signs are not permitted.

1. Identification Signs: Provide Project identification signs at locations acceptable to Owner.
2. Temporary Signs: Provide other signs as indicated and as required to inform public and individuals seeking entrance to Project.

    a. Provide temporary, directional signs for construction personnel and visitors.

3. Maintain and touchup signs so they are legible at all times.

F. Waste Disposal Facilities: Provide waste-collection containers in sizes adequate to handle waste from construction operations. Comply with requirements of authorities having jurisdiction. Comply with progress cleaning requirements in Division 01 Section "Execution."

G. Lifts and Hoists: Provide facilities necessary for hoisting materials and personnel.

1. Truck cranes and similar devices used for hoisting materials are considered "tools and equipment" and not temporary facilities.

3.5 SECURITY AND PROTECTION FACILITIES INSTALLATION

A. Protection of Existing Facilities: Protect existing vegetation, equipment, structures, utilities, and other improvements at Project site and on adjacent properties, except those indicated to be removed or altered. Repair damage to existing facilities.

B. Environmental Protection: Provide protection, operate temporary facilities, and conduct construction as required to comply with environmental regulations and that minimize possible air, waterway, and subsoil contamination or pollution or other undesirable effects.

1. Comply with work restrictions specified in Division 01 Section "Summary."

C. Temporary Erosion and Sedimentation Control: Provide measures to prevent soil erosion and discharge of soil-bearing water runoff and airborne dust to undisturbed areas and to adjacent properties and walkways, according to erosion- and sedimentation-control Drawings.

1. Verify that flows of water redirected from construction areas or generated by construction activity do not enter or cross tree- or plant- protection zones.
2. Inspect, repair, and maintain erosion- and sedimentation-control measures during construction until permanent vegetation has been established.
3. Clean, repair, and restore adjoining properties and roads affected by erosion and sedimentation from Project site during the course of Project.
4. Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

D. Stormwater Control: Comply with requirements of authorities having jurisdiction. Provide barriers in and around excavations and subgrade construction to prevent flooding by runoff of stormwater from heavy rains.

E. Tree and Plant Protection: Install temporary fencing located as indicated or outside the drip line of trees to protect vegetation from damage from construction operations. Protect tree root systems from damage, flooding, and erosion.

F. Site Enclosure Fence: Before construction operations begin, furnish and install site enclosure fence in a manner that will prevent people and animals from easily entering site except by entrance gates.

1. Extent of Fence: As required to enclose entire Project site or portion determined sufficient to accommodate construction operations.

G. Security Enclosure and Lockup: Install temporary enclosure around partially completed areas of construction. Provide lockable entrances to prevent unauthorized entrance, vandalism, theft, and similar violations of security. Lock entrances at end of each work day.

H. Barricades, Warning Signs, and Lights: Comply with requirements of authorities having jurisdiction for erecting structurally adequate barricades, including warning signs and lighting.

I. Temporary Egress: Maintain temporary egress from existing occupied facilities as indicated and as required by authorities having jurisdiction.

J. Temporary Enclosures: Provide temporary enclosures for protection of construction, in progress and completed, from exposure, foul weather, other construction operations, and similar activities. Provide temporary weathertight enclosure for building exterior.

1. Where heating or cooling is needed and permanent enclosure is incomplete, insulate temporary enclosures.

K. Temporary Fire Protection: Install and maintain temporary fire-protection facilities of types needed to protect against reasonably predictable and controllable fire losses. Comply with NFPA 241; manage fire-prevention program.

1. Prohibit smoking in construction areas.
2. Supervise welding operations, combustion-type temporary heating units, and similar sources of fire ignition according to requirements of authorities having jurisdiction.
3. Develop and supervise an overall fire-prevention and -protection program for personnel at Project site. Review needs with local fire department and establish procedures to be followed. Instruct personnel in methods and procedures. Post warnings and information.

4. Provide temporary standpipes and hoses for fire protection. Hang hoses with a warning sign stating that hoses are for fire-protection purposes only and are not to be removed. Match hose size with outlet size and equip with suitable nozzles.

3.6 MOISTURE AND MOLD CONTROL

A. Contractor's Moisture-Protection Plan: Describe delivery, handling, storage, installation, and protection provisions for materials subject to water absorption or water damage.

1. Indicate procedures for discarding water-damaged materials, protocols for mitigating water intrusion into completed Work, and replacing water-damaged Work.
2. Indicate sequencing of work that requires water, such as sprayed fire-resistive materials, plastering, and terrazzo grinding, and describe plans for dealing with water from these operations. Show procedures for verifying that wet construction has dried sufficiently to permit installation of finish materials.
3. Indicate methods to be used to avoid trapping water in finished work.

B. Exposed Construction Period: Before installation of weather barriers, when materials are subject to wetting and exposure and to airborne mold spores, protect as follows:

1. Protect porous materials from water damage.
2. Protect stored and installed material from flowing or standing water.
3. Keep porous and organic materials from coming into prolonged contact with concrete.
4. Remove standing water from decks.
5. Keep deck openings covered or dammed.

C. Partially Enclosed Construction Period: After installation of weather barriers but before full enclosure and conditioning of building, when installed materials are still subject to infiltration of moisture and ambient mold spores, protect as follows:

1. Do not load or install drywall or other porous materials or components, or items with high organic content, into partially enclosed building.
2. Keep interior spaces reasonably clean and protected from water damage.
3. Periodically collect and remove waste containing cellulose or other organic matter.
4. Discard or replace water-damaged material.
5. Do not install material that is wet.
6. Discard and replace stored or installed material that begins to grow mold.
7. Perform work in a sequence that allows wet materials adequate time to dry before enclosing the material in gypsum board or other interior finishes.

D. Controlled Construction Period: After completing and sealing of the building enclosure but prior to the full operation of permanent HVAC systems, maintain as follows:

1. Control moisture and humidity inside building by maintaining effective dry-in conditions.
2. Use temporary or permanent HVAC system to control humidity within ranges specified for installed and stored materials.
3. Comply with manufacturer's written instructions for temperature, relative humidity, and exposure to water limits.

    a. Hygroscopic materials that may support mold growth, including wood and gypsum-based products, that become wet during the course of construction and remain wet for 48 hours are considered defective and require replacing.
    b. Measure moisture content of materials that have been exposed to moisture during construction operations or after installation. Record readings beginning at time of

exposure and continuing daily for 48 hours. Identify materials containing moisture levels higher than allowed. Report findings in writing to Architect.

c. Remove and replace materials that cannot be completely restored to their manufactured moisture level within 48 hours.

3.7 OPERATION, TERMINATION, AND REMOVAL

A. Supervision: Enforce strict discipline in use of temporary facilities. To minimize waste and abuse, limit availability of temporary facilities to essential and intended uses.

B. Maintenance: Maintain facilities in good operating condition until removal.

1. Maintain operation of temporary enclosures, heating, cooling, humidity control, ventilation, and similar facilities on a 24-hour basis where required to achieve indicated results and to avoid possibility of damage.

C. Temporary Facility Changeover: Do not change over from using temporary security and protection facilities to permanent facilities until Substantial Completion.

D. Termination and Removal: Remove each temporary facility when need for its service has ended, when it has been replaced by authorized use of a permanent facility, or no later than Substantial Completion. Complete or, if necessary, restore permanent construction that may have been delayed because of interference with temporary facility. Repair damaged Work, clean exposed surfaces, and replace construction that cannot be satisfactorily repaired.

1. Materials and facilities that constitute temporary facilities are property of Contractor. Owner reserves right to take possession of Project identification signs.
2. Remove temporary roads and paved areas not intended for or acceptable for integration into permanent construction. Where area is intended for landscape development, remove soil and aggregate fill that do not comply with requirements for fill or subsoil. Remove materials contaminated with road oil, asphalt and other petrochemical compounds, and other substances that might impair growth of plant materials or lawns. Repair or replace street paving, curbs, and sidewalks at temporary entrances, as required by authorities having jurisdiction.
3. At Substantial Completion, repair, renovate, and clean permanent facilities used during construction period. Comply with final cleaning requirements specified in Section 017700 "Closeout Procedures."

END OF SECTION 015000

SECTION 016000 - PRODUCT REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. 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; and comparable products.

B. Related Requirements:

1. Division 01 Section "Allowances" for products selected under an allowance.
2. Division 01 Section "Alternates" for products selected under an alternate.
3. Division 01 Section "Substitution Procedures" for requests for substitutions.
4. Division 01 Section "References" for applicable industry standards for products specified.

1.3 DEFINITIONS

A. Products: Items obtained 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 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. Basis-of-Design Product Specification: A specification in which a specific manufacturer's product is named and accompanied by the words "basis-of-design product," 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 additional manufacturers named in the specification.

1.4 ACTION SUBMITTALS

A. Comparable Product Requests: Refer to Division 01 Section "Substitution Procedures" for information relating to comparable product requests received Prior to Bid and after Award of Contract.

B. Product Substitution Requests: Refer to Division 01 Section "Substitution Procedures" for information relating to substitution requests received Prior to Bid and after Award of Contract.

C. Basis-of-Design Product Specification Submittal: Comply with requirements in Division 01 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, select product 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 and vandalism. 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 determine compliance with the Contract Documents and to determine 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 weathertight enclosure above ground, with ventilation adequate to prevent condensation.
4. Protect foam plastic from exposure to sunlight, except to extent necessary for period of installation and concealment.
5. Comply with product manufacturer's written instructions for temperature, humidity, ventilation, and weather-protection requirements for storage.
6. 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. Manufacturer's Warranty: Written warranty furnished by individual manufacturer for a particular product and specifically endorsed by manufacturer to Owner.
2. Special Warranty: Written warranty required by the Contract Documents to provide specific rights for Owner.

B. Special Warranties: Prepare a written document that contains appropriate terms and identification, ready for execution.

1. Manufacturer's Standard Form: Modified to include Project-specific information and properly executed.
2. Specified Form: When specified forms are included with the Specifications, prepare a written document using indicated form properly executed.
3. See Divisions 02 through 33 Sections for specific content requirements and particular requirements for submitting special warranties.

C. Submittal Time: Comply with requirements in Division 01 Section "Closeout Procedures."

PART 2 - PRODUCTS

2.1 PRODUCT SELECTION PROCEDURES

A. General Product Requirements: Provide products that comply with the Contract Documents, are undamaged and, unless otherwise indicated, 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," Architect will make selection.
5. Descriptive, performance, and reference standard requirements in the Specifications establish salient characteristics of products.

B. Product Selection Procedures:

1. Products:

a. Restricted List: Where Specifications include a list of names of both manufacturers and products, provide one of the products listed that complies with requirements. Comparable products or substitutions for Contractor's convenience received Prior to Bid and after Award of the Contract may be considered. Refer to Division 01 Section "Substitution Procedures" for information relating to

comparable product and substitution requests received Prior to Bid and after Award of Contract.

2. Manufacturers:

a. Restricted List: Where Specifications include a list of manufacturers' names, provide a product by one of the manufacturers listed that complies with requirements. Comparable products or substitutions for Contractor's convenience received Prior to Bid and after Award of the Contract may be considered. Refer to Division 01 Section "Substitution Procedures" for information relating to comparable product and substitution requests received Prior to Bid and after Award of Contract.

3. Basis-of-Design Product: Where Specifications name a product, or refer to a product indicated on Drawings, and include a list of manufacturers, provide the specified or indicated 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 requirements in Division 01 Section "Substitution Procedures" for consideration of an unnamed product by one of the other named manufacturers.

C. Visual Matching Specification: Where Specifications require "match Architect's sample", provide a product that complies with requirements and matches Architect's sample. Architect's decision will be final on whether a proposed product matches.

1. If no product available within specified category matches and complies with other specified requirements, comply with requirements in Division 01 Section "Substitution Procedures" for proposal of product.

D. Visual Selection Specification: Where Specifications include the phrase "as selected by Architect from manufacturer's full range" or similar phrase, select a product that complies with requirements. Architect will select color, gloss, pattern, density, or texture from manufacturer's product line that includes both standard and premium items.

2.2 COMPARABLE PRODUCTS AND PRODUCT SUBSTITUTIONS

A. Refer to Division 01 Section "Substitution Procedures" for information relating to substitution requests received Prior to Bid and after Award of Contract.

PART 3 - EXECUTION (Not Used)

END OF SECTION 016000

SECTION 017300 - EXECUTION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes general administrative and procedural requirements governing execution of the Work including, but not limited to, the following:

1. Construction layout.
2. Field engineering and surveying.
3. Installation of the Work.
4. Cutting and patching.
5. Progress cleaning.
6. Starting and adjusting.
7. Protection of installed construction.

B. Related Requirements:

1. Section 011000 "Summary" for limits on use of Project site.
2. Section 017700 "Closeout Procedures" for submitting final property survey with Project Record Documents, recording of Owner-accepted deviations from indicated lines and levels, and final cleaning.
3. Section 024100 "Selective Demolition" for demolition and removal of selected portions of the building.
4. Section 078400 "Firestopping" for patching penetrations in fire-rated construction.

1.3 DEFINITIONS

A. Cutting: Removal of in-place construction necessary to permit installation or performance of other work.

B. Patching: Fitting and repair work required to restore construction to original conditions after installation of other work.

1.4 QUALITY ASSURANCE

A. Cutting and Patching: Comply with requirements for and limitations on cutting and patching of construction elements.

1. Structural Elements: When cutting and patching structural elements, notify Architect of locations and details of cutting and await directions from Architect before proceeding. Shore, brace, and support structural elements during cutting and patching. Do not cut

and patch structural elements in a manner that could change their load-carrying capacity or increase deflection

2. Operational Elements: Do not cut and patch operating elements and related components in a manner that results in reducing their capacity to perform as intended or that results in increased maintenance or decreased operational life or safety.

3. Other Construction Elements: Do not cut and patch other construction elements or components in a manner that could change their load-carrying capacity, that results in reducing their capacity to perform as intended, or that results in increased maintenance or decreased operational life or safety.

4. Visual Elements: Do not cut and patch construction in a manner that results in visual evidence of cutting and patching. Do not cut and patch exposed construction in a manner that would, in Architect's opinion, reduce the building's aesthetic qualities. Remove and replace construction that has been cut and patched in a visually unsatisfactory manner.

B. Manufacturer's Installation Instructions: Obtain and maintain on-site manufacturer's written recommendations and instructions for installation of products and equipment.

PART 2 - PRODUCTS

2.1 MATERIALS

A. General: Comply with requirements specified in other Sections.

B. In-Place Materials: Use materials for patching identical to in-place materials. For exposed surfaces, use materials that visually match in-place adjacent surfaces to the fullest extent possible.

1. If identical materials are unavailable or cannot be used, use materials that, when installed, will provide a match acceptable to Architect for the visual and functional performance of in-place materials.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Existing Conditions: The existence and location of underground and other utilities and construction indicated as existing are not guaranteed. Before beginning sitework, investigate and verify the existence and location of underground utilities, mechanical and electrical systems, and other construction affecting the Work.

1. Before construction, verify the location and invert elevation at points of connection of sanitary sewer, storm sewer, and water-service piping; underground electrical services, and other utilities.
2. Furnish location data for work related to Project that must be performed by public utilities serving Project site.

B. Examination and Acceptance of Conditions: Before proceeding with each component of the Work, examine substrates, areas, and conditions, with Installer or Applicator present where

indicated, for compliance with requirements for installation tolerances and other conditions affecting performance. Record observations.

1. Examine roughing-in for mechanical and electrical systems to verify actual locations of connections before equipment and fixture installation.
2. Examine walls, floors, and roofs for suitable conditions where products and systems are to be installed.
3. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.

C. Written Report: Where a written report listing conditions detrimental to performance of the Work is required by other Sections, include the following:

1. Description of the Work.
2. List of detrimental conditions, including substrates.
3. List of unacceptable installation tolerances.
4. Recommended corrections.

D. Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with the Work indicates acceptance of surfaces and conditions.

3.2 PREPARATION

A. Existing Utility Information: Furnish information to local utility that is necessary to adjust, move, or relocate existing utility structures, utility poles, lines, services, or other utility appurtenances located in or affected by construction. Coordinate with authorities having jurisdiction.

B. Field Measurements: Take field measurements as required to fit the Work properly. Recheck measurements before installing each product. Where portions of the Work are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

C. Space Requirements: Verify space requirements and dimensions of items shown diagrammatically on Drawings.

D. Review of Contract Documents and Field Conditions: Immediately on discovery of the need for clarification of the Contract Documents caused by differing field conditions outside the control of Contractor, submit a request for information to Architect according to requirements in Section 013100 "Project Management and Coordination."

3.3 CONSTRUCTION LAYOUT

A. Verification: Before proceeding to lay out the Work, verify layout information shown on Drawings, in relation to the property survey and existing benchmarks. If discrepancies are discovered, notify Architect promptly.

B. General: Engage a land surveyor to lay out the Work using accepted surveying practices.

1. Establish benchmarks and control points to set lines and levels at each story of construction and elsewhere as needed to locate each element of Project.
2. Establish limits on use of Project site.

3. Establish dimensions within tolerances indicated. Do not scale Drawings to obtain required dimensions.
4. Inform installers of lines and levels to which they must comply.
5. Check the location, level and plumb, of every major element as the Work progresses.
6. Notify Architect when deviations from required lines and levels exceed allowable tolerances.
7. Close site surveys with an error of closure equal to or less than the standard established by authorities having jurisdiction.

C. Site Improvements: Locate and lay out site improvements, including pavements, grading, fill and topsoil placement, utility slopes, and rim and invert elevations.

D. Building Lines and Levels: Locate and lay out control lines and levels for structures, building foundations, column grids, and floor levels, including those required for mechanical and electrical work. Transfer survey markings and elevations for use with control lines and levels. Level foundations and piers from two or more locations.

E. Record Log: Maintain a log of layout control work. Record deviations from required lines and levels. Include beginning and ending dates and times of surveys, weather conditions, name and duty of each survey party member, and types of instruments and tapes used. Make the log available for reference by Architect.

3.4 FIELD ENGINEERING

A. Reference Points: Locate existing permanent benchmarks, control points, and similar reference points before beginning the Work. Preserve and protect permanent benchmarks and control points during construction operations.

1. Do not change or relocate existing benchmarks or control points without prior written approval of Architect. Report lost or destroyed permanent benchmarks or control points promptly. Report the need to relocate permanent benchmarks or control points to Architect before proceeding.
2. Replace lost or destroyed permanent benchmarks and control points promptly. Base replacements on the original survey control points.

B. Benchmarks: Establish and maintain a minimum of two permanent benchmarks on Project site, referenced to data established by survey control points. Comply with authorities having jurisdiction for type and size of benchmark.

1. Record benchmark locations, with horizontal and vertical data, on Project Record Documents.
2. Where the actual location or elevation of layout points cannot be marked, provide temporary reference points sufficient to locate the Work.
3. Remove temporary reference points when no longer needed. Restore marked construction to its original condition.

3.5 INSTALLATION

A. General: Locate the Work and components of the Work accurately, in correct alignment and elevation, as indicated.

1. Make vertical work plumb and make horizontal work level.

2. Where space is limited, install components to maximize space available for maintenance and ease of removal for replacement.
3. Conceal pipes, ducts, and wiring in finished areas unless otherwise indicated.
4. Maintain minimum headroom clearance of 96 inches (2440 mm) in occupied spaces and 90 inches (2300 mm) in unoccupied spaces.

B. Comply with manufacturer's written instructions and recommendations for installing products in applications indicated.

C. Install products at the time and under conditions that will ensure the best possible results. Maintain conditions required for product performance until Substantial Completion.

D. Conduct construction operations so no part of the Work is subjected to damaging operations or loading in excess of that expected during normal conditions of occupancy.

E. Sequence the Work and allow adequate clearances to accommodate movement of construction items on site and placement in permanent locations.

F. Tools and Equipment: Do not use tools or equipment that produce harmful noise levels.

G. Templates: Obtain and distribute to the parties involved templates for work specified to be factory prepared and field installed. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing products to comply with indicated requirements.

H. Attachment: Provide blocking and attachment plates and anchors and fasteners of adequate size and number to securely anchor each component in place, accurately located and aligned with other portions of the Work. Where size and type of attachments are not indicated, verify size and type required for load conditions.

1. Mounting Heights: Where mounting heights are not indicated, mount components at heights directed by Architect.
2. Allow for building movement, including thermal expansion and contraction.
3. Coordinate installation of anchorages. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.

I. Joints: Make joints of uniform width. Where joint locations in exposed work are not indicated, arrange joints for the best visual effect. Fit exposed connections together to form hairline joints.

J. Hazardous Materials: Use products, cleaners, and installation materials that are not considered hazardous.

3.6 CUTTING AND PATCHING

A. Cutting and Patching, General: Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time, and complete without delay.

1. Cut in-place construction to provide for installation of other components or performance of other construction, and subsequently patch as required to restore surfaces to their original condition.

B. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during installation or cutting and patching operations, by methods and with materials so as not to void existing warranties.

C. Temporary Support: Provide temporary support of work to be cut.

D. Protection: Protect in-place construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of Project that might be exposed during cutting and patching operations.

E. Cutting: Cut in-place construction by sawing, drilling, breaking, chipping, grinding, and similar operations, including excavation, using methods least likely to damage elements retained or adjoining construction. If possible, review proposed procedures with original Installer; comply with original Installer's written recommendations.

1. In general, use hand or small power tools designed for sawing and grinding, not hammering and chopping. Cut holes and slots neatly to minimum size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
2. Finished Surfaces: Cut or drill from the exposed or finished side into concealed surfaces.
3. Concrete and Masonry: Cut using a cutting machine, such as an abrasive saw or a diamond-core drill.
4. Excavating and Backfilling: Comply with requirements in applicable Sections where required by cutting and patching operations.
5. Mechanical and Electrical Services: Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after cutting.
6. Proceed with patching after construction operations requiring cutting are complete.

F. Patching: Patch construction by filling, repairing, refinishing, closing up, and similar operations following performance of other work. Patch with durable seams that are as invisible as practicable. Provide materials and comply with installation requirements specified in other Sections, where applicable.

1. Inspection: Where feasible, test and inspect patched areas after completion to demonstrate physical integrity of installation.
2. Exposed Finishes: Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will minimize evidence of patching and refinishing.

    a. Clean piping, conduit, and similar features before applying paint or other finishing materials.
    b. Restore damaged pipe covering to its original condition.

3. Floors and Walls: Where walls or partitions that are removed extend one finished area into another, patch and repair floor and wall surfaces in the new space. Provide an even surface of uniform finish, color, texture, and appearance. Remove in-place floor and wall coverings and replace with new materials, if necessary, to achieve uniform color and appearance.

    a. Where patching occurs in a painted surface, prepare substrate and apply primer and intermediate paint coats appropriate for substrate over the patch, and apply final paint coat over entire unbroken surface containing the patch. Provide additional coats until patch blends with adjacent surfaces.

4. Ceilings: Patch, repair, or rehang in-place ceilings as necessary to provide an even-plane surface of uniform appearance.
5. Exterior Building Enclosure: Patch components in a manner that restores enclosure to a weathertight condition and ensures thermal and moisture integrity of building enclosure. Patched and/or repaired finishes shall match adjacent retained finishes.

G. Cleaning: Clean areas and spaces where cutting and patching are performed. Remove paint, mortar, oils, putty, and similar materials from adjacent finished surfaces.

3.7 PROGRESS CLEANING

A. General: Clean Project site and work areas daily, including common areas. Enforce requirements strictly. Dispose of materials lawfully.

1. Comply with requirements in NFPA 241 for removal of combustible waste materials and debris.
2. Do not hold waste materials more than seven days during normal weather or three days if the temperature is expected to rise above 80 deg F (27 deg C).
3. Containerize hazardous and unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, according to regulations.

    a. Use containers intended for holding waste materials of type to be stored.

B. Site: Maintain Project site free of waste materials and debris.

C. Work Areas: Clean areas where work is in progress to the level of cleanliness necessary for proper execution of the Work.

1. Remove liquid spills promptly.
2. Where dust would impair proper execution of the Work, broom-clean or vacuum the entire work area, as appropriate.

D. Installed Work: Keep installed work clean. Clean installed surfaces according to written instructions of manufacturer or fabricator of product installed, using only cleaning materials specifically recommended. If specific cleaning materials are not recommended, use cleaning materials that are not hazardous to health or property and that will not damage exposed surfaces.

E. Concealed Spaces: Remove debris from concealed spaces before enclosing the space.

F. Exposed Surfaces in Finished Areas: Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.

G. Waste Disposal: Do not bury or burn waste materials on-site. Do not wash waste materials down sewers or into waterways. Comply with waste disposal requirements in Section 017419 "Construction Waste Management and Disposal."

H. During handling and installation, clean and protect construction in progress and adjoining materials already in place. Apply protective covering where required to ensure protection from damage or deterioration at Substantial Completion.

I. Clean and provide maintenance on completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.

J. Limiting Exposures: Supervise construction operations to assure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period.

3.8 STARTING AND ADJUSTING

A. Start equipment and operating components to confirm proper operation. Remove malfunctioning units, replace with new units, and retest.

B. Adjust equipment for proper operation. Adjust operating components for proper operation without binding.

C. Test each piece of equipment to verify proper operation. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

D. Manufacturer's Field Service: Comply with qualification requirements in Section 014000 "Quality Requirements."

3.9 PROTECTION OF INSTALLED CONSTRUCTION

A. Provide final protection and maintain conditions that ensure installed Work is without damage or deterioration at time of Substantial Completion.

B. Comply with manufacturer's written instructions for temperature and relative humidity.

END OF SECTION 017300

SECTION 017419 - CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes administrative and procedural requirements for the following:

1. Salvaging nonhazardous demolition and construction waste.
2. Recycling nonhazardous demolition and construction waste.
3. Disposing of nonhazardous demolition and construction waste.

B. Related Requirements:

1. Section 024100 "Selective Demolition" for disposition of waste resulting from partial demolition of buildings, structures, and site improvements.
2. Section 042000 "Unit Masonry" for disposal requirements for masonry waste.

1.3 DEFINITIONS

A. Construction Waste: Building and site improvement materials and other solid waste resulting from construction, remodeling, renovation, or repair operations. Construction waste includes packaging.

B. Demolition Waste: Building and site improvement materials resulting from demolition or selective demolition operations.

C. Disposal: Removal off-site of demolition and construction waste and subsequent sale, recycling, reuse, or deposit in landfill or incinerator acceptable to authorities having jurisdiction.

D. Recycle: Recovery of demolition or construction waste for subsequent processing in preparation for reuse.

E. Salvage: Recovery of demolition or construction waste and subsequent sale or reuse in another facility.

F. Salvage and Reuse: Recovery of demolition or construction waste and subsequent incorporation into the Work.

1.4 PERFORMANCE REQUIREMENTS

A. General: Practice efficient waste management in the use of materials in the course of the Work. Use all reasonable means to divert construction and demolition waste from landfills and incinerators. Facilitate recycling and salvage of materials, including the following:

1. Demolition Waste:

    a. Concrete
    b. Aggregate.
    c. Brick.
    d. Concrete masonry units.
    e. Plywood and oriented strand board.
    f. Wood paneling.
    g. Wood trim.
    h. Structural and miscellaneous steel.
    i. Rough hardware.
    j. Roofing.
    k. Insulation.
    l. Doors and frames.
    m. Door hardware.
    n. Windows.
    o. Glazing.
    p. Metal studs.
    q. Acoustical tile and panels.
    r. Carpet.
    s. Carpet pad.
    t. Equipment.
    u. Cabinets.
    v. Plumbing fixtures.
    w. Piping.
    x. Supports and hangers.
    y. Valves.
    z. Sprinklers.
    aa. Mechanical equipment.
    bb. Refrigerants.
    cc. Electrical conduit.
    dd. Copper wiring.
    ee. Lighting fixtures.
    ff. Lamps.
    gg. Ballasts.
    hh. Electrical devices.
    ii. Switchgear and panelboards.
    jj. Transformers.

2. Construction Waste:

    a. Masonry and CMU.
    b. Lumber.
    c. Wood sheet materials.
    d. Wood trim.
    e. Metals.
    f. Roofing.
    g. Insulation.
    h. Carpet and pad.
    i. Gypsum board.
    j. Piping.
    k. Electrical conduit.
    l. Packaging: Regardless of salvage/recycle goal indicated in "General" Paragraph above, salvage or recycle 100 percent of the following uncontaminated packaging materials:

1) Paper.
2) Cardboard.
3) Boxes.
4) Plastic sheet and film.
5) Polystyrene packaging.
6) Wood crates.
7) Plastic pails.

1.5 QUALITY ASSURANCE

A. Waste Management Coordinator Qualifications: Experienced firm, with a record of successful waste management coordination of projects with similar requirements.

B. Refrigerant Recovery Technician Qualifications: Certified by EPA-approved certification program.

C. Regulatory Requirements: Comply with hauling and disposal regulations of authorities having jurisdiction.

1.6 WASTE MANAGEMENT PLAN

A. General: Develop a waste management plan according to ASTM E 1609 and requirements in this Section. Plan shall consist of waste identification, waste reduction work plan, and cost/revenue analysis. Indicate quantities by weight or volume, but use same units of measure throughout waste management plan.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 PLAN IMPLEMENTATION

A. General: Implement approved waste management plan. Provide handling, containers, storage, signage, transportation, and other items as required to implement waste management plan during the entire duration of the Contract.

1. Comply with operation, termination, and removal requirements in Section 015000 "Temporary Facilities and Controls."

B. Waste Management Coordinator: Engage a waste management coordinator to be responsible for implementing, monitoring, and reporting status of waste management work plan.

C. Training: Train workers, subcontractors, and suppliers on proper waste management procedures, as appropriate for the Work.

1. Distribute waste management plan to entities when they first begin work on-site. Review plan procedures and locations established for salvage, recycling, and disposal.

D. Site Access and Temporary Controls: Conduct waste management operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.

1. Designate and label specific areas on Project site necessary for separating materials that are to be salvaged, recycled, reused, donated, and sold.
2. Comply with Section 015000 "Temporary Facilities and Controls" for controlling dust and dirt, environmental protection, and noise control.

3.2 SALVAGING DEMOLITION WASTE

A. Salvaged Items for Reuse in the Work: Salvage items for reuse and handle as follows:

1. Clean salvaged items.
2. Pack or crate items after cleaning. Identify contents of containers with label indicating elements, date of removal, quantity, and location where removed.
3. Store items in a secure area until installation.
4. Protect items from damage during transport and storage.
5. Install salvaged items to comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make items functional for use indicated.

B. Salvaged Items for Sale and Donation: Not permitted on Project site.

3.3 RECYCLING DEMOLITION AND CONSTRUCTION WASTE, GENERAL

A. General: Recycle paper and beverage containers used by on-site workers.

B. Available Waste Management Services: Wastecap Nebraska, a non-profit organization providing non-regulatory waste reduction and recycling services to Nebraska businesses will offer construction waste management services, helping to provide plans and track recycled materials as well as train site personnel on recycling efforts for the job. Use of these services is an option the Contractor may elect to utilize. Any costs associated with such services are the responsibility of the Contractor.

C. Recycling Receivers and Processors: Organizations and locations that will accept materials for recycling purposes are available at www.wastecapne.org. Website is associated with WasteCap Nebraska, a non-profit organization that provides non-regulatory waste reduction and recycling services to Nebraska businesses.

D. Recycling Incentives: Revenues, savings, rebates, tax credits, and other incentives received for recycling waste materials shall accrue to Contractor.

E. Preparation of Waste: Prepare and maintain recyclable waste materials according to recycling or reuse facility requirements. Maintain materials free of dirt, adhesives, solvents, petroleum contamination, and other substances deleterious to the recycling process.

F. Procedures: Separate recyclable waste from other waste materials, trash, and debris. Separate recyclable waste by type at Project site to the maximum extent practical according to approved construction waste management plan.

1. Provide appropriately marked containers or bins for controlling recyclable waste until removed from Project site. Include list of acceptable and unacceptable materials at each container and bin.

    a. Inspect containers and bins for contamination and remove contaminated materials if found.

2. Stockpile processed materials on-site without intermixing with other materials. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.
3. Stockpile materials away from construction area. Do not store within drip line of remaining trees.
4. Store components off the ground and protect from the weather.
5. Remove recyclable waste from Owner's property and transport to recycling receiver or processor.

3.4 RECYCLING DEMOLITION WASTE

A. Concrete: Remove reinforcement and other metals from concrete and sort with other metals.

1. Pulverize concrete to maximum 1-1/2-inch (38-mm) size.

B. Masonry: Remove metal reinforcement, anchors, and ties from masonry and sort with other metals.

1. Pulverize masonry to maximum 3/4-inch (19-mm) size.
2. Clean and stack undamaged, whole masonry units on wood pallets.

C. Wood Materials: Sort and stack members according to size, type, and length. Separate lumber, engineered wood products, panel products, and treated wood materials.

D. Metals: Separate metals by type.

1. Structural Steel: Stack members according to size, type of member, and length.
2. Remove and dispose of bolts, nuts, washers, and other rough hardware.

E. Acoustical Ceiling Panels and Tile: Stack large clean pieces on wood pallets and store in a dry location.

F. Metal Suspension System: Separate metal members including trim, and other metals from acoustical panels and tile and sort with other metals.

G. Carpet and Pad: Roll large pieces tightly after removing debris, trash, adhesive, and tack strips.

1. Store clean, dry carpet and pad in a closed container or trailer provided by Carpet Reclamation Agency or carpet recycler.

H. Carpet Tile: Remove debris, trash, and adhesive.

1. Stack tile on pallet and store clean, dry carpet in a closed container or trailer provided by Carpet Reclamation Agency or carpet recycler.

I. Piping: Reduce piping to straight lengths and store by type and size. Separate supports, hangers, valves, sprinklers, and other components by type and size.

J. Conduit: Reduce conduit to straight lengths and store by type and size.

3.5 RECYCLING CONSTRUCTION WASTE

A. Packaging:

1. Cardboard and Boxes: Break down packaging into flat sheets. Bundle and store in a dry location.
2. Polystyrene Packaging: Separate and bag materials.
3. Pallets: As much as possible, require deliveries using pallets to remove pallets from Project site. For pallets that remain on-site, break down pallets into component wood pieces and comply with requirements for recycling wood.
4. Crates: Break down crates into component wood pieces and comply with requirements for recycling wood.

B. Wood Materials:

1. Clean Cut-Offs of Lumber: Grind or chip into small pieces.
2. Clean Sawdust: Bag sawdust that does not contain painted or treated wood.

C. Gypsum Board: Stack large clean pieces on wood pallets or in container and store in a dry location.

3.6 DISPOSAL OF WASTE

A. General: Except for items or materials to be salvaged, recycled, or otherwise reused, remove waste materials from Project site and legally dispose of them in a landfill or incinerator acceptable to authorities having jurisdiction.

1. Except as otherwise specified, do not allow waste materials that are to be disposed of accumulate on-site.
2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.

B. Burning: Do not burn waste materials.

C. Burning: Burning of waste materials is permitted only at designated areas on Owner's property, provided required permits are obtained. Provide full-time monitoring for burning materials until fires are extinguished.

D. Disposal: Remove waste materials from Owner's property and legally dispose of them.

END OF SECTION 017419

SECTION 017700 - CLOSEOUT PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes administrative and procedural requirements for contract closeout, including, but not limited to, the following:

1. Substantial Completion procedures.
2. Final completion procedures.
3. Final cleaning.
4. Repair of the Work.

B. Related Requirements:

1. Section 017300 "Execution" for progress cleaning of Project site.
2. Section 017823 "Operation and Maintenance Data" for operation and maintenance manual requirements.
3. Section 017839 "Project Record Documents" for submitting record Drawings, record Specifications, and record Product Data.

1.3 ACTION SUBMITTALS

A. Contractor's List of Incomplete Items: Initial submittal at Substantial Completion.

B. Contractor certified copy of Design Professional’s List(s) of Incomplete Items: Final submittal at Final Completion.

1.4 CLOSEOUT SUBMITTALS

A. Certificate of Insurance: For continuing coverage.

1.5 SUBSTANTIAL COMPLETION PROCEDURES

A. Contractor's List of Incomplete Items: Prepare and submit a list of items to be completed and corrected (Contractor's punch list), indicating the value of each item on the list and reasons why the Work is incomplete.

B. Submittals Prior to Substantial Completion: Complete the following a minimum of 10 days prior to requesting inspection for determining date of Substantial Completion. List items below that are incomplete at time of request.

1. Certificates of Release: Obtain and submit releases from authorities having jurisdiction permitting Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
2. Submit closeout submittals specified in other Division 01 Sections, including project record documents, operation and maintenance manuals, final completion construction photographic documentation, damage or settlement surveys, property surveys, and similar final record information.
3. Submit closeout submittals specified in individual Sections, including specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.
4. Submit maintenance material submittals specified in individual Sections, including tools, spare parts, extra materials, and similar items, and deliver to location designated by Owner. Label with manufacturer's name and model number where applicable.

    a. Schedule of Maintenance Material Items: Prepare and submit schedule of maintenance material submittal items, including name and quantity of each item and name and number of related Specification Section. Obtain Owner's signature for receipt of submittals.

5. Submit test/adjust/balance records.

C. Procedures Prior to Substantial Completion: Complete the following a minimum of 10 days prior to requesting inspection for determining date of Substantial Completion. List items below that are incomplete at time of request.

1. Advise Owner of pending insurance changeover requirements.
2. Make final changeover of permanent locks and deliver keys to Owner. Advise Owner's personnel of changeover in security provisions.
3. Complete startup and testing of systems and equipment.
4. Perform preventive maintenance on equipment used prior to Substantial Completion.
5. Instruct Owner's personnel in operation, adjustment, and maintenance of products, equipment, and systems. Submit demonstration and training video recordings specified in Section 017900 "Demonstration and Training."
6. Advise Owner of changeover in heat and other utilities.
7. Participate with Owner in conducting inspection and walkthrough with local emergency responders.
8. Terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.
9. Complete final cleaning requirements, including touchup painting.
10. Touch up and otherwise repair and restore marred exposed finishes to eliminate visual defects.

D. Inspection: Submit a written request for inspection to determine Substantial Completion a minimum of 10 days prior to date the work will be completed and ready for final inspection and tests. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare the Certificate of Substantial Completion after inspection or will notify Contractor of items, either on Contractor's list or additional items identified by Architect, that must be completed or corrected before certificate will be issued.

1. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.

    a. Costs incurred by the Architect or the Architect’s Consultants associated with “Substantial Completion” re-inspections resulting from the Contractor’s failure to have the Work sufficiently complete at time of the initial inspection shall be borne solely by the Contractor.

1) Design Professional re-inspections service fees, owed by the Contractor, will be billed by the Architect on a time and material basis at the Architect's current billing rates and the Owner will deduct this amount from the Contractor's Final Payment Request.

2. Results of completed inspection will form the basis of requirements for final completion.

1.6 FINAL COMPLETION PROCEDURES

A. Submittals Prior to Final Completion: Before requesting final inspection for determining final completion, complete the following:

1. Submit a final Application for Payment according to Section 012900 "Payment Procedures."
2. Certified List of Incomplete Items: Submit certified copy of Architect's Substantial Completion inspection list of items to be completed or corrected (punch list), endorsed and dated by Architect. Certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance.
3. Certificate of Insurance: Submit evidence of final, continuing insurance coverage complying with insurance requirements.

B. Inspection: Submit a written request for final inspection to determine acceptance a minimum of 10 days prior to date the work will be completed and ready for final inspection and tests. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare a final Certificate for Payment after inspection or will notify Contractor of construction that must be completed or corrected before certificate will be issued.

1. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.

a. Costs incurred by the Architect or the Architect's Consultants associated with "Final Completion" re-inspections resulting from the Contractor's failure to have the Work sufficiently complete at time of the initial inspection shall be borne solely by the Contractor.

1) Design Professional re-inspections service fees, owed by the Contractor, will be billed by the Architect on a time and material basis at the Architect's current billing rates and the Owner will deduct this amount from the Contractor's Final Payment Request.

1.7 LIST OF INCOMPLETE ITEMS (PUNCH LIST)

A. Organization of List: Include name and identification of each space and area affected by construction operations for incomplete items and items needing correction including, if necessary, areas disturbed by Contractor that are outside the limits of construction.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Cleaning Agents: Use cleaning materials and agents recommended by manufacturer or fabricator of the surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finished surfaces.

PART 3 - EXECUTION

3.1 FINAL CLEANING

A. General: Perform final cleaning. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and antipollution regulations.

B. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to condition expected in an average commercial building cleaning and maintenance program. Comply with manufacturer's written instructions.

1. Complete the following cleaning operations before requesting inspection for certification of Substantial Completion for entire Project or for a designated portion of Project:

a. Clean Project site, yard, and grounds, in areas disturbed by construction activities, including landscape development areas, of rubbish, waste material, litter, and other foreign substances.
b. Sweep paved areas broom clean. Remove petrochemical spills, stains, and other foreign deposits.
c. Rake grounds that are neither planted nor paved to a smooth, even-textured surface.
d. Remove tools, construction equipment, machinery, and surplus material from Project site.
e. Remove snow and ice to provide safe access to building.
f. Clean exposed exterior and interior hard-surfaced finishes to a dirt-free condition, free of stains, films, and similar foreign substances. Avoid disturbing natural weathering of exterior surfaces. Restore reflective surfaces to their original condition.
g. Remove debris and surface dust from limited access spaces, including roofs, plenums, shafts, trenches, equipment vaults, manholes, attics, and similar spaces.
h. Sweep concrete floors broom clean in unoccupied spaces.
i. Vacuum carpet and similar soft surfaces, removing debris and excess nap; clean according to manufacturer's recommendations if visible soil or stains remain.
j. Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compounds and other noticeable, vision-obscuring materials. Polish mirrors and glass, taking care not to scratch surfaces.
k. Remove labels that are not permanent.
l. Wipe surfaces of mechanical and electrical equipment and similar equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.
m. Clean plumbing fixtures to a sanitary condition, free of stains, including stains resulting from water exposure.
n. Replace disposable air filters and clean permanent air filters. Clean exposed surfaces of diffusers, registers, and grills.

o. Clean ducts, blowers, and coils if units were operated without filters during construction or that display contamination with particulate matter on inspection.
p. Clean light fixtures, lamps, globes, and reflectors to function with full efficiency.
q. Leave Project clean and ready for occupancy.

C. Construction Waste Disposal: Comply with waste disposal requirements in Section 017419 "Construction Waste Management and Disposal."

3.2 REPAIR OF THE WORK

A. Complete repair and restoration operations before requesting inspection for determination of Substantial Completion.

B. Repair or remove and replace defective construction. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment. Where damaged or worn items cannot be repaired or restored, provide replacements. Remove and replace operating components that cannot be repaired. Restore damaged construction and permanent facilities used during construction to specified condition.

1. Remove and replace chipped, scratched, and broken glass, reflective surfaces, and other damaged transparent materials.
2. Touch up and otherwise repair and restore marred or exposed finishes and surfaces. Replace finishes and surfaces that that already show evidence of repair or restoration.

a. Do not paint over "UL" and other required labels and identification, including mechanical and electrical nameplates. Remove paint applied to required labels and identification.

3. Replace parts subject to operating conditions during construction that may impede operation or reduce longevity.
4. Replace burned-out bulbs, bulbs noticeably dimmed by hours of use, and defective and noisy starters in fluorescent and mercury vapor fixtures to comply with requirements for new fixtures.

END OF SECTION 017700

SECTION 017823 - OPERATION AND MAINTENANCE DATA

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes administrative and procedural requirements for preparing operation and maintenance manuals, including the following:

1. Operation and maintenance documentation directory.
2. Emergency manuals.
3. Operation manuals for systems, subsystems, and equipment.
4. Product maintenance manuals.
5. Systems and equipment maintenance manuals.

B. Related Requirements:

1. Section 013300 "Submittal Procedures" for submitting copies of submittals for operation and maintenance manuals.
2. Divisions 2 through 48 for specific requirements regarding record document requirements for Work in those Sections.

1.3 DEFINITIONS

A. System: An organized collection of parts, equipment, or subsystems united by regular interaction.

B. Subsystem: A portion of a system with characteristics similar to a system.

1.4 CLOSEOUT SUBMITTALS

A. Manual Content: Operations and maintenance manual content is specified in individual Specification Sections to be reviewed at the time of Section submittals. Submit reviewed manual content formatted and organized as required by this Section.

1. Architect will comment on whether content of operations and maintenance submittals are acceptable.
2. Where applicable, clarify and update reviewed manual content to correspond to revisions and field conditions.

B. Format: Submit operations and maintenance manuals in the following format:

1. Three paper copies. Include a complete operation and maintenance directory. Enclose title pages and directories in clear plastic sleeves.

C. Initial Manual Submittal: Submit draft copy of each manual at least 30 days before commencing demonstration and training. Architect will comment on whether general scope and content of manual are acceptable.

D. Final Manual Submittal: Submit each manual in final form prior to requesting inspection for Substantial Completion and at least 15 days before commencing demonstration and training. Architect will return copy with comments.

1. Correct or revise each manual to comply with Architect's comments. Submit copies of each corrected manual within 15 days of receipt of Architect's comments and prior to commencing demonstration and training.

PART 2 - PRODUCTS

2.1 OPERATION AND MAINTENANCE DOCUMENTATION DIRECTORY

A. Directory: Prepare a single, comprehensive directory of emergency, operation, and maintenance data and materials, listing items and their location to facilitate ready access to desired information. Include a section in the directory for each of the following:

1. List of documents.
2. List of systems.
3. List of equipment.
4. Table of contents.

B. List of Systems and Subsystems: List systems alphabetically. Include references to operation and maintenance manuals that contain information about each system.

C. List of Equipment: List equipment for each system, organized alphabetically by system. For pieces of equipment not part of system, list alphabetically in separate list.

D. Tables of Contents: Include a table of contents for each emergency, operation, and maintenance manual.

E. Identification: In the documentation directory and in each operation and maintenance manual, identify each system, subsystem, and piece of equipment with same designation used in the Contract Documents. If no designation exists, assign a designation according to ASHRAE Guideline 4, "Preparation of Operating and Maintenance Documentation for Building Systems."

2.2 REQUIREMENTS FOR EMERGENCY, OPERATION, AND MAINTENANCE MANUALS

A. Organization: Unless otherwise indicated, organize each manual into a separate section for each system and subsystem, and a separate section for each piece of equipment not part of a system. Each manual shall contain the following materials, in the order listed:

1. Title page.
2. Table of contents.
3. Manual contents.

B. Title Page: Include the following information:

1. Subject matter included in manual.
2. Name and address of Project.
3. Name and address of Owner.
4. Date of submittal.
5. Name and contact information for Contractor.
6. Name and contact information for Construction Manager.
7. Name and contact information for Architect.
8. Name and contact information for Commissioning Authority.
9. Names and contact information for major consultants to the Architect that designed the systems contained in the manuals.
10. Cross-reference to related systems in other operation and maintenance manuals.

C. Table of Contents: List each product included in manual, identified by product name, indexed to the content of the volume, and cross-referenced to Specification Section number in Project Manual.

1. If operation or maintenance documentation requires more than one volume to accommodate data, include comprehensive table of contents for all volumes in each volume of the set.

D. Manual Contents: Organize into sets of manageable size. Arrange contents alphabetically by system, subsystem, and equipment. If possible, assemble instructions for subsystems, equipment, and components of one system into a single binder.

E. Manuals, Paper Copy: Submit manuals in the form of hard copy, bound and labeled volumes.

1. Binders: Heavy-duty, three-ring, vinyl-covered, loose-leaf binders, in thickness necessary to accommodate contents, sized to hold 8-1/2-by-11-inch (215-by-280-mm) paper; with clear plastic sleeve on spine to hold label describing contents and with pockets inside covers to hold folded oversize sheets.

    a. If two or more binders are necessary to accommodate data of a system, organize data in each binder into groupings by subsystem and related components. Cross-reference other binders if necessary to provide essential information for proper operation or maintenance of equipment or system.
    b. Identify each binder on front and spine, with printed title "OPERATION AND MAINTENANCE MANUAL," Project title or name, and subject matter of contents, and indicate Specification Section number on bottom of spine. Indicate volume number for multiple-volume sets.

2. Dividers: Heavy-paper dividers with plastic-covered tabs for each section of the manual. Mark each tab to indicate contents. Include typed list of products and major components of equipment included in the section on each divider, cross-referenced to Specification Section number and title of Project Manual.
3. Protective Plastic Sleeves: Transparent plastic sleeves designed to enclose diagnostic software storage media for computerized electronic equipment.
4. Supplementary Text: Prepared on 8-1/2-by-11-inch (215-by-280-mm) white bond paper.
5. Drawings: Attach reinforced, punched binder tabs on drawings and bind with text.

    a. If oversize drawings are necessary, fold drawings to same size as text pages and use as foldouts.
    b. If drawings are too large to be used as foldouts, fold and place drawings in labeled envelopes and bind envelopes in rear of manual. At appropriate locations in manual, insert typewritten pages indicating drawing titles, descriptions of contents, and drawing locations.

2.3 EMERGENCY MANUALS

A. Content: Organize manual into a separate section for each of the following:

1. Type of emergency.
2. Emergency instructions.
3. Emergency procedures.

B. Type of Emergency: Where applicable for each type of emergency indicated below, include instructions and procedures for each system, subsystem, piece of equipment, and component:

1. Fire.
2. Flood.
3. Gas leak.
4. Water leak.
5. Power failure.
6. Water outage.
7. System, subsystem, or equipment failure.
8. Chemical release or spill.

C. Emergency Instructions: Describe and explain warnings, trouble indications, error messages, and similar codes and signals. Include responsibilities of Owner's operating personnel for notification of Installer, supplier, and manufacturer to maintain warranties.

D. Emergency Procedures: Include the following, as applicable:

1. Instructions on stopping.
2. Shutdown instructions for each type of emergency.
3. Operating instructions for conditions outside normal operating limits.
4. Required sequences for electric or electronic systems.
5. Special operating instructions and procedures.

2.4 OPERATION MANUALS

A. Content: In addition to requirements in this Section, include operation data required in individual Specification Sections and the following information:

1. System, subsystem, and equipment descriptions. Use designations for systems and equipment indicated on Contract Documents.
2. Performance and design criteria if Contractor has delegated design responsibility.
3. Operating standards.
4. Operating procedures.
5. Operating logs.
6. Wiring diagrams.
7. Control diagrams.
8. Piped system diagrams.
9. Precautions against improper use.
10. License requirements including inspection and renewal dates.

B. Descriptions: Include the following:

1. Product name and model number. Use designations for products indicated on Contract Documents.
2. Manufacturer's name.

3. Equipment identification with serial number of each component.
4. Equipment function.
5. Operating characteristics.
6. Limiting conditions.
7. Performance curves.
8. Engineering data and tests.
9. Complete nomenclature and number of replacement parts.

C. Operating Procedures: Include the following, as applicable:

1. Startup procedures.
2. Equipment or system break-in procedures.
3. Routine and normal operating instructions.
4. Regulation and control procedures.
5. Instructions on stopping.
6. Normal shutdown instructions.
7. Seasonal and weekend operating instructions.
8. Required sequences for electric or electronic systems.
9. Special operating instructions and procedures.

D. Systems and Equipment Controls: Describe the sequence of operation, and diagram controls as installed.

E. Piped Systems: Diagram piping as installed, and identify color-coding where required for identification.

2.5 PRODUCT MAINTENANCE MANUALS

A. Content: Organize manual into a separate section for each product, material, and finish. Include source information, product information, maintenance procedures, repair materials and sources, and warranties and bonds, as described below.

B. Source Information: List each product included in manual, identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual and drawing or schedule designation or identifier where applicable.

C. Product Information: Include the following, as applicable:

1. Product name and model number.
2. Manufacturer's name.
3. Color, pattern, and texture.
4. Material and chemical composition.
5. Reordering information for specially manufactured products.

D. Maintenance Procedures: Include manufacturer's written recommendations and the following:

1. Inspection procedures.
2. Types of cleaning agents to be used and methods of cleaning.
3. List of cleaning agents and methods of cleaning detrimental to product.
4. Schedule for routine cleaning and maintenance.
5. Repair instructions.

E. Repair Materials and Sources: Include lists of materials and local sources of materials and related services.

F. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.

1. Include procedures to follow and required notifications for warranty claims.

2.6 SYSTEMS AND EQUIPMENT MAINTENANCE MANUALS

A. Content: For each system, subsystem, and piece of equipment not part of a system, include source information, manufacturers' maintenance documentation, maintenance procedures, maintenance and service schedules, spare parts list and source information, maintenance service contracts, and warranty and bond information, as described below.

B. Source Information: List each system, subsystem, and piece of equipment included in manual, identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual and drawing or schedule designation or identifier where applicable.

C. Manufacturers' Maintenance Documentation: Manufacturers' maintenance documentation including the following information for each component part or piece of equipment:

1. Standard maintenance instructions and bulletins.
2. Drawings, diagrams, and instructions required for maintenance, including disassembly and component removal, replacement, and assembly.
3. Identification and nomenclature of parts and components.
4. List of items recommended to be stocked as spare parts.

D. Maintenance Procedures: Include the following information and items that detail essential maintenance procedures:

1. Test and inspection instructions.
2. Troubleshooting guide.
3. Precautions against improper maintenance.
4. Disassembly; component removal, repair, and replacement; and reassembly instructions.
5. Aligning, adjusting, and checking instructions.
6. Demonstration and training video recording, if available.

E. Maintenance and Service Schedules: Include service and lubrication requirements, list of required lubricants for equipment, and separate schedules for preventive and routine maintenance and service with standard time allotment.

1. Scheduled Maintenance and Service: Tabulate actions for daily, weekly, monthly, quarterly, semiannual, and annual frequencies.
2. Maintenance and Service Record: Include manufacturers' forms for recording maintenance.

F. Spare Parts List and Source Information: Include lists of replacement and repair parts, with parts identified and cross-referenced to manufacturers' maintenance documentation and local sources of maintenance materials and related services.

G. Maintenance Service Contracts: Include copies of maintenance agreements with name and telephone number of service agent.

H. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.

1. Include procedures to follow and required notifications for warranty claims.

PART 3 - EXECUTION

3.1 MANUAL PREPARATION

A. Emergency Manual: Assemble a complete set of emergency information indicating procedures for use by emergency personnel and by Owner's operating personnel for types of emergencies indicated.

B. Product Maintenance Manual: Assemble a complete set of maintenance data indicating care and maintenance of each product, material, and finish incorporated into the Work.

C. Operation and Maintenance Manuals: Assemble a complete set of operation and maintenance data indicating operation and maintenance of each system, subsystem, and piece of equipment not part of a system.

1. Engage a factory-authorized service representative to assemble and prepare information for each system, subsystem, and piece of equipment not part of a system.
2. Prepare a separate manual for each system and subsystem, in the form of an instructional manual for use by Owner's operating personnel.

D. Manufacturers' Data: Where manuals contain manufacturers' standard printed data, include only sheets pertinent to product or component installed. Mark each sheet to identify each product or component incorporated into the Work. If data include more than one item in a tabular format, identify each item using appropriate references from the Contract Documents. Identify data applicable to the Work and delete references to information not applicable.

1. Prepare supplementary text if manufacturers' standard printed data are not available and where the information is necessary for proper operation and maintenance of equipment or systems.

E. Drawings: Prepare drawings supplementing manufacturers' printed data to illustrate the relationship of component parts of equipment and systems and to illustrate control sequence and flow diagrams. Coordinate these drawings with information contained in record Drawings to ensure correct illustration of completed installation.

1. Do not use original project record documents as part of operation and maintenance manuals.
2. Comply with requirements of newly prepared record Drawings in Section 017839 "Project Record Documents."

F. Comply with Section 017700 "Closeout Procedures" for schedule for submitting operation and maintenance documentation.

END OF SECTION 017823

SECTION 017839 - PROJECT RECORD DOCUMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes administrative and procedural requirements for project record documents, including the following:

1. Record Drawings.
2. Record Specifications.

B. Related Requirements:

1. Section 017700 "Closeout Procedures" for general closeout procedures.
2. Section 017823 "Operation and Maintenance Data" for operation and maintenance manual requirements.

1.3 CLOSEOUT SUBMITTALS

A. Record Drawings: Submit one set(s) of marked-up record prints.

B. Record Specifications: Submit one paper copy of Project's Specifications, including addenda and contract modifications.

PART 2 - PRODUCTS

2.1 RECORD DRAWINGS

A. Record Prints: Maintain one set of marked-up paper copies of the Contract Drawings and Shop Drawings, incorporating new and revised drawings as modifications are issued.

1. Preparation: Mark record prints to show the actual installation where installation varies from that shown originally. Require individual or entity who obtained record data, whether individual or entity is Installer, subcontractor, or similar entity, to provide information for preparation of corresponding marked-up record prints.

a. Give particular attention to information on concealed elements that would be difficult to identify or measure and record later.
b. Accurately record information in an acceptable drawing technique.
c. Record data as soon as possible after obtaining it.
d. Record and check the markup before enclosing concealed installations.

e. Cross-reference record prints to corresponding archive photographic documentation.

2. Content: Types of items requiring marking include, but are not limited to, the following:

a. Dimensional changes to Drawings.
b. Revisions to details shown on Drawings.
c. Depths of foundations below first floor.
d. Locations and depths of underground utilities.
e. Revisions to routing of piping and conduits.
f. Revisions to electrical circuitry.
g. Actual equipment locations.
h. Duct size and routing.
i. Locations of concealed internal utilities.
j. Changes made by Change Order or Construction Change Directive.
k. Changes made following Architect's written orders.
l. Details not on the original Contract Drawings.
m. Field records for variable and concealed conditions.
n. Record information on the Work that is shown only schematically.

3. Mark the Contract Drawings and Shop Drawings completely and accurately. Use personnel proficient at recording graphic information in production of marked-up record prints.
4. Mark record sets with erasable, red-colored pencil. Use other colors to distinguish between changes for different categories of the Work at same location.
5. Mark important additional information that was either shown schematically or omitted from original Drawings.
6. Note Construction Change Directive numbers, alternate numbers, Change Order numbers, and similar identification, where applicable.

B. Format: Identify and date each record Drawing; include the designation "PROJECT RECORD DRAWING" in a prominent location.

1. Record Prints: Organize record prints and newly prepared record Drawings into manageable sets. Bind each set with durable paper cover sheets. Include identification on cover sheets.
2. Identification: As follows:

a. Project name.
b. Date.
c. Designation "PROJECT RECORD DRAWINGS."
d. Name of Architect.
e. Name of Contractor.

2.2 RECORD SPECIFICATIONS

A. Preparation: Mark Specifications to indicate the actual product installation where installation varies from that indicated in Specifications, addenda, and contract modifications.

1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
2. Mark copy with the proprietary name and model number of products, materials, and equipment furnished, including substitutions and product options selected.

3. Record the name of manufacturer, supplier, Installer, and other information necessary to provide a record of selections made.
4. For each principal product, indicate whether record Product Data has been submitted in operation and maintenance manuals instead of submitted as record Product Data.
5. Note related Change Orders, record Product Data, and record Drawings where applicable.

B. Format: Submit record Specifications as paper copy.

PART 3 - EXECUTION

3.1 RECORDING AND MAINTENANCE

A. Recording: Maintain one copy of each submittal during the construction period for project record document purposes. Post changes and revisions to project record documents as they occur; do not wait until end of Project.

B. Maintenance of Record Documents and Samples: Store record documents and Samples in the field office apart from the Contract Documents used for construction. Do not use project record documents for construction purposes. Maintain record documents in good order and in a clean, dry, legible condition, protected from deterioration and loss. Provide access to project record documents for Architect's reference during normal working hours.

END OF SECTION 017839

SECTION 017900 - DEMONSTRATION AND TRAINING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes administrative and procedural requirements for instructing Owner's personnel, including the following:

1. Demonstration of operation of systems, subsystems, and equipment.
2. Training in operation and maintenance of systems, subsystems, and equipment.
3. Demonstration and training video recordings.

1.3 INFORMATIONAL SUBMITTALS

A. Instruction Program: Submit outline of instructional program for demonstration and training, including a list of training modules and a schedule of proposed dates, times, length of instruction time, and instructors' names for each training module. Include learning objective and outline for each training module.

B. Attendance Record: For each training module, submit list of participants and length of instruction time.

1.4 CLOSEOUT SUBMITTALS

A. Demonstration and Training Video Recordings: Submit two copies within seven days of end of each training module.

1. Identification: On each copy, provide an applied label with the following information:

a. Name of Project.
b. Name and address of videographer.
c. Name of Architect.
d. Name of Construction Manager.
e. Name of Contractor.
f. Date of video recording.

2. Transcript: Prepared in PDF electronic format. Include a cover sheet with same label information as the corresponding video recording and a table of contents with links to corresponding training components. Include name of Project and date of video recording on each page.
3. At completion of training, submit complete training manual(s) for Owner's use in PDF electronic file format on compact disc.

1.5 QUALITY ASSURANCE

A. Facilitator Qualifications: A firm or individual experienced in training or educating maintenance personnel in a training program similar in content and extent to that indicated for this Project, and whose work has resulted in training or education with a record of successful learning performance.

1.6 COORDINATION

A. Coordinate instruction schedule with Owner's operations. Adjust schedule as required to minimize disrupting Owner's operations and to ensure availability of Owner's personnel.

B. Coordinate instructors, including providing notification of dates, times, length of instruction time, and course content.

C. Coordinate content of training modules with content of approved emergency, operation, and maintenance manuals. Do not submit instruction program until operation and maintenance data has been reviewed and approved by Architect.

PART 2 - PRODUCTS

2.1 INSTRUCTION PROGRAM

A. Program Structure: Develop an instruction program that includes individual training modules for each system and for equipment not part of a system, as required by individual Specification Sections.

B. Training Modules: Develop a learning objective and teaching outline for each module. Include a description of specific skills and knowledge that participant is expected to master. For each module, include instruction for the following as applicable to the system, equipment, or component:

1. Basis of System Design, Operational Requirements, and Criteria: Include the following:

    a. System, subsystem, and equipment descriptions.
    b. Performance and design criteria if Contractor is delegated design responsibility.
    c. Operating standards.
    d. Regulatory requirements.
    e. Equipment function.
    f. Operating characteristics.
    g. Limiting conditions.
    h. Performance curves.

2. Documentation: Review the following items in detail:

    a. Emergency manuals.
    b. Operations manuals.
    c. Maintenance manuals.
    d. Project record documents.
    e. Identification systems.
    f. Warranties and bonds.
    g. Maintenance service agreements and similar continuing commitments.

3. Emergencies: Include the following, as applicable:

    a. Instructions on meaning of warnings, trouble indications, and error messages.
    b. Instructions on stopping.
    c. Shutdown instructions for each type of emergency.
    d. Operating instructions for conditions outside of normal operating limits.
    e. Sequences for electric or electronic systems.
    f. Special operating instructions and procedures.

4. Operations: Include the following, as applicable:

    a. Startup procedures.
    b. Equipment or system break-in procedures.
    c. Routine and normal operating instructions.
    d. Regulation and control procedures.
    e. Control sequences.
    f. Safety procedures.
    g. Instructions on stopping.
    h. Normal shutdown instructions.
    i. Operating procedures for emergencies.
    j. Operating procedures for system, subsystem, or equipment failure.
    k. Seasonal and weekend operating instructions.
    l. Required sequences for electric or electronic systems.
    m. Special operating instructions and procedures.

5. Adjustments: Include the following:

    a. Alignments.
    b. Checking adjustments.
    c. Noise and vibration adjustments.
    d. Economy and efficiency adjustments.

6. Troubleshooting: Include the following:

    a. Diagnostic instructions.
    b. Test and inspection procedures.

7. Maintenance: Include the following:

    a. Inspection procedures.
    b. Types of cleaning agents to be used and methods of cleaning.
    c. List of cleaning agents and methods of cleaning detrimental to product.
    d. Procedures for routine cleaning
    e. Procedures for preventive maintenance.
    f. Procedures for routine maintenance.
    g. Instruction on use of special tools.

8. Repairs: Include the following:

    a. Diagnosis instructions.
    b. Repair instructions.
    c. Disassembly; component removal, repair, and replacement; and reassembly instructions.
    d. Instructions for identifying parts and components.
    e. Review of spare parts needed for operation and maintenance.

PART 3 - EXECUTION

3.1 PREPARATION

A. Assemble educational materials necessary for instruction, including documentation and training module. Assemble training modules into a training manual organized in coordination with requirements in Section 017823 "Operation and Maintenance Data."

B. Set up instructional equipment at instruction location.

3.2 INSTRUCTION

A. Facilitator: Engage a qualified facilitator to prepare instruction program and training modules, to coordinate instructors, and to coordinate between Contractor and Owner for number of participants, instruction times, and location.

B. Engage qualified instructors to instruct Owner's personnel to adjust, operate, and maintain systems, subsystems, and equipment not part of a system.

1. Owner will furnish Contractor with names and positions of participants.

C. Scheduling: Provide instruction at mutually agreed on times. For equipment that requires seasonal operation, provide similar instruction at start of each season.

1. Schedule training with Owner, with at least seven days' advance notice.

D. Training Location and Reference Material: Conduct training on-site in the completed and fully operational facility using the actual equipment in-place. Conduct training using final operation and maintenance data submittals.

E. Evaluation: At conclusion of each training module, assess and document each participant's mastery of module by use of a demonstration performance-based test.

F. Cleanup: Collect used and leftover educational materials and remove from Project site. Remove instructional equipment. Restore systems and equipment to condition existing before initial training use.

3.3 DEMONSTRATION AND TRAINING VIDEO RECORDINGS

A. General: Record demonstration and training video recordings. Record each training module separately. Include classroom instructions and demonstrations, board diagrams, and other visual aids, but not student practice.

1. At beginning of each training module, record each chart containing learning objective and lesson outline.

B. Video: Provide minimum 640 x 480 video resolution converted to format file type acceptable to Owner, on electronic media.

1. Electronic Media: Read-only format compact disc acceptable to Owner, with commercial-grade graphic label.

2. File Hierarchy: Organize folder structure and file locations according to project manual table of contents. Provide complete screen-based menu.
3. File Names: Utilize file names based upon name of equipment generally described in video segment, as identified in Project specifications.
4. Contractor and Installer Contact File: Using appropriate software, create a file for inclusion on the Equipment Demonstration and Training DVD that describes the following for each Contractor involved on the Project, arranged according to Project table of contents:

    a. Name of Contractor/Installer.
    b. Business address.
    c. Business phone number.
    d. Point of contact.
    e. E-mail address.

C. Recording: Mount camera on tripod before starting recording, unless otherwise necessary to adequately cover area of demonstration and training. Display continuous running time.

1. Film training session(s) in segments not to exceed 15 minutes.

    a. Produce segments to present a single significant piece of equipment per segment.
    b. Organize segments with multiple pieces of equipment to follow order of Project Manual table of contents.
    c. Where a training session on a particular piece of equipment exceeds 15 minutes, stop filming and pause training session. Begin training session again upon commencement of new filming segment.

D. Light Levels: Verify light levels are adequate to properly light equipment. Verify equipment markings are clearly visible prior to recording.

1. Furnish additional portable lighting as required.

END OF SECTION 017900

SECTION 019113 – COMMISSIONING REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the contract, including general and supplementary conditions, general mechanical provisions, and applicable mechanical and electrical specification sections, apply to work of this section.

1.2 DEFINITIONS

A. Commissioning Plan: A document that outlines the organization, schedule, allocation of resources, and documentation requirements of the commissioning process

B. CxA: Commissioning Authority.

C. Systems, Subsystems, Equipment, and Components: Where these terms are used together or separately, they shall mean "as-built" systems, subsystems, equipment, and components.

1.3 COMISSIONING AUTHORITY

A. CxA will be contracted directly by the Owner. The CxA has overall responsibility for planning and coordinating the commissioning process.

1.4 CONTRACTOR RESPONSIBILITY

A. This section of the specifications defines the Contractor’s responsibilities with respect to the commissioning process. Each Contractor and subcontractor shall review this section and shall include in their bids for carrying out the work described, as it applies to each division and section of these specifications, individually and collectively.

1.5 DESCRIPTION OF WORK

A. Commissioning is a systematic process of ensuring that all building systems perform interactively according to the design intent and the owner’s operational needs. The CxA shall provide the Owner with an unbiased, objective view of the system’s installation, operation, and performance. The commissioning process does not take away or reduce the responsibility of the installing contractors to provide a finished product, installed and fully functional in accordance with the Contract Documents.

B. Commissioning is intended to enhance the quality of system startup and aid in the orderly completion and transfer of systems for beneficial use by the Owner. The CxA shall be the leader of the commissioning team, planning and coordinating all commissioning activities in conjunction with the design professionals, construction manager, subcontractors, manufacturers, and equipment suppliers.

C. The General Contractor, Mechanical Contractor, Electrical Contractor, Temperature Control Contractor, and all subcontractors shall be responsible for cooperating and coordinating their work with the CxA. They shall also be responsible for carrying out all the physical activities required for installation of components and systems, and operating them during the commissioning process as required in this section.

D. Commissioning, including functional tests, O&M documentation review, and training is to occur after startup and initial checkout and be completed before Substantial Completion.

1.6 SCOPE OF COMMISSIONING

A. The following shall be commissioned:

1. HVAC Systems, including:

a. VRF Units
b. Multi-zone Air Handler
c. Transfer Fan including variable frequency drive.

2. Other equipment and systems explicitly identified elsewhere in the Contract Documents as requiring commissioning.

1.7 SUBMITTALS

A. Manufacturers Instructions: Submit copies of all manufacturer-provided instructions that are shipped with the equipment as soon as the equipment is delivered.

B. Startup plans and reports, including blank Startup and Prefunctional Checklists for approval by CxA.

C. Submit O&M manuals related to items that are commissioned to CxA for review; make changes recommended by CxA.

D. Completed Prefunctional Checklists.

1.8 STARTUP, PREFUNCTIONAL CHECKLISTS, AND INITIAL CHECKOUT

A. General: Prefunctional checklists are important to ensure that the equipment and systems are hooked up and operational. It ensures that functional performance testing may proceed without unnecessary delays. Each piece of equipment receives full prefunctional checkout. No sampling strategies are used. The prefunctional performance testing for a given system shall be successfully completed prior to formal functional performance testing of equipment can begin.

B. Startup and Initial Checkout Plan: The primary role of the CxA in this process is to ensure there is written documentation that each of the manufacturer-recommended procedures has been completed.

1. Contractor responsible for the purchase of the equipment develops the full startup plan by utilizing the manufacturer’s detailed startup and checkout procedures from the O&M Manual and the normally-used field checkout sheets. The plan shall include checklists and procedures with specific boxes or lines for recording and documenting the checking

and inspections of each procedure and a summary statement with a signature block at the end of the plan.

2. The full startup plan shall consist of something as simple as:

    a. The manufacturer's prefunctional checklists.
    b. The manufacturer's standard written startup procedures copied from the installation manuals with check boxes by each procedure and a signature block added by hand at the end.

3. Contractor shall submit the full startup plan to the General Contractor for review and scheduling.
4. The CxA reviews the procedures and the format for documenting them, noting any procedures that need to be added. Checklists shall be submitted to CxA for approval not less than 8 weeks prior to startup.

C. Execution of Prefunctional Checklists and Startup: Contractor shall be responsible for filling out Prefunctional Checklists after completion of installation and before startup; witnessing by the CxA is not required unless otherwise specified.

1. Each line item without deficiency is to be witnessed, initialed, and dated by the actual witness; checklists are not complete until all line items are initialed and dated complete with deficiencies.
2. Checklists with incomplete items may be submitted for approval provided the Contractor attests that incomplete items do not preclude the performance of safe and reliable Functional Testing; resubmission of the checklist is required upon completion of remaining items.
3. Individual checklists may contain line items that are the responsibility of more than one installer; Contractor shall assign responsibility to appropriate installers or subcontractors, with identification recorded on the form.
4. If any checklist line item is not relevant, record reasons on the form.
5. Regardless of these reporting requirements, Contractor shall be responsible for correct startup and operation.
6. The Subs and vendors shall execute startup and provide the General Contractor with a signed and dated copy of the completed start-up report within two days of completion. The General Contractor shall submit copies to the CxA for review.

D. Deficiencies: Correct deficiencies and re-inspect or retest, as applicable, at no extra cost to the Owner.

1. If difficulty in correction would delay progress, report deficiency to the CxA immediately.

1.9 FUNCTIONAL PERFORMANCE TESTS

A. General: The objective of functional performance testing is to demonstrate that each system is operating according to the documented design intent and Contract Documents. In general, each system will be operated through all modes of operation as described in the Contract Documents (seasonal, occupied, unoccupied, warm-up, cool-down, part- and full-load) where there is a specified system response. Verifying each step in the sequences of operation is required. Proper responses to such modes and conditions as power failure, freeze condition, low oil pressure, no flow, equipment failure, etc. will also be tested.

B. A Functional Performance Test is required for each piece of equipment, system, or other assembly specified to be commissioned, unless sampling of multiple identical or near-identical units is allowed by the final test procedures.

C. Development of Test Procedures: The CxA shall develop specific test procedures and forms to verify and document proper operation of each piece of equipment and system. Prior to execution, the CxA will provide a copy of the test procedures to the Contractor(s) who shall review the tests for feasibility, safety, equipment and warranty protection. The CxA will submit the tests to the A/E for review.

D. Coordination and Scheduling: The Subs shall provide sufficient notice to the CxA regarding their completion schedule for the prefunctional checklists and startup of all equipment and systems. The CxA will schedule functional tests through the GC and affected Subs. The CxA shall direct, witness and document the functional testing of all equipment and systems. The Contractor(s) shall execute the tests.

E. In general, functional testing is conducted after prefunctional testing and startup has been satisfactorily completed. The control system is sufficiently tested and approved by the CxA before it is used for TAB or to verify performance of other components or systems. The air balancing and water balancing is completed and debugged before functional testing of air-related or water-related equipment or systems.

F. Contractor shall be responsible for correction of deficiencies and retesting at no extra cost to the Owner; if a deficiency is not corrected and retested immediately, the CxA shall document the deficiency and the Contractor's stated intentions regarding correction.

1. Deficiencies are any condition in the installation or function of a component, piece of equipment, or system that is not in compliance with the Contract Documents or does not perform properly.
2. When the deficiency has been corrected, the Contractor shall notify the CxA. The CxA shall reschedule the test and the Contractor shall retest.
3. Contractor shall bear the cost of Owner and CxA personnel time witnessing retesting.
4. Contractor shall bear the cost of Owner and CxA personnel time witnessing retesting if the test failed due to failure to execute the relevant Prefunctional Checklist correctly. If the test failed for reasons that would not have been identified in the Prefunctional Checklist process, Contractor shall bear the cost of the second and any subsequent retests.

G. Deferred Functional Performance Testing: Some tests may need to be performed later, after Substantial Completion, due to partial occupancy, equipment, seasonal requirements, design, or other site conditions. Performance of these tests remains the Contractor's responsibility regardless of timing.

PART 2 - PRODUCTS

2.1 TEST EQUIPMENT

A. Division 23 and 26 contractors shall provide all testing equipment required to fulfill the testing requirements outlined in this Section.

B. Calibration Tolerances: Provide testing equipment of sufficient quality and accuracy to test and/or measure system performance with the tolerances specified. If not otherwise noted, the following minimum requirements apply:

1. Temperature Sensors and Digital Thermometers: Certified calibration within past year to accuracy of 0.5 deg F and resolution of plus/minus 0.1 deg F.

2. Calibration: According to the manufacturer's recommended intervals and when dropped or damaged; affix calibration tags or keep certificates readily available for inspection.

C. Equipment-Specific Tools: When special testing equipment, tools, and instruments are specific to a piece of equipment, are only available from the vendor, and are required in order to accomplish startup or Functional Testing, provide such equipment, tools, and instruments as part of the work at no extra cost to the Owner; such equipment, tools, and instruments are to become the property of the Owner.

PART 3 - EXECUTION

3.1 COMMISSIONING RESPONSIBILITIES - NON-CONTRACTOR TEAM MEMBERS

A. Introduction:

1. A multi-disciplinary team carries out commissioning. The commissioning responsibilities of some non-contractor team members during the construction and acceptance phases of the project are provided here for information and to provide some context for the overall process.

B. Commissioning Authority Responsibilities:

1. Plan, organize, and implement the commissioning process as specified herein.
2. Provide commissioning plan.
3. Revise the commissioning plan as required during construction.
4. Chair commissioning meetings and prepare and distribute minutes to all commissioning team members, whether or not they attend the meeting.
5. Coordinate the commissioning work and, with the GC, ensure that commissioning activities are being scheduled into the master schedule.
6. Perform site visits, as necessary, to observe component and system installations.
7. Monitor system verification checks and ensure the results are documented as the checks are done.
8. Approve air and water systems balancing by spot testing, by reviewing completed reports and by selected site observation.
9. Coordinate, witness, and approve functional performance tests performed by installing contractors. Coordinate retesting as necessary until satisfactory performance is achieved.
10. Witness all functional performance tests and document the results.
11. Prepare and maintain the Commissioning Issues Log to track system deficiencies.
12. Provide a final commissioning report.

C. Design Team Responsibilities (A/E):

1. A/E will review the Commissioning Plan and will participate, as appropriate, in on-site commissioning meetings.
2. During the acceptance phase of the commissioning process, the Mechanical/Electrical Engineer may be on site to review commissioning documentation, to witness functional performance tests, and to analyze the installation and its performance.
3. Participate in the resolution of system deficiencies identified during commissioning, according to the contract documents.
4. Review and approve the O&M manuals.

3.2 COMMISSIONING RESPONSIBILITIES - GENERAL CONTRACTOR

A. The General Contractor has responsibility to ensure the overall completion of the work. In this regard, he shall:

1. Participate as required in the HVAC commissioning process.
2. Cooperate with the CxA for resolution of issues recorded in the Issues Log.
3. Integrate and coordinate commissioning process activities with the construction schedule.
4. Ensure the Mechanical Contractor performs all assigned HVAC commissioning responsibilities as specified in Article Commissioning Responsibilities Mechanical Contractor.
5. Ensure the testing, adjusting, and balancing agency performs HVAC commissioning responsibilities as specified in Article Commissioning Responsibilities TAB Agency, if TAB is contracted through the General Contractor.
6. Ensure the Electrical Contractor performs all assigned HVAC commissioning responsibilities as specified in Article Commissioning Responsibilities Electrical Contractor.
7. Ensure the cooperation and participation in the HVAC commissioning process of all other subcontractors as applicable.

B. The General Contractor shall assign a representative to the commissioning team, and submit the person's name to the CxA within one month of the award of the contract. The representative shall have the authority to make decisions on behalf of the General Contractor as they relate to the organization and scheduling of HVAC commissioning. The representative shall facilitate communications among all Contractors and suppliers and other commissioning team members, and shall foster the necessary cooperative action. One specific responsibility shall be to attend commissioning meetings and ensure action items arising from them are attended to as required to allow the commissioning process to proceed on schedule.

C. In the event that any scheduled equipment or system startups or functional performance tests are terminated because the CxA or Mechanical Engineer discover deficient or incomplete work, or due to non-attendance of required Contractor or supplier personnel the Contractor or subcontractor responsible for the termination shall also be responsible for paying reasonable costs of time and travel expenses for any or all of the following representatives who were physically present for the purpose of witnessing the start or function performance tests: the CxA, the Mechanical Engineer, the Electrical Engineer, and the Owner. The Owner may provide a statement to the General Contractor identifying the specific activity that was terminated, the scheduled date, and a list of those in attendance, along with their reasonable time and travel expense costs.

3.3 COMMISSIONING RESPONSIBILITIES - MECHANICAL CONTRACTOR

A. The Mechanical Contractor, and all mechanical subcontractors and suppliers, shall cooperate with the CxA and other commissioning team members to facilitate the successful completion of the commissioning process.

B. The Contractor shall assign a representative to the commissioning team, and submit the person's name to the CxA within one month of the award of the contract. The representative shall have the authority to make decisions on behalf of the Mechanical Contractor as they relate to the organization and scheduling of HVAC commissioning. The representative shall ensure communications between Mechanical Contractors and suppliers and all other commissioning team embers, and shall foster the necessary cooperative action. One specific responsibility shall be to attend commissioning meetings, and ensure action items arising from them are attended to as required to allow the commissioning process to proceed on schedule.

C. The Mechanical Contractor, and all mechanical subcontractors and suppliers, shall cooperate with the CxA in carrying out the HVAC commissioning process. In this context, the Mechanical Contractor shall:

1. Each contractor and subcontractor shall include in their quotes the cost of participating in the commissioning process as specified herein.
2. Ensure the Temperature Controls Contractor performs HVAC commissioning responsibilities as listed in Article Commissioning Responsibilities Controls Contractor.
3. Ensure the testing, adjusting, and balancing agency performs HVAC commissioning responsibilities as specified in Article Commissioning Responsibilities TAB Agency, if TAB is contracted through the Mechanical Contractor.
4. Ensure participation of major equipment manufacturers in appropriate startup, testing, and training activities.
5. Attend commissioning meetings scheduled by the CxA.
6. Provide a complete set of as-built drawings and O&M Manuals to the CxA.
7. Prepare preliminary schedule for mechanical system orientation and inspections, O&M Manual submission, training sessions, pipe and duct system testing, flushing and cleaning, equipment start TAB, and task completion for use by the CxA. Update schedule as appropriate throughout the construction period.
8. Notify the CxA a minimum of two weeks in advance of scheduled equipment and system startups, so the CxA may witness system verifications and equipment and system startups.
9. Provide sufficient personnel to assist the CxA as required during system verification and functional performance testing.
10. Prior to startup, inspect, check, and confirm the correct and complete installation of all equipment and systems for which system verification checklists are included in the Commissioning Plan. Document the results of all inspections and checks on the checklists and sign them. If deficient or incomplete work is discovered, ensure corrective action is taken and recheck until the results are satisfactory and the system is ready for safe startup.
11. Notify the CxA a minimum of two weeks in advance of the time for start of the TAB work. Attend the initial TAB meeting for review of the TAB procedures.
12. Provide equipment and systems startup resources as specified and required. If, during an attempted equipment or system startup, deficient or incomplete work is discovered that would preclude safe operation, the startup shall be aborted until corrective action has been taken. Ensure such action is taken and verified before rescheduling a new startup. Those responsible for deficient or incomplete work shall be responsible for costs in accordance with this Section.
13. Carry out performance checks to ensure that all equipment and systems are fully functional and ready for the CxA to witness formal functional performance tests.
14. Operate equipment and systems for functional performance tests in accordance with the Commissioning Plan and as directed by the CxA. If improper functionality, incomplete work, or other deficiencies affecting system performance are discovered, the functional performance tests will be stopped by the CxA. Those responsible for deficient or incomplete work shall be responsible for costs in accordance with this Section. Ensure that all corrections necessary for full and complete system operation as specified are complete then, with the Temperature Controls Contractor and other applicable subcontractors, carry out functional performance checks to confirm correct operation before applying to the CxA to reschedule the functional performance tests for the system in question.

3.4 COMMISSIONING RESPONSIBILITIES - TAB AGENCY

A. With respect to commissioning, the TAB agency shall:

1. Include costs for HVAC commissioning requirements in the quoted price.
2. Attend commissioning meetings scheduled by the CxA prior to, and during, onsite TAB work being done.
3. Submit proposed TAB procedures to the CxA and Mechanical Engineer for review and acceptance.
4. A copy of the TAB report shall be submitted to the CxA prior to the start of system functional performance testing. The report shall contain the results in a clear format. The report should follow the latest and most rigorous reporting recommendations by AABC, NEBB or ASHRAE Standard 111.
5. Provide skilled TAB technician to assist during system verification and functional performance testing as required by the CxA.

3.5 COMMISSIONING RESPONSIBILITIES - CONTROLS CONTRACTOR

A. With respect to commissioning, the Controls Contractor shall:

1. Include cost for commissioning requirements in the quoted price.
2. Attend commissioning meetings scheduled by the CxA.
3. Provide a complete set of as-built drawings and O&M Manuals to the CxA.
4. Provide the following submittals to the CxA eight (8) weeks prior to equipment prefunctional startup for review:

    a. Control shop drawings including equipment data sheets.
    b. Narrative description of all control sequences for each piece of equipment controlled. These shall be provided to the CxA in electronic format upon request.
    c. Proposed list of alarm points including alarm notification levels.
    d. Project specific operator workstation graphics screen shots.

5. Inspect, check, and confirm the proper installation and performance of controls/BAS hardware and software provided by others.
6. Integrate installation and programming scheduling with construction and commissioning schedules.
7. Inspect, check, and confirm the correct installation and operation of input and output field points and devices through documented and signed off point-to-point checkouts.
8. Provide support and coordination with TAB Contractor on all interfaces between controls and TAB scopes of work. Provide, at no additional cost to the TAB and CxA, all devices, such as portable operator’s terminals and all software for the TAB agency to use in completing TAB procedures.
9. In conjunction with the Mechanical Contractor, demonstrate system performance to the CxA including all modes of system operation (e.g. occupied, unoccupied, emergency) during the functional performance tests. If improper functionality, incomplete work, or other deficiencies affecting system performance are discovered, the functional performance tests will be stopped by the CxA. Those responsible for deficient or incomplete work will be responsible for costs in accordance with this Section.
10. Provide skilled control system technician to assist during system verification and functional performance testing.

3.6 COMMISSIONING RESPONSIBILITIES - ELECTRICAL CONTRACTOR

A. With respect to commissioning, the Electrical Contractor shall:

1. Include cost for HVAC and electrical systems commissioning requirements in the quoted price.

2. Review design with respect to providing power to the HVAC equipment.

    a. Verify that proper hardware specifications exist for functional performance and sequence of operation required by specification.
    b. Verify that proper safeties and interlocks are included in the design of electrical connections for HVAC equipment.

3. Attend commissioning meetings scheduled by the CxA.
4. Provide a complete set of as-built drawings and O&M Manuals to the CxA.
5. Schedule work so that required electrical installations are completed and systems verification checks and functional performance tests can be carried out on schedule.
6. Attend commissioning meetings scheduled by the CxA.
7. Ensure participation of major equipment manufacturers in appropriate startup, testing, and training activities.
8. Inspect, check, and confirm in writing the proper installation and performance of all electrical services provided.
9. Provide skilled electrical system technicians to assist during system verification and functional performance testing as required by the CxA.

3.7 TEST PROCEDURES GENERAL

A. Provide skilled technicians to execute starting of equipment and to execute the Functional Performance Tests. Ensure that they are available and present during the agreed upon schedules and for sufficient duration to complete the necessary tests, adjustments, and problem solving.

B. Provide all necessary materials and system modifications required to produce the flows, pressures, temperatures, and conditions necessary to execute the test according to the specified conditions. At completion of the test, return all affected equipment and systems to their pretest condition.

C. Simulated conditions may need to be imposed using an artificial load when it is not practical to test under design conditions. Before simulating conditions, calibrate testing instruments. Provide equipment to simulate loads. Set simulated conditions as directed by the CxA and document simulated conditions and methods of simulation. After tests, return settings to normal operating conditions.

D. The CxA may direct that set points be altered when simulating conditions is not practical.

END OF SECTION 019113

SECTION 024119 - SELECTIVE DEMOLITION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Demolition and removal of selected portions of building or structure.
2. Demolition and removal of selected site elements.
3. Salvage of existing items to be reused or recycled.

B. Related Requirements:

1. Section 011000 "Summary" for restrictions on use of the premises, Owner-occupancy requirements, and phasing requirements.
2. Section 017300 "Execution" for cutting and patching procedures.

1.3 DEFINITIONS

A. Remove: Detach items from existing construction and dispose of them off-site unless indicated to be salvaged or reinstalled.

B. Remove and Salvage: Detach items from existing construction, in a manner to prevent damage, and deliver to Owner ready for reuse.

C. Remove and Reinstall: Detach items from existing construction, in a manner to prevent damage, prepare for reuse, and reinstall where indicated.

D. Existing to Remain: Leave existing items that are not to be removed and that are not otherwise indicated to be salvaged or reinstalled.

E. Dismantle: To remove by disassembling or detaching an item from a surface, using gentle methods and equipment to prevent damage to the item and surfaces; disposing of items unless indicated to be salvaged or reinstalled.

1.4 MATERIALS OWNERSHIP

A. Unless otherwise indicated, demolition waste becomes property of Contractor.

1.5 PREINSTALLATION MEETINGS

A. Predemolition Conference: Conduct conference at Project site.

1. Inspect and discuss condition of construction to be selectively demolished.
2. Review structural load limitations of existing structure.
3. Review and finalize selective demolition schedule and verify availability of materials, demolition personnel, equipment, and facilities needed to make progress and avoid delays.
4. Review requirements of work performed by other trades that rely on substrates exposed by selective demolition operations.
5. Review areas where existing construction is to remain and requires protection.

1.6 INFORMATIONAL SUBMITTALS

A. Proposed Protection Measures: Submit report, including Drawings, that indicates the measures proposed for protecting individuals and property, for environmental protection, for dust control and, for noise control. Indicate proposed locations and construction of barriers.

B. Schedule of Selective Demolition Activities: Indicate the following:

1. Detailed sequence of selective demolition and removal work, with starting and ending dates for each activity. Ensure Owner's building manager's and other tenants' on-site operations are uninterrupted.
2. Interruption of utility services. Indicate how long utility services will be interrupted.
3. Coordination for shutoff, capping, and continuation of utility services.
4. Coordination of Owner's continuing occupancy of portions of existing building and of Owner's partial occupancy of completed Work.

C. Predemolition Photographs or Video: Show existing conditions of adjoining construction, including finish surfaces, that might be misconstrued as damage caused by demolition operations. Submit before Work begins.

D. Warranties: Documentation indicating that existing warranties are still in effect after completion of selective demolition.

1.7 CLOSEOUT SUBMITTALS

A. Inventory: Submit a list of items that have been removed and salvaged.

1.8 FIELD CONDITIONS

A. Owner will occupy portions of building immediately adjacent to selective demolition area. Conduct selective demolition so Owner's operations will not be disrupted.

1. Coordinate demolition operations with existing Youth Services Center staff to ensure that proper security measures are in place.

B. Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.

C. Notify Architect of discrepancies between existing conditions and Drawings before proceeding with selective demolition.

D. Hazardous Materials: It is not expected that hazardous materials will be encountered in the Work.

1. If suspected hazardous materials are encountered, do not disturb; immediately notify Architect and Owner. Hazardous materials will be removed by Owner under a separate contract.

E. Storage or sale of removed items or materials on-site is not permitted.

F. Utility Service: Maintain existing utilities indicated to remain in service and protect them against damage during selective demolition operations.

1. Maintain fire-protection facilities in service during selective demolition operations.

1.9 COORDINATION

A. Arrange selective demolition schedule so as not to interfere with Owner's operations.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Regulatory Requirements: Comply with governing EPA notification regulations before beginning selective demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.

B. Standards: Comply with ASSE A10.6 and NFPA 241.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that utilities have been disconnected and capped before starting selective demolition operations.

B. Review Project Record Documents of existing construction or other existing conditions and information provided by Owner. Owner does not guarantee that existing conditions are same as those indicated in Project Record Documents.

C. Survey of Existing Conditions: Record existing conditions by use of preconstruction photographs or video.

1. Inventory and record the condition of items to be removed and salvaged. Provide photographs or video of conditions that might be misconstrued as damage caused by salvage operations.

3.2 UTILITY SERVICES AND MECHANICAL/ELECTRICAL SYSTEMS

A. Existing Services/Systems to Remain: Maintain services/systems indicated to remain and protect them against damage.

B. Existing Services/Systems to Be Removed, Relocated, or Abandoned: Locate, identify, disconnect, and seal or cap off utility services and mechanical/electrical systems serving areas to be selectively demolished.

1. Owner will arrange to shut off indicated services/systems when requested by Contractor.
2. Arrange to shut off utilities with utility companies.
3. If services/systems are required to be removed, relocated, or abandoned, provide temporary services/systems that bypass area of selective demolition and that maintain continuity of services/systems to other parts of building.
4. Disconnect, demolish, and remove fire-suppression systems, plumbing, and HVAC systems, equipment, and components indicated on Drawings to be removed.

    a. Piping to Be Removed: Remove portion of piping indicated to be removed and cap or plug remaining piping with same or compatible piping material.
    b. Piping to Be Abandoned in Place: Drain piping and cap or plug piping with same or compatible piping material and leave in place.
    c. Equipment to Be Removed: Disconnect and cap services and remove equipment.
    d. Equipment to Be Removed and Reinstalled: Disconnect and cap services and remove, clean, and store equipment; when appropriate, reinstall, reconnect, and make equipment operational.
    e. Equipment to Be Removed and Salvaged: Disconnect and cap services and remove equipment and deliver to Owner.
    f. Ducts to Be Removed: Remove portion of ducts indicated to be removed and plug remaining ducts with same or compatible ductwork material.
    g. Ducts to Be Abandoned in Place: Cap or plug ducts with same or compatible ductwork material and leave in place.

3.3 PROTECTION

A. Temporary Protection: Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.

1. Provide protection to ensure safe passage of people around selective demolition area and to and from occupied portions of building.
2. Provide temporary weather protection, during interval between selective demolition of existing construction on exterior surfaces and new construction, to prevent water leakage and damage to structure and interior areas.
3. Protect walls, ceilings, floors, and other existing finish work that are to remain or that are exposed during selective demolition operations.
4. Cover and protect furniture, furnishings, and equipment that have not been removed.
5. Comply with requirements for temporary enclosures, dust control, heating, and cooling specified in Section 015000 "Temporary Facilities and Controls."

B. Temporary Shoring: Design, provide, and maintain shoring, bracing, and structural supports as required to preserve stability and prevent movement, settlement, or collapse of construction and finishes to remain, and to prevent unexpected or uncontrolled movement or collapse of construction being demolished.

1. Strengthen or add new supports when required during progress of selective demolition.

C. Remove temporary barricades and protections where hazards no longer exist.

3.4 SELECTIVE DEMOLITION, GENERAL

A. General: Demolish and remove existing construction only to the extent required by new construction and as indicated. Use methods required to complete the Work within limitations of governing regulations and as follows:

1. Proceed with selective demolition systematically, from higher to lower level. Complete selective demolition operations above each floor or tier before disturbing supporting members on the next lower level.
2. Neatly cut openings and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage construction to remain or adjoining construction. Use hand tools or small power tools designed for sawing or grinding, not hammering and chopping. Temporarily cover openings to remain.
3. Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.
4. Do not use cutting torches until work area is cleared of flammable materials. At concealed spaces, such as duct and pipe interiors, verify condition and contents of hidden space before starting flame-cutting operations. Maintain portable fire-suppression devices during flame-cutting operations.
5. Maintain fire watch during and for at least two hours after flame-cutting operations.
6. Maintain adequate ventilation when using cutting torches.
7. Remove decayed, vermin-infested, or otherwise dangerous or unsuitable materials and promptly dispose of off-site.
8. Remove structural framing members and lower to ground by method suitable to avoid free fall and to prevent ground impact or dust generation.
9. Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
10. Dispose of demolished items and materials promptly. Comply with requirements in Section 017419 "Construction Waste Management and Disposal."

B. Site Access and Temporary Controls: Conduct selective demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.

C. Removed and Salvaged Items:

1. Clean salvaged items.
2. Pack or crate items after cleaning. Identify contents of containers.
3. Store items in a secure area until delivery to Owner.
4. Transport items to Owner's storage area designated by Owner.
5. Protect items from damage during transport and storage.

D. Existing Items to Remain: Protect construction indicated to remain against damage and soiling during selective demolition. When permitted by Architect, items may be removed to a suitable, protected storage location during selective demolition and reinstalled in their original locations after selective demolition operations are complete.

3.5 DISPOSAL OF DEMOLISHED MATERIALS

A. Remove demolition waste materials from Project site and dispose of them in an EPA-approved construction and demolition waste landfill acceptable to authorities having jurisdiction.

1. Do not allow demolished materials to accumulate on-site.

2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
3. Comply with requirements specified in Section 017419 "Construction Waste Management and Disposal."

B. Burning: Do not burn demolished materials.

3.6 CLEANING

A. Clean adjacent structures and improvements of dust, dirt, and debris caused by selective demolition operations. Return adjacent areas to condition existing before selective demolition operations began.

END OF SECTION 024119

SECTION 033000 - CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes cast-in-place concrete, including formwork, reinforcement, concrete materials, mixture design, placement procedures, and finishes.

1.3 DEFINITIONS

A. Cementitious Materials: Portland cement alone or in combination with one or more of the following: blended hydraulic cement, fly ash, slag cement, other pozzolans, and silica fume; materials subject to compliance with requirements.

B. W/C Ratio: The ratio by weight of water to cementitious materials.

1.4 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1. Before submitting design mixtures, review concrete design mixture and examine procedures for ensuring quality of concrete materials. Require representatives of each entity directly concerned with cast-in-place concrete to attend, including the following:

    a. Contractor's superintendent.
    b. Independent testing agency responsible for concrete design mixtures.
    c. Ready-mix concrete manufacturer.
    d. Concrete Subcontractor.

2. Review special inspection and testing and inspecting agency procedures for field quality control, concrete finishes and finishing, cold- and hot-weather concreting procedures, curing procedures, construction contraction and isolation joints, and joint-filler strips, semirigid joint fillers, forms and form removal limitations, vapor-retarder installation, anchor rod and anchorage device installation tolerances, steel reinforcement installation, methods for achieving specified floor and slab flatness and levelness floor and slab flatness and levelness measurement, concrete repair procedures, and concrete protection.

1.5 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Design Mixtures: For each concrete mixture. Submit alternate design mixtures when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant adjustments.

1. Indicate amounts of mixing water to be withheld for later addition at Project site.

C. Steel Reinforcement Shop Drawings: Placing Drawings that detail fabrication, bending, and placement. Include bar sizes, lengths, material, grade, bar schedules, stirrup spacing, bent bar diagrams, bar arrangement, splices and laps, mechanical connections, tie spacing, hoop spacing, and supports for concrete reinforcement.

1.6 INFORMATIONAL SUBMITTALS

A. Material Certificates: For each of the following, signed by manufacturers:

1. Cementitious materials.
2. Admixtures.
3. Steel reinforcement and accessories.
4. Curing compounds.
5. Floor and slab treatments.
6. Bonding agents.
7. Adhesives.
8. Vapor barriers.
9. Semirigid joint filler.
10. Repair materials.

B. Material Test Reports: For the following, from a qualified testing agency:

1. Aggregates: Include service record data indicating absence of deleterious expansion of concrete due to alkali aggregate reactivity.

C. Floor surface flatness and levelness measurements indicating compliance with specified tolerances.

D. Field quality-control reports.

E. Minutes of preinstallation conference.

1.7 QUALITY ASSURANCE

A. Installer Qualifications: A qualified installer who employs on Project personnel qualified as ACI-certified Flatwork Technician and Finisher and a supervisor who is an ACI-certified Concrete Flatwork Technician.

B. Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C 94/C 94M requirements for production facilities and equipment.

1. Manufacturer certified according to NRMCA's "Certification of Ready Mixed Concrete Production Facilities."

C. Testing Agency Qualifications: An independent agency qualified according to ASTM C 1077 and ASTM E 329 for testing indicated.

1. Personnel conducting field tests shall be qualified as ACI Concrete Field Testing Technician, Grade 1, according to ACI CP-1 or an equivalent certification program.
2. Personnel performing laboratory tests shall be ACI-certified Concrete Strength Testing Technician and Concrete Laboratory Testing Technician, Grade I. Testing agency laboratory supervisor shall be an ACI-certified Concrete Laboratory Testing Technician, Grade II.

D. Welding Qualifications: Qualify procedures and personnel according to AWS D1.4/D 1.4M.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Steel Reinforcement: Deliver, store, and handle steel reinforcement to prevent bending and damage. Avoid damaging coatings on steel reinforcement.

1.9 FIELD CONDITIONS

A. Cold-Weather Placement: Comply with ACI 306.1 and as follows. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.

1. When average high and low temperature is expected to fall below 40 deg F for three successive days, maintain delivered concrete mixture temperature within the temperature range required by ACI 301.
2. Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials.
3. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise specified and approved in mixture designs.

B. Hot-Weather Placement: Comply with ACI 301 and as follows:

1. Maintain concrete temperature below 90 deg F at time of placement. Chilled mixing water or chopped ice may be used to control temperature, provided water equivalent of ice is calculated to total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.
2. Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade uniformly moist without standing water, soft spots, or dry areas.

PART 2 - PRODUCTS

2.1 CONCRETE, GENERAL

A. ACI Publications: Comply with the following unless modified by requirements in the Contract Documents:

1. ACI 301.
2. ACI 117.

2.2 STEEL REINFORCEMENT

A. Reinforcing Bars: ASTM A 615/A 615M, Grade 60, deformed.

B. Low-Alloy-Steel Reinforcing Bars: ASTM A 706/A 706M, deformed.

C. Plain-Steel Wire: ASTM A 1064/A 1064M, as drawn.

D. Deformed-Steel Wire: ASTM A 1064/A 1064M.

2.3 REINFORCEMENT ACCESSORIES

A. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded-wire reinforcement in place. Manufacture bar supports from steel wire, plastic, or precast concrete according to CRSI's "Manual of Standard Practice," of greater compressive strength than concrete and as follows:

1. For concrete surfaces exposed to view, where legs of wire bar supports contact forms, use CRSI Class 1 plastic-protected steel wire or CRSI Class 2 stainless-steel bar supports.
2. For zinc-coated reinforcement, use galvanized wire or dielectric-polymer-coated wire bar supports.

2.4 CONCRETE MATERIALS

A. Source Limitations: Obtain each type or class of cementitious material of the same brand from the same manufacturer's plant, obtain aggregate from single source, and obtain admixtures from single source from single manufacturer.

B. Cementitious Materials:

1. Portland Cement: ASTM C 150/C 150M, Type I or Type II Retain supplementary cementing materials in "Fly Ash" and "Slag Cement" subparagraphs below if permitted. Ready-mix-concrete manufacturer blends these materials with portland cement. Fly ash, slag cement, or pozzolanic materials may slow rate of concrete strengthening and affect color uniformity. Class F fly ash is more readily available than Class C fly ash.
2. Fly Ash: ASTM C 618, Class F or C.
3. Slag Cement: ASTM C 989/C 989M, Grade 100 or 120.

C. Normal-Weight Aggregates: ASTM C 33/C 33M, Class 3S coarse aggregate or better, graded. Provide aggregates from a single source with documented service record data of at least 10 years' satisfactory service in similar applications and service conditions using similar aggregates and cementitious materials.

1. Maximum Coarse-Aggregate Size: 3/4 inch nominal.
2. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.

D. Air-Entraining Admixture: ASTM C 260/C 260M.

E. Chemical Admixtures: Certified by manufacturer to be compatible with other admixtures and that do not contribute water-soluble chloride ions exceeding those permitted in hardened concrete. Do not use calcium chloride or admixtures containing calcium chloride.

1. Water-Reducing Admixture: ASTM C 494/C 494M, Type A.
2. Retarding Admixture: ASTM C 494/C 494M, Type B.
3. Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type D.
4. High-Range, Water-Reducing Admixture: ASTM C 494/C 494M, Type F.

5. High-Range, Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type G.
6. Plasticizing and Retarding Admixture: ASTM C 1017/C 1017M, Type II.

F. Water: ASTM C 94/C 94M and potable.

2.5 VAPOR RETARDERS or BARRIER

A. Vapor Barrier Membrane must meet the following requirements:

1. Water vapor transmission rate: 0.006 WVTR or lower as per ASTM E 96;
2. Water vapor barrier: meet or exceed Class A (Plastics), ASTM E 1745;
3. Permeance Rating: 0.01 Perms or lower as per ASTM E 96.

B. Acceptable Manufacturers:

1. Stego Wrap 15-mil vapor barrier by STEGO INDUSTRIES LLC
2. Premoulded membrane with Plasmatic Core by W.R. Meadows.
3. Zero-Perm by Alumiseal.
4. Viper VaporCheck 16

C. Accessories: Seam tape, mastic and pipe boots as recommended by manufacturer and with a water vapor transmission rate of 0.3 perms or lower as per ASTEM E 96

2.6 LIQUID FLOOR TREATMENTS

A. Penetrating Liquid Floor Treatment: Clear, chemically reactive, waterborne solution of inorganic silicate or siliconate materials and proprietary components; odorless; that penetrates, hardens, and densifies concrete surfaces.

1. Products: Requests for manufacturer substitutions prior to bidding will be reviewed and responded to in conformance with Division 1 requirements. Subject to compliance with requirements, provide the following or a product pre-approved during bidding:

a. ChemMasters; Chemisil Plus.
b. ChemTec Int'l; ChemTec One.
c. Conspec by Dayton Superior; Intraseal.
d. Curecrete Distribution Inc.; Ashford Formula.
e. Dayton Superior Corporation; Day-Chem Sure Hard (J-17).
f. Edoco by Dayton Superior; Titan Hard.
g. Euclid Chemical Company (The), an RPM company; Euco Diamond Hard.
h. Kaufman Products, Inc.; SureHard.
i. L&M Construction Chemicals, Inc.; Seal Hard.
j. Meadows, W. R., Inc.; LIQUI-HARD.
k. Metalcrete Industries; Floorsaver.
l. Symons by Dayton Superior; Buff Hard.
m. US SPEC, Division of US Mix Products Company; US SPEC Industraseal.
n. Vexcon Chemicals, Inc.; Vexcon StarSeal PS Clear.

2.7 CURING MATERIALS

A. Absorptive Cover: AASHTO M 182, Class 2, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. (305 g/sq. m) when dry.

B. Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet.

C. Water: Potable.

D. Clear, Solvent-Borne, Membrane-Forming Curing and Sealing Compound: ASTM C 1315, Type 1, Class A.

1. Products: Subject to compliance with requirements, provide the following:

a. BASF Construction Chemicals - Building Systems; Kure-N-Seal 25 LV.

2.8 RELATED MATERIALS

A. Expansion- and Isolation-Joint-Filler Strips: ASTM D 1751, asphalt-saturated cellulosic fiber.

B. Bonding Agent: ASTM C 1059/C 1059M, Type II, nonredispersible, acrylic emulsion or styrene butadiene.

2.9 REPAIR MATERIALS

A. Repair Underlayment: Cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/8 inch and that can be feathered at edges to match adjacent floor elevations.

1. Cement Binder: ASTM C 150/C 150M, portland cement or hydraulic or blended hydraulic cement as defined in ASTM C 219.
2. Primer: Product of underlayment manufacturer recommended for substrate, conditions, and application.
3. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch or coarse sand as recommended by underlayment manufacturer.
4. Compressive Strength: Not less than 4100 psi at 28 days when tested according to ASTM C 109/C 109M.

B. Repair Overlayment: Cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/4 inch and that can be filled in over a scarified surface to match adjacent floor elevations.

1. Cement Binder: ASTM C 150/C 150M, portland cement or hydraulic or blended hydraulic cement as defined in ASTM C 219.
2. Primer: Product of topping manufacturer recommended for substrate, conditions, and application.
3. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch or coarse sand as recommended by topping manufacturer.
4. Compressive Strength: Not less than 5000 psi at 28 days when tested according to ASTM C 109/C 109M.

2.10 CONCRETE MIXTURES, GENERAL

A. Prepare design mixtures for each type and strength of concrete, proportioned on the basis of laboratory trial mixture or field test data, or both, according to ACI 301.

1. Use a qualified independent testing agency for preparing and reporting proposed mixture designs based on laboratory trial mixtures.

2. Mix Designs to provide normal weight concrete meeting the compressive strength required by the drawings. Use air entrained concrete for all concrete unless otherwise indicated. The maximum water cement ratios are to be as follows:

   4000 psi 28 day compressive strength; a maximum water cement ratio of .50
   3000 psi 28 day compressive strength; a maximum water cement ratio of .55

   If submittals do not meet the requirements of ACI 318 Chapter 5 the following criteria shall be met:

   4000 psi 28 day compressive strength; a maximum water cement ratio of .48
   3000 psi 28 day compressive strength; a maximum water cement ratio of .53

B. Cementitious Materials Limit percentage, by weight, of cementitious materials other than portland cement in concrete as follows:

1. Fly Ash: 25 percent.

C. Limit water-soluble, chloride-ion content in hardened concrete to 0.06 percent by weight of cement.

D. Admixtures: Use admixtures according to manufacturer's written instructions.

1. Use water-reducing, high-range water-reducing or plasticizing admixture in concrete, as required, for placement and workability.
2. Use water-reducing and -retarding admixture when required by high temperatures, low humidity, or other adverse placement conditions.
3. Use water-reducing admixture in pumped concrete, concrete for heavy-use industrial slabs and parking structure slabs, concrete required to be watertight, and concrete with a w/c ratio below 0.50.
4. Use corrosion-inhibiting admixture in concrete mixtures where indicated.

2.11 FABRICATING REINFORCEMENT

A. Fabricate steel reinforcement according to CRSI's "Manual of Standard Practice."

2.12 CONCRETE MIXING

A. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete according to ASTM C 94/C 94M and ASTM C 1116/C 1116M, and furnish batch ticket information.

1. When air temperature is between 85 and 90 deg F, reduce mixing and delivery time from 1-1/2 hours to 75 minutes; when air temperature is above 90 deg F, reduce mixing and delivery time to 60 minutes.

PART 3 - EXECUTION

3.1 FORMWORK INSTALLATION

A. Design, erect, shore, brace, and maintain formwork, according to ACI 301, to support vertical, lateral, static, and dynamic loads, and construction loads that might be applied, until structure can support such loads.

B. Construct formwork so concrete members and structures are of size, shape, alignment, elevation, and position indicated, within tolerance limits of ACI 117.

C. Limit concrete surface irregularities, designated by ACI 347 as abrupt or gradual, as follows:

1. Class A, 1/8 inch for smooth-formed finished surfaces.

D. Construct forms tight enough to prevent loss of concrete mortar.

E. Construct forms for easy removal without hammering or prying against concrete surfaces. Provide crush or wrecking plates where stripping may damage cast-concrete surfaces. Provide top forms for inclined surfaces steeper than 1.5 horizontal to 1 vertical.

1. Install keyways, reglets, recesses, and the like, for easy removal.
2. Do not use rust-stained steel form-facing material.

F. Set edge forms, bulkheads, and intermediate screed strips for slabs to achieve required elevations and slopes in finished concrete surfaces. Provide and secure units to support screed strips; use strike-off templates or compacting-type screeds.

G. Provide temporary openings for cleanouts and inspection ports where interior area of formwork is inaccessible. Close openings with panels tightly fitted to forms and securely braced to prevent loss of concrete mortar. Locate temporary openings in forms at inconspicuous locations.

H. Chamfer exterior corners and edges of permanently exposed concrete.

I. Form openings, chases, offsets, sinkages, keyways, reglets, blocking, screeds, and bulkheads required in the Work. Determine sizes and locations from trades providing such items.

J. Clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, and other debris just before placing concrete.

K. Retighten forms and bracing before placing concrete, as required, to prevent mortar leaks and maintain proper alignment.

L. Coat contact surfaces of forms with form-release agent, according to manufacturer's written instructions, before placing reinforcement.

3.2 EMBEDDED ITEM INSTALLATION

A. Place and secure anchorage devices and other embedded items required for adjoining work that is attached to or supported by cast-in-place concrete. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.

1. Install anchor rods, accurately located, to elevations required and complying with tolerances in Section 7.5 of AISC 303.

3.3 REMOVING AND REUSING FORMS

A. General: Formwork for sides of beams, walls, columns, and similar parts of the Work that does not support weight of concrete may be removed after cumulatively curing at not less than 50 deg F for 24 hours after placing concrete. Concrete has to be hard enough to not be damaged by form-removal operations, and curing and protection operations need to be maintained.

1. Leave formwork for beam soffits, joists, slabs, and other structural elements that support weight of concrete in place until concrete has achieved at least 70 percent of its 28-day design compressive strength.
2. Remove forms only if shores have been arranged to permit removal of forms without loosening or disturbing shores.

B. Clean and repair surfaces of forms to be reused in the Work. Split, frayed, delaminated, or otherwise damaged form-facing material are not acceptable for exposed surfaces. Apply new form-release agent.

C. When forms are reused, clean surfaces, remove fins and laitance, and tighten to close joints. Align and secure joints to avoid offsets. Do not use patched forms for exposed concrete surfaces unless approved by Architect.

3.4 VAPOR-BARRIER INSTALLATION

A. Sheet Vapor Barriers: Place, protect, and repair sheet vapor retarder according to ASTM E 1643 and manufacturer's written instructions.

1. Lap joints 6 inches and seal with manufacturer's recommended tape.

3.5 STEEL REINFORCEMENT INSTALLATION

A. General: Comply with CRSI's "Manual of Standard Practice" for fabricating, placing, and supporting reinforcement.

1. Do not cut or puncture vapor retarder. Repair damage and reseal vapor retarder before placing concrete.

B. Clean reinforcement of loose rust and mill scale, earth, ice, and other foreign materials that reduce bond to concrete.

C. Accurately position, support, and secure reinforcement against displacement. Locate and support reinforcement with bar supports to maintain minimum concrete cover. Do not tack weld crossing reinforcing bars.

1. Weld reinforcing bars according to AWS D1.4/D 1.4M, where indicated.

D. Set wire ties with ends directed into concrete, not toward exposed concrete surfaces.

E. Install welded-wire reinforcement in longest practicable lengths on bar supports spaced to minimize sagging. Lap edges and ends of adjoining sheets at least one mesh spacing. Offset

laps of adjoining sheet widths to prevent continuous laps in either direction. Lace overlaps with wire.

3.6 JOINTS

A. General: Construct joints true to line with faces perpendicular to surface plane of concrete.

B. Construction Joints: Install so strength and appearance of concrete are not impaired, at locations indicated or as approved by Architect.

1. Place joints perpendicular to main reinforcement. Continue reinforcement across construction joints unless otherwise indicated.

C. Contraction Joints in Slabs-on-Grade: Form weakened-plane contraction joints, sectioning concrete into areas as indicated. Construct contraction joints for a depth equal to at least one-fourth of concrete thickness as follows:

1. Grooved Joints: Form contraction joints after initial floating by grooving and finishing each edge of joint to a radius of 1/8 inch. Repeat grooving of contraction joints after applying surface finishes. Eliminate groover tool marks on concrete surfaces.
2. Sawed Joints: Form contraction joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch-wide joints into concrete when cutting action does not tear, abrade, or otherwise damage surface and before concrete develops random contraction cracks.

D. Isolation Joints in Slabs-on-Grade: After removing formwork, install joint-filler strips at slab junctions with vertical surfaces, such as column pedestals, foundation walls, grade beams, and other locations, as indicated.

1. Extend joint-filler strips full width and depth of joint, terminating flush with finished concrete surface unless otherwise indicated.
2. Terminate full-width joint-filler strips not less than 1/2 inch or more than 1 inch below finished concrete surface where joint sealants, specified in Section 079200 "Joint Sealants," are indicated.
3. Install joint-filler strips in lengths as long as practicable. Where more than one length is required, lace or clip sections together.

3.7 CONCRETE PLACEMENT

A. Before placing concrete, verify that installation of formwork, reinforcement, and embedded items is complete and that required inspections are completed.

B. Addition of Water on Site: Water may be added to the concrete on site for adjustment of slump only to the limit of the specified water/cement ratio. In no case may the water/cement ratio be exceeded. Concrete supplier shall indicate in the mix design submittals the maximum amount of water per yard that can be added on site.

C. Before test sampling and placing concrete, water may be added at Project site, subject to limitations of ACI 301.

1. Do not add water to concrete after adding high-range water-reducing admixtures to mixture.

D. Deposit concrete continuously in one layer or in horizontal layers of such thickness that no new concrete is placed on concrete that has hardened enough to cause seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as indicated. Deposit concrete to avoid segregation.

1. Deposit concrete in horizontal layers of depth not to exceed formwork design pressures and in a manner to avoid inclined construction joints.
2. Consolidate placed concrete with mechanical vibrating equipment according to ACI 301.
3. Do not use vibrators to transport concrete inside forms. Insert and withdraw vibrators vertically at uniformly spaced locations to rapidly penetrate placed layer and at least 6 inches into preceding layer. Do not insert vibrators into lower layers of concrete that have begun to lose plasticity. At each insertion, limit duration of vibration to time necessary to consolidate concrete and complete embedment of reinforcement and other embedded items without causing mixture constituents to segregate.

E. Deposit and consolidate concrete for floors and slabs in a continuous operation, within limits of construction joints, until placement of a panel or section is complete.

1. Consolidate concrete during placement operations, so concrete is thoroughly worked around reinforcement and other embedded items and into corners.
2. Maintain reinforcement in position on chairs during concrete placement.
3. Screed slab surfaces with a straightedge and strike off to correct elevations.
4. Slope surfaces uniformly to drains where required.
5. Begin initial floating using bull floats or darbies to form a uniform and open-textured surface plane, before excess bleedwater appears on the surface. Do not further disturb slab surfaces before starting finishing operations.

3.8 FINISHING FLOORS AND SLABS

A. General: Comply with ACI 302.1R recommendations for screeding, restraightening, and finishing operations for concrete surfaces. Do not wet concrete surfaces.

B. Float Finish: Consolidate surface with power-driven floats or by hand floating if area is small or inaccessible to power-driven floats. Restraighten, cut down high spots, and fill low spots. Repeat float passes and restraightening until surface is left with a uniform, smooth, granular texture.

1. Apply float finish to surfaces to receive trowel finish.

C. Trowel Finish: After applying float finish, apply first troweling and consolidate concrete by hand or power-driven trowel. Continue troweling passes and restraighten until surface is free of trowel marks and uniform in texture and appearance. Grind smooth any surface defects that would telegraph through applied coatings or floor coverings.

1. Apply a trowel finish to surfaces to be covered with resilient flooring, carpet, ceramic or quarry tile set over a cleavage membrane, paint, or another thin-film-finish coating system.
2. Finish surfaces to the following tolerances, according to ASTM E 1155, for a randomly trafficked floor surface:

a. Specified overall values of flatness, F(F) 35; and of levelness, F(L) 25; with minimum local values of flatness, F(F) 24; and of levelness, F(L) 17; for slabs-on-grade.

3. Finish and measure surface, so gap at any point between concrete surface and an unleveled, freestanding, 10-ft.- long straightedge resting on two high spots and placed anywhere on the surface does not exceed 1/8 inch.

3.9 MISCELLANEOUS CONCRETE ITEM INSTALLATION

A. Filling In: Fill in holes and openings left in concrete structures after work of other trades is in place unless otherwise indicated. Mix, place, and cure concrete, as specified, to blend with in-place construction. Provide other miscellaneous concrete filling indicated or required to complete the Work.

B. Curbs: Provide monolithic finish to interior curbs by stripping forms while concrete is still green and by steel-troweling surfaces to a hard, dense finish with corners, intersections, and terminations slightly rounded.

3.10 CONCRETE PROTECTING AND CURING

A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Comply with ACI 306.1 for cold-weather protection and ACI 301 for hot-weather protection during curing.

B. Evaporation Retarder: Apply evaporation retarder to unformed concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb/sq. ft. x h before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete, but before float finishing.

C. Unformed Surfaces: Begin curing immediately after finishing concrete. Cure unformed surfaces, including floors and slabs, concrete floor toppings, and other surfaces.

D. Cure concrete according to ACI 308.1, by one or a combination of the following methods:

1. Moisture Curing: Keep surfaces continuously moist for not less than seven days with the following materials:

    a. Water.
    b. Continuous water-fog spray.
    c. Absorptive cover, water saturated, and kept continuously wet. Cover concrete surfaces and edges with 12-inch lap over adjacent absorptive covers.

2. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches, and sealed by waterproof tape or adhesive. Cure for not less than seven days. Immediately repair any holes or tears during curing period, using cover material and waterproof tape.

    a. Moisture cure or use moisture-retaining covers to cure concrete surfaces to receive floor coverings.
    b. Moisture cure or use moisture-retaining covers to cure concrete surfaces to receive penetrating liquid floor treatments.
    c. Cure concrete surfaces to receive floor coverings with either a moisture-retaining cover or a curing compound that the manufacturer certifies does not interfere with bonding of floor covering used on Project.

3. Curing Compound: Apply uniformly in continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Maintain continuity of coating and repair damage during curing period.

    a. Removal: After curing period has elapsed, remove curing compound without damaging concrete surfaces by method recommended by curing compound manufacturer unless manufacturer certifies curing compound does not interfere with bonding of floor covering used on Project.

4. Curing and Sealing Compound: Apply uniformly to floors and slabs indicated in a continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Repeat process 24 hours later and apply a second coat. Maintain continuity of coating and repair damage during curing period.

3.11 LIQUID FLOOR TREATMENTS

A. Penetrating Liquid Floor Treatment: Prepare, apply, and finish penetrating liquid floor treatment according to manufacturer's written instructions.

1. Remove curing compounds, sealers, oil, dirt, laitance, and other contaminants and complete surface repairs.
2. Apply liquid until surface is saturated, scrubbing into surface until a gel forms; rewet; and repeat brooming or scrubbing. Rinse with water; remove excess material until surface is dry. Apply a second coat in a similar manner if surface is rough or porous.

B. Sealing Coat: Uniformly apply a continuous sealing coat of curing and sealing compound to hardened concrete by power spray or roller according to manufacturer's written instructions.

3.12 JOINT FILLING

A. Prepare, clean, and install joint filler according to manufacturer's written instructions.

1. Defer joint filling until concrete has aged at least one month(s). Do not fill joints until construction traffic has permanently ceased.

B. Remove dirt, debris, saw cuttings, curing compounds, and sealers from joints; leave contact faces of joints clean and dry.

C. Install semirigid joint filler full depth in saw-cut joints and at least 2 inches deep in formed joints. Overfill joint and trim joint filler flush with top of joint after hardening.

3.13 CONCRETE SURFACE REPAIRS

A. Defective Concrete: Repair and patch defective areas when approved by Architect. Remove and replace concrete that cannot be repaired and patched to Architect's approval.

B. Patching Mortar: Mix dry-pack patching mortar, consisting of 1 part portland cement to 2-1/2 parts fine aggregate passing a No. 16 sieve, using only enough water for handling and placing.

C. Repairing Unformed Surfaces: Test unformed surfaces, such as floors and slabs, for finish and verify surface tolerances specified for each surface. Correct low and high areas. Test surfaces sloped to drain for trueness of slope and smoothness; use a sloped template.

1. Repair finished surfaces containing defects. Surface defects include spalls, popouts, honeycombs, rock pockets, crazing and cracks in excess of 0.01 inch wide or that penetrate to reinforcement or completely through unreinforced sections regardless of width, and other objectionable conditions.
2. After concrete has cured at least 14 days, correct high areas by grinding.
3. Correct localized low areas during or immediately after completing surface finishing operations by cutting out low areas and replacing with patching mortar. Finish repaired areas to blend into adjacent concrete.
4. Correct other low areas scheduled to receive floor coverings with a repair underlayment. Prepare, mix, and apply repair underlayment and primer according to manufacturer's written instructions to produce a smooth, uniform, plane, and level surface. Feather edges to match adjacent floor elevations.
5. Correct other low areas scheduled to remain exposed with a repair topping. Cut out low areas to ensure a minimum repair topping depth of 1/4 inch to match adjacent floor elevations. Prepare, mix, and apply repair topping and primer according to manufacturer's written instructions to produce a smooth, uniform, plane, and level surface.
6. Repair defective areas, except random cracks and single holes 1 inch or less in diameter, by cutting out and replacing with fresh concrete. Remove defective areas with clean, square cuts and expose steel reinforcement with at least a 3/4-inch clearance all around. Dampen concrete surfaces in contact with patching concrete and apply bonding agent. Mix patching concrete of same materials and mixture as original concrete, except without coarse aggregate. Place, compact, and finish to blend with adjacent finished concrete. Cure in same manner as adjacent concrete.
7. Repair random cracks and single holes 1 inch or less in diameter with patching mortar. Groove top of cracks and cut out holes to sound concrete and clean off dust, dirt, and loose particles. Dampen cleaned concrete surfaces and apply bonding agent. Place patching mortar before bonding agent has dried. Compact patching mortar and finish to match adjacent concrete. Keep patched area continuously moist for at least 72 hours.

D. Perform structural repairs of concrete, subject to Architect's approval, using epoxy adhesive and patching mortar.

E. Repair materials and installation not specified above may be used, subject to Architect's approval.

3.14 FIELD QUALITY CONTROL

A. Special Inspections: Engage a qualified testing and inspecting agency to perform tests and inspections and to submit reports.

B. Inspections:

1. Steel reinforcement placement.
2. Steel reinforcement welding.
3. Headed bolts.
4. Verification of use of required design mixture.
5. Concrete placement, including conveying and depositing.
6. Curing procedures and maintenance of curing temperature.

C. Concrete Tests: Testing of composite samples of fresh concrete obtained according to ASTM C 172/C 172M shall be performed according to the following requirements:

1. Testing Frequency: Obtain one composite sample for each day's pour of each concrete mixture exceeding 5 cu. yd., but less than 25 cu. yd., plus one set for each additional 50 cu. yd. or fraction thereof.
2. Testing Frequency: Obtain at least one composite sample for each 100 cu. yd. or fraction thereof of each concrete mixture placed each day.

    a. When frequency of testing provides fewer than five compressive-strength tests for each concrete mixture, testing shall be conducted from at least five randomly selected batches or from each batch if fewer than five are used.

3. Slump: ASTM C 143/C 143M; one test at point of placement for each composite sample, but not less than one test for each day's pour of each concrete mixture. Perform additional tests when concrete consistency appears to change.
4. Air Content: ASTM C 231/C 231M, pressure method, for normal-weight concrete; one test for each composite sample, but not less than one test for each day's pour of each concrete mixture.
5. Concrete Temperature: ASTM C 1064/C 1064M; one test hourly when air temperature is 40 deg F and below or 80 deg F and above, and one test for each composite sample.
6. Unit Weight: ASTM C 567/C 567M, fresh unit weight of structural lightweight concrete; one test for each composite sample, but not less than one test for each day's pour of each concrete mixture.
7. Compression Test Specimens: ASTM C 31/C 31M.

    a. Cast and laboratory cure two sets of two standard cylinder specimens for each composite sample.

8. Compressive-Strength Tests: ASTM C 39/C 39M; test one set of two laboratory-cured specimens at 7 days and one set of two specimens at 28 days.

    a. Test one set of two field-cured specimens at 7 days and one set of two specimens at 28 days.
    b. A compressive-strength test shall be the average compressive strength from a set of two specimens obtained from same composite sample and tested at age indicated.

9. When strength of field-cured cylinders is less than 85 percent of companion laboratory-cured cylinders, Contractor shall evaluate operations and provide corrective procedures for protecting and curing in-place concrete.
10. Strength of each concrete mixture will be satisfactory if every average of any three consecutive compressive-strength tests equals or exceeds specified compressive strength and no compressive-strength test value falls below specified compressive strength by more than 500 psi.
11. Test results shall be reported in writing to Architect, concrete manufacturer, and Contractor within 48 hours of testing. Reports of compressive-strength tests shall contain Project identification name and number, date of concrete placement, name of concrete testing and inspecting agency, location of concrete batch in Work, design compressive strength at 28 days, concrete mixture proportions and materials, compressive breaking strength, and type of break for both 7- and 28-day tests.
12. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted by Architect but will not be used as sole basis for approval or rejection of concrete.
13. Additional Tests: Testing and inspecting agency shall make additional tests of concrete when test results indicate that slump, air entrainment, compressive strengths, or other

requirements have not been met, as directed by Architect. Testing and inspecting agency may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C 42/C 42M or by other methods as directed by Architect.

14. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.
15. Correct deficiencies in the Work that test reports and inspections indicate do not comply with the Contract Documents.

3.15 PROTECTION OF LIQUID FLOOR TREATMENTS

A. Protect liquid floor treatment from damage and wear during the remainder of construction period. Use protective methods and materials, including temporary covering, recommended in writing by liquid floor treatments installer.

END OF SECTION 033000

SECTION 034100 - PRECAST STRUCTURAL CONCRETE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Precast structural concrete: Hollowcore.

B. Related Requirements:

1. Section 033000 "Cast-in-Place Concrete" for concrete topping and placing connection anchors in concrete.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Design Mixtures: For each precast concrete mixture. Include compressive strength and, if required, water-absorption tests.

C. Shop Drawings:

1. Include member locations, plans, elevations, dimensions, shapes and sections, openings, support conditions, and types of reinforcement, including special reinforcement.
2. Detail fabrication and installation of precast structural concrete units, including connections at member ends and to adjoining construction.
3. Indicate joints, reveals, drips, chamfers, and extent and location of each surface finish.
4. Indicate separate face and backup mixture locations and thicknesses.
5. Indicate type, size, and length of welded connections by AWS standard symbols.
6. Detail loose and cast-in hardware, lifting and erection inserts, connections, and joints.
7. Indicate locations, tolerances, and details of anchorage devices to be embedded in or attached to structure or other construction.
8. Include and locate openings larger than 10 inches (250 mm). Where additional structural support is required, include header design.
9. Indicate location of each precast structural concrete unit by same identification mark placed on panel.
10. Indicate relationship of precast structural concrete units to adjacent materials.
11. Indicate locations, dimensions, and details of thin-brick units, including corner units and special shapes, and joint treatment.
12. Indicate locations, dimensions, and details of stone facings, anchors, and joint widths.
13. Indicate estimated camber for precast floor slabs with concrete toppings.
14. Indicate shim sizes and grouting sequence.

15. If design modifications are proposed to meet performance requirements and field conditions, submit design calculations and Shop Drawings. Do not adversely affect the appearance, durability, or strength of units when modifying details or materials and maintain the general design concept.

D. Delegated-Design Submittal: For precast structural concrete indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer, licensed in the state of Nebraska, responsible for their preparation.

1. Show precast structural concrete unit types, connections, types of reinforcement, including special reinforcement, and concrete cover on reinforcement. Indicate location, type, magnitude, and direction of loads imposed on the building structural frame from precast structural concrete.

1.4 INFORMATIONAL SUBMITTALS

A. Qualification Data: For fabricator.

B. Welding certificates.

C. Material Certificates: For the following:

1. Cementitious materials.
2. Reinforcing materials and prestressing tendons.
3. Admixtures.
4. Bearing pads.

D. Material Test Reports: For aggregates, by a qualified testing agency.

E. Preconstruction test reports.

F. Source quality-control reports.

G. Field quality-control reports.

1.5 QUALITY ASSURANCE

A. Fabricator Qualifications: A firm that assumes responsibility for engineering precast structural concrete units to comply with performance requirements. Responsibility includes preparation of Shop Drawings and comprehensive engineering analysis by a qualified professional engineer.

1. Designated as a PCI-certified plant as follows:

a. Group C, Category C3 - Prestressed Straight Strand Structural Members.
b. Group CA.

B. Installer Qualifications: An experienced installer who has completed precast structural concrete work similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.

C. Design Standards: Comply with ACI 318 (ACI 318M) and design recommendations in PCI MNL 120, "PCI Design Handbook - Precast and Prestressed Concrete," applicable to types of precast structural concrete units indicated

D. Quality-Control Standard: For manufacturing procedures, testing requirements, and quality-control recommendations for types of units required, comply with PCI MNL 116, "Manual for Quality Control for Plants and Production of Structural Precast Concrete Products."

E. Welding Qualifications: Qualify procedures and personnel according to the following:

1. AWS D1.1/D1.1M, "Structural Welding Code - Steel."
2. AWS D1.4/D1.4M, "Structural Welding Code - Reinforcing Steel."

F. For hollow core units, provide the required strand cover and equivalent thickness, including topping, to provide the required fire resistance rating.

G. Provide the required reinforcement cover for lintels to provide the required fire resistance rating.

H. Design by Fabricator: Design hollowcore units to support superimposed dead loads and live loads as indicated on drawings and as required for compliance with local governing code requirements.

I. At completion of construction, the fabricator shall submit a certificate of compliance to the Building Official and the Architect stating that the Work was performed in accordance with the Construction Documents.

1.6 COORDINATION

A. Furnish loose connection hardware and anchorage items to be embedded in or attached to other construction before starting that Work. Provide locations, setting diagrams, templates, instructions, and directions, as required, for installation.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Support units during shipment on nonstaining shock-absorbing material in same position as during storage.

B. Store units with adequate bracing and protect units to prevent contact with soil, to prevent staining, and to prevent cracking, distortion, warping or other physical damage.

1. Store units with dunnage across full width of each bearing point unless otherwise indicated.
2. Place adequate dunnage of even thickness between each unit.
3. Place stored units so identification marks are clearly visible, and units can be inspected.

C. Handle and transport units in a manner that avoids excessive stresses that cause cracking or damage.

D. Lift and support units only at designated points indicated on Shop Drawings.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Fabricators: Subject to compliance with requirements, available fabrications offering products that may be incorporated in the Work include, but are not limited to, the following:

1. Concrete Industries, Inc.
2. Coreslab Sturcturs.
3. Enterprise Precast
4. Gage Brothers Concrete Products, Inc.
5. Iowa Prestressed Concrete, Inc.

2.2 PERFORMANCE REQUIREMENTS

A. Delegated Design: Engage a qualified professional engineer, as defined in Section 014000 "Quality Requirements," to design precast structural concrete .

B. Design Standards: Comply with ACI 318 (ACI 318M) and with design recommendations in PCI MNL 120, "PCI Design Handbook - Precast and Prestressed Concrete," applicable to types of precast structural concrete units indicated.

C. Fire-Resistance Calculations: Provide precast structural concrete units whose fire resistance meets prescriptive requirements of authorities having jurisdiction or has been calculated according to ACI 216.1 (ACI 216.1M) and is acceptable to authorities having jurisdiction.

D. Structural Performance: Precast structural concrete units and connections shall withstand design loads indicated on the contract documents.

2.3 MOLD MATERIALS

A. Molds: Rigid, dimensionally stable, non-absorptive material, warp and buckle free, that provides continuous precast concrete surfaces within fabrication tolerances indicated; nonreactive with concrete and suitable for producing required finishes.

1. Mold-Release Agent: Commercially produced form-release agent that does not bond with, stain, or adversely affect precast concrete surfaces and does not impair subsequent surface or joint treatments of precast concrete.

B. Surface Retarder: Chemical set retarder, capable of temporarily delaying setting of newly placed concrete mixture to depth of reveal specified.

2.4 REINFORCING MATERIALS

A. Reinforcing Bars: ASTM A 615/A 615M, Grade 60 (Grade 420), deformed.

B. Low-Alloy-Steel Reinforcing Bars: ASTM A 706/A 706M, deformed.

C. Plain-Steel Welded Wire Reinforcement: ASTM A 185/A 185M, fabricated from as-drawn steel wire into flat sheets.

D. Supports: Suspend reinforcement from back of mold or use bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded wire reinforcement in place according to PCI MNL 116.

2.5 PRESTRESSING TENDONS

A. Pretensioning Strand: ASTM A 886/A 886M, Grade 270 (Grade 1860), indented, seven-wire], low-relaxation strand.CONCRETE MATERIALS

B. Portland Cement: ASTM C 150/C 150M, Type I or Type III, gray, unless otherwise indicated.

1. For surfaces exposed to view in finished structure, use gray or white cement, of same type, brand, and mill source.

C. Supplementary Cementitious Materials:

1. Fly Ash: ASTM C 618, Class C or F, with maximum loss on ignition of 3 percent.

D. Normal-Weight Aggregates: Except as modified by PCI MNL 116, ASTM C 33/C 33M, with coarse aggregates complying with Class 5S. Stockpile fine and coarse aggregates for each type of exposed finish from a single source (pit or quarry) for Project.

E. Water: Potable; free from deleterious material that may affect color stability, setting, or strength of concrete and complying with chemical limits of PCI MNL 116.

F. Air-Entraining Admixture: ASTM C 260, certified by manufacturer to be compatible with other required admixtures.

G. Chemical Admixtures: Certified by manufacturer to be compatible with other admixtures and to not contain calcium chloride, or more than 0.15 percent chloride ions or other salts by weight of admixture.

1. Water-Reducing Admixtures: ASTM C 494/C 494M, Type A.
2. Retarding Admixture: ASTM C 494/C 494M, Type B.
3. Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type D.
4. Water-Reducing and Accelerating Admixture: ASTM C 494/C 494M, Type E.
5. High-Range, Water-Reducing Admixture: ASTM C 494/C 494M, Type F.
6. High-Range, Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type G.
7. Plasticizing Admixture: ASTM C 1017/C 1017M, Type I.

2.6 STEEL CONNECTION MATERIALS

A. Carbon-Steel Shapes and Plates: ASTM A 36/A 36M.

B. Carbon-Steel-Headed Studs: ASTM A 108, Grade 1010 through 1020, cold finished, AWS D1.1/D1.1M, Type A or B, with arc shields and with minimum mechanical properties of PCI MNL 116.

C. Carbon-Steel Structural Tubing: ASTM A 500/A 500M, Grade B or Grade C.

D. Carbon-Steel Bolts and Studs: ASTM A 307, Grade A (ASTM F 568M, Property Class 4.6); carbon-steel, hex-head bolts and studs; carbon-steel nuts, ASTM A 563 (ASTM A 563M); and flat, unhardened steel washers, ASTM F 844.

E. High-Strength Bolts and Nuts: ASTM A 325 (ASTM A 325M) or ASTM A 490 (ASTM A 490M), Type 1, heavy hex steel structural bolts; heavy hex carbon-steel nuts, ASTM A 563 (ASTM A 563M); and hardened carbon-steel washers, ASTM F 436 (ASTM F 436M).

1. Do not zinc coat ASTM A 490 (ASTM A 490M) bolts.

F. Welding Electrodes: Comply with AWS standards.

G. Precast Accessories: Provide clips, hangers, plastic or steel shims, and other accessories required to install precast structural concrete units.

2.7 BEARING PADS

A. Provide one of the following bearing pads for precast structural concrete units:

1. Elastomeric Pads: AASHTO M 251, plain, vulcanized, 100 percent polychloroprene (neoprene) elastomer, molded to size or cut from a molded sheet, 50 to 70 Shore, Type A durometer hardness, ASTM D 2240; minimum tensile strength 2250 psi (15.5 MPa), ASTM D 412.
2. High-Density Plastic: Multimonomer, nonleaching, plastic strip.

2.8 GROUT MATERIALS

A. Sand-Cement Grout: Portland cement, ASTM C 150/C 150M, Type I, and clean, natural sand, ASTM C 144 or ASTM C 404. Mix at ratio of 1 part cement to 2-1/2 to 3 parts sand, by volume, with minimum water required for placement and hydration. Water-soluble chloride ion content less than 0.06 percent by weight of cement when tested according to ASTM C 1218/C 1218M.

B. Nonmetallic, Nonshrink Grout: Packaged, nonmetallic, noncorrosive, nonstaining grout containing selected silica sands, portland cement, shrinkage-compensating agents, plasticizing and water-reducing agents, complying with ASTM C 1107/C 1107M, Grade A for drypack and Grades B and C for flowable grout and of consistency suitable for application within a 30-minute working time. Water-soluble chloride ion content less than 0.06 percent by weight of cement when tested according to ASTM C 1218/C 1218M.

C. Epoxy-Resin Grout: Two-component, mineral-filled epoxy resin; ASTM C 881/C 881M, of type, grade, and class to suit requirements.

2.9 CONCRETE MIXTURES

A. Prepare design mixtures for each type of precast concrete required.

1. Limit use of fly ash to 20 percent replacement of portland cement by.

B. Design mixtures may be prepared by a qualified independent testing agency or by qualified precast plant personnel at precast structural concrete fabricator's option.

C. Limit water-soluble chloride ions to maximum percentage by weight of cement permitted by ACI 318 (ACI 318M) or PCI MNL 116 when tested according to ASTM C 1218/C 1218M.

D. Normal-Weight Concrete Mixtures: Proportion by either laboratory trial batch or field test data methods according to ACI 211.1, with materials to be used on Project, to provide normal-weight concrete with the following properties:

1. Compressive Strength (28 Days): 5000 psi (34.5 MPa).
2. Maximum Water-Cementitious Materials Ratio: 0.45.

E. Add air-entraining admixture at manufacturer's prescribed rate to result in concrete at point of placement having an air content complying with PCI MNL 116.

F. When included in design mixtures, add other admixtures to concrete mixtures according to manufacturer's written instructions.

G. Concrete Mix Adjustments: Concrete mix design adjustments may be proposed if characteristics of materials, Project conditions, weather, test results, or other circumstances warrant.

2.10 MOLD FABRICATION

A. Molds: Accurately construct molds, mortar tight, of sufficient strength to withstand pressures due to concrete-placement operations and temperature changes and for prestressing and detensioning operations. Coat contact surfaces of molds with release agent before reinforcement is placed. Avoid contamination of reinforcement and prestressing tendons by release agent.

B. Maintain molds to provide completed precast structural concrete units of shapes, lines, and dimensions indicated, within fabrication tolerances specified.

1. Edge and Corner Treatment: Uniformly chamfered.

2.11 FABRICATION

A. Cast-in Anchors, Inserts, Plates, Angles, and Other Anchorage Hardware: Fabricate anchorage hardware with sufficient anchorage and embedment to comply with design requirements. Accurately position for attachment of loose hardware, and secure in place during precasting operations. Locate anchorage hardware where it does not affect position of main reinforcement or concrete placement.

1. Weld-headed studs and deformed bar anchors used for anchorage according to AWS D1.1/D1.1M and AWS C5.4, "Recommended Practices for Stud Welding."

B. Furnish loose hardware items including steel plates, clip angles, seat angles, anchors, dowels, cramps, hangers, and other hardware shapes for securing precast structural concrete units to supporting and adjacent construction.

C. Cast-in reglets, slots, holes, and other accessories in precast structural concrete units as indicated on the Contract Drawings.

D. Cast-in openings larger than 6 inches (152 mm) in any dimension. Do not drill or cut openings or prestressing strand without Architect's approval.

E. Reinforcement: Comply with recommendations in PCI MNL 116 for fabricating, placing, and supporting reinforcement.

1. Clean reinforcement of loose rust and mill scale, earth, and other materials that reduce or destroy the bond with concrete. When damage to epoxy-coated reinforcement exceeds limits specified in ASTM A 775/A 775M, repair with patching material compatible with coating material and epoxy coat bar ends after cutting.
2. Accurately position, support, and secure reinforcement against displacement during concrete-placement and consolidation operations. Completely conceal support devices to prevent exposure on finished surfaces.
3. Place reinforcing steel and prestressing strand to maintain at least 3/4-inch (19-mm) minimum concrete cover. Increase cover requirements for reinforcing steel to 1-1/2 inches (38 mm) when units are exposed to corrosive environment or severe exposure conditions. Arrange, space, and securely tie bars and bar supports to hold reinforcement in position while placing concrete. Direct wire tie ends away from finished, exposed concrete surfaces.
4. Install welded wire fabric in lengths as long as practicable. Lap adjoining pieces at least one full mesh spacing and wire tie laps, where required by design. Offset laps of adjoining widths to prevent continuous laps in either direction.

F. Reinforce precast structural concrete units to resist handling, transportation, and erection stresses and specified in-place loads.

G. Prestress tendons for precast structural concrete units by either pretensioning or post-tensioning methods. Comply with PCI MNL 116.

1. Delay detensioning or post-tensioning of precast, prestressed structural concrete units until concrete has reached its indicated minimum design release compressive strength as established by test cylinders cured under same conditions as concrete unit.
2. Detension pretensioned tendons either by gradually releasing tensioning jacks or by heat cutting tendons, using a sequence and pattern to prevent shock or unbalanced loading.
3. If concrete has been heat cured, detension while concrete is still warm and moist to avoid dimensional changes that may cause cracking or undesirable stresses.

H. Comply with requirements in PCI MNL 116 and in this Section for measuring, mixing, transporting, and placing concrete. After concrete batching, no additional water may be added.

I. Place concrete in a continuous operation to prevent cold joints or planes of weakness from forming in precast concrete units.

J. Thoroughly consolidate placed concrete by vibration without dislocating or damaging reinforcement and built-in items, and minimize pour lines, honeycombing, or entrapped air voids on surfaces. Use equipment and procedures complying with PCI MNL 116.

1. Place self-consolidating concrete without vibration according to PCI TR-6, "Interim Guidelines for the Use of Self-Consolidating Concrete in Precast/Prestressed Concrete Institute Member Plants." Ensure adequate bond between face and backup concrete, if used.

K. Comply with PCI MNL 116 procedures for hot- and cold-weather concrete placement.

L. Identify pickup points of precast structural concrete units and orientation in structure with permanent markings, complying with markings indicated on Shop Drawings. Imprint or permanently mark casting date on each precast structural concrete unit on a surface that does not show in finished structure.

M. Cure concrete, according to requirements in PCI MNL 116, by moisture retention without heat or by accelerated heat curing using live steam or radiant heat and moisture. Cure units until

compressive strength is high enough to ensure that stripping does not have an effect on performance or appearance of final product.

N. Discard and replace precast structural concrete units that do not comply with requirements, including structural, manufacturing tolerance, and appearance, unless repairs meet requirements in PCI MNL 116 and meet Architect's approval.

2.12 CASTING HOLLOW CORE SLAB UNITS

A. Type: Precast, prestressed concrete units with open, hollow cores running the full length of the slab units.

B. Furnish units free of voids and honeycombs.

C. Provide standard finish to precast concrete units.

D. Reinforce units to resist transportation and erection stresses.

E. Include cast-in weld plates where required.

F. Coordinate with other trades for installation of cast-in items.

G. Provide solid, monolithic, precast concrete slab units forming an integral part of hollow-core slab unit system. Design and fabricate solid units to dimensions and details indicated for hollow-core slab units.

H. Provide headers of structural-steel shapes for openings larger than one slab width according to hollow-core slab unit fabricator's recommendations.

I. Holes and blockouts interfering with a web or prestressing strand shall be cast-in or cut in the manufacturing plant.

J. Cast, screed, and consolidate wythe supported by mold.

K. Place insulation boards abutting edges and ends of adjacent boards. Insert wythe connectors through insulation, and consolidate concrete around connectors according to connector manufacturer's written instructions.

L. Ensure bottom wythe and insulation layer are not disturbed after bottom wythe reaches initial set.

M. Cast, screed, and consolidate top wythe to meet required finish.

N. Maintain temperature below 150 deg F (65 deg C) in bottom concrete wythe.

2.13 FABRICATION TOLERANCES

A. Fabricate precast structural concrete units to shapes, lines, and dimensions indicated so each finished unit complies with PCI MNL 116 product dimension tolerances as well as position tolerances for cast-in items.

2.14 COMMERCIAL FINISHES

A. For Hollow core:

1. Standard Grade: Normal plant-run finish produced in molds that impart a smooth finish to concrete. Surface holes smaller than 1/2 inch (13 mm) caused by air bubbles, normal color variations, form joint marks, and minor chips and spalls are permitted. Fill air holes greater than 1/4 inch (6 mm) in width that occur more than once per 2 sq. in. (1300 sq. mm). Major or unsightly imperfections, honeycombs, or structural defects are not permitted. Limit joint offsets to 1/8 inch (3 mm).

B. Screed or float finish unformed surfaces. Strike off and consolidate concrete with vibrating screeds to a uniform finish. Hand screed at projections. Normal color variations, minor indentations, minor chips, and spalls are permitted. Major imperfections, honeycombing, or defects are not permitted.

C. Apply roughened surface finish according to ACI 318 (ACI 318M) to precast concrete units that receive concrete topping after installation.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine supporting structural frame or foundation and conditions for compliance with requirements for installation tolerances, bearing surface tolerances, and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

C. Do not install precast concrete units until supporting, cast-in-place concrete has attained minimum allowable design compressive strength and until supporting steel or other structure is structurally ready to receive loads from precast concrete units.

3.2 INSTALLATION

A. Install clips, hangers, bearing pads, and other accessories required for connecting precast structural concrete units to supporting members and backup materials.

B. Erect precast structural concrete level, plumb, and square within specified allowable tolerances. Provide temporary structural framing, shoring, and bracing as required to maintain position, stability, and alignment of units until permanent connections are complete.

1. Install temporary steel or plastic spacing shims or bearing pads as precast structural concrete units are being erected. Tack weld steel shims to each other to prevent shims from separating.
2. Maintain horizontal and vertical joint alignment and uniform joint width as erection progresses.
3. Remove projecting lifting devices and use plastic patch caps or sand-cement grout to fill voids within recessed lifting devices flush with surface of adjacent precast surfaces when recess is exposed.
4. For hollow-core slab voids used as electrical raceways or mechanical ducts, align voids between units and tape butt joint at end of slabs.

C. Connect precast structural concrete units in position by bolting, welding, grouting, or as otherwise indicated on Shop Drawings. Remove temporary shims, wedges, and spacers as soon as practical after connecting and grouting are completed.

1. Do not permit connections to disrupt continuity of roof flashing.

D. Field cutting of precast units is not permitted without approval of Architect.

E. Fasteners: Do not use drilled or powder-actuated fasteners for attaching accessory items to precast, prestressed concrete units.

F. Welding: Comply with applicable requirements in AWS D1.1/D1.1M and AWS D1.4/D1.4M for welding, welding electrodes, appearance, quality of welds, and methods used in correcting welding work.

1. Protect precast structural concrete units and bearing pads from damage by field welding or cutting operations, and provide noncombustible shields as required.
2. Clean weld-affected steel surfaces with chipping hammer followed by brushing, and apply a minimum 4.0-mil- (0.1-mm-) thick coat of galvanized repair paint to galvanized surfaces according to ASTM A 780/A 780M.
3. Clean weld-affected steel surfaces with chipping hammer followed by brushing, and reprime damaged painted surfaces.
4. Visually inspect welds and remove, reweld, or repair incomplete and defective welds.

G. At bolted connections, use lock washers, tack welding, or other approved means to prevent loosening of nuts after final adjustment.

1. Where slotted connections are used, verify bolt position and tightness. For sliding connections, properly secure bolt but allow bolt to move within connection slot.
2. For slip-critical connections, use one of the following methods to assure proper bolt pretension:

    a. Turn-of-Nut: According to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."
    b. Calibrated Wrench: According to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."
    c. Twist-off Tension Control Bolt: ASTM F 1852.
    d. Direct-Tension Control Bolt: ASTM F 1852.

3. For slip-critical connections, use method and inspection procedure approved by Architect and coordinated with inspection agency.

H. Grouting or Dry-Packing Connections and Joints: Grout connections and joints and open spaces at keyways, connections, and joints where required or indicated on Shop Drawings. Retain flowable grout in place until hard enough to support itself. Alternatively, pack spaces with stiff dry-pack grout material, tamping until voids are completely filled.

1. Place grout and finish smooth, level, and plumb with adjacent concrete surfaces.
2. Fill joints completely without seepage to other surfaces.
3. Trowel top of grout joints on roofs smooth and uniform. Finish transitions between different surface levels not steeper than 1 to 12.
4. Place grout end cap or dam in voids at ends of hollow-core slabs.
5. Promptly remove grout material from exposed surfaces before it affects finishes or hardens.
6. Keep grouted joints damp for not less than 24 hours after initial set.

3.3 ERECTION TOLERANCES

A. Erect precast structural concrete units level, plumb, square, and in alignment without exceeding the noncumulative erection tolerances of PCI MNL 135.

B. Minimize variations between adjacent slab members by jacking, loading, or other method recommended by fabricator and approved by Architect.

3.4 FIELD QUALITY CONTROL

A. Special Inspections: Owner will engage a qualified special inspector to perform the following special inspections:

1. Erection of precast structural concrete members.

B. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections.

C. Visually inspect field welds and test according to ASTM E 165 or to ASTM E 709 and ASTM E 1444. High-strength bolted connections are subject to inspections.

D. Testing agency will report test results promptly and in writing to Contractor and Architect.

E. Repair or remove and replace work where tests and inspections indicate that it does not comply with specified requirements.

F. Additional testing and inspecting, at Contractor's expense, shall be performed to determine compliance of replaced or additional work with specified requirements.

G. Prepare test and inspection reports.

3.5 REPAIRS

A. Repair precast structural concrete units if permitted by Architect.

1. Repairs may be permitted if structural adequacy, serviceability, durability, and appearance of units have not been impaired.

B. Mix patching materials and repair units so cured patches blend with color, texture, and uniformity of adjacent exposed surfaces and show no apparent line of demarcation between original and repaired work, when viewed in typical daylight illumination from a distance of 20 feet (6 m).

C. Prepare and repair damaged galvanized coatings with galvanizing repair paint according to ASTM A 780/A 780M.

D. Wire brush, clean, and paint damaged prime-painted components with same type of shop primer.

E. Remove and replace damaged precast structural concrete units that cannot be repaired or when repairs do not comply with requirements as determined by Architect.

3.6 CLEANING

A. Clean mortar, plaster, fireproofing, weld slag, and other deleterious material from concrete surfaces and adjacent materials immediately.

B. Clean exposed surfaces of precast concrete units after erection and completion of joint treatment to remove weld marks, other markings, dirt, and stains.

1. Perform cleaning procedures, if necessary, according to precast concrete fabricator's written recommendations. Protect other work from staining or damage due to cleaning operations.
2. Do not use cleaning materials or processes that could change the appearance of exposed concrete finishes or damage adjacent materials.

END OF SECTION 034100

SECTION 034500 – PRECAST ARCHITECTURAL CONCRETE

Project keynotes are generally associated with existing conditions. No additional specification information is being provided beyond the information already shown in the Contract Drawings.

END OF SECTION 034500

SECTION 042000 - UNIT MASONRY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Concrete masonry units.
2. Mortar and grout.
3. Steel reinforcing bars.
4. Masonry-joint reinforcement.
5. Ties and anchors.

B. Products Installed but not Furnished under This Section:

1. Steel lintels in unit masonry.
2. Cavity wall insulation.

C. Related Requirements:

1. Section 072100 "Thermal Insulation" for cavity wall insulation.

1.3 DEFINITIONS

A. CMU(s): Concrete masonry unit(s).

B. Reinforced Masonry: Masonry containing reinforcing steel in grouted cells.

1.4 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.5 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: For the following:

1. Masonry Units: Show sizes, profiles, coursing, and locations of special shapes.
2. Reinforcing Steel: Detail bending, lap lengths, and placement of unit masonry reinforcing bars. Comply with ACI 315. Show elevations of reinforced walls.
3. Fabricated Flashing: Detail corner units, end-dam units, and other special applications.

1.6 INFORMATIONAL SUBMITTALS

A. Qualification Data: For testing agency.

B. Material Certificates: For each type and size of the following:

1. Masonry units.

a. Include material test reports substantiating compliance with requirements.

2. Cementitious materials. Include name of manufacturer, brand name, and type.
3. Mortar admixtures.
4. Preblended, dry mortar mixes. Include description of type and proportions of ingredients.
5. Grout mixes. Include description of type and proportions of ingredients.
6. Reinforcing bars.
7. Joint reinforcement.
8. Anchors, ties, and metal accessories.

C. Mix Designs: For each type of mortar and grout. Include description of type and proportions of ingredients.

1. Include test reports for mortar mixes required to comply with property specification. Test according to ASTM C 109/C 109M for compressive strength, ASTM C 1506 for water retention, and ASTM C 91/C 91M for air content.
2. Include test reports, according to ASTM C 1019, for grout mixes required to comply with compressive strength requirement.

D. Statement of Compressive Strength of Masonry: For each combination of masonry unit type and mortar type, provide statement of average net-area compressive strength of masonry units, mortar type, and resulting net-area compressive strength of masonry determined according to TMS 602/ACI 530.1/ASCE 6.

E. Cold-Weather and Hot-Weather Procedures: Detailed description of methods, materials, and equipment to be used to comply with requirements.

1.7 QUALITY ASSURANCE

A. Testing Agency Qualifications: Qualified according to ASTM C 1093 for testing indicated.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Store masonry units on elevated platforms in a dry location. If units are not stored in an enclosed location, cover tops and sides of stacks with waterproof sheeting, securely tied. If units become wet, do not install until they are dry.

B. Store cementitious materials on elevated platforms, under cover, and in a dry location. Do not use cementitious materials that have become damp.

C. Store aggregates where grading and other required characteristics can be maintained and contamination avoided.

D. Deliver preblended, dry mortar mix in moisture-resistant containers. Store preblended, dry mortar mix in delivery containers on elevated platforms in a dry location or in covered weatherproof dispensing silos.

E. Store masonry accessories, including metal items, to prevent corrosion and accumulation of dirt and oil.

1.9 FIELD CONDITIONS

A. Protection of Masonry: During construction, cover tops of walls, projections, and sills with waterproof sheeting at end of each day's work. Cover partially completed masonry when construction is not in progress.

1. Extend cover a minimum of 24 inches (600 mm) down both sides of walls, and hold cover securely in place.
2. Where one wythe of multiwythe masonry walls is completed in advance of other wythes, secure cover a minimum of 24 inches (600 mm) down face next to unconstructed wythe, and hold cover in place.

B. Do not apply uniform floor or roof loads for at least 12 hours and concentrated loads for at least three days after building masonry walls or columns.

C. Stain Prevention: Prevent grout, mortar, and soil from staining the face of masonry to be left exposed or painted. Immediately remove grout, mortar, and soil that come in contact with such masonry.

1. Protect base of walls from rain-splashed mud and from mortar splatter by spreading coverings on ground and over wall surface.
2. Protect sills, ledges, and projections from mortar droppings.
3. Protect surfaces of window and door frames, as well as similar products with painted and integral finishes, from mortar droppings.
4. Turn scaffold boards near the wall on edge at the end of each day to prevent rain from splashing mortar and dirt onto completed masonry.

D. Cold-Weather Requirements: Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen substrates. Remove and replace unit masonry damaged by frost or by freezing conditions. Comply with cold-weather construction requirements contained in TMS 602/ACI 530.1/ASCE 6.

1. Cold-Weather Cleaning: Use liquid cleaning methods only when air temperature is 40 deg F (4 deg C) and higher and will remain so until masonry has dried, but not less than seven days after completing cleaning.

E. Hot-Weather Requirements: Comply with hot-weather construction requirements contained in TMS 602/ACI 530.1/ASCE 6.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Source Limitations for Masonry Units: Obtain exposed masonry units of a uniform texture and color, or a uniform blend within the ranges accepted for these characteristics, from single source from single manufacturer for each product required.

B. Source Limitations for Mortar Materials: Obtain mortar ingredients of a uniform quality, including color for exposed masonry, from single manufacturer for each cementitious component and from single source or producer for each aggregate.

2.2 PERFORMANCE REQUIREMENTS

A. Provide structural unit masonry that develops indicated net-area compressive strengths at 28 days.

1. Determine net-area compressive strength of masonry from average net-area compressive strengths of masonry units and mortar types (unit-strength method) according to TMS 602/ACI 530.1/ASCE 6.
2. Determine net-area compressive strength of masonry by testing masonry prisms according to ASTM C 1314.

2.3 UNIT MASONRY, GENERAL

A. Masonry Standard: Comply with TMS 602/ACI 530.1/ASCE 6, except as modified by requirements in the Contract Documents.

2.4 CONCRETE MASONRY UNITS

A. Shapes: Provide shapes indicated and as follows, with exposed surfaces matching exposed faces of adjacent units unless otherwise indicated.

1. Provide special shapes for lintels, corners, jambs, sashes, movement joints, headers, bonding, and other special conditions.
2. Provide bullnose units for outside corners unless otherwise indicated.

B. CMUs: ASTM C 90.

1. Unit Compressive Strength: Provide units with minimum average net-area compressive strength of **2800 psi (19.3 MPa).**
2. Density Calssification: Normal weight.
3. Size (Width): Manufactured to dimensions 3/8 inch (10 mm) less than nominal dimensions.
4. Exposed Faces: Provide color and texture matching the range represented by Architect's sample.

2.5 MASONRY LINTELS

A. General: Provide one of the following:

B. Masonry Lintels: Prefabricated or built-in-place masonry lintels made from bond beam CMUs matching adjacent CMUs in color, texture, and density classification, with reinforcing bars placed as indicated and filled with coarse grout. Cure precast lintels before handling and installing. Temporarily support built-in-place lintels until cured.

2.6 MORTAR AND GROUT MATERIALS

A. Portland Cement: ASTM C 150/C 150M, Type I or II, except Type III may be used for cold-weather construction. Provide natural color or white cement as required to produce mortar color indicated.

1. Alkali content shall not be more than 0.1 percent when tested according to ASTM C 114.

B. Hydrated Lime: ASTM C 207, Type S.

C. Portland Cement-Lime Mix: Packaged blend of portland cement and hydrated lime containing no other ingredients.

D. Masonry Cement: ASTM C 91/C 91M.

E. Mortar Cement: ASTM C 1329/C 1329M.

F. Aggregate for Mortar: ASTM C 144.

1. For mortar that is exposed to view, use washed aggregate consisting of natural sand or crushed stone.
2. For joints less than 1/4 inch (6 mm) thick, use aggregate graded with 100 percent passing the No. 16 (1.18-mm) sieve.
3. White-Mortar Aggregates: Natural white sand or crushed white stone.
4. Colored-Mortar Aggregates: Natural sand or crushed stone of color necessary to produce required mortar color.

G. Aggregate for Grout: ASTM C 404.

H. Water: Potable.

2.7 REINFORCEMENT

A. Uncoated-Steel Reinforcing Bars: ASTM A 615/A 615M or ASTM A 996/A 996M, Grade 60 (Grade 420).

B. Reinforcing Bar Positioners: Wire units designed to fit into mortar bed joints spanning masonry unit cells and to hold reinforcing bars in center of cells. Units are formed from 0.148-inch (3.77-mm) steel wire, hot-dip galvanized after fabrication. Provide units designed for number of bars indicated.

C. Masonry-Joint Reinforcement, General: ASTM A 951/A 951M.

1. Interior Walls: Hot-dip galvanized carbon steel.
2. Exterior Walls: Hot-dip galvanized carbon steel.
3. Wire Size for Side Rods: 0.148-inch (3.77-mm) diameter.
4. Wire Size for Cross Rods: 0.148-inch (3.77-mm) diameter.
5. Wire Size for Veneer Ties: 0.148-inch (3.77-**mm)** diameter.

6. Spacing of Cross Rods, Tabs, and Cross Ties: Not more than 16 inches (407 mm) o.c.
7. Provide in lengths of not less than 10 feet (3 m), with prefabricated corner and tee units.

D. Masonry-Joint Reinforcement for Single-Wythe Masonry: Ladder type with single pair of side rods.

2.8 MASONRY CLEANERS

A. Proprietary Acidic Cleaner: Manufacturer's standard-strength cleaner designed for removing mortar/grout stains, efflorescence, and other new construction stains from new masonry without discoloring or damaging masonry surfaces. Use product expressly approved for intended use by cleaner manufacturer and manufacturer of masonry units being cleaned.

2.9 MORTAR AND GROUT MIXES

A. General: Do not use admixtures, including pigments, air-entraining agents, accelerators, retarders, water-repellent agents, antifreeze compounds, or other admixtures unless otherwise indicated.

1. Do not use calcium chloride in mortar or grout.
2. Use masonry cement mortar unless otherwise indicated.
3. Add cold-weather admixture (if used) at same rate for all mortar that will be exposed to view, regardless of weather conditions, to ensure that mortar color is consistent.

B. Preblended, Dry Mortar Mix: Furnish dry mortar ingredients in form of a preblended mix. Measure quantities by weight to ensure accurate proportions, and thoroughly blend ingredients before delivering to Project site.

C. ASTM C 476.

1. Use grout of type indicated or, if not otherwise indicated, of type (fine or coarse) that will comply with TMS 602/ACI 530.1/ASCE 6 for dimensions of grout spaces and pour height.
2. Proportion grout in accordance with ASTM C 476, Table 1.
3. Provide grout with a slump of 8 to 11 inches (200 to 280 mm) as measured according to ASTM C 143/C 143M.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

1. For the record, prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.
2. Verify that foundations are within tolerances specified.
3. Verify that reinforcing dowels are properly placed.
4. Verify that substrates are free of substances that impair mortar bond.

B. Before installation, examine rough-in and built-in construction for piping systems to verify actual locations of piping connections.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION, GENERAL

A. Thickness: Build cavity and composite walls and other masonry construction to full thickness shown. Build single-wythe walls to actual widths of masonry units, using units of widths indicated.

B. Build chases and recesses to accommodate items specified in this and other Sections.

C. Leave openings for equipment to be installed before completing masonry. After installing equipment, complete masonry to match construction immediately adjacent to opening.

D. Use full-size units without cutting if possible. If cutting is required to provide a continuous pattern or to fit adjoining construction, cut units with motor-driven saws; provide clean, sharp, unchipped edges. Allow units to dry before laying unless wetting of units is specified. Install cut units with cut surfaces and, where possible, cut edges concealed.

E. Select and arrange units for exposed unit masonry to produce a uniform blend of colors and textures. Mix units from several pallets or cubes as they are placed.

3.3 TOLERANCES

A. Dimensions and Locations of Elements:

1. For dimensions in cross section or elevation, do not vary by more than plus 1/2 inch (12 mm) or minus 1/4 inch (6 mm).
2. For location of elements in plan, do not vary from that indicated by more than plus or minus 1/2 inch (12 mm).
3. For location of elements in elevation, do not vary from that indicated by more than plus or minus 1/4 inch (6 mm) in a story height or 1/2 inch (12 mm) total.

B. Lines and Levels:

1. For bed joints and top surfaces of bearing walls, do not vary from level by more than 1/4 inch in 10 feet (6 mm in 3 m), or 1/2-inch (12-mm) maximum.
2. For conspicuous horizontal lines, such as lintels, sills, parapets, and reveals, do not vary from level by more than 1/8 inch in 10 feet (3 mm in 3 m), 1/4 inch in 20 feet (6 mm in 6 m), or 1/2-inch (12-mm) maximum.
3. For vertical lines and surfaces, do not vary from plumb by more than 1/4 inch in 10 feet (6 mm in 3 m), 3/8 inch in 20 feet (9 mm in 6 m), or 1/2-inch (12-mm) maximum.
4. For conspicuous vertical lines, such as external corners, door jambs, reveals, and expansion and control joints, do not vary from plumb by more than 1/8 inch in 10 feet (3 mm in 3 m), 1/4 inch in 20 feet (6 mm in 6 m), or 1/2-inch (12-mm) maximum.
5. For lines and surfaces, do not vary from straight by more than 1/4 inch in 10 feet (6 mm in 3 m), 3/8 inch in 20 feet (9 mm in 6 m), or 1/2-inch (12-mm) maximum.
6. For vertical alignment of exposed head joints, do not vary from plumb by more than 1/4 inch in 10 feet (6 mm in 3 m), or 1/2-inch (12-mm) maximum.
7. For faces of adjacent exposed masonry units, do not vary from flush alignment by more than 1/16 inch (1.5 mm) except due to warpage of masonry units within tolerances specified for warpage of units.

C. Joints:

1. For bed joints, do not vary from thickness indicated by more than plus or minus 1/8 inch (3 mm), with a maximum thickness limited to 1/2 inch (12 mm).
2. For exposed bed joints, do not vary from bed-joint thickness of adjacent courses by more than 1/8 inch (3 mm).
3. For head and collar joints, do not vary from thickness indicated by more than plus 3/8 inch (9 mm) or minus 1/4 inch (6 mm).
4. For exposed head joints, do not vary from thickness indicated by more than plus or minus 1/8 inch (3 mm).
5. For exposed bed joints and head joints of stacked bond, do not vary from a straight line by more than 1/16 inch (1.5 mm) from one masonry unit to the next.

3.4 LAYING MASONRY WALLS

A. Lay out walls in advance for accurate spacing of surface bond patterns with uniform joint thicknesses and for accurate location of openings, movement-type joints, returns, and offsets. Avoid using less-than-half-size units, particularly at corners, jambs, and, where possible, at other locations.

B. Bond Pattern for Exposed Masonry: Unless otherwise indicated, lay exposed masonry in running bond; do not use units with less-than-nominal 4-inch (100-mm) horizontal face dimensions at corners or jambs.

C. Lay concealed masonry with all units in a wythe in running bond or bonded by lapping not less than 4 inches (100 mm). Bond and interlock each course of each wythe at corners. Do not use units with less-than-nominal 4-inch (100-mm) horizontal face dimensions at corners or jambs.

D. Stopping and Resuming Work: Stop work by stepping back units in each course from those in course below; do not tooth. When resuming work, clean masonry surfaces that are to receive mortar, remove loose masonry units and mortar, and wet brick if required before laying fresh masonry.

E. Built-in Work: As construction progresses, build in items specified in this and other Sections. Fill in solidly with masonry around built-in items.

F. Fill space between steel frames and masonry solidly with mortar unless otherwise indicated.

G. Where built-in items are to be embedded in cores of hollow masonry units, place a layer of metal lath, wire mesh, or plastic mesh in the joint below, and rod mortar or grout into core.

H. Fill cores in hollow CMUs with grout 24 inches (600 mm) under bearing plates, beams, lintels, posts, and similar items unless otherwise indicated.

3.5 MORTAR BEDDING AND JOINTING

A. Lay CMUs as follows:

1. Bed face shells in mortar and make head joints of depth equal to bed joints.
2. Bed webs in mortar in all courses of piers, columns, and pilasters.
3. Bed webs in mortar in grouted masonry, including starting course on footings.
4. Fully bed entire units, including areas under cells, at starting course on footings where cells are not grouted.
5. Fully bed units and fill cells with mortar at anchors and ties as needed to fully embed anchors and ties in mortar.

B. Tool exposed joints slightly concave when thumbprint hard, using a jointer larger than joint thickness unless otherwise indicated.

3.6 MASONRY-JOINT REINFORCEMENT

A. General: Install entire length of longitudinal side rods in mortar with a minimum cover of 5/8 inch (16 mm) on exterior side of walls, 1/2 inch (13 mm) elsewhere. Lap reinforcement a minimum of 6 inches (150 mm).

1. Space reinforcement not more than 16 inches (406 mm) o.c.
2. Space reinforcement not more than 8 inches (203 mm) o.c. in foundation walls and parapet walls.
3. Provide reinforcement not more than 8 inches (203 mm) above and below wall openings and extending 12 inches (305 mm) beyond openings in addition to continuous reinforcement.

B. Interrupt joint reinforcement at control and expansion joints unless otherwise indicated.

C. Provide continuity at wall intersections by using prefabricated T-shaped units.

D. Provide continuity at corners by using prefabricated L-shaped units.

E. Cut and bend reinforcing units as directed by manufacturer for continuity at corners, returns, offsets, column fireproofing, pipe enclosures, and other special conditions.

3.7 ANCHORING MASONRY TO STRUCTURAL STEEL AND CONCRETE

A. Anchor masonry to structural steel and concrete, where masonry abuts or faces structural steel or concrete, to comply with the following:

1. Provide an open space not less than 1/2 inch (13 mm) wide between masonry and structural steel or concrete unless otherwise indicated. Keep open space free of mortar and other rigid materials.
2. Anchor masonry with anchors embedded in masonry joints and attached to structure.
3. Space anchors as indicated, but not more than 24 inches (610 mm) o.c. vertically and 36 inches (915 mm) o.c. horizontally.

3.8 CONTROL AND EXPANSION JOINTS

A. General: Install control- and expansion-joint materials in unit masonry as masonry progresses. Do not allow materials to span control and expansion joints without provision to allow for in-plane wall or partition movement.

B. Form control joints in concrete masonry as follows:

1. Fit bond-breaker strips into hollow contour in ends of CMUs on one side of control joint. Fill resultant core with grout, and rake out joints in exposed faces for application of sealant.
2. Install preformed control-joint gaskets designed to fit standard sash block.
3. Install interlocking units designed for control joints. Install bond-breaker strips at joint. Keep head joints free and clear of mortar, or rake out joint for application of sealant.

4. Install temporary foam-plastic filler in head joints, and remove filler when unit masonry is complete for application of sealant.

C. Provide horizontal, pressure-relieving joints by either leaving an airspace or inserting a compressible filler of width required for installing sealant and backer rod specified in Section 079200 "Joint Sealants," but not less than 3/8 inch (10 mm).

1. Locate horizontal, pressure-relieving joints beneath shelf angles supporting masonry.

3.9 LINTELS

A. Provide masonry lintels where shown and where openings of more than 12 inches (305 mm) for brick-size units and 24 inches (610 mm) for block-size units are shown without structural steel or other supporting lintels.

B. Provide minimum bearing of 8 inches (200 mm) at each jamb unless otherwise indicated.

3.10 REINFORCED UNIT MASONRY INSTALLATION

A. Temporary Formwork and Shores: Construct formwork and shores as needed to support reinforced masonry elements during construction.

1. Construct formwork to provide shape, line, and dimensions of completed masonry as indicated. Make forms sufficiently tight to prevent leakage of mortar and grout. Brace, tie, and support forms to maintain position and shape during construction and curing of reinforced masonry.
2. Do not remove forms and shores until reinforced masonry members have hardened sufficiently to carry their own weight and that of other loads that may be placed on them during construction.

B. Placing Reinforcement: Comply with requirements in TMS 602/ACI 530.1/ASCE 6.

C. Grouting: Do not place grout until entire height of masonry to be grouted has attained enough strength to resist grout pressure.

1. Comply with requirements in TMS 602/ACI 530.1/ASCE 6 for cleanouts and for grout placement, including minimum grout space and maximum pour height.
2. Limit height of vertical grout pours to not more than 60 inches (1520 mm).

3.11 FIELD QUALITY CONTROL

A. Testing and Inspecting: Owner will engage special inspectors to perform tests and inspections and prepare reports. Allow inspectors access to scaffolding and work areas as needed to perform tests and inspections. Retesting of materials that fail to comply with specified requirements shall be done at Contractor's expense.

B. Inspections: Special inspections as indicated on the drawings.

3.12 REPAIRING, POINTING, AND CLEANING

A. Remove and replace masonry units that are loose, chipped, broken, stained, or otherwise damaged or that do not match adjoining units. Install new units to match adjoining units; install in fresh mortar, pointed to eliminate evidence of replacement.

B. Pointing: During the tooling of joints, enlarge voids and holes, except weep holes, and completely fill with mortar. Point up joints, including corners, openings, and adjacent construction, to provide a neat, uniform appearance. Prepare joints for sealant application, where indicated.

C. In-Progress Cleaning: Clean unit masonry as work progresses by dry brushing to remove mortar fins and smears before tooling joints.

D. Final Cleaning: After mortar is thoroughly set and cured, clean exposed masonry as follows:

1. Remove large mortar particles by hand with wooden paddles and nonmetallic scrape hoes or chisels.
2. Test cleaning methods on sample wall panel; leave one-half of panel uncleaned for comparison purposes. Obtain Architect's approval of sample cleaning before proceeding with cleaning of masonry.
3. Protect adjacent stone and nonmasonry surfaces from contact with cleaner by covering them with liquid strippable masking agent or polyethylene film and waterproof masking tape.
4. Wet wall surfaces with water before applying cleaners; remove cleaners promptly by rinsing surfaces thoroughly with clear water.
5. Clean brick by bucket-and-brush hand-cleaning method described in BIA Technical Notes 20.
6. Clean concrete masonry by applicable cleaning methods indicated in NCMA TEK 8-4A.
7. Clean masonry with a proprietary acidic cleaner applied according to manufacturer's written instructions.
8. Clean stone trim to comply with stone supplier's written instructions.
9. Clean limestone units to comply with recommendations in ILI's "Indiana Limestone Handbook."

3.13 MASONRY WASTE DISPOSAL

A. Salvageable Materials: Unless otherwise indicated, excess masonry materials are Contractor's property. At completion of unit masonry work, remove from Project site.

B. Excess Masonry Waste: Remove excess clean masonry waste that cannot be used as fill, as described above or recycled, and other masonry waste, and legally dispose of off Owner's property.

END OF SECTION 042000

SECTION 061053 - MISCELLANEOUS ROUGH CARPENTRY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Wood blocking and nailers.
2. Plywood backing panels.

1.3 DEFINITIONS

A. Boards or Strips: Lumber of less than 2 inches nominal (38 mm actual) size in least dimension.

B. Dimension Lumber: Lumber of 2 inches nominal (38 mm actual) or greater size but less than 5 inches nominal (114 mm actual) size in least dimension.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Stack lumber flat with spacers beneath and between each bundle to provide air circulation. Protect lumber from weather by covering with waterproof sheeting, securely anchored. 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 grading agencies indicated. If no grading agency is indicated, provide lumber that complies with the applicable rules of any rules-writing agency certified by the ALSC Board of Review. Provide lumber graded by an agency certified by the ALSC Board of Review to inspect and grade lumber under the rules indicated.

1. Factory mark each piece of lumber with grade stamp of grading agency.
2. Dress lumber, S4S, unless otherwise indicated.

B. Maximum Moisture Content of Lumber: 15 percent unless otherwise indicated.

2.2 FIRE-RETARDANT-TREATED MATERIALS

A. General: Where fire-retardant-treated materials are indicated, materials shall comply with requirements in this article, that are acceptable to authorities having jurisdiction, and with fire-test-response characteristics specified as determined by testing identical products per test method indicated by a qualified testing agency.

B. Fire-Retardant-Treated Lumber and Plywood by Pressure Process: Products with a flame-spread index of 25 or less when tested according to ASTM E 84, and with no evidence of significant progressive combustion when the test is extended an additional 20 minutes, and with the flame front not extending more than 10.5 feet (3.2 m) beyond the centerline of the burners at any time during the test.

1. Treatment shall not promote corrosion of metal fasteners.
2. Interior Type A: Treated materials shall have a moisture content of 28 percent or less when tested according to ASTM D 3201 at 92 percent relative humidity. Use where exterior type is not indicated.

C. Kiln-dry lumber after treatment to a maximum moisture content of 19 percent. Kiln-dry plywood after treatment to a maximum moisture content of 15 percent.

D. Identify fire-retardant-treated wood with appropriate classification marking of qualified testing agency.

E. Application: Treat items indicated on Drawings, and the following:

1. Blocking that is exposed to any open plenum condition.
2. Plywood backing panels.

2.3 MISCELLANEOUS LUMBER

A. General: Provide miscellaneous lumber indicated and lumber for support or attachment of other construction, including the following:

1. Blocking.
2. Nailers.

B. Dimension Lumber Items: Construction or No. 2 grade lumber of any of the following species:

1. Hem-fir (north); NLGA.
2. Mixed southern pine or southern pine; SPIB.
3. Spruce-pine-fir; NLGA.
4. Hem-fir; WCLIB or WWPA.
5. Spruce-pine-fir (south); NeLMA, WCLIB, or WWPA.

C. Concealed Boards: 15 percent maximum moisture content of any of the following species and grades:

1. Mixed southern pine or southern pine, No. 2 grade; SPIB.
2. Hem-fir or hem-fir (north), Construction or No. 2 Common grade; NLGA, WCLIB, or WWPA.
3. Spruce-pine-fir (south) or spruce-pine-fir, Construction or No. 2 Common grade; NeLMA, NLGA, WCLIB, or WWPA.

D. For blocking not used for attachment of other construction, Utility, Stud, or No. 3 grade lumber of any species may be used provided that it is cut and selected to eliminate defects that will interfere with its attachment and purpose.

E. For blocking and nailers used for attachment of other construction, select and cut lumber to eliminate knots and other defects that will interfere with attachment of other work.

F. For furring strips for installing plywood or hardboard paneling, select boards with no knots capable of producing bent-over nails and damage to paneling.

2.4 PLYWOOD BACKING PANELS

A. Equipment Backing Panels: Plywood, DOC PS 1, Exterior, C-C Plugged, fire-retardant treated, in thickness indicated or, if not indicated, not less than 1/2-inch (13-mm) nominal thickness.

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. Where carpentry is exposed to weather, in ground contact, pressure-preservative treated, or in area of high relative humidity, provide fasteners with hot-dip zinc coating complying with ASTM A 153/A 153M.

B. Screws for Fastening to Metal Framing: ASTM C 1002 and ASTM C 954, length as recommended by screw manufacturer for material being fastened.

C. Power-Driven Fasteners: Fastener systems with an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC70.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Set carpentry to required levels and lines, with members plumb, true to line, cut, and fitted. Fit carpentry accurately to other construction. Locate nailers, blocking,and similar supports to comply with requirements for attaching other construction.

B. Install plywood backing panels by fastening to studs; coordinate locations with utilities requiring backing panels. Install fire-retardant-treated plywood backing panels with classification marking of testing agency exposed to view.

C. Install metal framing anchors to comply with manufacturer's written instructions. Install fasteners through each fastener hole.

D. Do not splice structural members between supports unless otherwise indicated.

E. Provide blocking and framing as indicated and as required to support facing materials, fixtures, specialty items, and trim.

1. Provide metal clips for fastening gypsum board or lath at corners and intersections where framing or blocking does not provide a surface for fastening edges of panels. Space clips not more than 16 inches (406 mm) o.c.

F. Sort and select lumber so that natural characteristics do not interfere with installation or with fastening other materials to lumber. Do not use materials with defects that interfere with function of member or pieces that are too small to use with minimum number of joints or optimum joint arrangement.

G. Securely attach carpentry work to substrate by anchoring and fastening as indicated, complying with the following:

1. Table 2304.9.1, "Fastening Schedule," in ICC's International Building Code.

3.2 WOOD BLOCKING AND NAILER INSTALLATION

A. Install where indicated and where required for 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.

END OF SECTION 061053

SECTION 064116 - PLASTIC-LAMINATE-CLAD ARCHITECTURAL CABINETS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Plastic-laminate-faced architectural cabinets.
2. Wood furring, blocking, shims, and hanging strips for installing plastic-laminate-faced architectural cabinets that are not concealed within other construction.

B. Related Requirements:

1. Section 061053 "Miscellaneous Rough Carpentry" for wood furring, blocking, shims, and hanging strips required for installing cabinets that are concealed within other construction before cabinet installation.
2. Section 123623.13 "Plastic-Laminate-Clad Countertops."

1.3 COORDINATION

A. Coordinate sizes and locations of framing, blocking, furring, reinforcements, and other related units of Work specified in other Sections to support loads imposed by installed and fully loaded cabinets.

1.4 ACTION SUBMITTALS

A. Shop Drawings: For plastic-laminate-faced architectural cabinets.

1. Include plans, elevations, sections, and attachment details.
2. Show locations and sizes of furring, blocking, and hanging strips, including concealed blocking and reinforcement specified in other Sections.
3. Show locations and sizes of cutouts and holes for items installed in plastic-laminate architectural cabinets.

B. Samples for Verification: For the following:

1. Plastic Laminates: 8 by 10 inches (200 by 250 mm), for each type, color, pattern, and surface finish required.

1.5 QUALITY ASSURANCE

A. Fabricator Qualifications: Shop that employs skilled workers who custom fabricate products similar to those required for this Project and whose products have a record of successful in-service performance.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Do not deliver cabinets until painting and similar finish operations that might damage architectural cabinets have been completed in installation areas. Store cabinets in installation areas or in areas where environmental conditions comply with requirements specified in "Field Conditions" Article.

1.7 FIELD CONDITIONS

A. Environmental Limitations: Do not deliver or install cabinets until building is enclosed, wet-work is complete, and HVAC system is operating and maintaining temperature and relative humidity at levels planned for building occupants during the remainder of the construction period.

B. Field Measurements: Where cabinets are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication, and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

1. Locate concealed framing, blocking, and reinforcements that support cabinets by field measurements before being enclosed/concealed by construction, and indicate measurements on Shop Drawings.

C. Established Dimensions: Where cabinets are indicated to fit to other construction, establish dimensions for areas where cabinets are to fit. Provide allowance for trimming at site, and coordinate construction to ensure that actual dimensions correspond to established dimensions.

PART 2 - PRODUCTS

2.1 PLASTIC-LAMINATE-FACED ARCHITECTURAL CABINETS

A. Quality Standard: Unless otherwise indicated, comply with the "Architectural Woodwork Standards" for grades of cabinets indicated for construction, finishes, installation, and other requirements.

B. Grade: Custom.

C. Type of Construction: Frameless.

D. Door and Drawer-Front Style: Flush overlay.

E. High-Pressure Decorative Laminate: NEMA LD 3, grades as indicated or if not indicated, as required by quality standard.

1. Manufacturers: Requests for manufacturer substitutions prior to bidding will be reviewed and responded to in conformance with Division 1 requirements. Subject to compliance

with requirements, provide products by the following manufacturers or a manufacturer pre-approved during bidding:

a. Formica

F. Laminate Cladding for Exposed Surfaces:

1. Horizontal Surfaces: Grade HGS.
2. Vertical Surfaces: Grade VGS.
3. Edges: PVC edge banding, 0.12 inch (3 mm) thick, matching laminate in color, pattern, and finish.
4. Pattern Direction: Vertically for drawer fronts, doors, and fixed panels.

G. Materials for Semiexposed Surfaces:

1. Surfaces Other Than Drawer Bodies: Thermoset decorative panels.

a. Edges of Plastic-Laminate Shelves: PVC edge banding, 0.12 inch (3 mm) thick, matching laminate in color, pattern, and finish.
b. Edges of Thermoset Decorative Panel Shelves: PVC or polyester edge banding.
c. For semiexposed backs of panels with exposed plastic-laminate surfaces, provide surface of high-pressure decorative laminate, NEMA LD 3, Grade VGS.

2. Drawer Sides and Backs: Thermoset decorative panels with PVC or polyester edge banding.
3. Drawer Bottoms: Thermoset decorative panels.

H. Drawer Construction: Fabricate with exposed fronts fastened to subfront with mounting screws from interior of body.

1. Join subfronts, backs, and sides with dowels.

I. Colors, Patterns, and Finishes: Provide materials and products that result in colors and textures of exposed laminate surfaces complying with the following requirements:

1. **(PL-1)**:

a. Manufacturer Basis-of-Design: Formica.
b. Color: 5882-58 “Citadel Warp”.
c. Location: All upper and base cabinets in Copy 106, Break 109 and EOC 118.
d. Patterns: Matte finish.

2.2 WOOD MATERIALS

A. Wood Products: Provide materials that comply with requirements of referenced quality standard for each type of architectural cabinet and quality grade specified unless otherwise indicated.

1. Wood Moisture Content: 5 to 10 percent.

B. Composite Wood and Agrifiber Products: Provide materials that comply with requirements of referenced quality standard for each type of architectural cabinet and quality grade specified unless otherwise indicated.

1. Medium-Density Fiberboard (MDF): ANSI A208.2, Grade 130.

2. Particleboard: ANSI A208.1, Grade M-2.
3. Softwood Plywood: DOC PS 1, medium-density overlay.
4. Thermoset Decorative Panels: Particleboard or MDF finished with thermally fused, melamine-impregnated decorative paper and complying with requirements of NEMA LD 3, Grade VGL, for Test Methods 3.3, 3.4, 3.6, 3.8, and 3.10.

2.3 CABINET HARDWARE AND ACCESSORIES

A. General: Provide cabinet hardware and accessory materials associated with architectural cabinets except for items specified in Section 087100 "Door Hardware."

B. Frameless Concealed Hinges (European Type): BHMA A156.9, B01602, 135 degrees of opening.

C. Wire Pulls: Back mounted, solid metal, 4 inches (100 mm) long, 5/16 inch (8 mm) in diameter.

D. Catches: Magnetic catches, BHMA A156.9, B03141.

E. Adjustable Shelf Standards and Supports: BHMA A156.9, B04071; with shelf rests, B04081.

F. Shelf Rests: BHMA A156.9, B04013; metal.

G. Drawer Slides: BHMA A156.9.

1. Grade 1HD-100 and Grade 1HD-200: Side mounted; full-extension type; zinc-plated-steel ball-bearing slides.
2. For drawers more than 3 inches (75 mm) high, but not more than 6 inches (150 mm) high and not more than 24 inches (600 mm) wide, provide Grade 1HD-100.
3. For drawers more than 6 inches (150 mm) high or more than 24 inches (600 mm) wide, provide Grade 1HD-200.

H. Door and Drawer Silencers: BHMA A156.16, L03011.

I. Exposed Hardware Finishes: For exposed hardware, provide finish that complies with BHMA A156.18 for BHMA finish number indicated.

1. Satin Chromium Plated: BHMA 626 for brass or bronze base; BHMA 652 for steel base.

J. For concealed hardware, provide manufacturer's standard finish that complies with product class requirements in BHMA A156.9.

2.4 MISCELLANEOUS MATERIALS

A. Furring, Blocking, Shims, and Hanging Strips: Softwood or hardwood lumber, kiln-dried to less than 15 percent moisture content.

B. Anchors: Select material, type, size, and finish required for each substrate for secure anchorage. Provide metal expansion sleeves or expansion bolts for post-installed anchors. Use nonferrous-metal or hot-dip galvanized anchors and inserts at inside face of exterior walls and at floors.

C. Adhesive for Bonding Plastic Laminate: Unpigmented contact cement.

1. Adhesive for Bonding Edges: Hot-melt adhesive or adhesive specified above for faces.

2.5 FABRICATION

A. Fabricate architectural cabinets to dimensions, profiles, and details indicated.

B. Complete fabrication, including assembly and hardware application, to maximum extent possible before shipment to Project site. Disassemble components only as necessary for shipment and installation. Where necessary for fitting at site, provide ample allowance for scribing, trimming, and fitting.

C. Shop-cut openings to maximum extent possible to receive hardware, appliances, electrical work, and similar items. Locate openings accurately and use templates or roughing-in diagrams to produce accurately sized and shaped openings. Sand edges of cutouts to remove splinters and burrs.

PART 3 - EXECUTION

3.1 PREPARATION

A. Before installation, condition cabinets to humidity conditions in installation areas for not less than 72 hours.

3.2 INSTALLATION

A. Grade: Install cabinets to comply with quality standard grade of item to be installed.

B. Assemble cabinets and complete fabrication at Project site to extent that it was not completed in the shop.

C. Anchor cabinets to anchors or blocking built in to substrates. Secure with wafer-head cabinet installation screws.

D. Install cabinets level, plumb, and true in line to a tolerance of 1/8 inch in 96 inches (3 mm in 2400 mm) using concealed shims.

1. Scribe and cut cabinets to fit adjoining work, refinish cut surfaces, and repair damaged finish at cuts.
2. Install cabinets without distortion so doors and drawers fit openings and are accurately aligned. Adjust hardware to center doors and drawers in openings and to provide unencumbered operation. Complete installation of hardware and accessory items as indicated.
3. Fasten wall cabinets through back, near top and bottom, and at ends not more than 16 inches (400 mm) o.c. with No. 10 wafer-head screws sized for not less than 1-1/2-inch (38-mm) penetration into wood framing, blocking, or hanging strips.

3.3 ADJUSTING AND CLEANING

A. Repair damaged and defective cabinets, where possible, to eliminate functional and visual defects. Where not possible to repair, replace architectural cabinets. Adjust joinery for uniform appearance.

B. Clean, lubricate, and adjust hardware.

C. Clean cabinets on exposed and semiexposed surfaces.

END OF SECTION 064116

SECTION 072100 - THERMAL INSULATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Extruded polystyrene foam-plastic board.

B. Related Requirements:

1. Section 075213 "Atactic-Polypropylene (APP) Modified Bituminous Membrane Roofing" for insulation specified as part of roofing construction.

1.3 DELIVERY, STORAGE, AND HANDLING

A. Protect insulation materials from physical damage and from deterioration due to moisture, soiling, and other sources. Store inside and in a dry location. Comply with manufacturer's written instructions for handling, storing, and protecting during installation.

B. Protect foam-plastic board insulation as follows:

1. Do not expose to sunlight except to necessary extent for period of installation and concealment.
2. Protect against ignition at all times. Do not deliver foam-plastic board materials to Project site until just before installation time.
3. Quickly complete installation and concealment of foam-plastic board insulation in each area of construction.

PART 2 - PRODUCTS

2.1 EXTRUDED POLYSTYRENE FOAM-PLASTIC BOARD

A. Extruded polystyrene boards in this article are also called "XPS boards." Roman numeral designators in ASTM C 578 are assigned in a fixed random sequence, and their numeric order does not reflect increasing strength or other characteristics.

B. Extruded Polystyrene Board, Type IV: ASTM C 578, Type IV, 25-psi (173-kPa) minimum compressive strength; unfaced; maximum flame-spread and smoke-developed indexes of 25 and 450, respectively, per ASTM E 84.

1. Manufacturers: Requests for manufacturer substitutions prior to bidding will be reviewed and responded to in conformance with Division 1 requirements. Subject to compliance with requirements, provide products by one of the following manufacturers or a manufacturer pre-approved during bidding:

    a. DiversiFoam Products.
    b. Dow Chemical Company (The).
    c. Owens Corning.

2.2 INSULATION FASTENERS

A. Adhesively Attached, Spindle-Type Anchors: Plate welded to projecting spindle; capable of holding insulation of specified thickness securely in position with self-locking washer in place.

B. Products: Requests for product substitutions prior to bidding will be reviewed and responded to in conformance with Division 1 requirements. Subject to compliance with requirements, provide one of the following or comparable product pre-approved during bidding:

1. AGM Industries, Inc; Series T TACTOO Insul-Hangers.
2. Gemco; Spindle Type.Revise "Plate" and "Spindle" subparagraphs below if stainless steel or another metal is required.

    a. Plate: Perforated, galvanized carbon-steel sheet, 0.030 inch (0.762 mm) thick by 2 inches (50 mm) square.
    b. Spindle: Copper-coated, low-carbon steel; fully annealed; 0.105 inch (2.67 mm) in diameter; length to suit depth of insulation.

C. Anchor Adhesive: Product with demonstrated capability to bond insulation anchors securely to substrates without damaging insulation, fasteners, or substrates.

1. Products: Requests for product substitutions prior to bidding will be reviewed and responded to in conformance with Division 1 requirements. Subject to compliance with requirements, provide one of the following or comparable product pre-approved during bidding:

    a. AGM Industries, Inc; TACTOO Adhesive.
    b. Gemco; Tuff Bond Hanger Adhesive.

PART 3 - EXECUTION

3.1 PREPARATION

A. Clean substrates of substances that are harmful to insulation, including removing projections capable of puncturing insulation or vapor retarders, or that interfere with insulation attachment.

3.2 INSTALLATION, GENERAL

A. Comply with insulation manufacturer's written instructions applicable to products and applications.

B. Install insulation that is undamaged, dry, and unsoiled and that has not been left exposed to ice, rain, or snow at any time.

C. Extend insulation to envelop entire area to be insulated. Fit tightly around obstructions and fill voids with insulation. Remove projections that interfere with placement.

D. Provide sizes to fit applications and selected from manufacturer's standard thicknesses, widths, and lengths. Apply single layer of insulation units unless multiple layers are otherwise shown or required to make up total thickness or to achieve R-value.

3.3 PROTECTION

A. Protect installed insulation from damage due to harmful weather exposures, physical abuse, and other causes. Provide temporary coverings or enclosures where insulation is subject to abuse and cannot be concealed and protected by permanent construction immediately after installation.

END OF SECTION 072100

SECTION 075216 - STYRENE-BUTADIENE-STYRENE (SBS) MODIFIED BITUMINOUS MEMBRANE ROOFING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Styrene-butadiene-styrene (SBS)-modified bituminous membrane roofing.
2. Vapor retarder.
3. Roof insulation.

B. Related Requirements:

1. Section 072100 "Thermal Insulation" for insulation beneath the roof deck.
2. Section 076200 "Sheet Metal Flashing and Trim" for metal roof flashings and counterflashings.
3. Section 079200 "Joint Sealants" for joint sealants, joint fillers, and joint preparation.
4. Section 221423 "Storm Drainage Piping Specialties" for roof drains.

1.3 DEFINITIONS

A. Roofing Terminology: Definitions in ASTM D 1079 and glossary of NRCA's "The NRCA Roofing and Waterproofing Manual" apply to work of this Section.

1.4 PREINSTALLATION MEETINGS

A. Preinstallation Roofing Conference: Conduct conference at Project site.

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 affects 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.

1.5 ACTION SUBMITTALS

A. Shop Drawings: For roofing system. Include plans, elevations, sections, details, and attachments to other work, including:

1. Base flashings and membrane terminations.
2. Tapered insulation, including slopes.
3. Crickets, saddles, and tapered edge strips, including slopes.
4. Insulation fastening patterns for corner, perimeter, and field-of-roof locations.

1.6 CLOSEOUT SUBMITTALS

A. Maintenance Data: For roofing system to include in maintenance manuals.

1.7 QUALITY ASSURANCE

A. Manufacturer Qualifications: A qualified manufacturer that is FM Global approved for membrane roofing system identical to that used for this Project.

B. Installer Qualifications: A qualified firm that is approved, authorized, or licensed by roofing system manufacturer to install manufacturer's product and that is eligible to receive manufacturer's special warranty.

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, approval or listing agency markings, and directions for storing and mixing with other components.

B. 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.

1. Discard and legally dispose of liquid material that cannot be applied within its stated shelf life.

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 FIELD CONDITIONS

A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit roofing system to be installed according to manufacturer's written instructions and warranty requirements.

1.10 WARRANTY

A. Special Warranty: Manufacturer agrees to repair or replace components of roofing system that fail in materials or workmanship within specified warranty period.

1. Special warranty includes membrane roofing, base flashings, roof insulation, fasteners, cover boards, substrate board, roofing accessories, and other components of roofing system.
2. Warranty Period: 15 years from date of Substantial Completion.

B. Special Project Warranty: Submit roofing Installer's warranty, on warranty form at end of this Section, signed by Installer, covering the Work of this Section, including all components of roofing system such as membrane roofing, base flashing, roof insulation, fasteners, cover boards, substrate boards, vapor retarders, and walkway products, for the following warranty period:

1. Warranty Period: Two years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Requests for manufacturer substitutions prior to bidding will be reviewed and responded to in conformance with Division 1 requirements. Subject to compliance with requirements, provide products by one of the following manufacturers or a manufacturer pre-approved during bidding:

1. CertainTeed Corporation.
2. Firestone Building Products.
3. Johns Manville; a Berkshire Hathaway company.

B. Source Limitations: Obtain components including roof insulation and fasteners for roofing system from same manufacturer as membrane roofing or manufacturer approved by membrane roofing manufacturer.

2.2 PERFORMANCE REQUIREMENTS

A. General Performance: Installed roofing and base flashings shall withstand specified uplift pressures, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction. Roofing and base flashings shall remain watertight.

1. Accelerated Weathering: Roofing system shall withstand 2000 hours of exposure when tested according to ASTM G 152, ASTM G 154, or ASTM G 155.

2. Impact Resistance: Roofing system shall resist impact damage when tested according to ASTM D 3746 or ASTM D 4272.

B. Material Compatibility: Roofing materials shall be compatible with one another and adjacent materials under conditions of service and application required, as demonstrated by roofing manufacturer based on testing and field experience.

C. Roofing System Design: Tested by a qualified testing agency to resist the following uplift pressures:

1. Corner Uplift Pressure: 101 lbf/sq. ft..
2. Perimeter Uplift Pressure: 67 lbf/sq. ft.
3. Field-of-Roof Uplift Pressure: 40 lbf/sq. ft.

D. Exterior Fire-Test Exposure: ASTM E 108 or UL 790, Class A; for application and roof slopes indicated; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

E. Fire-Resistance Ratings: Comply with fire-resistance-rated assembly designs indicated. Identify products with appropriate markings of applicable testing agency.

2.3 ROOFING SHEET MATERIALS

A. Roofing Membrane Sheet: ASTM D 6163, Grade S, Type I or II, SBS-modified asphalt sheet (reinforced with glass fibers); smooth surfaced; suitable for application method specified.

1. Basis-of-Design; Firestone SBS Premium Base

B. Granule-Surfaced Roofing Cap Sheet: ASTM D 6164/D 6164M, Grade G, Type I or II, SBS-modified asphalt sheet (reinforced with polyester fabric); granule surfaced; suitable for application method specified, and as follows:

1. Granule Color: Gray.
2. Basis-of-Design; Firestone SBS Premium FR

2.4 AUXILIARY ROOFING MATERIALS

A. General: Auxiliary materials recommended by roofing system manufacturer for intended use and compatible with roofing.

B. Asphalt Primer: ASTM D 41/D 41M.

C. Roofing Asphalt: ASTM D 312, Type IV.

D. Asphalt Roofing Cement: ASTM D 4586, asbestos free, of consistency required by roofing system manufacturer for application.

E. Mastic Sealant: Polyisobutylene, plain or modified bitumen; nonhardening, nonmigrating, nonskinning, and nondrying.

F. Fasteners: Factory-coated steel fasteners and metal or plastic plates complying with corrosion-resistance provisions in FM Global 4470, designed for fastening roofing components to

substrate; tested by manufacturer for required pullout strength, and acceptable to roofing system manufacturer.

G. Roofing Granules: Ceramic-coated roofing granules, No. 11 screen size with 100 percent passing No. 8 (2.36-mm) sieve and 98 percent of mass retained on No. 40 (0.425-mm) sieve, color to match roofing.

H. Miscellaneous Accessories: Provide those recommended by roofing system manufacturer.

2.5 SUBSTRATE BOARDS

A. Substrate Board: ASTM C 1177/C 1177M, glass-mat, water-resistant gypsum substrate, Type X, 5/8 inch (16 mm) thick, factory primed.

1. Products: Requests for product substitutions prior to bidding will be reviewed and responded to in conformance with Division 1 requirements. Subject to compliance with requirements, provide one of the following or comparable product pre-approved during bidding:

a. CertainTeed Corporation; GlasRoc Roof Board.
b. Georgia-Pacific Gypsum LLC; Dens Deck Prime.
c. National Gypsum Company; Gold Bond eXP Extended Exposure Sheathing.
d. USG Corporation; Securock Glass Mat Roof Board.

B. Fasteners: Factory-coated steel fasteners and metal or plastic plates complying with corrosion-resistance provisions in FM Global 4470, designed for fastening substrate board to roof deck.

2.6 VAPOR RETARDER

A. Base Sheet: SBS polymer-modified bitumen sheet, complying with ASTM D6163/D6163M, Type I, Grade S, with glass fiber reinforcing fabric, formulated for hot asphalt and cold adhesive application to substrate and cap sheet; Basis-of-Design; Firestone SBS Base.

2.7 ROOF INSULATION

A. General: Preformed roof insulation boards manufactured or approved by roofing manufacturer, selected from manufacturer's standard sizes suitable for application, of thicknesses indicated.

B. Polyisocyanurate Board Insulation: ASTM C 1289, Type II, Class 1, Grade 3, felt or glass-fiber mat facer on both major surfaces.

1. Manufacturers: Requests for manufacturer substitutions prior to bidding will be reviewed and responded to in conformance with Division 1 requirements. Subject to compliance with requirements, provide products by one of the following manufacturers or a manufacturer pre-approved during bidding:

a. Atlas Roofing Corporation.
b. Carlisle SynTec Incorporated.
c. CertainTeed Corporation.
d. Firestone Building Products.
e. GAF.
f. Hunter Panels.

g. Johns Manville; a Berkshire Hathaway company.

C. Tapered Insulation: Provide factory-tapered insulation boards fabricated to slope of 1/4 inch per 12 inches (1:48) unless otherwise indicated.

D. Provide preformed saddles, crickets, tapered edge strips, and other insulation shapes where indicated for sloping to drain. Fabricate to slopes indicated.

2.8 INSULATION ACCESSORIES

A. General: Roof insulation accessories recommended by insulation manufacturer for intended use and compatibility with roofing.

B. Fasteners: Factory-coated steel fasteners and metal or plastic plates complying with corrosion-resistance provisions in FM Global 4470, designed for fastening roof insulation to substrate, and acceptable to roofing system manufacturer.

C. Insulation Adhesive: Insulation manufacturer's recommended adhesive formulated to attach roof insulation to substrate or to another insulation layer as follows:

1. Modified asphaltic, asbestos-free, cold-applied adhesive.

D. Insulation Cant Strips: ASTM C 728, perlite insulation board.

E. Tapered Edge Strips: ASTM C 728, perlite insulation board.

F. Cover Board: ASTM C 1177/C 1177M, glass-mat, water-resistant gypsum substrate, 1/4 inch (6 mm) thick, factory primed.

1. Products: Requests for product substitutions prior to bidding will be reviewed and responded to in conformance with Division 1 requirements. Subject to compliance with requirements, provide one of the following or comparable product pre-approved during bidding:

a. CertainTeed Corporation; GlasRoc Roof Board.
b. Georgia-Pacific Gypsum LLC; Dens Deck Prime.
c. National Gypsum Company; Gold Bond eXP Extended Exposure Sheathing.
d. USG Corporation; Securock Glass Mat Roof Board.

G. Substrate Joint Tape: 6- or 8-inch- (150- or 200-mm-) wide, coated, glass fiber.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements and other conditions affecting performance of the Work:

1. Verify that roof openings and penetrations are in place, curbs are set and braced, and roof-drain bodies are securely clamped in place.
2. Verify that wood cants, blocking, curbs, and nailers are securely anchored to roof deck at penetrations and terminations and that nailers match thicknesses of insulation.

3. Verify that surface plane flatness and fastening of steel roof deck complies with requirements in Section 053100 "Steel Decking."
4. Verify that minimum concrete drying period recommended by roofing system manufacturer has passed.
5. Verify that concrete substrate is visibly dry and free of moisture. Test for capillary moisture by plastic sheet method according to ASTM D 4263.

    a. Test for moisture by pouring 1 pint (0.5 L) of hot roofing asphalt on deck at start of each day's work and at start of each roof area or plane. Do not proceed with Work of this Section if test sample foams or can be easily and cleanly stripped after cooling.

6. Verify that concrete-curing compounds that impair adhesion of roofing components to roof deck have been removed.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 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 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. Prime surface of concrete deck with asphalt primer at a rate of 3/4 gal./100 sq. ft. (0.3 L/sq. m), and allow primer to dry.

3.3 INSTALLATION, GENERAL

A. Comply with roofing system manufacturer's written instructions.

B. Asphalt Heating: Heat and apply SEBS-modified roofing asphalt according to roofing system manufacturer's written instructions.

C. Substrate-Joint Penetrations: Prevent roofing asphalt and adhesives from penetrating substrate joints, entering building, or damaging roofing system components or adjacent building construction.

3.4 SUBSTRATE BOARD INSTALLATION

A. Install substrate board with long joints in continuous straight lines, perpendicular to roof slopes with end joints staggered between rows. Tightly butt substrate boards together.

1. Fasten substrate board to top flanges of steel deck to resist uplift pressure at corners, perimeter, and field of roof according to roofing system manufacturers' written instructions.
2. Substrate board is only required at location of metal roof deck.

3.5 VAPOR-RETARDER INSTALLATION

A. Unroll sheets in the location where they are to be installed, maintaining proper side and end lap widths, and allow to relax completely.

B. Start at the low point of the roof, using full width sheet.

C. Install with minimum 2 inch side laps and 4 inch end laps; maintain minimum 12 inch stagger between end laps in adjacent layers.

D. Hot Asphalt Installation: Prime substrate as recommended by roofing manufacturer; install sheets in full mopping of asphalt applied to substrate at rate recommended by roofing manufacturer; a minor flow of hot asphalt should be seen coming from the side laps.

E. Keep sheets free of wrinkles, buckles and fish mouths; "broom in" if necessary to eliminate voids and obtain proper embedment.

F. Ensure that all penetrations and edge conditions are sealed to prevent moisture and air drive into the roofing system.

G. Completely seal vapor retarder at terminations, obstructions, and penetrations to prevent air movement into roofing system.

3.6 INSULATION INSTALLATION

A. Install one lapped base-sheet course and mechanically fasten to substrate according to roofing system manufacturer's written instructions.

B. Insulation Cant Strips: Install and secure preformed 45-degree insulation cant strips at junctures of roofing system with vertical surfaces or angle changes greater than 45 degrees.

C. Install tapered insulation under area of roofing to conform to slopes indicated.

D. Install insulation with long joints of insulation in a continuous straight line, with end joints staggered between rows, abutting edges and ends between boards. Fill gaps exceeding 1/4 inch (6 mm) with insulation.

1. Cut and fit insulation within 1/4 inch (6 mm) of nailers, projections, and penetrations.

E. Install insulation under area of roofing to achieve required thickness. Where overall insulation thickness is 2.7 inches (68 mm) or greater, install two or more layers with joints of each succeeding layer staggered from joints of previous layer a minimum of 6 inches (150 mm) in each direction.

F. Trim surface of insulation where necessary at roof drains so completed surface is flush and does not restrict flow of water.

G. Install tapered edge strips at perimeter edges of roof that do not terminate at vertical surfaces.

H. Adhered Insulation (AT CONCRETE SUBSTRATES): Install each layer of insulation and adhere to substrate as follows:

1. Prime surface of concrete deck with asphalt primer at rate of 3/4 gal./100 sq. ft. (0.3 L/sq. m), and allow primer to dry.

2. Set each layer of insulation in a solid mopping of hot roofing asphalt.

I. Mechanically Fastened and Adhered Insulation (AT METAL DECK SUBSTRATE): Install first layer of insulation to deck using mechanical fasteners specifically designed and sized for fastening specified board-type roof insulation to deck type.

1. Fasten first layer of insulation to resist uplift pressure at corners, perimeter, and field of roof.
2. Set each subsequent layer of insulation in a solid mopping of hot roofing asphalt.

J. Install cover boards over insulation with long joints in continuous straight lines with end joints staggered between rows. Offset joints of insulation below a minimum of 6 inches (150 mm) in each direction. Loosely butt cover boards together. Tape joints if required by roofing system manufacturer.

1. Apply hot roofing asphalt to underside, and immediately bond cover board to substrate.

3.7 ROOFING INSTALLATION, GENERAL

A. Install roofing system according to roofing system manufacturer's written instructions and applicable recommendations in ARMA/NRCA's "Quality Control Guidelines for the Application of Polymer Modified Bitumen Roofing" and as follows:

1. Deck Type: N (nailable).
2. Adhering Method: M (mopped).
3. Base Sheet: One.
4. Number of Glass-Fiber Base-Ply Sheets: One.
5. Number of SBS-Modified Asphalt Sheets: One.
6. Surfacing Type: M (mineral-granule-surfaced cap sheet).

A. Install roofing system according to roofing system manufacturer's written instructions and applicable recommendations in ARMA/NRCA's "Quality Control Guidelines for the Application of Polymer Modified Bitumen Roofing" and as follows:

1. Deck Type: C (concrete or nonnailable).
2. Adhering Method: M (mopped).
3. Base Sheet: One.
4. Number of Glass-Fiber Base-Ply Sheets: One.
5. Number of SBS-Modified Asphalt Sheets: One.
6. Surfacing Type: M (mineral-granule-surfaced cap sheet).

B. Start installation of roofing in presence of manufacturer's technical personnel.

C. Coordinate installation of roofing system so insulation and other components of the roofing system not permanently exposed are not subjected to precipitation or left uncovered 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 sheets and insulation with a course of coated felt set in roofing cement or hot roofing asphalt, 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.

3.8 BASE-SHEET INSTALLATION

A. Install lapped base-sheet course, extending sheet over and terminating beyond cants. Attach base sheet as follows:

1. Adhere to substrate in a solid mopping of hot roofing asphalt.

3.9 BASE-PLY SHEET INSTALLATION

A. Install glass-fiber base-ply sheets according to roofing system manufacturer's written instructions starting at low point of roofing system. Align glass-fiber base-ply sheets without stretching. Extend sheets over and terminate beyond cants.

1. Embed each glass-fiber base-ply sheet in a continuous void-free mopping of hot roofing asphalt to form a uniform membrane without glass-fiber base-ply sheets touching.

3.10 SBS-MODIFIED BITUMINOUS MEMBRANE INSTALLATION

A. Install modified bituminous roofing 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. Adhere to substrate in a solid mopping of hot roofing asphalt applied at not less than 425 deg F (218 deg C).
2. Unroll roofing sheets and allow them to relax for minimum time period required by manufacturer.

B. Laps: Accurately align roofing 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 sheets so side and end laps shed water.

3.11 FLASHING AND STRIPPING INSTALLATION

A. Install base flashing over cant strips and other sloped and vertical surfaces, at roof edges, and at penetrations through roof, and secure to substrates according to roofing system manufacturer's written instructions and as follows:

1. Prime substrates with asphalt primer if required by roofing system manufacturer.
2. Backer-Sheet Application: Adhere backer sheet to substrate in a solid mopping of hot roofing asphalt.
3. Flashing-Sheet Application: Adhere flashing sheet to substrate in a solid mopping of hot roofing asphalt applied at not less than 425 deg F (218 deg C). Apply hot roofing asphalt to back of flashing sheet if recommended by roofing system manufacturer.

B. Extend base flashing up walls or parapets a minimum of 8 inches (200 mm) above roofing membrane and 4 inches (100 mm) onto field of roofing membrane.

C. Mechanically fasten top of base flashing securely at terminations and perimeter of roofing.

1. Seal top termination of base flashing.

D. Install roofing cap-sheet stripping where metal flanges and edgings are set on roofing according to roofing system manufacturer's written instructions.

E. Roof Drains: Set 30-by-30-inch- (760-by-760-mm-) metal flashing in bed of asphaltic adhesive on completed roofing membrane. Cover metal flashing with roofing cap-sheet stripping, and extend a minimum of 6 inches (150 mm) beyond edge of metal flashing onto field of roofing membrane. Clamp roofing membrane, metal flashing, and stripping into roof-drain clamping ring.

1. Install stripping according to roofing system manufacturer's written instructions.

3.12 PROTECTING AND CLEANING

A. Protect roofing system from damage and wear during remainder of construction period. When remaining construction does 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 roofing system that does not comply with requirements, repair substrates, and repair or reinstall 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 075216

SECTION 076200 – SHEET METAL FLASHING AND TRIM

Project keynotes are generally associated with existing conditions. No additional specification information is being provided beyond the information already shown in the Contract Drawings.

END OF SECTION 076200

SECTION 078100 – APPLIED FIREPROOFING

Contractor to repair and restore existing applied fireproofing assembly as required to match conditions of existing construction that have been disturbed as a result of construction activities. Existing primary structure is rated for 2-hours and existing roof assembly is rated for 1-hour. Modifications required to existing structure and roof assemblies will impact the existing applied fireproofing assemblies.

END OF SECTION 078100

SECTION 078413 - PENETRATION FIRESTOPPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Penetrations in fire-resistance-rated walls.
2. Penetrations in horizontal assemblies.
3. Penetrations in smoke barriers.

B. Related Requirements:

1. Section 078443 "Joint Firestopping" for joints in or between fire-resistance-rated construction, at exterior curtain-wall/floor intersections, and in smoke barriers.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

1.4 CLOSEOUT SUBMITTALS

A. Installer Certificates: From Installer indicating that penetration firestopping systems have been installed in compliance with requirements and manufacturer's written instructions.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: A firm experienced in installing penetration firestopping similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful performance. Qualifications include having the necessary experience, staff, and training to install manufacturer's products per specified requirements. Manufacturer's willingness to sell its penetration firestopping products to Contractor or to Installer engaged by Contractor does not in itself confer qualification on buyer.

1.6 PROJECT CONDITIONS

A. Environmental Limitations: Do not install penetration firestopping system when ambient or substrate temperatures are outside limits permitted by penetration firestopping system manufacturers or when substrates are wet because of rain, frost, condensation, or other causes.

B. Install and cure penetration firestopping materials per manufacturer's written instructions using natural means of ventilations or, where this is inadequate, forced-air circulation.

1.7 COORDINATION

A. Coordinate construction of openings and penetrating items to ensure that penetration firestopping systems can be installed according to specified firestopping system design.

B. Coordinate sizing of sleeves, openings, core-drilled holes, or cut openings to accommodate penetration firestopping systems.

PART 2 - PRODUCTS

2.1 PENETRATION FIRESTOPPING SYSTEMS

A. Penetration Firestopping Systems: Systems that resist spread of fire, passage of smoke and other gases, and maintain original fire-resistance rating of construction penetrated. Penetration firestopping systems shall be compatible with one another, with the substrates forming openings, and with penetrating items if any.

1. Manufacturers: Requests for manufacturer substitutions prior to bidding will be reviewed and responded to in conformance with Division 1 requirements. Subject to compliance with requirements, provide products by one of the following manufacturers or a manufacturer pre-approved during bidding:

a. 3M Fire Protection Products.
b. Hilti, Inc.
c. Tremco, Inc.

B. Penetrations in Fire-Resistance-Rated Walls: Penetration firestopping systems with ratings determined per ASTM E 814 or UL 1479, based on testing at a positive pressure differential of 0.01-inch wg (2.49 Pa).

1. F-Rating: Not less than the fire-resistance rating of constructions penetrated.

C. Penetrations in Horizontal Assemblies: Penetration firestopping systems with ratings determined per ASTM E 814 or UL 1479, based on testing at a positive pressure differential of 0.01-inch wg (2.49 Pa).

1. F-Rating: At least one hour, but not less than the fire-resistance rating of constructions penetrated.
2. T-Rating: At least one hour, but not less than the fire-resistance rating of constructions penetrated except for floor penetrations within the cavity of a wall.

D. Penetrations in Smoke Barriers: Penetration firestopping systems with ratings determined per UL 1479, based on testing at a positive pressure differential of 0.30-inch wg (74.7 Pa).

1. L-Rating: Not exceeding 5.0 cfm/sq. ft. (0.025 cu. m/s per sq. m) of penetration opening at and no more than 50-cfm (0.024-cu. m/s) cumulative total for any 100 sq. ft. (9.3 sq. m) at both ambient and elevated temperatures.

E. Exposed Penetration Firestopping Systems: Flame-spread and smoke-developed indexes of less than 25 and 450, respectively, per ASTM E 84.

F. Accessories: Provide components for each penetration firestopping system that are needed to install fill materials and to maintain ratings required. Use only those components specified by penetration firestopping system manufacturer and approved by qualified testing and inspecting agency for conditions indicated.

1. Permanent forming/damming/backing materials.
2. Substrate primers.
3. Collars.
4. Steel sleeves.

2.2 FILL MATERIALS

A. Cast-in-Place Firestop Devices: Factory-assembled devices for use in cast-in-place concrete floors and consisting of an outer sleeve lined with an intumescent strip, a flange attached to one end of the sleeve for fastening to concrete formwork, and a neoprene gasket.

B. Latex Sealants: Single-component latex formulations that do not re-emulsify after cure during exposure to moisture.

C. Firestop Devices: Factory-assembled collars formed from galvanized steel and lined with intumescent material sized to fit specific diameter of penetrant.

D. Intumescent Putties: Nonhardening, water-resistant, intumescent putties containing no solvents or inorganic fibers.

E. Intumescent Wrap Strips: Single-component intumescent elastomeric sheets with aluminum foil on one side.

F. Mortars: Prepackaged dry mixes consisting of a blend of inorganic binders, hydraulic cement, fillers and lightweight aggregate formulated for mixing with water at Project site to form a nonshrinking, homogeneous mortar.

G. Pillows/Bags: Reusable heat-expanding pillows/bags consisting of glass-fiber cloth cases filled with a combination of mineral-fiber, water-insoluble expansion agents, and fire-retardant additives. Where exposed, cover openings with steel-reinforcing wire mesh to protect pillows/bags from being easily removed.

H. Silicone Foams: Multicomponent, silicone-based liquid elastomers that, when mixed, expand and cure in place to produce a flexible, nonshrinking foam.

I. Silicone Sealants: Single-component, silicone-based, neutral-curing elastomeric sealants.

2.3 MIXING

A. Penetration Firestopping Materials: For those products requiring mixing before application, comply with penetration firestopping system manufacturer's written instructions for accurate proportioning of materials, water (if required), type of mixing equipment, selection of mixer speeds, mixing containers, mixing time, and other items or procedures needed to produce products of uniform quality with optimum performance characteristics for application indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Installer present, for compliance with requirements for opening configurations, penetrating items, substrates, and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Surface Cleaning: Before installing penetration firestopping systems, clean out openings immediately to comply with manufacturer's written instructions and with the following requirements:

1. Remove from surfaces of opening substrates and from penetrating items foreign materials that could interfere with adhesion of penetration firestopping materials.
2. Clean opening substrates and penetrating items to produce clean, sound surfaces capable of developing optimum bond with penetration firestopping materials. Remove loose particles remaining from cleaning operation.
3. Remove laitance and form-release agents from concrete.

B. Prime substrates where recommended in writing by manufacturer using that manufacturer's recommended products and methods. Confine primers to areas of bond; do not allow spillage and migration onto exposed surfaces.

3.3 INSTALLATION

A. General: Install penetration firestopping systems to comply with manufacturer's written installation instructions and published drawings for products and applications.

B. Install forming materials and other accessories of types required to support fill materials during their application and in the position needed to produce cross-sectional shapes and depths required to achieve fire ratings.

1. After installing fill materials and allowing them to fully cure, remove combustible forming materials and other accessories not forming permanent components of firestopping.

C. Install fill materials by proven techniques to produce the following results:

1. Fill voids and cavities formed by openings, forming materials, accessories and penetrating items to achieve required fire-resistance ratings.
2. Apply materials so they contact and adhere to substrates formed by openings and penetrating items.
3. For fill materials that will remain exposed after completing the Work, finish to produce smooth, uniform surfaces that are flush with adjoining finishes.

3.4 IDENTIFICATION

A. Wall Identification: Permanently label walls containing penetration firestopping systems with the words "FIRE AND/OR SMOKE BARRIER - PROTECT ALL OPENINGS," using lettering not less than 3 inches (76 mm) high and with minimum 0.375-inch (9.5-mm) strokes.

1. Locate in accessible concealed floor, floor-ceiling, or attic space at 15 feet (4.57 m) from end of wall and at intervals not exceeding 30 feet (9.14 m).

B. Penetration Identification: Identify each penetration firestopping system with legible metal or plastic labels. Attach labels permanently to surfaces adjacent to and within 6 inches (150 mm) of penetration firestopping system edge so labels are visible to anyone seeking to remove penetrating items or firestopping systems. Use mechanical fasteners or self-adhering-type labels with adhesives capable of permanently bonding labels to surfaces on which labels are placed. Include the following information on labels:

1. The words "Warning - Penetration Firestopping - Do Not Disturb. Notify Building Management of Any Damage."
2. Contractor's name, address, and phone number.
3. Designation of applicable testing and inspecting agency.
4. Date of installation.
5. Manufacturer's name.
6. Installer's name.

3.5 CLEANING AND PROTECTION

A. Clean off excess fill materials adjacent to openings as the Work progresses by methods and with cleaning materials that are approved in writing by penetration firestopping system manufacturers and that do not damage materials in which openings occur.

B. Provide final protection and maintain conditions during and after installation that ensure that penetration firestopping systems are without damage or deterioration at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, immediately cut out and remove damaged or deteriorated penetration firestopping material and install new materials to produce systems complying with specified requirements.

END OF SECTION 078413

SECTION 079200 - JOINT SEALANTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Nonstaining silicone joint sealants.
2. Urethane joint sealants.
3. Mildew-resistant joint sealants.
4. Butyl joint sealants.
5. Latex joint sealants.

1.3 ACTION SUBMITTALS

A. Samples for Initial Selection: Manufacturer's color charts consisting of strips of cured sealants showing the full range of colors available for each product exposed to view.

B. Samples for Verification: For each kind and color of joint sealant required, provide Samples with joint sealants in 1/2-inch- (13-mm-) wide joints formed between two 6-inch- (150-mm-) long strips of material matching the appearance of exposed surfaces adjacent to joint sealants.

C. Joint-Sealant Schedule: Include the following information:

1. Joint-sealant application, joint location, and designation.
2. Joint-sealant manufacturer and product name.
3. Joint-sealant formulation.
4. Joint-sealant color.

1.4 QUALITY ASSURANCE

A. Installer Qualifications: An authorized representative who is trained and approved by manufacturer.

B. Mockups: Install sealant in mockups of assemblies specified in other Sections that are indicated to receive joint sealants specified in this Section. Use materials and installation methods specified in this Section.

1.5 FIELD CONDITIONS

A. Do not proceed with installation of joint sealants under the following conditions:

1. When ambient and substrate temperature conditions are outside limits permitted by joint-sealant manufacturer or are below 40 deg F (5 deg C).
2. When joint substrates are wet.
3. Where joint widths are less than those allowed by joint-sealant manufacturer for applications indicated.
4. Where contaminants capable of interfering with adhesion have not yet been removed from joint substrates.

1.6 WARRANTY

A. Special Installer's Warranty: Installer agrees to repair or replace joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.

1. Warranty Period: Two years from date of Substantial Completion.

B. Special Manufacturer's Warranty: Manufacturer agrees to furnish joint sealants to repair or replace those joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.

1. Warranty Period: Five years from date of Substantial Completion.

C. Special Manufacturer's Warranty: Manufacturer agrees to furnish joint sealants to repair or replace those joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.

1. Warranty Period:

a. Urethane - Five (5) years from date of Substantial Completion.
b. Silicone – Twenty (20) years from date of Substantial Completion.

1) Requires performance of adhesion test prior to commencement of work.

D. Special warranties specified in this article exclude deterioration or failure of joint sealants from the following:

1. Movement of the structure caused by stresses on the sealant exceeding sealant manufacturer's written specifications for sealant elongation and compression.
2. Disintegration of joint substrates from causes exceeding design specifications.
3. Mechanical damage caused by individuals, tools, or other outside agents.
4. Changes in sealant appearance caused by accumulation of dirt or other atmospheric contaminants.

PART 2 - PRODUCTS

2.1 JOINT SEALANTS, GENERAL

A. Compatibility: Provide joint sealants, backings, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by joint-sealant manufacturer, based on testing and field experience.

B. Colors of Exposed Joint Sealants: As selected by Architect from manufacturer's full range.

1. Sealants will be selected to match the adhered masonry veneer, cedar siding, storefront, curtain walls and zinc siding. Provide opportunity for custom colors at no additional cost to the Owner if standard color selections do not provide an adequate match as determined by the Architect.

2.2 NONSTAINING SILICONE JOINT SEALANTS

A. Nonstaining Joint Sealants: No staining of substrates when tested according to ASTM C 1248.

B. Silicone, Nonstaining, S, NS, 100/50, NT: Nonstaining, single-component, nonsag, plus 100 percent and minus 50 percent movement capability, nontraffic-use, neutral-curing silicone joint sealant; ASTM C 920, Type S, Grade NS, Class 100/50, Use NT.

1. Products: Requests for product substitutions prior to bidding will be reviewed and responded to in conformance with Division 1 requirements. Subject to compliance with requirements, provide one of the following or comparable product pre-approved during bidding:

a. Pecora Corporation; 890 NST or 890FTS/TXTR.
b. Tremco Incorporated; Spectrem 1.

C. Silicone, Nonstaining, S, NS, 100/50, T, NT: Nonstaining, single-component, nonsag, plus 100 percent and minus 50 percent movement capability, traffic- and nontraffic-use, neutral-curing silicone joint sealant; ASTM C 920, Type S, Grade NS, Class 100/50, Uses T and NT.

1. Products: Requests for product substitutions prior to bidding will be reviewed and responded to in conformance with Division 1 requirements. Subject to compliance with requirements, provide one of the following or comparable product pre-approved during bidding:

a. Dow Corning Corporation; Dow Corning® 790 Silicone Building Sealant.

2.3 URETHANE JOINT SEALANTS

A. Urethane, S, NS, 25, NT: Single-component, nonsag, nontraffic-use, plus 25 percent and minus 25 percent movement capability, urethane joint sealant; ASTM C 920, Type S, Grade NS, Class 25, Use NT.

1. Products: Requests for product substitutions prior to bidding will be reviewed and responded to in conformance with Division 1 requirements. Subject to compliance with requirements, provide one of the following or comparable product pre-approved during bidding:

a. BASF Corporation; Construction Systems;MasterSeal NP 1 (Pre-2014: Sonolastic NP1).
b. Pecora Corporation; Dynatrol I-XL.
c. Tremco Incorporated; Dymonic 100 or Vulkem 116

B. Urethane, M, NS, 50, T, NT: Multicomponent, nonsag, plus 50 percent and minus 50 percent movement capability, traffic- and nontraffic-use, urethane joint sealant; ASTM C 920, Type M, Grade NS, Class 50, Uses T and NT.

1. Products: Requests for product substitutions prior to bidding will be reviewed and responded to in conformance with Division 1 requirements. Subject to compliance with requirements, provide one of the following or comparable product pre-approved during bidding:

    a. Tremco Incorporated; Dymeric 240.

2.4 MILDEW-RESISTANT JOINT SEALANTS

A. Mildew-Resistant Joint Sealants: Formulated for prolonged exposure to humidity with fungicide to prevent mold and mildew growth.

B. Silicone, Mildew Resistant, Acid Curing, S, NS, 25, NT: Mildew-resistant, single-component, nonsag, plus 25 percent and minus 25 percent movement capability, nontraffic-use, acid-curing silicone joint sealant; ASTM C 920, Type S, Grade NS, Class 25, Use NT.

1. Products: Requests for product substitutions prior to bidding will be reviewed and responded to in conformance with Division 1 requirements. Subject to compliance with requirements, provide one of the following or comparable product pre-approved during bidding:

    a. Dow Corning Corporation; DOW CORNING® 786 SILICONE SEALANT -.
    b. GE Construction Sealants; Momentive Performance Materials Inc.; SCS1700 Sanitary.
    c. Tremco Incorporated; Tremsil 200.

2.5 BUTYL JOINT SEALANTS

A. Butyl-Rubber-Based Joint Sealants: ASTM C 1311.

1. Products: Requests for product substitutions prior to bidding will be reviewed and responded to in conformance with Division 1 requirements. Subject to compliance with requirements, provide one of the following or comparable product pre-approved during bidding:

    a. Bostik, Inc; Chem-Calk 300.
    b. Pecora Corporation; BC-158.

2.6 LATEX JOINT SEALANTS

A. Acrylic Latex: Acrylic latex or siliconized acrylic latex, ASTM C 834, Type OP, Grade NF.

1. Products: Requests for product substitutions prior to bidding will be reviewed and responded to in conformance with Division 1 requirements. Subject to compliance with requirements, provide one of the following or comparable product pre-approved during bidding:

    a. BASF Corporation; Construction Systems.
    b. Pecora Corporation; AC-20.
    c. Tremco Incorporated; Tremflex 834.

2.7 JOINT-SEALANT BACKING

A. Sealant Backing Material, General: Nonstaining; compatible with joint substrates, sealants, primers, and other joint fillers; and approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.

B. Cylindrical Sealant Backings: ASTM C 1330, Type B (bicellular material with a surface skin), and of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance.

C. Bond-Breaker Tape: Polyethylene tape or other plastic tape recommended by sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint-filler materials or joint surfaces at back of joint. Provide self-adhesive tape where applicable.

2.8 MISCELLANEOUS MATERIALS

A. Primer: Material recommended by joint-sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint-sealant-substrate tests and field tests.

B. Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials, free of oily residues or other substances capable of staining or harming joint substrates and adjacent nonporous surfaces in any way, and formulated to promote optimum adhesion of sealants to joint substrates.

C. Masking Tape: Nonstaining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine joints indicated to receive joint sealants, with Installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with joint-sealant manufacturer's written instructions and the following requirements:

1. Remove all foreign material from joint substrates that could interfere with adhesion of joint sealant, including dust, paints (except for permanent, protective coatings tested and approved for sealant adhesion and compatibility by sealant manufacturer), old joint sealants, oil, grease, waterproofing, water repellents, water, surface dirt, and frost.
2. Clean porous joint substrate surfaces by brushing, grinding, mechanical abrading, or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealants. Remove loose particles remaining after cleaning

operations above by vacuuming or blowing out joints with oil-free compressed air. Porous joint substrates include the following:

a. Concrete.
b. Masonry.
c. Unglazed surfaces of ceramic tile.

3. Remove laitance and form-release agents from concrete.
4. Clean nonporous joint substrate surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants. Nonporous joint substrates include the following:

a. Metal.
b. Glass.
c. Porcelain enamel.
d. Glazed surfaces of ceramic tile.

B. Joint Priming: Prime joint substrates where recommended by joint-sealant manufacturer or as indicated by preconstruction joint-sealant-substrate tests or prior experience. Apply primer to comply with joint-sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.

C. Masking Tape: Use masking tape where required to prevent contact of sealant or primer with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

3.3 INSTALLATION OF JOINT SEALANTS

A. General: Comply with joint-sealant manufacturer's written installation instructions for products and applications indicated, unless more stringent requirements apply.

B. Sealant Installation Standard: Comply with recommendations in ASTM C 1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.

C. Install sealant backings of kind indicated to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.

1. Do not leave gaps between ends of sealant backings.
2. Do not stretch, twist, puncture, or tear sealant backings.
3. Remove absorbent sealant backings that have become wet before sealant application, and replace them with dry materials.

D. Install bond-breaker tape behind sealants where sealant backings are not used between sealants and backs of joints.

E. Install sealants using proven techniques that comply with the following and at the same time backings are installed:

1. Place sealants so they directly contact and fully wet joint substrates.
2. Completely fill recesses in each joint configuration.
3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.

F. Tooling of Nonsag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants according to requirements specified in subparagraphs below to form smooth, uniform beads of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint.

1. Remove excess sealant from surfaces adjacent to joints.
2. Use tooling agents that are approved in writing by sealant manufacturer and that do not discolor sealants or adjacent surfaces.
3. Provide concave joint profile per Figure 8A in ASTM C 1193 unless otherwise indicated.

3.4 CLEANING

A. Clean off excess sealant or sealant smears adjacent to joints as the Work progresses by methods and with cleaning materials approved in writing by manufacturers of joint sealants and of products in which joints occur.

3.5 PROTECTION

A. Protect joint sealants during and after curing period from contact with contaminating substances and from damage resulting from construction operations or other causes so sealants are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out, remove, and repair damaged or deteriorated joint sealants immediately so installations with repaired areas are indistinguishable from original work.

3.6 JOINT-SEALANT SCHEDULE

A. Joint-Sealant Application: Exterior joints in vertical surfaces and horizontal nontraffic surfaces **(JS-S1)**.

1. Joint Locations:

a. Construction joints in cast-in-place concrete.
b. Joints between cast stone units.
c. Control and expansion joints in unit masonry.
d. Joints in adhered stone cladding.
e. Joints between different materials listed above.
f. Perimeter joints between materials listed above and frames of doors windows and louvers.
g. Control and expansion joints in ceilings and other overhead surfaces.
h. Other joints as indicated.

2. Joint Sealant: Silicone, nonstaining, S, NS, 100/50, NT.
3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors. Sealants will be selected to match the adhered stone veneer, cast stone, storefront, curtain walls and storefronts. Provide opportunity for custom colors at no additional cost to the Owner if standard color selections do not provide an adequate match as determined by the Architect.

B. Joint-Sealant Application: Interior joints in horizontal traffic surfaces **(JS-U1)**.

1. Joint Locations:

a. Isolation joints in cast-in-place concrete slabs.
b. Control and expansion joints in tile flooring.
c. Other joints as indicated.

2. Joint Sealant: Urethane, M, NS, 50, T, NT.
3. Joint-Sealant Color: Standard concrete grey in concrete slabs. Match grout color at tile flooring.

C. Joint-Sealant Application: Interior joints in vertical surfaces and horizontal nontraffic surfaces **(JS-U2)**.

1. Joint Locations:

a. Control and expansion joints on exposed interior surfaces of exterior walls.
b. Perimeter joints of exterior openings.
c. Tile control and expansion joints.
d. Other joints as indicated.

2. Joint Sealant: Urethane, S, NS, 25, NT.
3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors and paintable.

D. Joint-Sealant Application: Interior joints in vertical surfaces and horizontal nontraffic surfaces not subject to significant movement **(JS-L1)**.

1. Joint Locations:

a. Control joints on exposed interior surfaces of exterior walls.
b. Perimeter joints between interior wall surfaces and frames of interior doors windows and elevator entrances.
c. Other joints as indicated.

2. Joint Sealant: Acrylic latex.
3. Joint-Sealant Color: Paintable.

E. Joint-Sealant Application: Mildew-resistant interior joints in vertical surfaces and horizontal nontraffic surfaces (JS-S2).

1. Joint Locations:

a. Joints between plumbing fixtures and adjoining walls, floors, and counters.
b. Tile control and expansion joints at showers.
c. Other joints as indicated.

2. Joint Sealant: Silicone, mildew resistant, acid curing, S, NS, 25, NT.
3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.

F. Joint-Sealant Application: Concealed mastics **(JS-B1)**.

1. Joint Locations:

a. Aluminum thresholds.
b. Sill plates.
c. Other joints as indicated.

2. Joint Sealant: Butyl-rubber based.
3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.

END OF SECTION 079200

SECTION 081113 - HOLLOW METAL DOORS AND FRAMES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes:

1. Interior standard steel doors and frames, including FEMA rated assemblies.

B. Related Requirements:

1. Section 087100 "Door Hardware" for door hardware for hollow-metal doors.

1.3 DEFINITIONS

A. Minimum Thickness: Minimum thickness of base metal without coatings according to NAAMM-HMMA 803 or SDI A250.8.

1.4 COORDINATION

A. Coordinate anchorage installation for hollow-metal frames. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors. Deliver such items to Project site in time for installation.

B. Coordinate requirements for installation of door hardware, electrified door hardware, and access control and security systems.

1.5 ACTION SUBMITTALS

A. Shop Drawings: Include the following:

1. Elevations of each door type.
2. Details of doors, including vertical- and horizontal-edge details and metal thicknesses.
3. Frame details for each frame type, including dimensioned profiles and metal thicknesses.
4. Locations of reinforcement and preparations for hardware.
5. Details of each different wall opening condition.
6. Details of electrical raceway and preparation for electrified hardware, access control systems, and security systems.
7. Details of anchorages, joints, field splices, and connections.
8. Details of accessories.
9. Details of moldings, removable stops, and glazing.

B. Product Schedule: For hollow-metal doors and frames, prepared by or under the supervision of supplier, using same reference numbers for details and openings as those on Drawings. Coordinate with final door hardware schedule.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver hollow-metal doors and frames palletized, packaged, or crated to provide protection during transit and Project-site storage. Do not use nonvented plastic.

1. Provide additional protection to prevent damage to factory-finished units.

B. Deliver welded frames with two removable spreader bars across bottom of frames, tack welded to jambs and mullions.

C. Store hollow-metal doors and frames vertically under cover at Project site with head up. Place on minimum 4-inch- (102-mm-) high wood blocking. Provide minimum 1/4-inch (6-mm) space between each stacked door to permit air circulation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Requests for manufacturer substitutions prior to bidding will be reviewed and responded to in conformance with Division 1 requirements. Subject to compliance with requirements, provide products by one of the following manufacturers or a manufacturer pre-approved during bidding:

1. Ceco Door; ASSA ABLOY.
2. Curries Company; ASSA ABLOY.

2.2 INTERIOR STANDARD STEEL DOORS AND FRAMES

A. Construct hollow-metal doors and frames to comply with standards indicated for materials, fabrication, hardware locations, hardware reinforcement, tolerances, and clearances, and as specified.

B. Extra-Heavy-Duty Doors and Frames: SDI A250.8, Level 3; SDI A250.4, Level A.

1. Doors:

a. Type: As indicated in the Door and Frame Schedule.
b. Thickness: 1-3/4 inches (44.5 mm).
c. Face: Uncoated steel sheet, minimum thickness of 0.053 inch (1.3 mm).
d. Edge Construction: Model 2, Seamless.
e. Edge Bevel: Provide manufacturer's standard beveled or square edges.
f. Core: Manufacturer's standard.

2. Frames:

a. Materials: Uncoated steel sheet, minimum thickness of 0.053 inch (1.3 mm).
b. Sidelite Frames: Fabricated from same thickness material as adjacent door frame.

c. Construction: Full profile welded.

3. Exposed Finish: Prime.

2.3 HOLLOW METAL DOORS FOR SEVERE STORM SHELTERS

A. Type: As indicated in the Door and Frame Schedule.

B. General: Provide complete tornado or hurricane resistant door and frame shelter assemblies constructed to resist the design wind pressures for components and cladding and missile impact loads as described in ICC 500 - 2014, ICC/NSSA Standard for the Design and Construction of Storm Shelters. Only single opening and paired opening doors and their frames constructed to resist calculated design wind pressures and laboratory tested missile impacts are acceptable.

1. Door systems, both single doors and paired openings, tested and complying with ICC 500 - 2014 and FEMA P-361 (2015), Design and Construction Guidance for Community Safe Rooms and supported by third party test results.
2. Sheets fabricated on exterior openings from commercial quality hot dipped zinc coated steel complying with ASTM A924 A60. Gauges to be in accordance with manufacturers tested assemblies.
3. Vertical Edges: Vertical edges to have the face sheets joined by a continuous weld extending the full height of the door. Welds are to be ground, filled and dressed smooth. Beveled Lock Edge, 1/8 inch in 2 inches (3 mm in 50 mm).
4. Top Edge: Reinforce top of doors with a continuous steel channel extending the full width of the door and welded to the face sheet. Doors with an inverted top channel to include a steel closure channel, screw attached and welded in place with the web of the channel flush with the face sheets of the door. Plastic or composite channel fillers are not acceptable.
5. Hinge Reinforcement: Minimum 7 gauge (3/16") plate 1-1/4" x 9".
6. Exposed Finish: Prime.

C. Manufacturers Basis of Design:

1. CECO Door Products (C) - StormPro Series.
2. Curries Company (CU) - StormPro Series.

2.4 FRAMES FOR SEVERE STORM SHELTERS

A. General: Subject to the same compliance standards and requirements as standard hollow metal frames, provide complete tornado or hurricane resistant door and frame assemblies, for both single doors and paired openings, tested and labeled as complying with ICC 500 - 2014 and FEMA P-361 (2015) and supported by third party test results.

1. Fabricate exterior frames from 14 gauge hot dipped zinc coated steel that complying with ASTM designations A924 A60.
2. Frame Construction: Full profile welded.
3. Exposed Finish: Prime.

B. Manufacturers Basis of Design:

1. CECO Door Products (C) - StormPro Series.

2.5 BORROWED LITES

A. Fabricate of uncoated steel sheet, minimum thickness of 0.053 inch (1.3 mm).

B. Construction: Full profile welded.

C. Fabricate in one piece except where handling and shipping limitations require multiple sections. Where frames are fabricated in sections due to shipping or handling limitations, provide alignment plates or angles at each joint, fabricated of metal of same or greater thickness as metal as frames.

D. Provide countersunk, flat- or oval-head exposed screws and bolts for exposed fasteners unless otherwise indicated.

2.6 FRAME ANCHORS

A. Jamb Anchors:

1. Type: Anchors of minimum size and type required by applicable door and frame standard, and suitable for performance level indicated.
2. Quantity: Minimum of three anchors per jamb, with one additional anchor for frames with no floor anchor. Provide one additional anchor for each 24 inches (610 mm) of frame height above 7 feet (2.1 m).
3. Postinstalled Expansion Anchor: Minimum 3/8-inch- (9.5-mm-) diameter bolts with expansion shields or inserts, with manufacturer's standard pipe spacer.

B. Floor Anchors: Provide floor anchors for each jamb and mullion that extends to floor.

C. Floor Anchors for Concrete Slabs with Underlayment: Adjustable-type anchors with extension clips, allowing not less than 2-inch (51-mm) height adjustment. Terminate bottom of frames at top of underlayment.

D. Material: ASTM A 879/A 879M, Commercial Steel (CS), 04Z (12G) coating designation; mill phosphatized.

2.7 MATERIALS

A. Cold-Rolled Steel Sheet: ASTM A 1008/A 1008M, Commercial Steel (CS), Type B; suitable for exposed applications.

B. Inserts, Bolts, and Fasteners: Hot-dip galvanized according to ASTM A 153/A 153M.

C. Power-Actuated Fasteners in Concrete: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with clips or other accessory devices for attaching hollow-metal frames of type indicated.

D. Mineral-Fiber Insulation: ASTM C 665, Type I (blankets without membrane facing); consisting of fibers manufactured from slag or rock wool; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively; passing ASTM E 136 for combustion characteristics.

E. Glazing: Comply with requirements in Section 088000 "Glazing."

2.8 FABRICATION

A. Hollow-Metal Frames: Fabricate in one piece except where handling and shipping limitations require multiple sections. Where frames are fabricated in sections, provide alignment plates or angles at each joint, fabricated of metal of same or greater thickness as frames.

1. Sidelite Frames: Provide closed tubular members with no visible face seams or joints, fabricated from same material as door frame. Fasten members at crossings and to jambs by welding.
2. Provide countersunk, flat- or oval-head exposed screws and bolts for exposed fasteners unless otherwise indicated.
3. Door Silencers: Except on weather-stripped frames, drill stops to receive door silencers as follows. Keep holes clear during construction.

a. Single-Door Frames: Drill stop in strike jamb to receive three door silencers.

B. Hardware Preparation: Factory prepare hollow-metal doors and frames to receive templated mortised hardware, and electrical wiring; include cutouts, reinforcement, mortising, drilling, and tapping according to SDI A250.6, the Door Hardware Schedule, and templates.

1. Reinforce doors and frames to receive nontemplated, mortised, and surface-mounted door hardware.
2. Comply with BHMA A156.115 for preparing hollow-metal doors and frames for hardware.

C. Glazed Lites: Provide stops and moldings around glazed lites where indicated. Form corners of stops and moldings with butted or mitered hairline joints.

1. Provide stops and moldings flush with face of door, and with beveled stops unless otherwise indicated.
2. Multiple Glazed Lites: Provide fixed and removable stops and moldings so that each glazed lite is capable of being removed independently.
3. Provide fixed frame moldings on outside of exterior and on secure side of interior doors and frames. Provide loose stops and moldings on inside of hollow-metal doors and frames.
4. Coordinate rabbet width between fixed and removable stops with glazing and installation types indicated.
5. Provide stops for installation with countersunk flat- or oval-head machine screws spaced uniformly not more than 9 inches (230 mm) o.c. and not more than 2 inches (51 mm) o.c. from each corner.

2.9 STEEL FINISHES

A. Prime Finish: Clean, pretreat, and apply manufacturer's standard primer.

1. Shop Primer: Manufacturer's standard, fast-curing, lead- and chromate-free primer complying with SDI A250.10; recommended by primer manufacturer for substrate; compatible with substrate and field-applied coatings despite prolonged exposure.

PART 3 - EXECUTION

3.1 PREPARATION

A. Remove welded-in shipping spreaders installed at factory. Restore exposed finish by grinding, filling, and dressing, as required to make repaired area smooth, flush, and invisible on exposed faces. Touch up factory-applied finishes where spreaders are removed.

B. Drill and tap doors and frames to receive nontemplated, mortised, and surface-mounted door hardware.

3.2 INSTALLATION

A. General: Install hollow-metal doors and frames plumb, rigid, properly aligned, and securely fastened in place. Comply with approved Shop Drawings and with manufacturer's written instructions.

B. Hollow-Metal Frames: Comply with SDI A250.11.

1. Set frames accurately in position; plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is complete, remove temporary braces without damage to completed Work.

    a. Install frames with removable stops located on secure side of opening.

2. Floor Anchors: Secure with postinstalled expansion anchors.
3. Masonry Walls: Coordinate installation of frames to allow for solidly filling space between frames and masonry with grout or mortar.

4. Installation Tolerances: Adjust hollow-metal frames to the following tolerances:

    a. Squareness: Plus or minus 1/16 inch (1.6 mm), measured at door rabbet on a line 90 degrees from jamb perpendicular to frame head.
    b. Alignment: Plus or minus 1/16 inch (1.6 mm), measured at jambs on a horizontal line parallel to plane of wall.
    c. Twist: Plus or minus 1/16 inch (1.6 mm), measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.
    d. Plumbness: Plus or minus 1/16 inch (1.6 mm), measured at jambs at floor.

C. Hollow-Metal Doors: Fit and adjust hollow-metal doors accurately in frames, within clearances specified below.

1. Non-Fire-Rated Steel Doors: Comply with SDI A250.8.

D. Glazing: Comply with installation requirements in Section 088000 "Glazing" and with hollow-metal manufacturer's written instructions.

3.3 CLEANING AND TOUCHUP

A. Prime-Coat Touchup: Immediately after erection, sand smooth rusted or damaged areas of prime coat and apply touchup of compatible air-drying, rust-inhibitive primer.

END OF SECTION 081113

SECTION 081416 - FLUSH WOOD DOORS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Solid-core doors with wood-veneer faces.
2. Factory finishing flush wood doors.
3. Factory fitting flush wood doors to frames and factory machining for hardware.

1.3 ACTION SUBMITTALS

A. Shop Drawings: Indicate location, size, and hand of each door; elevation of each kind of door; construction details not covered in Product Data; and the following:

1. Dimensions and locations of mortises and holes for hardware.
2. Dimensions and locations of cutouts.
3. Requirements for veneer matching.
4. Doors to be factory finished and finish requirements.

B. Samples for Verification:

1. Factory finishes applied to actual door face materials, approximately 8 by 10 inches (200 by 250 mm), for each material and finish**.** For each wood species and transparent finish, provide set of three Samples showing typical range of color and grain to be expected in finished Work.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Comply with requirements of referenced standard and manufacturer's written instructions.

B. Package doors individually in plastic bags or cardboard cartons.

C. Mark each door on top and bottom rail with opening number used on Shop Drawings.

1.5 FIELD CONDITIONS

A. Environmental Limitations: Do not deliver or install doors until spaces are enclosed and weathertight, wet work in spaces is complete and dry, and HVAC system is operating and maintaining ambient temperature and humidity conditions at occupancy levels during remainder of construction period.

1.6 WARRANTY

A. Special Warranty: Manufacturer agrees to repair or replace doors that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

a. Warping (bow, cup, or twist) more than 1/4 inch (6.4 mm) in a 42-by-84-inch (1067-by-2134-mm) section.
b. Telegraphing of core construction in face veneers exceeding 0.01 inch in a 3-inch (0.25 mm in a 76.2-mm) span.

2. Warranty Period for Solid-Core Interior Doors: Life of installation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Requests for manufacturer substitutions prior to bidding will be reviewed and responded to in conformance with Division 1 requirements. Subject to compliance with requirements, provide products by one of the following manufacturers or a manufacturer pre-approved during bidding:

1. Eggers Industries.
2. Graham Wood Doors; ASSA ABLOY Group company.
3. Marshfield DoorSystems, Inc.
4. VT Industries Inc.

B. Source Limitations: Obtain flush wood doors from single manufacturer.

2.2 FLUSH WOOD DOORS, GENERAL

A. Quality Standard: In addition to requirements specified, comply with WDMA I.S.1-A, "Architectural Wood Flush Doors."

B. WDMA I.S.1-A Performance Grade: Extra Heavy Duty.

C. Particleboard-Core Doors:

1. Particleboard: ANSI A208.1, Grade LD-1.
2. Blocking: Provide wood blocking in particleboard-core doors as needed to eliminate through-bolting hardware.
3. Provide doors with glued-wood-stave cores instead of particleboard cores for doors indicated to receive exit devices.

2.3 VENEER-FACED DOORS FOR TRANSPARENT FINISH

A. Interior Solid-Core Doors **(081416.A)**:

1. Grade: Premium, with Grade A faces.
2. Species: Red oak.

3. Cut: Plain sliced (flat sliced).
4. Match between Veneer Leaves: Book match.
5. Assembly of Veneer Leaves on Door Faces: Running match.
6. Exposed Vertical Edges: Same species as faces - edge Type A.
7. Core: Particleboard.
8. Construction: Five plies. Stiles and rails are bonded to core, then entire unit is abrasive planed before veneering.
9. WDMA I.S.1-A Performance Grade: Extra Heavy Duty.

2.4 FABRICATION

A. Factory fit doors to suit frame-opening sizes indicated. Comply with clearance requirements of referenced quality standard for fitting unless otherwise indicated.

1. Comply with NFPA 80 requirements for fire-rated doors.

B. Factory machine doors for hardware that is not surface applied. Locate hardware to comply with DHI-WDHS-3. Comply with final hardware schedules, door frame Shop Drawings, BHMA-156.115-W, and hardware templates.

1. Coordinate with hardware mortises in metal frames to verify dimensions and alignment before factory machining.

2.5 FACTORY FINISHING

A. General: Comply with referenced quality standard for factory finishing. Complete fabrication, including fitting doors for openings and machining for hardware that is not surface applied, before finishing.

1. Finish faces, all four edges, edges of cutouts, and mortises. Stains and fillers may be omitted on top and bottom edges, edges of cutouts, and mortises.

B. Factory finish doors.

C. Transparent Finish:

1. Grade: Premium.
2. Finish: WDMA TR-6 catalyzed polyurethane.
3. Staining: Match finish of Owner’s existing oak furniture which appears to be a close match to Marshfield 28-95 “Toast”.
4. Effect: Open-grain finish.
5. Sheen: Satin.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine doors and installed door frames, with Installer present, before hanging doors.

1. Verify that installed frames comply with indicated requirements for type, size, location, and swing characteristics and have been installed with level heads and plumb jambs.

2. Reject doors with defects.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Hardware: For installation, see Section 087100 "Door Hardware."

B. Installation Instructions: Install doors to comply with manufacturer's written instructions and referenced quality standard, and as indicated.

C. Factory-Fitted Doors: Align in frames for uniform clearance at each edge.

D. Factory-Finished Doors: Restore finish before installation if fitting or machining is required at Project site.

3.3 ADJUSTING

A. Operation: Rehang or replace doors that do not swing or operate freely.

B. Finished Doors: Replace doors that are damaged or that do not comply with requirements. Doors may be repaired or refinished if Work complies with requirements and shows no evidence of repair or refinishing.

END OF SECTION 081416

SECTION 084113 - ALUMINUM-FRAMED ENTRANCES AND STOREFRONTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Storefront framing.
2. Manual-swing entrance doors.

1.3 ACTION SUBMITTALS

A. Shop Drawings: For aluminum-framed entrances and storefronts. Include plans, elevations, sections, full-size details, and attachments to other work.

1. Include full-size isometric details of each type of vertical-to-horizontal intersection of aluminum-framed entrances and storefronts, showing the following:

a. Joinery, including concealed welds.
b. Anchorage.
c. Glazing.

2. Include point-to-point wiring diagrams showing the following:

a. Power requirements for each electrically operated door hardware.
b. Location and types of switches, signal device, conduit sizes, and number and size of wires.

B. Samples for Verification: For each type of exposed finish required, in manufacturer's standard sizes.

C. Entrance Door Hardware Schedule: Prepared by or under supervision of supplier, detailing fabrication and assembly of entrance door hardware, as well as procedures and diagrams. Coordinate final entrance door hardware schedule with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of entrance door hardware.

D. Delegated-Design Submittal: For aluminum-framed entrances and storefronts indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.4 CLOSEOUT SUBMITTALS

A. Maintenance Data: For aluminum-framed entrances and storefronts to include in maintenance manuals.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer.

B. Product Options: Information on Drawings and in Specifications establishes requirements for aesthetic effects and performance characteristics of assemblies. Aesthetic effects are indicated by dimensions, arrangements, alignment, and profiles of components and assemblies as they relate to sightlines, to one another, and to adjoining construction.

1. Do not change intended aesthetic effects, as judged solely by Architect, except with Architect's approval. If changes are proposed, submit comprehensive explanatory data to Architect for review.

1.6 WARRANTY

A. Special Warranty: Manufacturer agrees to repair or replace components of aluminum-framed entrances and storefronts that do not comply with requirements or that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

a. Structural failures, including, but not limited to, excessive deflection.
b. Noise or vibration created by wind and thermal and structural movements.
c. Deterioration of metals and other materials beyond normal weathering.
d. Failure of operating components.

2. Warranty Period: 10 years from date of Substantial Completion.

B. Special Finish Warranty: Standard form in which manufacturer agrees to repair finishes or replace aluminum that shows evidence of deterioration of factory-applied finishes within specified warranty period.

1. Deterioration includes, but is not limited to, the following:

a. Color fading more than 5 Hunter units when tested according to ASTM D 2244.
b. Chalking in excess of a No. 8 rating when tested according to ASTM D 4214.
c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.

2. Warranty Period: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Source Limitations: Obtain all components of aluminum-framed entrance and storefront system, including framing and accessories, from single manufacturer.

2.2 PERFORMANCE REQUIREMENTS

A. Delegated Design: Engage a qualified professional engineer, as defined in Section 014000 "Quality Requirements," to design aluminum-framed entrances and storefronts.

B. General Performance: Comply with performance requirements specified, as determined by testing of aluminum-framed entrances and storefronts representing those indicated for this Project without failure due to defective manufacture, fabrication, installation, or other defects in construction.

1. Aluminum-framed entrances and storefronts shall withstand movements of supporting structure, including, but not limited to, twist, column shortening, long-term creep, and deflection from uniformly distributed and concentrated live loads.
2. Failure also includes the following:

    a. Thermal stresses transferring to building structure.
    b. Glass breakage.
    c. Noise or vibration created by wind and thermal and structural movements.
    d. Loosening or weakening of fasteners, attachments, and other components.

C. Structural Loads:

1. Wind Loads: As indicated on Drawings.
2. Other Design Loads: As indicated on Drawings.

D. Deflection of Framing Members: At design wind pressure, as follows:

1. Deflection Normal to Wall Plane: Limited to 1/175 of clear span for spans of up to 13 feet 6 inches (4.1 m) and to 1/240 of clear span plus 1/4 inch (6.35 mm) for spans greater than 13 feet 6 inches (4.1 m) or an amount that restricts edge deflection of individual glazing lites to 3/4 inch (19.1 mm), whichever is less.
2. Deflection Parallel to Glazing Plane: Limited to 1/360 of clear span or 1/8 inch (3.2 mm), whichever is smaller.

E. Structural: Test according to ASTM E 330/E 330M as follows:

1. When tested at positive and negative wind-load design pressures, storefront assemblies, including entrance doors, do not evidence deflection exceeding specified limits.
2. When tested at 150 percent of positive and negative wind-load design pressures, storefront assemblies, including entrance doors and anchorage, do not evidence material failures, structural distress, or permanent deformation of main framing members exceeding 0.2 percent of span.
3. Test Durations: As required by design wind velocity, but not less than 10 seconds.

F. Thermal Movements: Allow for thermal movements resulting from ambient and surface temperature changes.

1. Temperature Change: 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.

2.3 STOREFRONT SYSTEMS

A. Basis-of-Design Product: Requests for manufacturer substitutions prior to bidding will be reviewed and responded to in conformance with Division 1 requirements. Subject to compliance with requirements, provide **Kawneer North America Trifab VG 451** or comparable product pre-approved during bidding:

1. EFCO Corporation.
2. Manko
3. United States Aluminum.

B. Framing Members: Manufacturer's extruded- or formed-aluminum framing members of thickness required and reinforced as required to support imposed loads.

1. Interior Vestibule Framing Construction: Nonthermal.
2. Glazing System: Retained mechanically with gaskets on four sides.
3. Glazing Plane: Center.
4. Finish: High-performance organic finish.
5. Fabrication Method: Field-fabricated stick system.
6. Aluminum: Alloy and temper recommended by manufacturer for type of use and finish indicated.

C. Backer Plates: Manufacturer's standard, continuous backer plates for framing members, if not integral, where framing abuts adjacent construction.

D. Brackets and Reinforcements: Manufacturer's standard high-strength aluminum with nonstaining, nonferrous shims for aligning system components.

2.4 ENTRANCE DOOR SYSTEMS

A. Entrance Doors: Manufacturer's standard glazed entrance doors for manual-swing or automatic operation.

1. Door Construction: 1-3/4-inch (44.5-mm) overall thickness, with minimum 0.125-inch-(3.2-mm-) thick, extruded-aluminum tubular rail and stile members. Mechanically fasten corners with reinforcing brackets that are deeply penetrated and fillet welded or that incorporate concealed tie rods.
2. Door Design: Wide stile; 5-inch (127-mm) nominal width.
3. Glazing Stops and Gaskets: Square, snap-on, extruded-aluminum stops and preformed gaskets.

    a. Provide nonremovable glazing stops on outside of door.

2.5 ENTRANCE DOOR HARDWARE

A. Entrance Door Hardware: Hardware not specified in this Section is specified in Section 087100 "Door Hardware."

2.6 GLAZING

A. Glazing: Comply with Section 088000 "Glazing."

B. Glazing Gaskets: Manufacturer's standard sealed-corner pressure-glazing system of black, resilient elastomeric glazing gaskets, setting blocks, and shims or spacers.

2.7 MATERIALS

A. Sheet and Plate: ASTM B 209 (ASTM B 209M).

B. Extruded Bars, Rods, Profiles, and Tubes: ASTM B 221 (ASTM B 221M).

C. Extruded Structural Pipe and Tubes: ASTM B 429/B 429M.

D. Structural Profiles: ASTM B 308/B 308M.

2.8 ACCESSORIES

A. Fasteners and Accessories: Manufacturer's standard corrosion-resistant, nonstaining, nonbleeding fasteners and accessories compatible with adjacent materials.

1. Use self-locking devices where fasteners are subject to loosening or turning out from thermal and structural movements, wind loads, or vibration.
2. Reinforce members as required to receive fastener threads.

B. Anchors: Three-way adjustable anchors with minimum adjustment of 1 inch (25.4 mm) that accommodate fabrication and installation tolerances in material and finish compatible with adjoining materials and recommended by manufacturer.

C. Concealed Flashing: Manufacturer's standard corrosion-resistant, nonstaining, nonbleeding flashing compatible with adjacent materials.

D. Bituminous Paint: Cold-applied asphalt-mastic paint containing no asbestos, formulated for 30-mil (0.762-mm) thickness per coat.

2.9 FABRICATION

A. Form or extrude aluminum shapes before finishing.

B. Weld in concealed locations to greatest extent possible to minimize distortion or discoloration of finish. Remove weld spatter and welding oxides from exposed surfaces by descaling or grinding.

C. Fabricate components that, when assembled, have the following characteristics:

1. Profiles that are sharp, straight, and free of defects or deformations.
2. Accurately fitted joints with ends coped or mitered.
3. Physical and thermal isolation of glazing from framing members.
4. Accommodations for thermal and mechanical movements of glazing and framing to maintain required glazing edge clearances.
5. Provisions for field replacement of glazing from exterior.

6. Fasteners, anchors, and connection devices that are concealed from view to greatest extent possible.

D. Mechanically Glazed Framing Members: Fabricate for flush glazing without projecting stops.

E. Entrance Door Frames: Reinforce as required to support loads imposed by door operation and for installing entrance door hardware.

1. Provide compression weather stripping at fixed stops.

F. Entrance Doors: Reinforce doors as required for installing entrance door hardware.

G. Entrance Door Hardware Installation: Factory install entrance door hardware to the greatest extent possible. Cut, drill, and tap for factory-installed entrance door hardware before applying finishes.

H. After fabrication, clearly mark components to identify their locations in Project according to Shop Drawings.

2.10 ALUMINUM FINISHES

A. High-Performance Organic Finish: Two-coat fluoropolymer finish complying with AAMA 2605 and containing not less than 70 percent PVDF resin by weight in color coat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.

1. Color and Gloss: Match Kawneer standard color; “Charcoal” 732A345.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas, with Installer present, for compliance with requirements for 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. General:

1. Comply with manufacturer's written instructions.
2. Do not install damaged components.
3. Fit joints to produce hairline joints free of burrs and distortion.
4. Rigidly secure nonmovement joints.
5. Install anchors with separators and isolators to prevent metal corrosion and electrolytic deterioration and to prevent impeding movement of moving joints.
6. Seal perimeter and other joints watertight unless otherwise indicated.

B. Metal Protection:

1. Where aluminum is in contact with dissimilar metals, protect against galvanic action by painting contact surfaces with materials recommended by manufacturer for this purpose or by installing nonconductive spacers.
2. Where aluminum is in contact with concrete or masonry, protect against corrosion by painting contact surfaces with bituminous paint.

C. Set continuous sill members and flashing in full sealant bed, as specified in Section 079200 "Joint Sealants," to produce weathertight installation.

D. Install components plumb and true in alignment with established lines and grades.

E. Install glazing as specified in Section 088000 "Glazing."

F. Install weatherseal sealant according to Section 079200 "Joint Sealants" and according to sealant manufacturer's written instructions to produce weatherproof joints. Install joint filler behind sealant as recommended by sealant manufacturer.

G. Entrance Doors: Install doors to produce smooth operation and tight fit at contact points.

1. Field-Installed Entrance Door Hardware: Install surface-mounted entrance door hardware according to entrance door hardware manufacturers' written instructions using concealed fasteners to greatest extent possible.

3.3 ERECTION TOLERANCES

A. Erection Tolerances: Install aluminum-framed entrances and storefronts to comply with the following maximum tolerances:

1. Plumb: 1/8 inch in 10 feet (3.2 mm in 3 m); 1/4 inch in 40 feet (6.35 mm in 12.2 m).
2. Level: 1/8 inch in 20 feet (3.2 mm in 6 m); 1/4 inch in 40 feet (6.35 mm in 12.2 m).
3. Alignment:

    a. Where surfaces abut in line or are separated by reveal or protruding element up to 1/2 inch (12.7 mm) wide, limit offset from true alignment to 1/16 inch (1.6 mm).
    b. Where surfaces are separated by reveal or protruding element from 1/2 to 1 inch (12.7 to 25.4 mm) wide, limit offset from true alignment to 1/8 inch (3.2 mm).
    c. Where surfaces are separated by reveal or protruding element of 1 inch (25.4 mm) wide or more, limit offset from true alignment to 1/4 inch (6 mm).

4. Location: Limit variation from plane to 1/8 inch in 12 feet (3.2 mm in 3.6 m); 1/2 inch (12.7 mm) over total length.

END OF SECTION 084113

SECTION 087100 – DOOR HARDWARE

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes commercial door hardware for the following:

1. Swinging doors.

B. Door hardware includes, but is not necessarily limited to, the following:

1. Mechanical door hardware.
2. Electromechanical door hardware.

C. Related Sections:

1. Division 08 Section “Hollow Metal Doors and Frames”.
2. Division 08 Section “Flush Wood Doors”.

D. Codes and References: Comply with the version year adopted by the Authority Having Jurisdiction.

1. ANSI A117.1 - Accessible and Usable Buildings and Facilities.
2. ICC/IBC - International Building Code.
3. NFPA 70 - National Electrical Code.
4. NFPA 80 - Fire Doors and Windows.
5. NFPA 101 - Life Safety Code.
6. NFPA 105 - Installation of Smoke Door Assemblies.
7. State Building Codes, Local Amendments.

E. Standards: All hardware specified herein shall comply with the following industry standards:

1. ANSI/BHMA Certified Product Standards - A156 Series
2. UL10C – Positive Pressure Fire Tests of Door Assemblies

1.2 SUBMITTALS

A. Product Data: Manufacturer's product data sheets including installation details, material descriptions, dimensions of individual components and profiles, operational descriptions and finishes.

B. Door Hardware Schedule: Prepared by or under the supervision of supplier, detailing fabrication and assembly of door hardware, as well as procedures and diagrams. Coordinate the final Door Hardware Schedule with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of door hardware.

1. Format: Comply with scheduling sequence and vertical format in DHI's "Sequence and Format for the Hardware Schedule."

2. Organization: Organize the Door Hardware Schedule into door hardware sets indicating complete designations of every item required for each door or opening. Organize door hardware sets in same order as in the Door Hardware Sets at the end of Part 3. Submittals that do not follow the same format and order as the Door Hardware Sets will be rejected and subject to resubmission.

3. Content: Include the following information:

    a. Type, style, function, size, label, hand, and finish of each door hardware item.
    b. Manufacturer of each item.
    c. Fastenings and other pertinent information.
    d. Location of door hardware set, cross-referenced to Drawings, both on floor plans and in door and frame schedule.
    e. Explanation of abbreviations, symbols, and codes contained in schedule.
    f. Mounting locations for door hardware.
    g. Door and frame sizes and materials.
    h. Warranty information for each product.

4. Submittal Sequence: Submit the final Door Hardware Schedule at earliest possible date, particularly where approval of the Door Hardware Schedule must precede fabrication of other work that is critical in the Project construction schedule. Include Product Data, Samples, Shop Drawings of other work affected by door hardware, and other information essential to the coordinated review of the Door Hardware Schedule.

C. Shop Drawings: Details of electrified access control hardware indicating the following:

1. Wiring Diagrams: Upon receipt of approved schedules, submit detailed system wiring diagrams for power, signaling, monitoring, communication, and control of the access control system electrified hardware. Differentiate between manufacturer-installed and field-installed wiring. Include the following:

    a. Elevation diagram of each unique access controlled opening showing location and interconnection of major system components with respect to their placement in the respective door openings.
    b. Complete (risers, point-to-point) access control system block wiring diagrams.
    c. Wiring instructions for each electronic component scheduled herein.

2. Electrical Coordination: Coordinate with related sections the voltages and wiring details required at electrically controlled and operated hardware openings.

D. Keying Schedule: After a keying meeting with the owner has taken place prepare a separate keying schedule detailing final instructions. Submit the keying schedule in electronic format. Include keying system explanation, door numbers, key set symbols, hardware set numbers and special instructions. Owner must approve submitted keying schedule prior to the ordering of permanent cylinders/cores.

E. Operating and Maintenance Manuals: Provide manufacturers operating and maintenance manuals for each item comprising the complete door hardware installation in quantity as required in Division 01, Closeout Submittals.

1.3 QUALITY ASSURANCE

A. Manufacturers Qualifications: Engage qualified manufacturers with a minimum 5 years of documented experience in producing hardware and equipment similar to that indicated for this Project and that have a proven record of successful in-service performance.

B. Installer Qualifications: A minimum 3 years documented experience installing both standard and electrified door hardware similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.

C. Door Hardware Supplier Qualifications: Experienced commercial door hardware distributors with a minimum 5 years documented experience supplying both mechanical and electromechanical hardware installations comparable in material, design, and extent to that indicated for this Project. Supplier recognized as a factory direct distributor by the manufacturers of the primary materials with a warehousing facility in Project's vicinity. Supplier to have on staff a certified Architectural Hardware Consultant (AHC) available during the course of the Work to consult with Contractor, Architect, and Owner concerning both standard and electromechanical door hardware and keying.

D. Source Limitations: Obtain each type and variety of door hardware specified in this section from a single source unless otherwise indicated.

1. Electrified modifications or enhancements made to a source manufacturer's product line by a secondary or third party source will not be accepted.

2. Provide electromechanical door hardware from the same manufacturer as mechanical door hardware, unless otherwise indicated.

E. Each unit to bear third party permanent label demonstrating compliance with the referenced standards.

F. Keying Conference: Conduct conference to comply with requirements in Division 01 Section "Project Meetings." Keying conference to incorporate the following criteria into the final keying schedule document:

1. Function of building, purpose of each area and degree of security required.
2. Plans for existing and future key system expansion.
3. Requirements for key control storage and software.
4. Installation of permanent keys, cylinder cores and software.
5. Address and requirements for delivery of keys.

G. Pre-Submittal Conference: Conduct coordination conference in compliance with requirements in Division 01 Section "Project Meetings" with attendance by representatives of Supplier(s), Installer(s), and Contractor(s) to review proper methods and the procedures for receiving, handling, and installing door hardware.

1. Prior to installation of door hardware, conduct a project specific training meeting to instruct the installing contractors' personnel on the proper installation and adjustment of their respective products. Product training to be attended by installers of door hardware (including electromechanical hardware) for aluminum, hollow metal and wood doors. Training will include the use of installation manuals, hardware schedules, templates and physical product samples as required.

2. Inspect and discuss electrical roughing-in, power supply connections, and other preparatory work performed by other trades.
3. Review sequence of operation narratives for each unique access controlled opening.
4. Review and finalize construction schedule and verify availability of materials.
5. Review the required inspecting, testing, commissioning, and demonstration procedures

H. At completion of installation, provide written documentation that components were applied to manufacturer's instructions and recommendations and according to approved schedule.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Inventory door hardware on receipt and provide secure lock-up and shelving for door hardware delivered to Project site. Do not store electronic access control hardware, software or accessories at Project site without prior authorization.

B. Tag each item or package separately with identification related to the final Door Hardware Schedule, and include basic installation instructions with each item or package.

C. Deliver, as applicable, permanent keys, cylinders, cores, access control credentials, software and related accessories directly to Owner via registered mail or overnight package service. Instructions for delivery to the Owner shall be established at the "Keying Conference".

1.5 COORDINATION

A. Templates: Obtain and distribute to the parties involved templates for doors, frames, and other work specified to be factory prepared for installing standard and electrified hardware. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing hardware to comply with indicated requirements.

B. Door Hardware and Electrical Connections: Coordinate the layout and installation of scheduled electrified door hardware and related access control equipment with required connections to source power junction boxes, low voltage power supplies, detection and monitoring hardware, and fire and detection alarm systems.

C. Door and Frame Preparation: Doors and corresponding frames are to be prepared, reinforced and pre-wired (if applicable) to receive the installation of the specified electrified, monitoring, signaling and access control system hardware without additional in-field modifications.

1.6 WARRANTY

A. General Warranty: Reference Division 01, General Requirements. Special warranties specified in this Article shall not deprive Owner of other rights Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by Contractor under requirements of the Contract Documents.

B. Warranty Period: Written warranty, executed by manufacturer(s), agreeing to repair or replace components of standard and electrified door hardware that fails in materials or workmanship within specified warranty period after final acceptance by the Owner. Failures include, but are not limited to, the following:

1. Structural failures including excessive deflection, cracking, or breakage.
2. Faulty operation of the hardware.
3. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
4. Electrical component defects and failures within the systems operation.

C. Standard Warranty Period: One year from date of Substantial Completion, unless otherwise indicated.

D. Special Warranty Periods:

1. Ten years for mortise locks and latches.
2. Five years for exit hardware.
3. Twenty five years for manual surface door closer bodies.
4. Two years for electromechanical door hardware.

1.7 MAINTENANCE SERVICE

A. Maintenance Tools and Instructions: Furnish a complete set of specialized tools and maintenance instructions as needed for Owner's continued adjustment, maintenance, and removal and replacement of door hardware.

PART 2 - PRODUCTS

2.1 SCHEDULED DOOR HARDWARE

A. General: Provide door hardware for each door to comply with requirements in Door Hardware Sets and each referenced section that products are to be supplied under.

B. Designations: Requirements for quantity, item, size, finish or color, grade, function, and other distinctive qualities of each type of door hardware are indicated in the Door Hardware Sets at the end of Part 3. Products are identified by using door hardware designations, as follows:

1. Named Manufacturer's Products: Product designation and manufacturer are listed for each door hardware type required for the purpose of establishing requirements. Manufacturers' names are abbreviated in the Door Hardware Schedule.

C. Substitutions: Requests for substitution and product approval for inclusive mechanical and electromechanical door hardware in compliance with the specifications must be submitted in writing and in accordance with the procedures and time frames outlined in Division 01, Substitution Procedures. Approval of requests is at the discretion of the architect, owner, and their designated consultants.

2.2 HANGING DEVICES

A. Hinges: ANSI/BHMA A156.1 certified butt hinges with number of hinge knuckles as specified in the Door Hardware Sets.

1. Quantity: Provide the following hinge quantity, unless otherwise indicated:

a. Two Hinges: For doors with heights up to 60 inches.
b. Three Hinges: For doors with heights 61 to 90 inches.
c. Four Hinges: For doors with heights 91 to 120 inches.
d. For doors with heights more than 120 inches, provide 4 hinges, plus 1 hinge for every 30 inches of door height greater than 120 inches.

2. Hinge Size: Provide the following, unless otherwise indicated, with hinge widths sized for door thickness and clearances required:

a. Widths up to 3'0": 4-1/2" standard or heavy weight as specified.
b. Sizes from 3'1" to 4'0": 5" standard or heavy weight as specified.

3. Hinge Weight and Base Material: Unless otherwise indicated, provide the following:

a. Exterior Doors: Heavy weight, non-ferrous, ball bearing or oil impregnated bearing hinges unless Hardware Sets indicate standard weight.
b. Interior Doors: Standard weight, steel, ball bearing or oil impregnated bearing hinges unless Hardware Sets indicate heavy weight.

4. Hinge Options: Comply with the following where indicated in the Hardware Sets or on Drawings:

a. Non-removable Pins: Provide set screw in hinge barrel that, when tightened into a groove in hinge pin, prevents removal of pin while door is closed; for the all out-swinging lockable doors.

5. Acceptable Manufacturers:

a. McKinney Products; ASSA ABLOY Architectural Door Accessories (MK).

B. Continuous Geared Hinges: ANSI/BHMA A156.26 Grade 1-600 certified continuous geared hinge. with minimum 0.120-inch thick extruded 6060 T6 aluminum alloy hinge leaves and a minimum overall width of 4 inches. Hinges are non-handed, reversible and fabricated to template screw locations. Factory trim hinges to suit door height and prepare for electrical cut-outs.

1. Acceptable Manufacturers:

a. McKinney Products; ASSA ABLOY Architectural Door Accessories (MK).
b. Pemko Products; ASSA ABLOY Architectural Door Accessories (PE).

2.3 POWER TRANSFER DEVICES

A. Concealed Quick Connect Electric Power Transfers: Provide concealed wiring pathway housing mortised into the door and frame for low voltage electrified door hardware. Furnish with Molex™ standardized plug connectors and sufficient number of concealed wires (up to 12) to accommodate the electrified functions specified in the Door Hardware Sets. Connectors plug directly to through-door wiring harnesses for connection to electric locking devices and power supplies. Wire nut connections are not acceptable.

1. Acceptable Manufacturers:

a. Securitron (SU) - EL-CEPT Series.

B. Electric Door Wire Harnesses: Provide electric/data transfer wiring harnesses with standardized plug connectors to accommodate up to twelve (12) wires. Connectors plug directly to through-door wiring harnesses for connection to electric locking devices and power supplies. Provide sufficient number and type of concealed wires to accommodate electric function of specified hardware. Provide a connector for through-door electronic locking devices and from hinge to junction box above the opening. Wire nut connections are not acceptable. Determine the length required for each electrified hardware component for the door type, size and construction, minimum of two per electrified opening.

1. Provide one each of the following tools as part of the base bid contract:
   a. McKinney Products; ASSA ABLOY Architectural Door Accessories (MK) - Electrical Connecting Kit: QC-R001.
   b. McKinney Products; ASSA ABLOY Architectural Door Accessories (MK) - Connector Hand Tool: QC-R003.

2. Acceptable Manufacturers:

   a. McKinney Products; ASSA ABLOY Architectural Door Accessories (MK) – QC-C Series.

2.4 CYLINDERS AND KEYING

A. General: Cylinder manufacturer to have minimum (10) years' experience designing secured master key systems and have on record a published security keying system policy.

B. Source Limitations: Obtain each type of keyed cylinder and keys from the same source manufacturer as locksets and exit devices, unless otherwise indicated.

C. Cylinders: Original manufacturer cylinders complying with the following:

1. Mortise Type: Threaded cylinders with rings and cams to suit hardware application.
2. Rim Type: Cylinders with back plate, flat-type vertical or horizontal tailpiece, and raised trim ring.
3. Bored-Lock Type: Cylinders with tailpieces to suit locks.
4. Mortise and rim cylinder collars to be solid and recessed to allow the cylinder face to be flush and be free spinning with matching finishes.
5. Keyway: Match Facility Standard.

D. Keying System: Each type of lock and cylinders to be factory keyed.

1. Conduct specified "Keying Conference" to define and document keying system instructions and requirements.
2. Furnish factory cut, nickel-silver large bow permanently inscribed with a visual key control number as directed by Owner.
3. Existing System: Key locks to Owner's existing system.

E. Key Quantity: Provide the following minimum number of keys:

1. Change Keys per Cylinder: Two (2)
2. Master Keys (per Master Key Level/Group): Five (5).

3. Construction Keys (where required): Ten (10).

F. Construction Keying: Provide construction master keyed cylinders.

G. Key Registration List (Bitting List):

1. Provide keying transcript list to Owner's representative in the proper format for importing into key control software.
2. Provide transcript list in writing or electronic file as directed by the Owner.

2.5 MECHANICAL LOCKS AND LATCHING DEVICES

A. Mortise Locksets, Grade 1 (Heavy Duty): ANSI/BHMA A156.13, Series 1000, Operational Grade 1 certified. Locksets are to be manufactured with a corrosion resistant steel case and be field-reversible for handing without disassembly of the lock body.

1. Acceptable Manufacturers:

a. Sargent Manufacturing (SA) – 8200 Series.
b. No Substitution – Facility Standard.

2.6 LOCK AND LATCH STRIKES

A. Strikes: Provide manufacturer's standard strike with strike box for each latch or lock bolt, with curved lip extended to protect frame, finished to match door hardware set, unless otherwise indicated, and as follows:

1. Flat-Lip Strikes: For locks with three-piece antifriction latchbolts, as recommended by manufacturer.
2. Extra-Long-Lip Strikes: For locks used on frames with applied wood casing trim.
3. Aluminum-Frame Strike Box: Provide manufacturer's special strike box fabricated for aluminum framing.
4. Double-lipped strikes: For locks at double acting doors. Furnish with retractable stop for rescue hardware applications.

B. Standards: Comply with the following:

1. Strikes for Mortise Locks and Latches: BHMA A156.13.
2. Strikes for Bored Locks and Latches: BHMA A156.2.
3. Strikes for Auxiliary Deadlocks: BHMA A156.36.
4. Dustproof Strikes: BHMA A156.16.

2.7 ELECTRIC STRIKES

A. Standard Electric Strikes: Heavy duty, cylindrical and mortise lock electric strikes conforming to ANSI/BHMA A156.31, Grade 1, UL listed for both Burglary Resistance and for use on fire rated door assemblies. Stainless steel construction with dual interlocking plunger design tested to exceed 3000 lbs. of static strength and 350 ft-lbs. of dynamic strength. Strikes tested for a minimum 1 million operating cycles. Provide strikes with 12 or 24 VDC capability and supplied

standard as fail-secure unless otherwise specified. Option available for latchbolt and latchbolt strike monitoring indicating both the position of the latchbolt and locked condition of the strike.

1. Acceptable Manufacturers:

    a. HES (HS).

B. Surface Mounted Rim Electric Strikes: Surface mounted rim exit device electric strikes conforming to ANSI/BHMA A156.31, Grade 1, and UL Listed for both Burglary Resistance and for use on fire rated door assemblies. Construction includes internally mounted solenoid with two heavy-duty, stainless steel locking mechanisms operating independently to provide tamper resistance. Strikes tested for a minimum of 500,000 operating cycles. Provide strikes with 12 or 24 VDC capability supplied standard as fail-secure unless otherwise specified. Option available for latchbolt and latchbolt strike monitoring indicating both the position of the latchbolt and locked condition of the strike. Strike requires no cutting to the jamb prior to installation.

1. Acceptable Manufacturers:

    a. HES (HS) - 9500/9600 Series.

2.8 CONVENTIONAL EXIT DEVICES

A. General Requirements: All exit devices specified herein shall meet or exceed the following criteria:

1. At doors not requiring a fire rating, provide devices complying with NFPA 101 and listed and labeled for "Panic Hardware" according to UL305. Provide proper fasteners as required by manufacturer including sex nuts and bolts at openings specified in the Hardware Sets.

2. Where exit devices are required on fire rated doors, provide devices complying with NFPA 80 and with UL labeling indicating "Fire Exit Hardware". Provide devices with the proper fasteners for installation as tested and listed by UL. Consult manufacturer’s catalog and template book for specific requirements.

3. Except on fire rated doors, provide exit devices with hex key dogging device to hold the pushbar and latch in a retracted position. Provide optional keyed cylinder dogging on devices where specified in Hardware Sets.

4. Devices must fit flat against the door face with no gap that permits unauthorized dogging of the push bar. The addition of filler strips is required in any case where the door light extends behind the device as in a full glass configuration.

5. Lever Operating Trim: Where exit devices require lever trim, furnish manufacturer's heavy duty escutcheon trim with threaded studs for thru-bolts.

    a. Lock Trim Design: As indicated in Hardware Sets, provide finishes and designs to match that of the specified locksets.
    b. Where function of exit device requires a cylinder, provide a cylinder (Rim or Mortise) as specified in Hardware Sets.

6. Vertical Rod Exit Devices: Where surface or concealed vertical rod exit devices are used at interior openings, provide as less bottom rod (LBR) unless otherwise indicated. Provide dust proof strikes where thermal pins are required to project into the floor.

7. Narrow Stile Applications: At doors constructed with narrow stiles, or as specified in Hardware Sets, provide devices designed for maximum 2” wide stiles.

8. Dummy Push Bar: Nonfunctioning push bar matching functional push bar.

9. Rail Sizing: Provide exit device rails factory sized for proper door width application.

10. Through Bolt Installation: For exit devices and trim as indicated in Door Hardware Sets.

B. Conventional Push Rail Exit Devices (Heavy Duty): ANSI/BHMA A156.3, Grade 1 certified panic and fire exit hardware devices furnished in the functions specified in the Hardware Sets. Exit device latch to be stainless steel, pullman type, with deadlock feature.

1. Acceptable Manufacturers:

a. Sargent Manufacturing (SA) - 80 Series.
b. No Substitution – Facility Standard.

2.9 DOOR CLOSERS

A. All door closers specified herein shall meet or exceed the following criteria:

1. General: Door closers to be from one manufacturer, matching in design and style, with the same type door preparations and templates regardless of application or spring size. Closers to be non-handed with full sized covers including installation and adjusting information on inside of cover.

2. Standards: Closers to comply with UL-10C for Positive Pressure Fire Test and be U.L. listed for use of fire rated doors.

3. Cycle Testing: Provide closers which have surpassed 15 million cycles in a test witnessed and verified by UL.

4. Size of Units: Comply with manufacturer's written recommendations for sizing of door closers depending on size of door, exposure to weather, and anticipated frequency of use. Where closers are indicated for doors required to be accessible to the physically handicapped, provide units complying with ANSI ICC/A117.1.

5. Closer Arms: Provide heavy duty, forged steel closer arms unless otherwise indicated in Hardware Sets.

6. Closers shall not be installed on exterior or corridor side of doors; where possible install closers on door for optimum aesthetics.

7. Closer Accessories: Provide door closer accessories including custom templates, special mounting brackets, spacers and drop plates as required for proper installation. Provide through-bolt and security type fasteners as specified in the hardware sets.

B. Door Closers, Surface Mounted (Large Body Cast Iron): ANSI/BHMA A156.4, Grade 1 surface mounted, heavy duty door closers with complete spring power adjustment, sizes 1 thru 6; and fully operational adjustable according to door size, frequency of use, and opening force. Closers to be rack and pinion type, one piece cast iron body construction, with adjustable backcheck and separate non-critical valves for closing sweep and latch speed control.

1. Acceptable Manufacturers:

a. Norton Door Controls (NO) – 9500 Series.
b. Sargent Manufacturing (SA) - 281 Series.

2.10 ARCHITECTURAL TRIM

A. Door Protective Trim

1. General: Door protective trim units to be of type and design as specified below or in the Hardware Sets.

2. Size: Fabricate protection plates (kick, armor, or mop) not more than 2" less than door width (LDW) on stop side of single doors and 1” LDW on stop side of pairs of doors, and not more than 1" less than door width on pull side. Coordinate and provide proper width and height as required where conflicting hardware dictates. Height to be as specified in the Hardware Sets.

3. Where plates are applied to fire rated doors with the top of the plate more than 16” above the bottom of the door, provide plates complying with NFPA 80. Consult manufacturer’s catalog and template book for specific requirements for size and applications.

4. Protection Plates: ANSI/BHMA A156.6 certified protection plates (kick, armor, or mop), fabricated from the following:

a. Stainless Steel: 300 grade, 050-inch thick.

5. Options and fasteners: Provide manufacturer's designated fastener type as specified in the Hardware Sets. Provide countersunk screw holes.

6. Acceptable Manufacturers:

a. Rockwood Products; ASSA ABLOY Architectural Door Accessories (RO).

2.11 DOOR STOPS AND HOLDERS

A. General: Door stops and holders to be of type and design as specified below or in the Hardware Sets.

B. Door Stops and Bumpers: ANSI/BHMA A156.16, Grade 1 certified door stops and wall bumpers. Provide wall bumpers, either convex or concave types with anchorage as indicated, unless floor or other types of door stops are specified in Hardware Sets. Do not mount floor stops where they will impede traffic. Where floor or wall bumpers are not appropriate, provide overhead type stops and holders.

1. Acceptable Manufacturers:

    a. Rockwood Products; ASSA ABLOY Architectural Door Accessories (RO).

C. Overhead Door Stops and Holders: ANSI/BHMA A156.6, Grade 1 certified overhead stops and holders to be surface or concealed types as indicated in Hardware Sets. Track, slide, arm and jamb bracket to be constructed of extruded bronze and shock absorber spring of heavy tempered steel. Provide non-handed design with mounting brackets as required for proper operation and function.

1. Acceptable Manufacturers:

    a. Rixson Door Controls (RF).
    b. Rockwood Products; ASSA ABLOY Architectural Door Accessories (RO).
    c. Sargent Manufacturing (SA).

2.12 ARCHITECTURAL SEALS

A. General: Thresholds, weatherstripping, and gasket seals to be of type and design as specified below or in the Hardware Sets. Provide continuous weatherstrip gasketing on exterior doors and provide smoke, light, or sound gasketing on interior doors where indicated. At exterior applications provide non-corrosive fasteners and elsewhere where indicated.

B. Smoke Labeled Gasketing: Assemblies complying with NFPA 105 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for smoke control ratings indicated, based on testing according to UL 1784.

1. Provide smoke labeled perimeter gasketing at all smoke labeled openings.

C. Fire Labeled Gasketing: Assemblies complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire ratings indicated, based on testing according to UL-10C.

1. Provide intumescent seals as indicated to meet UL10C Standard for Positive Pressure Fire Tests of Door Assemblies, and NPFA 252, Standard Methods of Fire Tests of Door Assemblies.

D. Sound-Rated Gasketing: Assemblies that are listed and labeled by a testing and inspecting agency, for sound ratings indicated.

E. Replaceable Seal Strips: Provide only those units where resilient or flexible seal strips are easily replaceable and readily available from stocks maintained by manufacturer.

F. Acceptable Manufacturers:

1. National Guard Products (NG).
2. Pemko Products; ASSA ABLOY Architectural Door Accessories (PE).
3. Reese Enterprises, Inc. (RE).

2.13 ELECTRONIC ACCESSORIES

A. Request-to-Exit Motion Sensor: Request-to-Exit Sensors motion detectors specifically designed for detecting exiting through a door from the secure area to a non-secure area. Include built-in timers (up to 60 second adjustable timing), door monitor with sounder alert, internal vertical pointability coverage, 12VDC or 24VDC power and selectable relay trigger with fail safe/fail secure modes.

1. Acceptable Manufacturers:

a. Securitron (SU) - XMS Series.

B. Door Position Switches: Door position magnetic reed contact switches specifically designed for use in commercial door applications. On recessed models the contact and magnetic housing snap-lock into a 1" diameter hole. Surface mounted models include wide gap distance design complete with armored flex cabling. Provide SPDT, N/O switches with optional Rare Earth Magnet installation on steel doors with flush top channels.

1. Acceptable Manufacturers:

a. Securitron (SU) - DPS Series.

C. Power Supplies: Provide Nationally Recognized Testing Laboratory Listed 12VDC or 24VDC (field selectable) filtered and regulated power supplies. Include battery backup option with integral battery charging capability in addition to operating the DC load in event of line voltage failure. Provide the least number of units, at the appropriate amperage level, sufficient to exceed the required total draw for the specified electrified hardware and access control equipment.

1. Acceptable Manufacturers:

a. Securitron (SU) - BPS Series.

2.14 FABRICATION

A. Fasteners: Provide door hardware manufactured to comply with published templates generally prepared for machine, wood, and sheet metal screws. Provide screws according to manufacturers recognized installation standards for application intended.

2.15 FINISHES

A. Standard: Designations used in the Hardware Sets and elsewhere indicate hardware finishes complying with ANSI/BHMA A156.18, including coordination with traditional U.S. finishes indicated by certain manufacturers for their products.

B. Provide quality of finish, including thickness of plating or coating (if any), composition, hardness, and other qualities complying with manufacturer's standards, but in no case less than specified by referenced standards for the applicable units of hardware

C. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine scheduled openings, with Installer present, for compliance with requirements for installation tolerances, labeled fire door assembly construction, wall and floor construction, and other conditions affecting performance.

B. Notify architect of any discrepancies or conflicts between the door schedule, door types, drawings and scheduled hardware. Proceed only after such discrepancies or conflicts have been resolved in writing.

3.2 PREPARATION

A. Hollow Metal Doors and Frames: Comply with ANSI/DHI A115 series.

B. Wood Doors: Comply with ANSI/DHI A115-W series.

3.3 INSTALLATION

A. Install each item of mechanical and electromechanical hardware and access control equipment to comply with manufacturer's written instructions and according to specifications.

1. Installers are to be trained and certified by the manufacturer on the proper installation and adjustment of fire, life safety, and security products including: hanging devices; locking devices; closing devices; and seals.

B. Mounting Heights: Mount door hardware units at heights indicated in following applicable publications, unless specifically indicated or required to comply with governing regulations:

1. Standard Steel Doors and Frames: DHI's "Recommended Locations for Architectural Hardware for Standard Steel Doors and Frames."
2. Wood Doors: DHI WDHS.3, "Recommended Locations for Architectural Hardware for Wood Flush Doors."
3. Where indicated to comply with accessibility requirements, comply with ANSI A117.1 "Accessibility Guidelines for Buildings and Facilities."
4. Provide blocking in drywall partitions where wall stops or other wall mounted hardware is located.

C. Retrofitting: Install door hardware to comply with manufacturer's published templates and written instructions. Where cutting and fitting are required to install door hardware onto or into surfaces that are later to be painted or finished in another way, coordinate removal, storage, and reinstallation of surface protective trim units with finishing work specified in Division 9 Sections. Do not install surface-mounted items until finishes have been completed on substrates involved.

D. Thresholds: Set thresholds for exterior and acoustical doors in full bed of sealant complying with requirements specified in Division 7 Section "Joint Sealants."

E. Storage: Provide a secure lock up for hardware delivered to the project but not yet installed. Control the handling and installation of hardware items so that the completion of the work will not be delayed by hardware losses before and after installation.

3.4 FIELD QUALITY CONTROL

A. Field Inspection: Supplier will perform a final inspection of installed door hardware and state in report whether work complies with or deviates from requirements, including whether door hardware is properly installed, operating and adjusted.

3.5 ADJUSTING

A. Initial Adjustment: Adjust and check each operating item of door hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate as intended. Adjust door control devices to compensate for final operation of heating and ventilating equipment and to comply with referenced accessibility requirements.

3.6 CLEANING AND PROTECTION

A. Protect all hardware stored on construction site in a covered and dry place. Protect exposed hardware installed on doors during the construction phase. Install any and all hardware at the latest possible time frame.

B. Clean adjacent surfaces soiled by door hardware installation.

C. Clean operating items as necessary to restore proper finish. Provide final protection and maintain conditions that ensure door hardware is without damage or deterioration at time of owner occupancy.

3.7 DEMONSTRATION

A. Instruct Owner's maintenance personnel to adjust, operate, and maintain mechanical and electromechanical door hardware.

3.8 DOOR HARDWARE SETS

A. The hardware sets represent the design intent and direction of the owner and architect. They are a guideline only and should not be considered a detailed hardware schedule. Discrepancies, conflicting hardware and missing items should be brought to the attention of the architect with corrections made prior to the bidding process. Omitted items not included in a hardware set should be scheduled with the appropriate additional hardware required for proper application and functionality.

B. Manufacturer’s Abbreviations:

1. MK - McKinney
2. PE - Pemko

3. SA - Sargent
4. HS - HES
5. RO - Rockwood
6. SU - Securitron

Hardware Sets

Set: 1.0
Doors: 100.1

1	Continuous Hinge	KCFMxx-HD1 x Dr Ht		PE
1	Rim Exit Device	AD8504 Less Pull	US32D	SA
1	Electric Strike	9600-LBM	630	HS
1	Pull	RM201 Mtg-Type 12XHD	US32D	RO
1	Door Closer (push side, stop arm)	281 PS	EN	SA
1	Closer Accessories	As Req'd for Installation	EN	SA
1	Threshold	273x292AFGPK		PE
1	Aluminum Door Sweep	By Aluminum Door Supplier		
1	Perimeter Weatherstrip/Stop	By Aluminum Door Supplier		
1	Rain Guard	346C (Dr Width + 4")		PE
1	Frame ElectroLynx Harness	QC-C1500P (hinge to ACP)		MK
1	Position Switch	DPS-M-GY		SU
1	Motion Sensor	XMS		SU
1	Power Supply	BPS-24-x (sized for opening req'mts)		SU
1	Card Reader	By Security System Supplier		

Notes:
* Coordinate supply, installation and connection of electrified and access control components.
* Verify electrical requirements and provide power to opening.
* Door is normally closed, monitored and secured to prevent access. Door position will be monitored for propped door and unauthorized use. Request to exit motion sensor shunts signal to access control system upon exiting. Presentation of authorized credential to card reader will unlock electric strike and shunt door position switch to allow access. During designated hours electric strike to be powered off by access control system to allow free access. Access control system will secure opening on designated schedule. In the event of a loss of power door will remain or become secured to prevent access. Key override is available for emergency access. Free egress is always available from inside.

Set: 2.0
Doors: 119.1

3	Hinge	TA2714 (As specified)	US26D	MK
1	Entry Lock w/ Deadbolt	8225 LNP	US26D	SA
1	Door Closer (universal arm)	281 UO	EN	SA
1	Wall Stop	409	US26D	RO
1	Threshold	1715A x Dr Width		PE
1	Gasketing	294AV (head & jambs)		PE
1	Door Bottom	420APKL x Dr Width		PE
1	Sweep	345ANB x Dr Width		PE

Set: 3.0
Doors: 100.2

1	Continuous Hinge	KCFMxx-HD1 x Dr Ht		PE
1	Exit Device (dummy rail)	8893	US32D	SA

1	Pull	RM201 Mtg-Type 12XHD	US32D	RO
1	Door Closer (universal arm)	281 UO	EN	SA
1	Closer Accessories	As Req'd for Installation	EN	SA
1	Wall Stop	409	US26D	RO
1	Perimeter Seal/Stop	By Aluminum Frame Supplier		

Set: 4.0
Doors: 121.1

3	Hinge	TA2714 (As specified)	US26D	MK
1	Storeroom Lock	8204 LNP	US26D	SA
1	Electric Strike	1006CS	630	HS
1	Door Closer (universal arm)	281 UO	EN	SA
1	Kick Plate	K1050 10” (As Specified)	US32D	RO
1	Wall Stop	409	US26D	RO
1	Perimeter Seal	S442BL (head & jambs)		PE
1	Frame ElectroLynx Harness	QC-C1500P (hinge to ACP)		MK
1	Position Switch	DPS-M-GY		SU
1	Motion Sensor	XMS		SU
1	Power Supply	BPS-24-x (sized for opening req'mts)		SU
1	Card Reader	By Security System Supplier		

Notes:
* Coordinate supply, installation and connection of electrified and access control components.
* Verify electrical requirements and provide power to opening.
* Door is normally closed, monitored and secured to prevent access. Door position will be monitored for propped door and unauthorized use. Request to exit motion sensor shunts signal to access control system upon exiting. Presentation of authorized credential to card reader will unlock electric strike and shunt door position switch to allow access. In the event of a loss of power door will remain or become secured to prevent access. Key override is available for emergency access. Free egress is always available from inside.

Set: 5.0
Doors: 118.1, 118.2

3	Hinge (stormpro)	SP3386 4-1/2" x 4-1/2"	US32D	MK
1	Multi-Point Lock (FEMA, classroom)	FM7318 LNP 188	US26D	SA
1	Door Closer	281 PH10	EN	SA
1	Wall Stop	409	US26D	RO
1	Perimeter Seal	S442BL (head & jambs)		PE

Notes:
Door hardware is part of a tested assembly.
Follow door/frame manufacturer's installation instruction for protection of opening.
Dogging function allows door lock to be used as mortise function until top and bottom bolts are projected.
Provide through-bolt attachment for door closer.

Set: 6.0
Doors: 118.3

3	Hinge (stormpro)	SP3386 4-1/2" x 4-1/2"	US32D	MK
1	Electrified Multipoint Lockset (FEMA)	RX NAC FM73285		SA
1	Door Closer (push side, stop arm)	281 PS	EN	SA
1	HD Threshold	17xxA (verify width req'd)		PE

1 Perimeter Seal	S442BL (head & jambs)		PE
1 Frame ElectroLynx Harness	QC-C1500P (hinge to ACP)		MK
1 Door ElectroLynx Harness	QC-Cxxx (As req'd hinge to lock/exit)		MK
1 Electric Power Transfer	EL-CEPT		SU
1 Position Switch	DPS-M-GY		SU
1 Power Supply	BPS-24-x (sized for opening req'mts)		SU
1 Card Reader	By Security System Supplier		

Notes:
Door hardware is part of a tested assembly.
Follow door/frame manufacturer's installation instruction for protection of opening.
Provide through-bolt attachment for door closer.
Prepare door and frame for electrified component installation.
Door is normally closed, monitored and secured. Door to be monitored for propped door and unauthorized use. Request to exit switch to be included in lock trim to shunt door position switch to allow egress without alerting access control system. Presentation of authorized credential to card reader will unlock electrified trim and shunt door position switch to allow access. In the event of a loss of power door is to become or remain locked. Key override is available by other openings to this area. Free egress is always available from inside.

Set: 7.0
Doors: L8A

1 Door, Frame & Hardware	Existing to Remain		

Set: 8.0
Doors: JK3

1 Door & Hardware	Existing to Remain		

Notes:
Existing door and hardware to be re-located and re-used in new frame location.
Verify existing hardware preparations prior to ordering new frame.

Set: 9.0
Doors: 101.1, 115.1, 120.1

3 Hinge	TA2714 (As specified)	US26D	MK
1 Storeroom Lock	8204 LNP	US26D	SA
1 Wall Stop	409	US26D	RO
1 Perimeter Seal	S442BL (head & jambs)		PE

Set: 10.0
Doors: 108.1

3 Hinge	TA2714 (As specified)	US26D	MK
1 Storeroom Lock	8204 LNP	US26D	SA
1 Surface Overhead Stop	59xS x Dr Size	EN	SA
1 Perimeter Seal	S442BL (head & jambs)		PE

Set: 11.0
Doors: 102.1, 104.1, 107.1

3	Hinge	TA2714 (As specified)	US26D	MK
1	Office Lock	8205 LNP	US26D	SA
1	Wall Stop	409	US26D	RO
1	Perimeter Seal/Stop	By Aluminum Frame Supplier		

Set: 12.0
Doors: 110.1

3	Hinge	TA2714 (As specified)	US26D	MK
1	Passage Set	8215 LNP	US26D	SA
1	Wall Stop	409	US26D	RO
1	Perimeter Seal	S442BL (head & jambs)		PE

Set: 13.0
Doors: 103.1

3	Hinge	TA2714 (As specified)	US26D	MK
1	Passage Set	8215 LNP	US26D	SA
1	Wall Stop	409	US26D	RO
1	Perimeter Seal/Stop	By Aluminum Frame Supplier		

Set: 14.0
Doors: 122.1

3	Hinge	TA2714 (As specified)	US26D	MK
1	Passage Set	8215 LNP	US26D	SA
1	Door Closer (universal arm)	281 UO	EN	SA
1	Kick Plate	K1050 10” (As Specified)	US32D	RO
1	Wall Stop	409	US26D	RO
1	Perimeter Seal/Stop	By Aluminum Frame Supplier		

Set: 15.0
Doors: 111.1

3	Hinge	TA2714 (As specified)	US26D	MK
1	Privacy Set (w/ occ. indicator)	49 8265 LNP	US26D	SA
1	Door Closer (push side, stop arm)	281 PS	EN	SA
1	Kick Plate	K1050 10” (As Specified)	US32D	RO
1	Perimeter Seal	S442BL (head & jambs)		PE

Set: 16.0
Doors: 116.1, 117.1

3	Hinge	TA2714 (As specified)	US26D	MK
1	Privacy Set (w/ occ. indicator)	49 8265 LNP	US26D	SA
1	Door Closer (push side, stop arm)	281 PS	EN	SA
1	Kick Plate	K1050 10” (As Specified)	US32D	RO
1	Perimeter Seal	S442BL (head & jambs)		PE

Mark	Hardware
JK3	8.0
L8A	7.0
100.1	1.0
100.2	3.0
101.1	9.0
102.1	11.0
103.1	13.0

Mark	Hardware
104.1	11.0
107.1	11.0
108.1	10.0
110.1	12.0
111.1	15.0
115.1	9.0
116.1	16.0

Mark	Hardware
117.1	16.0
118.1	5.0
118.2	5.0
118.3	6.0
119.1	2.0
120.1	9.0
121.1	4.0
122.1	14.0

END OF SECTION 087100

SECTION 088000 - GLAZING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes:

1. Glass for interior borrowed lites and storefront framing.
2. Glazing sealants and accessories.

1.3 DEFINITIONS

A. Glass Manufacturers: Firms that produce primary glass, fabricated glass, or both, as defined in referenced glazing publications.

B. Glass Thicknesses: Indicated by thickness designations in millimeters according to ASTM C 1036.

C. IBC: International Building Code.

D. Interspace: Space between lites of an insulating-glass unit.

1.4 COORDINATION

A. Coordinate glazing channel dimensions to provide necessary bite on glass, minimum edge and face clearances, and adequate sealant thicknesses, with reasonable tolerances.

1.5 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Glass Samples: For each type of glass product other than clear monolithic vision glass; 12 inches (300 mm) square.

1.6 QUALITY ASSURANCE

A. Manufacturer Qualifications for Insulating-Glass Units with Sputter-Coated, Low-E Coatings: A qualified insulating-glass manufacturer who is approved by coated-glass manufacturer.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Protect glazing materials according to manufacturer's written instructions. Prevent damage to glass and glazing materials from condensation, temperature changes, direct exposure to sun, or other causes.

B. Comply with insulating-glass manufacturer's written instructions for venting and sealing units to avoid hermetic seal ruptures due to altitude change.

1.8 FIELD CONDITIONS

A. Environmental Limitations: Do not proceed with glazing when ambient and substrate temperature conditions are outside limits permitted by glazing material manufacturers and when glazing channel substrates are wet from rain, frost, condensation, or other causes.

1. Do not install glazing sealants when ambient and substrate temperature conditions are outside limits permitted by sealant manufacturer or are below 40 deg F (4.4 deg C).

1.9 WARRANTY

A. Manufacturer's Special Warranty for Coated-Glass Products: Manufacturer agrees to replace coated-glass units that deteriorate within specified warranty period. Deterioration of coated glass is defined as defects developed from normal use that are not attributed to glass breakage or to maintaining and cleaning coated glass contrary to manufacturer's written instructions. Defects include peeling, cracking, and other indications of deterioration in coating.

1. Warranty Period: 10 years from date of Substantial Completion.

B. Manufacturer's Special Warranty for Insulating Glass: Manufacturer agrees to replace insulating-glass units that deteriorate within specified warranty period. Deterioration of insulating glass is defined as failure of hermetic seal under normal use that is not attributed to glass breakage or to maintaining and cleaning insulating glass contrary to manufacturer's written instructions. Evidence of failure is the obstruction of vision by dust, moisture, or film on interior surfaces of glass.

1. Warranty Period: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Source Limitations for Glass: Obtain from single source from single manufacturer for each glass type.

B. Source Limitations for Glazing Accessories: Obtain from single source from single manufacturer for each product and installation method.

2.2 PERFORMANCE REQUIREMENTS

A. General: Installed glazing systems shall withstand normal thermal movement and wind and impact loads (where applicable) without failure, including loss or glass breakage attributable to the following: defective manufacture, fabrication, or installation; failure of sealants or gaskets to remain watertight and airtight; deterioration of glazing materials; or other defects in construction.

B. Structural Performance: Glazing shall withstand the following design loads within limits and under conditions indicated determined according to the IBC and ASTM E 1300.

1. Design Wind Pressures: As indicated on Drawings.
2. Maximum Lateral Deflection: For glass supported on all four edges, limit center-of-glass deflection at design wind pressure to not more than 1/50 times the short-side length or 1 inch (25 mm), whichever is less.
3. Differential Shading: Design glass to resist thermal stresses induced by differential shading within individual glass lites.

C. Safety Glazing: Where safety glazing is indicated, provide glazing that complies with 16 CFR 1201, Category II.

D. Thermal and Optical Performance Properties: Provide glass with performance properties specified, as indicated in manufacturer's published test data, based on procedures indicated below:

1. For monolithic-glass lites, properties are based on units with lites 6 mm thick.
2. For insulating-glass units, properties are based on units of thickness indicated for overall unit and for each lite.
3. U-Factors: Center-of-glazing values, according to NFRC 100 and based on LBL's WINDOW 5.2 computer program, expressed as Btu/sq. ft. x h x deg F (W/sq. m x K).
4. Solar Heat-Gain Coefficient and Visible Transmittance: Center-of-glazing values, according to NFRC 200 and based on LBL's WINDOW 5.2 computer program.
5. Visible Reflectance: Center-of-glazing values, according to NFRC 300.

2.3 GLASS PRODUCTS, GENERAL

A. Glazing Publications: Comply with published recommendations of glass product manufacturers and organizations below unless more stringent requirements are indicated. See these publications for glazing terms not otherwise defined in this Section or in referenced standards.

1. GANA Publications: "Glazing Manual."
2. IGMA Publication for Insulating Glass: SIGMA TM-3000, "North American Glazing Guidelines for Sealed Insulating Glass Units for Commercial and Residential Use."

B. Safety Glazing Labeling: Where safety glazing is indicated, permanently mark glazing with certification label of the SGCC or another certification agency acceptable to authorities having jurisdiction or manufacturer. Label shall indicate manufacturer's name, type of glass, thickness, and safety glazing standard with which glass complies.

C. Thickness: Where glass thickness is indicated, it is a minimum. Provide glass that complies with performance requirements and is not less than the thickness indicated.

D. Strength: Where annealed float glass is indicated, provide annealed float glass, heat-strengthened float glass, or fully tempered float glass. Where heat-strengthened float glass is

indicated, provide heat-strengthened float glass or fully tempered float glass. Where fully tempered float glass is indicated, provide fully tempered float glass.

2.4 GLASS PRODUCTS

A. Clear Annealed Float Glass: ASTM C 1036, Type I, Class 1 (clear), Quality-Q3.

B. Fully Tempered Float Glass: ASTM C 1048, Kind FT (fully tempered), Condition A (uncoated) unless otherwise indicated, Type I, Class 1 (clear) or Class 2 (tinted) as indicated, Quality-Q3.

1. Fabrication Process: By horizontal (roller-hearth) process with roll-wave distortion parallel to bottom edge of glass as installed unless otherwise indicated.

C. Heat-Strengthened Float Glass: ASTM C 1048, Kind HS (heat strengthened), Type I, Condition A (uncoated) unless otherwise indicated, Type I, Class 1 (clear) or Class 2 (tinted) as indicated, Quality-Q3.

1. Fabrication Process: By horizontal (roller-hearth) process with roll-wave distortion parallel to bottom edge of glass as installed unless otherwise indicated.

D. Ceramic-Coated Spandrel Glass: ASTM C 1048, Type I, Condition B, Quality-Q3.

2.5 INSULATING GLASS

A. Insulating-Glass Units: Factory-assembled units consisting of sealed lites of glass separated by a dehydrated interspace, qualified according to ASTM E 2190.

1. Sealing System: Dual seal, with manufacturer's standard primary and secondary sealants.
2. Perimeter Spacer: Manufacturer's standard spacer material and construction.
3. Desiccant: Molecular sieve or silica gel, or a blend of both.

2.6 GLAZING TAPES

A. Back-Bedding Mastic Glazing Tapes: Preformed, butyl-based, 100 percent solids elastomeric tape; nonstaining and nonmigrating in contact with nonporous surfaces; with or without spacer rod as recommended in writing by tape and glass manufacturers for application indicated; and complying with ASTM C 1281 and AAMA 800 for products indicated below:

1. AAMA 804.3 tape, where indicated.
2. AAMA 806.3 tape, for glazing applications in which tape is subject to continuous pressure.
3. AAMA 807.3 tape, for glazing applications in which tape is not subject to continuous pressure.

2.7 MISCELLANEOUS GLAZING MATERIALS

A. General: Provide products of material, size, and shape complying with referenced glazing standard, with requirements of manufacturers of glass and other glazing materials for application indicated, and with a proven record of compatibility with surfaces contacted in installation.

B. Cleaners, Primers, and Sealers: Types recommended by sealant or gasket manufacturer.

C. Setting Blocks: Elastomeric material with a Shore, Type A durometer hardness of 85, plus or minus 5.

D. Spacers: Elastomeric blocks or continuous extrusions of hardness required by glass manufacturer to maintain glass lites in place for installation indicated.

E. Edge Blocks: Elastomeric material of hardness needed to limit glass lateral movement (side walking).

2.8 FABRICATION OF GLAZING UNITS

A. Fabricate glazing units in sizes required to fit openings indicated for Project, with edge and face clearances, edge and surface conditions, and bite complying with written instructions of product manufacturer and referenced glazing publications, to comply with system performance requirements.

1. Allow for thermal movements from ambient and surface temperature changes acting on glass framing members and glazing components.

a. Temperature Change: 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine framing, glazing channels, and stops, with Installer present, for compliance with the following:

1. Manufacturing and installation tolerances, including those for size, squareness, and offsets at corners.
2. Presence and functioning of weep systems.
3. Minimum required face and edge clearances.
4. Effective sealing between joints of glass-framing members.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Clean glazing channels and other framing members receiving glass immediately before glazing. Remove coatings not firmly bonded to substrates.

B. Examine glazing units to locate exterior and interior surfaces. Label or mark units as needed so that exterior and interior surfaces are readily identifiable. Do not use materials that leave visible marks in the completed Work.

3.3 GLAZING, GENERAL

A. Comply with combined written instructions of manufacturers of glass, sealants, gaskets, and other glazing materials, unless more stringent requirements are indicated, including those in referenced glazing publications.

B. Protect glass edges from damage during handling and installation. Remove damaged glass from Project site and legally dispose of off Project site. Damaged glass includes glass with edge damage or other imperfections that, when installed, could weaken glass, impair performance, or impair appearance.

C. Apply primers to joint surfaces where required for adhesion of sealants, as determined by preconstruction testing.

D. Install setting blocks in sill rabbets, sized and located to comply with referenced glazing publications, unless otherwise required by glass manufacturer. Set blocks in thin course of compatible sealant suitable for heel bead.

E. Do not exceed edge pressures stipulated by glass manufacturers for installing glass lites.

F. Provide spacers for glass lites where length plus width is larger than 50 inches (1270 mm).

1. Locate spacers directly opposite each other on both inside and outside faces of glass. Install correct size and spacing to preserve required face clearances, unless gaskets and glazing tapes are used that have demonstrated ability to maintain required face clearances and to comply with system performance requirements.
2. Provide 1/8-inch (3-mm) minimum bite of spacers on glass and use thickness equal to sealant width. With glazing tape, use thickness slightly less than final compressed thickness of tape.

G. Provide edge blocking where indicated or needed to prevent glass lites from moving sideways in glazing channel, as recommended in writing by glass manufacturer and according to requirements in referenced glazing publications.

H. Set glass lites in each series with uniform pattern, draw, bow, and similar characteristics.

I. Set glass lites with proper orientation so that coatings face exterior or interior as specified.

J. Where wedge-shaped gaskets are driven into one side of channel to pressurize sealant or gasket on opposite side, provide adequate anchorage so gasket cannot walk out when installation is subjected to movement.

K. Square cut wedge-shaped gaskets at corners and install gaskets in a manner recommended by gasket manufacturer to prevent corners from pulling away; seal corner joints and butt joints with sealant recommended by gasket manufacturer.

3.4 TAPE GLAZING

A. Position tapes on fixed stops so that, when compressed by glass, their exposed edges are flush with or protrude slightly above sightline of stops.

B. Install tapes continuously, but not necessarily in one continuous length. Do not stretch tapes to make them fit opening.

C. Cover vertical framing joints by applying tapes to heads and sills first, then to jambs. Cover horizontal framing joints by applying tapes to jambs, then to heads and sills.

D. Place joints in tapes at corners of opening with adjoining lengths butted together, not lapped. Seal joints in tapes with compatible sealant approved by tape manufacturer.

E. Do not remove release paper from tape until right before each glazing unit is installed.

F. Center glass lites in openings on setting blocks, and press firmly against tape by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings.

3.5 GASKET GLAZING (DRY)

A. Cut compression gaskets to lengths recommended by gasket manufacturer to fit openings exactly, with allowance for stretch during installation.

B. Insert soft compression gasket between glass and frame or fixed stop so it is securely in place with joints miter cut and bonded together at corners.

C. Installation with Drive-in Wedge Gaskets: Center glass lites in openings on setting blocks, and press firmly against soft compression gasket by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings. Compress gaskets to produce a weathertight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended by gasket manufacturer.

D. Installation with Pressure-Glazing Stops: Center glass lites in openings on setting blocks, and press firmly against soft compression gasket. Install dense compression gaskets and pressure-glazing stops, applying pressure uniformly to compression gaskets. Compress gaskets to produce a weathertight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended by gasket manufacturer.

E. Install gaskets so they protrude past face of glazing stops.

3.6 CLEANING AND PROTECTION

A. Immediately after installation remove nonpermanent labels and clean surfaces.

B. Protect glass from contact with contaminating substances resulting from construction operations. Examine glass surfaces adjacent to or below exterior concrete and other masonry surfaces at frequent intervals during construction, but not less than once a month, for buildup of dirt, scum, alkaline deposits, or stains.

1. If, despite such protection, contaminating substances do come into contact with glass, remove substances immediately as recommended in writing by glass manufacturer. Remove and replace glass that cannot be cleaned without damage to coatings.

C. Remove and replace glass that is damaged during construction period.

D. Wash glass on both exposed surfaces not more than four days before date scheduled for inspections that establish date of Substantial Completion. Wash glass as recommended in writing by glass manufacturer.

3.7 MONOLITHIC GLASS SCHEDULE

A. Glass Type MG-1 **(088000.B)**: Clear annealed or fully tempered float glass.

1. Minimum Thickness: 6 mm.
2. Provide safety glazing labeling where safety glazing is required.

3.8 INSULATING GLASS SCHEDULE

A. Glass Type IG-1 **(088000.A)**: Ceramic-coated, low-E, insulating spandrel glass.

1. Basis-of-Design Product: PPG Industries Inc., Solarban® 60.
2. Coating Color: [**As selected by Architect from manufacturer's full range**] [**Match Architect's samples**] <**Insert one manufacturer's color designation if matching is required**> <**Insert manufacturer; color designation**>.
3. Overall Unit Thickness: 1 inch (25 mm).
4. Minimum Thickness of Each Glass Lite: 6 mm.
5. Outdoor Lite: Heat-strengthened float glass.
6. Interspace Content: Air.
7. Indoor Lite: Heat-strengthened float glass.
8. Low-E Coating: Sputtered on second surface.
9. Opaque Coating Location: Fourth surface.
10. Winter Nighttime U-Factor: <**Insert value**> maximum.
11. Summer Daytime U-Factor: <**Insert value**> maximum.

END OF SECTION 088000

SECTION 092216 - NON-STRUCTURAL METAL FRAMING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Non-load-bearing steel framing systems for interior partitions.
2. Suspension systems for interior ceilings and soffits.
3. Grid suspension systems for gypsum board ceilings.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Fire-Test-Response Characteristics: For fire-resistance-rated assemblies that incorporate non-load-bearing steel framing, provide materials and construction identical to those tested in assembly indicated, according to ASTM E 119 by an independent testing agency.

B. Horizontal Deflection: For wall assemblies, limited to 1/360 of the wall height based on horizontal loading of 5 lbf/sq. ft. (239 Pa).

2.2 FRAMING SYSTEMS

A. Framing Members, General: Comply with ASTM C 754 for conditions indicated.

1. Steel Sheet Components: Comply with ASTM C 645 requirements for metal unless otherwise indicated.
2. Protective Coating: ASTM A 653/A 653M, G40 (Z120), hot-dip galvanized unless otherwise indicated.

B. Studs and Tracks: ASTM C 645. Use either steel studs and tracks or embossed steel studs and tracks.

1. Steel Studs and Tracks:

a. Minimum Base-Metal Thickness: As required by performance requirements for horizontal deflection.
b. Depth: As indicated on Drawings.

2. Embossed Steel Studs and Tracks: Roll-formed and embossed with surface deformations to stiffen the framing members so that they are structurally equivalent to conventional ASTM C 645 steel studs and tracks.

    a. Minimum Base-Metal Thickness: As required by horizontal deflection performance requirements.
    b. Depth: As indicated on Drawings.

C. Slip-Type Head Joints: Where indicated, provide[**one of**] the following:

1. Single Long-Leg Track System: ASTM C 645 top track with 2-inch- (51-mm-) deep flanges in thickness not less than indicated for studs, installed with studs friction fit into top track and with continuous bridging located within 12 inches (305 mm) of the top of studs to provide lateral bracing.
2. Deflection Track: Steel sheet top track manufactured to prevent cracking of finishes applied to interior partition framing resulting from deflection of structure above; in thickness not less than indicated for studs and in width to accommodate depth of studs.

    a. Products: Requests for product substitutions prior to bidding will be reviewed and responded to in conformance with Division 1 requirements. Subject to compliance with requirements, provide one of the following or comparable product pre-approved during bidding:

        1) Blazeframe Industries; Bare Slotted Track (BST/BST 2).
        2) ClarkDietrich Building Systems; MaxTrak Slotted Deflection Track.
        3) Steel Network, Inc. (The); VertiClip SLD.

D. Firestop Tracks: Top track manufactured to allow partition heads to expand and contract with movement of structure while maintaining continuity of fire-resistance-rated assembly indicated; in thickness not less than indicated for studs and in width to accommodate depth of studs.

1. Products: Requests for product substitutions prior to bidding will be reviewed and responded to in conformance with Division 1 requirements. Subject to compliance with requirements, provide one of the following or comparable product pre-approved during bidding:

    a. Blazeframe Industries; Intumescent Framing, Fire Stop System.
    b. ClarkDietrich Building Systems; BlazeFrame.
    c. Fire Trak Corp; Fire Trak System attached to studs with Fire Trak Posi Klip.
    d. Steel Network, Inc. (The); VertiTrack VT.

E. Flat Strap and Backing Plate: Steel sheet for blocking and bracing in length and width indicated.

1. Products: Requests for product substitutions prior to bidding will be reviewed and responded to in conformance with Division 1 requirements. Subject to compliance with requirements, provide one of the following or comparable product pre-approved during bidding:

    a. MRI Steel Framing, LLC; Flat Strap and Backing Plate.
    b. SCAFCO Steel Stud Company; SCAFCO Flat Strap, Blocking, and Backing.
    c. Steel Construction Systems; Flat Strap and Blocking.

2. Minimum Base-Metal Thickness: 0.0329 inch (0.836 mm).

F. Cold-Rolled Channel Bridging: Steel, 0.0538-inch (1.367-mm) minimum base-metal thickness, with minimum 1/2-inch- (13-mm-) wide flanges.

1. Products: Requests for product substitutions prior to bidding will be reviewed and responded to in conformance with Division 1 requirements. Subject to compliance with requirements, provide one of the following or comparable product pre-approved during bidding:

a. ClarkDietrich Building Systems; Spazzer 9200.
b. MRI Steel Framing, LLC; U-Channel Bridging.
c. SCAFCO Steel Stud Company; SCAFCO CRC Cold Rolled Channel.
d. Steel Construction Systems; Steel-Con CRC Cold Rolled Channel.

2. Depth: 1-1/2 inches (38 mm).
3. Clip Angle: Not less than 1-1/2 by 1-1/2 inches (38 by 38 mm), 0.068-inch- (1.72-mm-) thick, galvanized steel.

2.3 SUSPENSION SYSTEMS

A. Tie Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 0.062-inch- (1.59-mm-) diameter wire, or double strand of 0.048-inch- (1.21-mm-) diameter wire.

B. Hanger Attachments to Concrete:

1. Post-Installed Anchors: Fastener systems with an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC193 or AC308 as appropriate for the substrate.

a. Uses: Securing hangers to structure.
b. Material for Interior Locations: Carbon-steel components zinc-plated to comply with ASTM B 633 or ASTM F 1941 (ASTM F 1941M), Class Fe/Zn 5, unless otherwise indicated.

C. Wire Hangers: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 0.16 inch (4.12 mm) in diameter.

D. Carrying Channels (Main Runners): Cold-rolled, commercial-steel sheet with a base-metal thickness of 0.0538 inch (1.367 mm) and minimum 1/2-inch- (13-mm-) wide flanges.

1. Depth: 1-1/2 inches (38 mm).

E. Furring Channels (Furring Members):

1. Hat-Shaped, Rigid Furring Channels: ASTM C 645, 7/8 inch (22 mm) deep.

a. Minimum Base-Metal Thickness: 0.0329 inch (0.836 mm).

F. Grid Suspension System for Gypsum Board Ceilings: ASTM C 645, direct-hung system composed of main beams and cross-furring members that interlock.

1. Products: Requests for product substitutions prior to bidding will be reviewed and responded to in conformance with Division 1 requirements. Subject to compliance with requirements, provide one of the following or comparable product pre-approved during bidding:

a. Armstrong World Industries, Inc; Drywall Grid Systems.
b. Chicago Metallic Corporation; 640/660 Drywall Ceiling Suspension.
c. USG Corporation; Drywall Suspension System.

2.4 AUXILIARY MATERIALS

A. General: Provide auxiliary materials that comply with referenced installation standards.

1. Fasteners for Steel Framing: Of type, material, size, corrosion resistance, holding power, and other properties required to fasten steel members to substrates.

B. Isolation Strip at Exterior Walls: Provide the following:

1. Foam Gasket: Adhesive-backed, closed-cell vinyl foam strips that allow fastener penetration without foam displacement, 1/8 inch (3.2 mm) thick, in width to suit steel stud size.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and substrates, with Installer present, and including welded hollow-metal frames, cast-in anchors, and structural framing, for compliance with requirements and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Coordination with Sprayed Fire-Resistive Materials:

1. Before sprayed fire-resistive materials are applied, attach offset anchor plates or ceiling tracks to surfaces indicated to receive sprayed fire-resistive materials. Where offset anchor plates are required, provide continuous plates fastened to building structure not more than 24 inches (610 mm) o.c.
2. After sprayed fire-resistive materials are applied, remove them only to extent necessary for installation of non-load-bearing steel framing. Do not reduce thickness of fire-resistive materials below that are required for fire-resistance ratings indicated. Protect adjacent fire-resistive materials from damage.

3.3 INSTALLATION, GENERAL

A. Installation Standard: ASTM C 754.

1. Gypsum Board Assemblies: Also comply with requirements in ASTM C 840 that apply to framing installation.

B. Install framing and accessories plumb, square, and true to line, with connections securely fastened.

C. Install supplementary framing, and blocking to support fixtures, equipment services, heavy trim, grab bars, toilet accessories, furnishings, or similar construction.

D. Install bracing at terminations in assemblies.

3.4 INSTALLING FRAMED ASSEMBLIES

A. Install framing system components according to spacings indicated, but not greater than spacings required by referenced installation standards for assembly types.

1. Single-Layer Application: As required by horizontal deflection performance requirements unless otherwise indicated.
2. Tile Backing Panels: 16 inches (406 mm) o.c. unless otherwise indicated.

B. Where studs are installed directly against exterior masonry walls or dissimilar metals at exterior walls, install isolation strip between studs and exterior wall.

C. Install studs so flanges within framing system point in same direction.

D. Install tracks at floors and overhead supports. Extend framing full height to structural supports or substrates above suspended ceilings except where partitions are indicated to terminate at suspended ceilings. Continue framing around ducts that penetrate partitions above ceiling.

1. Slip-Type Head Joints: Where framing extends to overhead structural supports, install to produce joints at tops of framing systems that prevent axial loading of finished assemblies.
2. Door Openings: Screw vertical studs at jambs to jamb anchor clips on door frames; install track section (for cripple studs) at head and secure to jamb studs.

    a. Install two studs at each jamb unless otherwise indicated.
    b. Install cripple studs at head adjacent to each jamb stud, with a minimum 1/2-inch (13-mm) clearance from jamb stud to allow for installation of control joint in finished assembly.
    c. Extend jamb studs through suspended ceilings and attach to underside of overhead structure.

3. Other Framed Openings: Frame openings other than door openings the same as required for door openings unless otherwise indicated. Install framing below sills of openings to match framing required above door heads.
4. Fire-Resistance-Rated Partitions: Install framing to comply with fire-resistance-rated assembly indicated and support closures and to make partitions continuous from floor to underside of solid structure.

    a. Firestop Track: Where indicated, install to maintain continuity of fire-resistance-rated assembly indicated.

E. Installation Tolerance: Install each framing member so fastening surfaces vary not more than 1/8 inch (3 mm) from the plane formed by faces of adjacent framing.

3.5 INSTALLING CEILING SUSPENSION SYSTEMS

A. Install suspension system components according to spacings indicated, but not greater than spacings required by referenced installation standards for assembly types.

1. Hangers: 48 inches (1219 mm) o.c.
2. Carrying Channels (Main Runners): 48 inches (1219 mm) o.c.
3. Furring Channels (Furring Members): 24 inches (610 mm) o.c.

B. Isolate suspension systems from building structure where they abut or are penetrated by building structure to prevent transfer of loading imposed by structural movement.

C. Suspend hangers from building structure as follows:

1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structural or suspension system.

    a. Splay hangers only where required to miss obstructions and offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.

2. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with locations of hangers required to support standard suspension system members, install supplemental suspension members and hangers in the form of trapezes or equivalent devices.

    a. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced installation standards.

3. Wire Hangers: Secure by looping and wire tying, either directly to structures or to inserts, eye screws, or other devices and fasteners that are secure and appropriate for substrate, and in a manner that will not cause hangers to deteriorate or otherwise fail.
4. Do not attach hangers to steel roof deck.
5. Do not attach hangers to rolled-in hanger tabs of composite steel floor deck.
6. Do not connect or suspend steel framing from ducts, pipes, or conduit.

D. Fire-Resistance-Rated Assemblies: Wire tie furring channels to supports.

E. Grid Suspension Systems: Attach perimeter wall track or angle where grid suspension systems meet vertical surfaces. Mechanically join main beam and cross-furring members to each other and butt-cut to fit into wall track.

F. Installation Tolerances: Install suspension systems that are level to within 1/8 inch in 12 feet (3 mm in 3.6 m) measured lengthwise on each member that will receive finishes and transversely between parallel members that will receive finishes.

END OF SECTION 092216

SECTION 092900 - GYPSUM BOARD

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Interior gypsum board.
2. Tile backing panels.

B. Related Requirements:

1. Section 092216 "Non-Structural Metal Framing" for non-structural steel framing and suspension systems that support gypsum board panels.

1.3 DELIVERY, STORAGE AND HANDLING

A. Store materials inside under cover and keep them dry and protected against weather, condensation, direct sunlight, construction traffic, and other potential causes of damage. Stack panels flat and supported on risers on a flat platform to prevent sagging.

1.4 FIELD CONDITIONS

A. Environmental Limitations: Comply with ASTM C 840 requirements or gypsum board manufacturer's written instructions, whichever are more stringent.

B. Do not install paper-faced gypsum panels until installation areas are enclosed and conditioned.

C. Do not install panels that are wet, moisture damaged, and mold damaged.

1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Fire-Resistance-Rated Assemblies: For fire-resistance-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E 119 by an independent testing agency.

2.2 GYPSUM BOARD, GENERAL

A. Size: Provide maximum lengths and widths available that will minimize joints in each area and that correspond with support system indicated.

2.3 INTERIOR GYPSUM BOARD

A. Gypsum Board, Type X: ASTM C 1396/C 1396M.

1. Manufacturers: Requests for manufacturer substitutions prior to bidding will be reviewed and responded to in conformance with Division 1 requirements. Subject to compliance with requirements, provide products by one of the following manufacturers or a manufacturer pre-approved during bidding:

    a. American Gypsum.
    b. CertainTeed Corporation.
    c. Georgia-Pacific Building Products.
    d. National Gypsum Company.
    e. Temple-Inland Building Products by Georgia-Pacific.
    f. USG Corporation.

2. Thickness: 5/8 inch (15.9 mm).
3. Long Edges: Tapered.

2.4 SPECIALTY GYPSUM BOARD

A. Glass-Mat Interior Gypsum Board: ASTM C 1658/C 1658M. With fiberglass mat laminated to both sides. Specifically designed for interior use.

1. Manufacturers: Requests for manufacturer substitutions prior to bidding will be reviewed and responded to in conformance with Division 1 requirements. Subject to compliance with requirements, provide products by one of the following manufacturers or a manufacturer pre-approved during bidding:

    a. Georgia-Pacific Building Products.
    b. National Gypsum Company.
    c. Temple-Inland Building Products by Georgia-Pacific.
    d. USG Corporation.

2. Core: 5/8 inch (15.9 mm), Type X.
3. Long Edges: Tapered.
4. Mold Resistance: ASTM D 3273, score of 10 as rated according to ASTM D 3274.

2.5 TILE BACKING PANELS

A. Glass-Mat, Water-Resistant Backing Board: ASTM C 1178/C 1178M, with manufacturer's standard edges.

1. Products: Requests for product substitutions prior to bidding will be reviewed and responded to in conformance with Division 1 requirements. Subject to compliance with requirements, provide one of the following or comparable product pre-approved during bidding:

a. CertainTeed Corporation; GlasRoc Tile Backer.
b. Georgia-Pacific Building Products; DensShield Tile Backer.
c. National Gypsum Company; eXP Tile Backer.
d. Temple-Inland Building Products by Georgia-Pacific; Green Glass Tilebacker.
e. USG Corporation; USG Durock™ Glass-Mat Tile Backerboard.

2. Core: 5/8 inch (15.9 mm), Type X.
3. Mold Resistance: ASTM D 3273, score of 10 as rated according to ASTM D 3274.

2.6 TRIM ACCESSORIES

A. Interior Trim: ASTM C 1047.

1. Material: Galvanized or aluminum-coated steel sheet or rolled zinc.
2. Shapes:

a. Cornerbead.
b. LC-Bead: J-shaped; exposed long flange receives joint compound.
c. L-Bead: L-shaped; exposed long flange receives joint compound.
d. Expansion (control) joint.

2.7 JOINT TREATMENT MATERIALS

A. General: Comply with ASTM C 475/C 475M.

B. Joint Tape:

1. Interior Gypsum Board: Paper.
2. Tile Backing Panels: As recommended by panel manufacturer.

C. Joint Compound for Interior Gypsum Board: For each coat, use formulation that is compatible with other compounds applied on previous or for successive coats.

1. Prefilling: At open joints and damaged surface areas, use setting-type taping compound.
2. Embedding and First Coat: For embedding tape and first coat on joints, fasteners, and trim flanges, use drying-type, all-purpose compound.
3. Fill Coat: For second coat, use drying-type, all-purpose compound.
4. Finish Coat: For third coat, use drying-type, all-purpose compound.
5. Skim Coat: For final coat of Level 5 finish, use setting-type, sandable topping compound.

D. Joint Compound for Tile Backing Panels:

1. Glass-Mat, Water-Resistant Backing Panel: As recommended by backing panel manufacturer.

2.8 AUXILIARY MATERIALS

A. General: Provide auxiliary materials that comply with referenced installation standards and manufacturer's written instructions.

B. Laminating Adhesive: Adhesive or joint compound recommended for directly adhering gypsum panels to continuous substrate.

C. Steel Drill Screws: ASTM C 1002 unless otherwise indicated.

D. Sound-Attenuation Blankets: ASTM C 665, Type I (blankets without membrane facing) produced by combining thermosetting resins with mineral fibers manufactured from glass, slag wool, or rock wool.

1. Fire-Resistance-Rated Assemblies: Comply with mineral-fiber requirements of assembly.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and substrates including welded hollow-metal frames and support framing, with Installer present, for compliance with requirements and other conditions affecting performance of the Work.

B. Examine panels before installation. Reject panels that are wet, moisture damaged, and mold damaged.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 APPLYING AND FINISHING PANELS, GENERAL

A. Comply with ASTM C 840.

B. Install ceiling panels across framing to minimize the number of abutting end joints and to avoid abutting end joints in central area of each ceiling. Stagger abutting end joints of adjacent panels not less than one framing member.

C. Install panels with face side out. Butt panels together for a light contact at edges and ends with not more than 1/16 inch (1.5 mm) of open space between panels. Do not force into place.

D. Locate edge and end joints over supports, except in ceiling applications where intermediate supports or gypsum board back-blocking is provided behind end joints. Do not place tapered edges against cut edges or ends. Stagger vertical joints on opposite sides of partitions. Do not make joints other than control joints at corners of framed openings.

E. Form control and expansion joints with space between edges of adjoining gypsum panels.

F. Cover both faces of support framing with gypsum panels in concealed spaces (above ceilings, etc.), except in chases braced internally.

1. Unless concealed application is indicated or required for sound, fire, air, or smoke ratings, coverage may be accomplished with scraps of not less than 8 sq. ft. (0.7 sq. m) in area.
2. Fit gypsum panels around ducts, pipes, and conduits.
3. Where partitions intersect structural members projecting below underside of floor/roof slabs and decks, cut gypsum panels to fit profile formed by structural members; allow 1/4- to 3/8-inch- (6.4- to 9.5-mm-) wide joints to install sealant.

G. Isolate perimeter of gypsum board applied to non-load-bearing partitions at structural abutments. Provide 1/4- to 1/2-inch- (6.4- to 12.7-mm-) wide spaces at these locations and trim edges with edge trim where edges of panels are exposed. Seal joints between edges and abutting structural surfaces with acoustical sealant.

H. Attachment to Steel Framing: Attach panels so leading edge or end of each panel is attached to open (unsupported) edges of stud flanges first.

I. Install sound attenuation blankets before installing gypsum panels unless blankets are readily installed after panels have been installed on one side.

3.3 APPLYING INTERIOR GYPSUM BOARD

A. Install interior gypsum board in the following locations:

1. Type X: At all locations unless indicated otherwise.
2. Glass-Mat Interior Type: As indicated on Drawings, at ceilings in Shower 111, Men 116 and Women 117, at walls at Custodial 115 and at exterior window infill locations in Emergency Operations Center 118, Data 121 and Conference 122.
3. Glass-Mat Water-Resistant Backer Board: As indicated on Drawings and at walls in Men 116 and Women 117.

B. Single-Layer Application:

1. On ceilings, apply gypsum panels before wall/partition board application to greatest extent possible and at right angles to framing unless otherwise indicated.
2. On partitions/walls, apply gypsum panels vertically (parallel to framing) unless otherwise indicated or required by fire-resistance-rated assembly, and minimize end joints.

    a. Stagger abutting end joints not less than one framing member in alternate courses of panels.

3. Fastening Methods: Apply gypsum panels to supports with steel drill screws.

C. Laminating to Substrate: Where gypsum panels are indicated as directly adhered to a substrate (other than studs, joists, furring members, or base layer of gypsum board), comply with gypsum board manufacturer's written instructions and temporarily brace or fasten gypsum panels until fastening adhesive has set.

3.4 APPLYING TILE BACKING PANELS

A. Glass-Mat, Water-Resistant Backing Panels: Comply with manufacturer's written installation instructions and install at locations indicated to receive tile. Install with 1/4-inch (6.4-mm) gap where panels abut other construction or penetrations.

3.5 INSTALLING TRIM ACCESSORIES

A. General: For trim with back flanges intended for fasteners, attach to framing with same fasteners used for panels. Otherwise, attach trim according to manufacturer's written instructions.

B. Control Joints: Install control joints at locations indicated on Drawings and according to ASTM C 840 and in specific locations approved by Architect for visual effect.

C. Interior Trim: Install in the following locations:

1. Cornerbead: Use at outside corners unless otherwise indicated.
2. LC-Bead: Use at exposed panel edges.
3. L-Bead: Use where indicated.

3.6 FINISHING GYPSUM BOARD

A. General: Treat gypsum board joints, interior angles, edge trim, control joints, penetrations, fastener heads, surface defects, and elsewhere as required to prepare gypsum board surfaces for decoration. Promptly remove residual joint compound from adjacent surfaces.

B. Prefill open joints and damaged surface areas.

C. Apply joint tape over gypsum board joints, except for trim products specifically indicated as not intended to receive tape.

D. Gypsum Board Finish Levels: Finish panels to levels indicated below and according to ASTM C 840:

1. Level 1: Ceiling plenum areas, concealed areas, and where indicated.
2. Level 2: Panels that are substrate for tile.
3. Level 4: At all mechanical, electrical and storage rooms.

    a. Primer and its application to surfaces are specified in Section 099123 "Interior Painting."

4. Level 5: At all locations unless noted otherwise..

    a. Primer and its application to surfaces are specified in Section 099123 "Interior Painting."

E. Glass-Mat Faced Panels: Finish according to manufacturer's written instructions.

3.7 PROTECTION

A. Protect adjacent surfaces from drywall compound and promptly remove from floors and other non-drywall surfaces. Repair surfaces stained, marred, or otherwise damaged during drywall application.

B. Protect installed products from damage from weather, condensation, direct sunlight, construction, and other causes during remainder of the construction period.

C. Remove and replace panels that are wet, moisture damaged, and mold damaged.

1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

END OF SECTION 092900

SECTION 093013 - CERAMIC TILING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Porcelain tile.
2. Metal edge strips.

B. Related Requirements:

1. Section 079200 "Joint Sealants" for sealing of expansion, contraction, control, and isolation joints in tile surfaces.
2. Section 092900 "Gypsum Board" for glass-mat, water-resistant backer board.

1.3 DEFINITIONS

A. General: Definitions in the ANSI A108 series of tile installation standards and in ANSI A137.1 apply to Work of this Section unless otherwise specified.

B. ANSI A108 Series: ANSI A108.01, ANSI A108.02, ANSI A108.1A, ANSI A108.1B, ANSI A108.1C, ANSI A108.4, ANSI A108.5, ANSI A108.6, ANSI A108.8, ANSI A108.9, ANSI A108.10, ANSI A108.11, ANSI A108.12, ANSI A108.13, ANSI A108.14, ANSI A108.15, ANSI A108.16, and ANSI A108.17, which are contained in its "Specifications for Installation of Ceramic Tile."

C. Module Size: Actual tile size plus joint width indicated.

D. Face Size: Actual tile size, excluding spacer lugs.

1.4 ACTION SUBMITTALS

A. Samples for Verification:

1. Full-size units of each type and composition of tile and for each color and finish required.

1.5 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials that match and are from same production runs as products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Tile and Trim Units: Furnish quantity of full-size units equal to 3 percent of amount installed for each type, composition, color, pattern, and size indicated.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver and store packaged materials in original containers with seals unbroken and labels intact until time of use. Comply with requirements in ANSI A137.1 for labeling tile packages.

B. Store tile and cementitious materials on elevated platforms, under cover, and in a dry location.

C. Store aggregates where grading and other required characteristics can be maintained and contamination can be avoided.

D. Store liquid materials in unopened containers and protected from freezing.

1.7 FIELD CONDITIONS

A. Environmental Limitations: Do not install tile until construction in spaces is complete and ambient temperature and humidity conditions are maintained at the levels indicated in referenced standards and manufacturer's written instructions.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Source Limitations for Tile: Obtain tile of each type and color or finish from single source or producer.

1. Obtain tile of each type and color or finish from same production run and of consistent quality in appearance and physical properties for each contiguous area.

B. Source Limitations for Setting and Grouting Materials: Obtain ingredients of a uniform quality for each mortar, adhesive, and grout component from single manufacturer and each aggregate from single source or producer.

1. Obtain setting and grouting materials, except for unmodified Portland cement and aggregate, from single manufacturer.

C. Source Limitations for Other Products: Obtain each of the following products specified in this Section from a single manufacturer:

1. Metal edge strips.

2.2 PRODUCTS, GENERAL

A. ANSI Ceramic Tile Standard: Provide tile that complies with ANSI A137.1 for types, compositions, and other characteristics indicated.

1. Provide tile complying with Standard grade requirements.

B. ANSI Standards for Tile Installation Materials: Provide materials complying with ANSI A108.02, ANSI standards referenced in other Part 2 articles, ANSI standards referenced by TCNA installation methods specified in tile installation schedules, and other requirements specified.

C. Factory Blending: For tile exhibiting color variations within ranges, blend tile in factory and package so tile units taken from one package show same range in colors as those taken from other packages and match approved Samples.

2.3 TILE PRODUCTS

A. Ceramic Tile Type **PT-1 (093000.A)**: Glazed color body porcelain tile.

1. Basis-of-Design Product: Crossville
2. Series: Main Street
3. Composition: Porcelain Stone
4. Face Size: 18 by 18 inches.
5. Thickness: 3/8 inch (9.5 mm).
6. Dynamic Coefficient of Friction: 0.58 to 0.68.
7. Tile Color and Pattern:

    a. Color: AV214 “Gallery Grey”
    b. Pattern: Stacked Bond

8. Grout Color: TEC #927 “Light Pewter”
9. Location: Where indicated in schedule and as follows:

    a. Floors at Break 109, Shower 111, Men 116, Women 117
    b. Walls at Men 116, Women 117

B. Ceramic Tile Type **PT-1CB (093000.B):** Glazed color body porcelain tile.

1. Basis-of-Design Product: Crossville
2. Series: Main Street
3. Composition: Porcelain Stone
4. Face Size: 6 by 12 inches (Cove Base).
5. Thickness: 3/8 inch (9.5 mm).
6. Dynamic Coefficient of Friction: 0.58 to 0.68.
7. Tile Color:

    a. Color: AV214 “Gallery Grey”

8. Grout Color: TEC #927 “Light Pewter”
9. Location: Where indicated in schedule and as follows:

    a. Wall base at Shower 111, Men 116, Women 117.

C. Ceramic Tile Type **PT-1BB (093000.B2):** Glazed color body porcelain tile.

1. Basis-of-Design Product: Crossville
2. Series: Main Street
3. Composition: Porcelain Stone
4. Face Size: 4 by 12 inches (Bullnose).
5. Thickness: 3/8 inch (9.5 mm).
6. Dynamic Coefficient of Friction: 0.58 to 0.68.

7. Tile Color:

   a. Color: AV214 “Gallery Grey”

8. Grout Color: TEC #927 “Light Pewter”
9. Location: Where indicated in schedule and as follows:

   a. Wall base at Break 109.

2.4 SETTING MATERIALS

A. Modified Dry-Set Mortar (Thinset): ANSI A118.4.

1. Manufacturers: Requests for manufacturer substitutions prior to bidding will be reviewed and responded to in conformance with Division 1 requirements. Subject to compliance with requirements, provide products by one of the following manufacturers or a manufacturer pre-approved during bidding:

   a. ARDEX Americas.
   b. Bostik, Inc.
   c. H.B. Fuller Construction Products Inc. / TEC.
   d. LATICRETE SUPERCAP, LLC.
   e. MAPEI Corporation.
   f. Merkrete by Parex USA, Inc.
   g. Summitville Tiles, Inc.

2. Provide prepackaged, dry-mortar mix combined with acrylic resin or styrene-butadiene-rubber liquid-latex additive at Project site.
3. For wall applications, provide mortar that complies with requirements for nonsagging mortar in addition to the other requirements in ANSI A118.4.

2.5 GROUT MATERIALS

A. High-Performance Tile Grout: ANSI A118.7.

1. Basis-of-Design Product: Requests for manufacturer substitutions prior to bidding will be reviewed and responded to in conformance with Division 1 requirements. Subject to compliance with requirements, provide **H.B. Fuller Construction Products Inc. TEC Power Grout TA 550** or comparable product pre-approved during bidding or by a manufacturer listed below:

   a. ARDEX Americas.
   b. Bostik, Inc.
   c. LATICRETE SUPERCAP, LLC.
   d. MAPEI Corporation.
   e. Summitville Tiles, Inc.

2.6 MISCELLANEOUS MATERIALS

A. Metal Edge Strips: Angle or L-shaped, height to match tile and setting-bed thickness, metallic or combination of metal and PVC or neoprene base, designed specifically for flooring applications; stainless-steel, ASTM A 666, 300 Series exposed-edge material.

1. Manufacturers: Requests for manufacturer substitutions prior to bidding will be reviewed and responded to in conformance with Division 1 requirements. Subject to compliance with requirements, provide products by one of the following manufacturers or a manufacturer pre-approved during bidding:

    a. Blanke Corporation.
    b. Ceramic Tool Company, Inc.
    c. Schluter Systems L.P.

B. Tile Cleaner: A neutral cleaner capable of removing soil and residue without harming tile and grout surfaces, specifically approved for materials and installations indicated by tile and grout manufacturers.

C. Floor Sealer: Manufacturer's standard product for sealing grout joints and that does not change color or appearance of grout.

1. Products: Requests for product substitutions prior to bidding will be reviewed and responded to in conformance with Division 1 requirements. Subject to compliance with requirements, provide one of the following or comparable product pre-approved during bidding:

    a. Custom Building Products; Surfaceguard Sealer.
    b. Summitville Tiles, Inc; SL-15, Invisible Seal.

2.7 MIXING MORTARS AND GROUT

A. Mix mortars and grouts to comply with referenced standards and mortar and grout manufacturers' written instructions.

B. Add materials, water, and additives in accurate proportions.

C. Obtain and use type of mixing equipment, mixer speeds, mixing containers, mixing time, and other procedures to produce mortars and grouts of uniform quality with optimum performance characteristics for installations indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions where tile will be installed, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

1. Verify that substrates for setting tile are firm; dry; clean; free of coatings that are incompatible with tile-setting materials, including curing compounds and other substances that contain soap, wax, oil, or silicone; and comply with flatness tolerances required by ANSI A108.01 for installations indicated.
2. Verify that concrete substrates for tile floors installed with thinset mortar comply with surface finish requirements in ANSI A108.01 for installations indicated.

    a. Verify that surfaces that received a steel trowel finish have been mechanically scarified.

b. Verify that protrusions, bumps, and ridges have been removed by sanding or grinding.

3. Verify that installation of grounds, anchors, recessed frames, electrical and mechanical units of work, and similar items located in or behind tile has been completed.
4. Verify that joints and cracks in tile substrates are coordinated with tile joint locations; if not coordinated, adjust joint locations in consultation with Architect.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Fill cracks, holes, and depressions in concrete substrates for tile floors installed with thinset mortar with trowelable leveling and patching compound specifically recommended by tile-setting material manufacturer.

B. Where indicated, prepare substrates to receive waterproofing by applying a reinforced mortar bed that complies with ANSI A108.1A and is sloped 1/4 inch per foot (1:50) toward drains.

C. Blending: For tile exhibiting color variations, verify that tile has been factory blended and packaged so tile units taken from one package show same range of colors as those taken from other packages and match approved Samples. If not factory blended, either return to manufacturer or blend tiles at Project site before installing.

3.3 CERAMIC TILE INSTALLATION

A. Comply with TCNA's "Handbook for Ceramic, Glass, and Stone Tile Installation" for TCNA installation methods specified in tile installation schedules. Comply with parts of the ANSI A108 series "Specifications for Installation of Ceramic Tile" that are referenced in TCNA installation methods, specified in tile installation schedules, and apply to types of setting and grouting materials used.

1. For the following installations, follow procedures in the ANSI A108 series of tile installation standards for providing 95 percent mortar coverage:

a. Tile floors in wet areas.
b. Tile floors consisting of tiles 8 by 8 inches (200 by 200 mm) or larger.

B. Extend tile work into recesses and under or behind equipment and fixtures to form complete covering without interruptions unless otherwise indicated. Terminate work neatly at obstructions, edges, and corners without disrupting pattern or joint alignments.

C. Accurately form intersections and returns. Perform cutting and drilling of tile without marring visible surfaces. Carefully grind cut edges of tile abutting trim, finish, or built-in items for straight aligned joints. Fit tile closely to electrical outlets, piping, fixtures, and other penetrations so plates, collars, or covers overlap tile.

D. Provide manufacturer's standard trim shapes where necessary to eliminate exposed tile edges.

E. Jointing Pattern: Lay tile in grid pattern unless otherwise indicated. Lay out tile work and center tile fields in both directions in each space or on each wall area. Lay out tile work to minimize the use of pieces that are less than half of a tile. Provide uniform joint widths unless otherwise indicated.

1. Where adjoining tiles on floor, base, walls, or trim are specified or indicated to be same size, align joints.
2. Where tiles are specified or indicated to be whole integer multiples of adjoining tiles on floor, base, walls, or trim, align joints unless otherwise indicated.

F. Joint Widths: Unless otherwise indicated, install tile with the following joint widths:

1. Porcelain Tile: 1/4 inch (6.4 mm).

G. Metal Edge Strips: Install where exposed edge of tile flooring meets carpet, wood, or other flooring that finishes flush with top of tile.

H. Floor Sealer: Apply floor sealer to grout joints in tile floors according to floor-sealer manufacturer's written instructions. As soon as floor sealer has penetrated grout joints, remove excess sealer and sealer from tile faces by wiping with soft cloth.

1. Floor sealer not required if Basis-of-Design grout is utilized.

3.4 ADJUSTING AND CLEANING

A. Remove and replace tile that is damaged or that does not match adjoining tile. Provide new matching units, installed as specified and in a manner to eliminate evidence of replacement.

B. Cleaning: On completion of placement and grouting, clean all ceramic tile surfaces so they are free of foreign matter.

1. Remove grout residue from tile as soon as possible.
2. Clean grout smears and haze from tile according to tile and grout manufacturer's written instructions but no sooner than 10 days after installation. Use only cleaners recommended by tile and grout manufacturers and only after determining that cleaners are safe to use by testing on samples of tile and other surfaces to be cleaned. Protect metal surfaces and plumbing fixtures from effects of cleaning. Flush surfaces with clean water before and after cleaning.

3.5 PROTECTION

A. Protect installed tile work with kraft paper or other heavy covering during construction period to prevent staining, damage, and wear. If recommended by tile manufacturer, apply coat of neutral protective cleaner to completed tile walls and floors.

B. Prohibit foot and wheel traffic from tiled floors for at least seven days after grouting is completed.

C. Before final inspection, remove protective coverings and rinse neutral protective cleaner from tile surfaces.

3.6 INTERIOR CERAMIC TILE INSTALLATION SCHEDULE

A. Interior Floor Installations, Concrete Subfloor:

1. Ceramic Tile Installation: TCNA F113; thinset mortar.

a. Ceramic Tile Type: PT-1.
b. Thinset Mortar: Modified dry-setmortar.
c. Grout: High-performance unsanded grout.

B. Interior Wall Installations, Wood or Metal Studs or Furring:

1. Ceramic Tile Installation: TCNA W245 or TCNA W248; thinset mortar on glass-mat, water-resistant gypsum backer board.

a. Ceramic Tile Type: PT-1, PT-1BB, PT-1CB.
b. Thinset Mortar: Modified dry-set mortar.
c. Grout: High-performance unsanded grout.

END OF SECTION 093013

SECTION 095113 - ACOUSTICAL PANEL CEILINGS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes acoustical panels and exposed suspension systems for interior ceilings.

1.3 ACTION SUBMITTALS

A. Samples for Verification: For each component indicated and for each exposed finish required, prepared on Samples of sizes indicated below:

1. Acoustical Panels: Set of 6-inch- (150-mm-) square Samples of each type, color, pattern, and texture.

1.4 CLOSEOUT SUBMITTALS

A. Maintenance Data: For finishes to include in maintenance manuals.

1.5 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Acoustical Ceiling Units: Full-size panels equal to 2 percent of quantity installed.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver acoustical panels, suspension-system components, and accessories to Project site and store them in a fully enclosed, conditioned space where they will be protected against damage from moisture, humidity, temperature extremes, direct sunlight, surface contamination, and other causes.

B. Before installing acoustical panels, permit them to reach room temperature and a stabilized moisture content.

1.7 FIELD CONDITIONS

A. Environmental Limitations: Do not install acoustical panel ceilings until spaces are enclosed and weathertight, wet-work in spaces is complete and dry, work above ceilings is complete, and

ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.

1. Pressurized Plenums: Operate ventilation system for not less than 48 hours before beginning acoustical panel ceiling installation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Source Limitations: Obtain each type of acoustical ceiling panel and its supporting suspension system from single source from single manufacturer.

2.2 PERFORMANCE REQUIREMENTS

A. Surface-Burning Characteristics: Comply with ASTM E 84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

1. Flame-Spread Index: Class A according to ASTM E 1264.
2. Smoke-Developed Index: 50 or less.

2.3 ACOUSTICAL PANELS **(095113.A)**

A. Basis-of-Design Product: Requests for manufacturer substitutions prior to bidding will be reviewed and responded to in conformance with Division 1 requirements. Subject to compliance with requirements, provide **Rockfon (Roxul Inc.)** products indicated or comparable product pre-approved during bidding or by a manufacturer listed below:

1. Armstrong World Industries, Inc.
2. CertainTeed Corporation.
3. USG Corporation.

B. Acoustical Panel Standard: Provide manufacturer's standard panels according to ASTM E 1264 and designated by type, form, pattern, acoustical rating, and light reflectance unless otherwise indicated.

C. Basis-of-Design Acoustical Panels (APC-1):

1. Rockfon (Roxul Inc.) Artic®

a. Classification: Type and Form: Type XX, Form 2.
b. Pattern: G (smooth).
c. Color: White.
d. Light Reflectance (LR): Not less than 0.85.
e. Ceiling Attenuation Class (CAC): Not less than 23
f. Noise Reduction Coefficient (NRC): Not less than 0.75.
g. Edge/Joint Detail: Reveal sized to fit flange of exposed suspension-system members.
h. Thickness: 5/8 inch.
i. Modular Size: 24 by 24 inches.

2. Location: All locations unless noted otherwise.

2.4 METAL SUSPENSION SYSTEM

A. Manufacturers: Requests for manufacturer substitutions prior to bidding will be reviewed and responded to in conformance with Division 1 requirements. Subject to compliance with requirements, provide products by one of the following manufacturers or a manufacturer pre-approved during bidding:

1. Armstrong World Industries, Inc.
2. CertainTeed Corporation.
3. Chicago Metallic Corporation.
4. United States Gypsum Company.

B. Metal Suspension-System Standard: Provide manufacturer's standard, direct-hung, metal suspension system and accessories according to ASTM C 635/C 635M and designated by type, structural classification, and finish indicated.

C. Wide-Face, Capped, Double-Web, Steel Suspension System: Main and cross runners roll formed from cold-rolled steel sheet; prepainted, electrolytically zinc coated, or hot-dip galvanized, G30 (Z90) coating designation; with prefinished 15/16-inch- (24-mm-) wide metal caps on flanges.

1. Structural Classification: Intermediate-duty system.
2. End Condition of Cross Runners: Override (stepped) or butt-edge type.
3. Face Design: Flat, flush.
4. Cap Material: Cold-rolled steel or aluminum.
5. Cap Finish: Painted white.

2.5 ACCESSORIES

A. Attachment Devices: Size for five times the design load indicated in ASTM C 635/C 635M, Table 1, "Direct Hung," unless otherwise indicated. Comply with seismic design requirements.

1. Anchors in Concrete: Anchors of type and material indicated below, with holes or loops for attaching hangers of type indicated and with capability to sustain, without failure, a load equal to five times that imposed by ceiling construction, as determined by testing according to ASTM E 488/E 488M or ASTM E 1512 as applicable, conducted by a qualified testing and inspecting agency.

a. Type: Postinstalled expansion anchors.
b. Corrosion Protection: Carbon-steel components zinc plated according to ASTM B 633, Class SC 1 (mild) service condition.

B. Wire Hangers, Braces, and Ties: Provide wires as follows:

1. Zinc-Coated, Carbon-Steel Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper.
2. Size: Wire diameter sufficient for its stress at three times hanger design load (ASTM C 635/C 635M, Table 1, "Direct Hung") will be less than yield stress of wire, but not less than 0.135-inch- (3.5-mm-) diameter wire.

2.6 METAL EDGE MOLDINGS AND TRIM

A. Manufacturers: Requests for manufacturer substitutions prior to bidding will be reviewed and responded to in conformance with Division 1 requirements. Subject to compliance with requirements, provide products by one of the following manufacturers or a manufacturer pre-approved during bidding:

1. Armstrong World Industries, Inc.
2. CertainTeed Corporation.
3. Chicago Metallic Corporation.
4. United States Gypsum Company.

B. Roll-Formed, Sheet-Metal Edge Moldings and Trim: Type and profile indicated or, if not indicated, manufacturer's standard moldings for edges and penetrations that comply with seismic design requirements; formed from sheet metal of same material, finish, and color as that used for exposed flanges of suspension-system runners.

1. Edge moldings shall fit acoustical panel edge details and suspension systems indicated and match width and configuration of exposed runners unless otherwise indicated.
2. For lay-in panels with reveal edge details, provide stepped edge molding that forms reveal of same depth and width as that formed between edge of panel and flange at exposed suspension member.
3. For circular penetrations of ceiling, provide edge moldings fabricated to diameter required to fit penetration exactly.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, including structural framing to which acoustical panel ceilings attach or abut, with Installer present, for compliance with requirements specified in this and other Sections that affect ceiling installation and anchorage and with requirements for installation tolerances and other conditions affecting performance of acoustical panel ceilings.

B. Examine acoustical panels before installation. Reject acoustical panels that are wet, moisture damaged, or mold damaged.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Measure each ceiling area and establish layout of acoustical panels to balance border widths at opposite edges of each ceiling. Avoid using less-than-half-width panels at borders unless otherwise indicated, and comply with layout shown on reflected ceiling plans.

B. Layout openings for penetrations centered on the penetrating items.

3.3 INSTALLATION

A. Install acoustical panel ceilings according to ASTM C 636/C 636M and manufacturer's written instructions.

B. Suspend ceiling hangers from building's structural members and as follows:

1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structure or of ceiling suspension system.
2. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with location of hangers at spacings required to support standard suspension-system members, install supplemental suspension members and hangers in form of trapezes or equivalent devices.
3. Secure wire hangers to ceiling-suspension members and to supports above with a minimum of three tight turns. Connect hangers directly to structure or to inserts, eye screws, or other devices that are secure and appropriate for substrate and that will not deteriorate or otherwise fail due to age, corrosion, or elevated temperatures.
4. Do not support ceilings directly from permanent metal forms or floor deck. Fasten hangers to cast-in-place hanger inserts, postinstalled mechanical or adhesive anchors, or power-actuated fasteners that extend through forms into concrete.
5. When steel framing does not permit installation of hanger wires at spacing required, install carrying channels or other supplemental support for attachment of hanger wires.
6. Do not attach hangers to steel deck tabs.
7. Do not attach hangers to steel roof deck. Attach hangers to structural members. Repair any disturbed applied fireproofing material.
8. Space hangers not more than 48 inches (1200 mm) o.c. along each member supported directly from hangers unless otherwise indicated; provide hangers not more than 8 inches (200 mm) from ends of each member.
9. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced standards.

C. Secure bracing wires to ceiling suspension members and to supports with a minimum of four tight turns. Suspend bracing from building's structural members as required for hangers, without attaching to permanent metal forms, steel deck, or steel deck tabs. Fasten bracing wires into concrete with cast-in-place or postinstalled anchors.

D. Install edge moldings and trim of type indicated at perimeter of acoustical ceiling area and where necessary to conceal edges of acoustical panels.

1. Apply acoustical sealant in a continuous ribbon concealed on back of vertical legs of moldings before they are installed.
2. Screw attach moldings to substrate at intervals not more than 16 inches (400 mm) o.c. and not more than 3 inches (75 mm) from ends. Miter corners accurately and connect securely.
3. Do not use exposed fasteners, including pop rivets, on moldings and trim.

E. Install suspension-system runners so they are square and securely interlocked with one another. Remove and replace dented, bent, or kinked members.

F. Install acoustical panels with undamaged edges and fit accurately into suspension-system runners and edge moldings. Scribe and cut panels at borders and penetrations to provide precise fit.

1. For reveal-edged panels on suspension-system runners, install panels with bottom of reveal in firm contact with top surface of runner flanges.

2. Paint cut edges of panel remaining exposed after installation; match color of exposed panel surfaces using coating recommended in writing for this purpose by acoustical panel manufacturer.

3.4 ERECTION TOLERANCES

A. Suspended Ceilings: Install main and cross runners level to a tolerance of 1/8 inch in 12 feet (3 mm in 3.6 m), non-cumulative.

B. Moldings and Trim: Install moldings and trim to substrate and level with ceiling suspension system to a tolerance of 1/8 inch in 12 feet (3 mm in 3.6 m), non-cumulative.

3.5 CLEANING

A. Clean exposed surfaces of acoustical panel ceilings, including trim, edge moldings, and suspension-system members. Comply with manufacturer's written instructions for cleaning and touchup of minor finish damage.

B. Remove and replace ceiling components that cannot be successfully cleaned and repaired to permanently eliminate evidence of damage.

END OF SECTION 095113

SECTION 096513 - RESILIENT BASE AND ACCESSORIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Thermoplastic-rubber base.
2. Rubber molding accessories.

1.3 ACTION SUBMITTALS

A. Samples for Verification: For each type of product indicated and for each color, texture, and pattern required in manufacturer's standard-size Samples, but not less than 12 inches (300 mm) long.

1.4 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Furnish one box of wall base.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Store resilient products and installation materials in dry spaces protected from the weather, with ambient temperatures maintained within range recommended by manufacturer, but not less than 50 deg F (10 deg C) or more than 90 deg F (32 deg C).

1.6 FIELD CONDITIONS

A. Maintain ambient temperatures within range recommended by manufacturer, but not less than 70 deg F (21 deg C) or more than 95 deg F (35 deg C), in spaces to receive resilient products during the following periods:

1. 48 hours before installation.
2. During installation.
3. 48 hours after installation.

B. After installation and until Substantial Completion, maintain ambient temperatures within range recommended by manufacturer, but not less than 55 deg F (13 deg C) or more than 95 deg F (35 deg C).

C. Install resilient products after other finishing operations, including painting, have been completed.

PART 2 - PRODUCTS

2.1 THERMOPLASTIC-RUBBER BASE **(096513.A)**

A. Basis-of-Design Product: Requests for manufacturer substitutions prior to bidding will be reviewed and responded to in conformance with Division 1 requirements. Subject to compliance with requirements, provide **Johnsonite; a Tarkett Company; Traditional** or comparable product pre-approved during bidding or by a manufacturer listed:

1. Armstrong World Industries, Inc.
2. Burke Mercer Flooring Products; a division of Burke Industries Inc.
3. Roppe Corporation, USA.
4. VPI Corporation.

B. Product Standard: ASTM F 1861, Type TP (rubber, thermoplastic).

1. Group: I (solid, homogeneous).
2. Style and Location:

a. Style B, Cove: .

C. Thickness: 0.125 inch (3.2 mm).

D. Height: 4 inches (102 mm).

E. Lengths: Coils in manufacturer's standard length.

F. Outside Corners: Job formed.

G. Inside Corners: Job formed.

H. Colors: Match Johnsonite #TA4 “Gateway”.

2.2 RUBBER MOLDING ACCESSORY

A. Manufacturers: Requests for manufacturer substitutions prior to bidding will be reviewed and responded to in conformance with Division 1 requirements. Subject to compliance with requirements, provide products by one of the following manufacturers or a manufacturer pre-approved during bidding:

1. Roppe Corporation, USA.
2. VPI Corporation.

B. Description: Rubber transition strips.

C. Profile and Dimensions: As required for material transition to dissimilar materials..

D. Locations: Carpet to VCT.

E. Colors and Patterns: As selected by Architect from full range of industry colors.

2.3 INSTALLATION MATERIALS

A. Trowelable Leveling and Patching Compounds: Latex-modified, portland-cement-based or blended hydraulic-cement-based formulation provided or approved by resilient-product manufacturer for applications indicated.

B. Adhesives: Water-resistant type recommended by resilient-product manufacturer for resilient products and substrate conditions indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, with Installer present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.

1. Verify that finishes of substrates comply with tolerances and other requirements specified in other Sections and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with adhesion of resilient products.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

1. Installation of resilient products indicates acceptance of surfaces and conditions.

3.2 PREPARATION

A. Prepare substrates according to manufacturer's written instructions to ensure adhesion of resilient products.

B. Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound; remove bumps and ridges to produce a uniform and smooth substrate.

C. Do not install resilient products until materials are the same temperature as space where they are to be installed.

1. At least 48 hours in advance of installation, move resilient products and installation materials into spaces where they will be installed.

D. Immediately before installation, sweep and vacuum clean substrates to be covered by resilient products.

3.3 RESILIENT BASE INSTALLATION

A. Comply with manufacturer's written instructions for installing resilient base.

B. Apply resilient base to walls, columns, pilasters, casework and cabinets in toe spaces, and other permanent fixtures in rooms and areas where base is required.

C. Install resilient base in lengths as long as practical without gaps at seams and with tops of adjacent pieces aligned.

D. Tightly adhere resilient base to substrate throughout length of each piece, with base in continuous contact with horizontal and vertical substrates.

E. Do not stretch resilient base during installation.

F. On masonry surfaces or other similar irregular substrates, fill voids along top edge of resilient base with manufacturer's recommended adhesive filler material.

G. Job-Formed Corners:

1. Outside Corners: Use straight pieces of maximum lengths possible and form with returns not less than 3 inches (76 mm) in length.

    a. Form without producing discoloration (whitening) at bends.

2. Inside Corners: Use straight pieces of maximum lengths possible and form with returns not less than 3 inches (76 mm) in length.

    a. Miter or cope corners to minimize open joints.

3.4 RESILIENT ACCESSORY INSTALLATION

A. Comply with manufacturer's written instructions for installing resilient accessories.

B. Resilient Molding Accessories: Butt to adjacent materials and tightly adhere to substrates throughout length of each piece. Install reducer strips at edges of floor covering that would otherwise be exposed.

3.5 CLEANING AND PROTECTION

A. Comply with manufacturer's written instructions for cleaning and protecting resilient products.

B. Perform the following operations immediately after completing resilient-product installation:

1. Remove adhesive and other blemishes from surfaces.

C. Protect resilient products from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period.

D. Cover resilient products subject to wear and foot traffic until Substantial Completion.

END OF SECTION 096513

SECTION 096519 - RESILIENT TILE FLOORING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Vinyl composition floor tile.

1.3 ACTION SUBMITTALS

A. Samples for Verification: Full-size units of each color and pattern of floor tile required.

1.4 CLOSEOUT SUBMITTALS

A. Maintenance Data: For each type of floor tile to include in maintenance manuals.

1.5 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Floor Tile: Furnish one box for every 50 boxes or fraction thereof, of each type, color, and pattern of floor tile installed.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: An entity that employs installers and supervisors who are competent in techniques required by manufacturer for floor tile installation and seaming method indicated.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Store floor tile and installation materials in dry spaces protected from the weather, with ambient temperatures maintained within range recommended by manufacturer, but not less than 50 deg F (10 deg C) or more than 90 deg F (32 deg C). Store floor tiles on flat surfaces.

1.8 FIELD CONDITIONS

A. Maintain ambient temperatures within range recommended by manufacturer, but not less than 70 deg F (21 deg C) or more than 95 deg F (35 deg C), in spaces to receive floor tile during the following periods:

1. 48 hours before installation.
2. During installation.
3. 48 hours after installation.

B. After installation and until Substantial Completion, maintain ambient temperatures within range recommended by manufacturer, but not less than 55 deg F (13 deg C) or more than 95 deg F (35 deg C).

C. Close spaces to traffic during floor tile installation.

D. Close spaces to traffic for 48 hours after floor tile installation.

E. Install floor tile after other finishing operations, including painting, have been completed.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Fire-Test-Response Characteristics: For resilient floor tile, as determined by testing identical products according to ASTM E 648 or NFPA 253 by a qualified testing agency.

1. Critical Radiant Flux Classification: Class I, not less than 0.45 W/sq. cm.

2.2 VINYL COMPOSITION FLOOR TILE **(096519.A – VCT-1)**

A. Basis-of-Design Product: Requests for manufacturer substitutions prior to bidding will be reviewed and responded to in conformance with Division 1 requirements. Subject to compliance with requirements, provide **Mannington Essentials®** or comparable product pre-approved during bidding:

a. Armstrong.
b. Johnsonite.

B. Tile Standard: ASTM F 1066, Class 2, through pattern.

C. Wearing Surface: Smooth.

D. Thickness: 0.125 inch (3.2 mm).

E. Size: 12 by 12 inches (305 by 305 mm).

F. Colors and Patterns: “Stone Gray”, #102.

2.3 INSTALLATION MATERIALS

A. Trowelable Leveling and Patching Compounds: Latex-modified, portland-cement-based or blended hydraulic-cement-based formulation provided or approved by floor tile manufacturer for applications indicated.

B. Adhesives: Water-resistant type recommended by floor tile and adhesive manufacturers to suit floor tile and substrate conditions indicated.

C. Floor Polish: Provide protective, liquid floor-polish products recommended by floor tile manufacturer.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, with Installer present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.

1. Verify that finishes of substrates comply with tolerances and other requirements specified in other Sections and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with adhesion of floor tile.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Prepare substrates according to floor tile manufacturer's written instructions to ensure adhesion of resilient products. Contractor to take into account that some locations of the installation will occur over substrates where existing flooring is scheduled to be removed.

B. Concrete Substrates: Prepare according to ASTM F 710.

1. Verify that substrates are dry and free of curing compounds, sealers, and hardeners.
2. Remove substrate coatings and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, using mechanical methods recommended by floor tile manufacturer. Do not use solvents.
3. Alkalinity and Adhesion Testing: Perform tests recommended by floor tile manufacturer. Proceed with installation only after substrate alkalinity falls within range on pH scale recommended by manufacturer in writing, but not less than 5 or more than 10 pH.

C. Access Flooring Panels: Remove protective film of oil or other coating using method recommended by access flooring manufacturer.

D. Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound; remove bumps and ridges to produce a uniform and smooth substrate.

E. Do not install floor tiles until materials are the same temperature as space where they are to be installed.

1. At least 48 hours in advance of installation, move resilient floor tile and installation materials into spaces where they will be installed.

F. Immediately before installation, sweep and vacuum clean substrates to be covered by resilient floor tile.

3.3 FLOOR TILE INSTALLATION

A. Comply with manufacturer's written instructions for installing floor tile.

B. Lay out floor tiles from center marks established with principal walls, discounting minor offsets, so tiles at opposite edges of room are of equal width. Adjust as necessary to avoid using cut widths that equal less than one-half tile at perimeter.

1. Lay tiles square with room axis.

C. Match floor tiles for color and pattern by selecting tiles from cartons in the same sequence as manufactured and packaged, if so numbered. Discard broken, cracked, chipped, or deformed tiles.

1. Lay tiles with grain direction alternating in adjacent tiles (basket-weave pattern).

D. Scribe, cut, and fit floor tiles to butt neatly and tightly to vertical surfaces and permanent fixtures including built-in furniture, cabinets, pipes, outlets, and door frames.

E. Extend floor tiles into toe spaces, door reveals, closets, and similar openings. Extend floor tiles to center of door openings.

F. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on floor tiles as marked on substrates. Use chalk or other nonpermanent marking device.

G. Install floor tiles on covers for telephone and electrical ducts, building expansion-joint covers, and similar items in installation areas. Maintain overall continuity of color and pattern between pieces of tile installed on covers and adjoining tiles. Tightly adhere tile edges to substrates that abut covers and to cover perimeters.

H. Adhere floor tiles to substrates using a full spread of adhesive applied to substrate to produce a completed installation without open cracks, voids, raising and puckering at joints, telegraphing of adhesive spreader marks, and other surface imperfections.

3.4 CLEANING AND PROTECTION

A. Comply with manufacturer's written instructions for cleaning and protecting floor tile.

B. Perform the following operations immediately after completing floor tile installation:

1. Remove adhesive and other blemishes from surfaces.
2. Sweep and vacuum surfaces thoroughly.
3. Damp-mop surfaces to remove marks and soil.

C. Protect floor tile from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period.

D. Floor Polish: Remove soil, adhesive, and blemishes from floor tile surfaces before applying liquid floor polish.

1. Apply three coat(s).

E. Cover floor tile until Substantial Completion.

END OF SECTION 096519

SECTION 096813 - TILE CARPETING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes modular carpet tile.

B. Related Requirements:

1. Section 024119 "Selective Demolition" for removing existing floor coverings.
2. Section 096513 "Resilient Base and Accessories" for resilient wall base and accessories installed with carpet tile.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include manufacturer's written data on physical characteristics, durability, and fade resistance.
2. Include manufacturer's written installation recommendations for each type of substrate.

B. Samples for Verification: For each of the following products and for each color and texture required. Label each Sample with manufacturer's name, material description, color, pattern, and designation indicated on Drawings and in schedules.

1. Carpet Tile: Full-size Sample.
2. Exposed Edge, Transition, and Other Accessory Stripping: 12-inch- (300-mm-) long Samples.

1.4 CLOSEOUT SUBMITTALS

A. Maintenance Data: For carpet tiles to include in maintenance manuals. Include the following:

1. Methods for maintaining carpet tile, including cleaning and stain-removal products and procedures and manufacturer's recommended maintenance schedule.
2. Precautions for cleaning materials and methods that could be detrimental to carpet tile.

1.5 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Carpet Tile: Full-size units equal to 5 percent of amount installed for each type indicated, but not less than 10 sq. yd. (8.3 sq. m).

1.6 DELIVERY, STORAGE, AND HANDLING

A. Comply with CRI's "CRI Carpet Installation Standard."

1.7 FIELD CONDITIONS

A. Comply with CRI's "CRI Carpet Installation Standard" for temperature, humidity, and ventilation limitations.

B. Environmental Limitations: Do not deliver or install carpet tiles until spaces are enclosed and weathertight, wet-work in spaces is complete and dry, and ambient temperature and humidity conditions are maintained at levels planned for building occupants during the remainder of the construction period.

C. Do not install carpet tiles over concrete slabs until slabs have cured and are sufficiently dry to bond with adhesive and concrete slabs have pH range recommended by carpet tile manufacturer.

D. Where demountable partitions or other items are indicated for installation on top of carpet tiles, install carpet tiles before installing these items.

1.8 WARRANTY

A. Special Warranty for Carpet Tiles: Manufacturer agrees to repair or replace components of carpet tile installation that fail in materials or workmanship within specified warranty period.

1. Warranty does not include deterioration or failure of carpet tile due to unusual traffic, failure of substrate, vandalism, or abuse.
2. Failures include, but are not limited to, the following:

a. More than 10 percent edge raveling, snags, and runs.
b. Dimensional instability.
c. Excess static discharge.
d. Loss of tuft-bind strength.
e. Loss of face fiber.
f. Delamination.

3. Warranty Period: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 CARPET TILE **(096813.A – CPT-1)**

A. Basis-of-Design Product: Requests for manufacturer substitutions prior to bidding will be reviewed and responded to in conformance with Division 1 requirements. Subject to compliance with requirements, provide product indicated or comparable product by manufacturer pre-approved during bidding:

1. Manufacturer: J&J Invision
2. Style: Flying Trapeze
3. Color: Ring Master #385

B. Size: 24 by 24 inches.

C. Installation: Ashlar

2.2 CARPET TILE **(096813.B – CPT-2)**

A. Basis-of-Design Product: Requests for manufacturer substitutions prior to bidding will be reviewed and responded to in conformance with Division 1 requirements. Subject to compliance with requirements, provide product indicated or comparable product by manufacturer pre-approved during bidding:

1. Manufacturer: Lees
2. Collection: Tuff Stuff II
3. Style Name: First Step II Tile
4. Style Number: QL315
5. Color: 859 Walnut

B. Size: 24 by 24 inch planks.

C. Installation Method: Monolithic.

2.3 CARPET TILE **(096813.C – CPT-3)**

A. Basis-of-Design Product: Requests for manufacturer substitutions prior to bidding will be reviewed and responded to in conformance with Division 1 requirements. Subject to compliance with requirements, provide product indicated or comparable product by manufacturer pre-approved during bidding:

1. Manufacturer: Julie Industries
2. Collection: StaticSmart PosiTile
3. Style Name: Presidential Series with PosiTile buttons
4. Color: Adams

B. Size: 24 by 24 inches.

C. Installation Method: Quarter Turn

2.4 INSTALLATION ACCESSORIES

A. Trowelable Leveling and Patching Compounds: Latex-modified, hydraulic-cement-based formulation provided or recommended by carpet tile manufacturer.

B. Adhesives: Water-resistant, mildew-resistant, nonstaining, pressure-sensitive type to suit products and subfloor conditions indicated, that comply with flammability requirements for installed carpet tile, and are recommended by carpet tile manufacturer for releasable installation.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for maximum moisture content, alkalinity range, installation tolerances, and other conditions affecting carpet tile performance.

B. Examine carpet tile for type, color, pattern, and potential defects.

C. Concrete Slabs: Verify that finishes comply with requirements specified in Section 033000 "Cast-in-Place Concrete" and that surfaces are free of cracks, ridges, depressions, scale, and foreign deposits.

1. Moisture Testing: Perform tests so that each test area does not exceed 1000 sq. ft. (304.8 sq. m), and perform no fewer than three tests in each installation area and with test areas evenly spaced in installation areas.

    a. Anhydrous Calcium Chloride Test: ASTM F 1869. Proceed with installation only after substrates have maximum moisture-vapor-emission rate of 3 lb of water/1000 sq. ft. (1.36 kg of water/92.9 sq. m) in 24 hours.
    b. Relative Humidity Test: Using in situ probes, ASTM F 2170. Proceed with installation only after substrates have a maximum 75 percent relative humidity level measurement.
    c. Perform additional moisture tests recommended in writing by adhesive and carpet tile manufacturers. Proceed with installation only after substrates pass testing.

D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. General: Comply with CRI's "Carpet Installation Standards" and with carpet tile manufacturer's written installation instructions for preparing substrates indicated to receive carpet tile.

B. Use trowelable leveling and patching compounds, according to manufacturer's written instructions, to fill cracks, holes, depressions, and protrusions in substrates. Fill or level cracks, holes and depressions 1/8 inch (3 mm) wide or wider, and protrusions more than 1/32 inch (0.8 mm) unless more stringent requirements are required by manufacturer's written instructions.

C. Concrete Substrates: Remove coatings, including curing compounds, and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, without using solvents. Use mechanical methods recommended in writing by adhesive and carpet tile manufacturers.

D. Broom and vacuum clean substrates to be covered immediately before installing carpet tile.

3.3 INSTALLATION

A. General: Comply with CRI's "CRI Carpet Installation Standard," Section 18, "Modular Carpet" and with carpet tile manufacturer's written installation instructions.

B. Installation Method: Glue free installation with manufacturer’s standard adhesive tile tabs.

C. Maintain dye-lot integrity. Do not mix dye lots in same area.

D. Cut and fit carpet tile to butt tightly to vertical surfaces, permanent fixtures, and built-in furniture including cabinets, pipes, outlets, edgings, thresholds, and nosings. Bind or seal cut edges as recommended by carpet tile manufacturer.

E. Extend carpet tile into toe spaces, door reveals, closets, open-bottomed obstructions, removable flanges, alcoves, and similar openings.

F. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on carpet tile as marked on subfloor. Use nonpermanent, nonstaining marking device.

G. Install pattern parallel to walls and borders.

H. Access Flooring: Stagger joints of carpet tiles so carpet tile grid is offset from access flooring panel grid. Do not fill seams of access flooring panels with carpet adhesive; keep seams free of adhesive.

3.4 CLEANING AND PROTECTION

A. Perform the following operations immediately after installing carpet tile:

1. Remove excess adhesive and other surface blemishes using cleaner recommended by carpet tile manufacturer.
2. Remove yarns that protrude from carpet tile surface.
3. Vacuum carpet tile using commercial machine with face-beater element.

B. Protect installed carpet tile to comply with CRI's "Carpet Installation Standard," Section 20, "Protecting Indoor Installations."

C. Protect carpet tile against damage from construction operations and placement of equipment and fixtures during the remainder of construction period. Use protection methods indicated or recommended in writing by carpet tile manufacturer.

END OF SECTION 096813

SECTION 096900 - ACCESS FLOORING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Cementitious-core steel panel access flooring.

1.3 COORDINATION

A. Coordinate location of electrical work in underfloor cavity to prevent interference with access flooring.

B. Mark pedestal locations on subfloor to enable electrical work to proceed without interfering with access-flooring pedestals installed after electrical work.

1.4 ACTION SUBMITTALS

A. Shop Drawings: For access flooring:

1. Include layout of access flooring and relationship to adjoining Work based on field-verified dimensions.
2. Details and sections with descriptive notes indicating materials, finishes, fasteners, typical and special edge conditions, accessories, and understructures.

B. Samples for Verification: For the following products:

1. Floor Coverings: Full-size units.

1.5 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Panels: 12.
2. Pedestals: 6.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer.

1.7 FIELD CONDITIONS

A. Environmental Limitations: Do not install access flooring until spaces are enclosed, ambient temperature is between 50 and 90 deg F (10 and 32 deg C), and relative humidity is not less than 20 and not more than 70 percent.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Structural Performance: Provide access flooring capable of complying with the following performance requirements according to testing procedures in CISCA's "Recommended Test Procedures for Access Floors":

1. Concentrated Loads: 1000 lbf (4448 N) with the following deflection and permanent set:

   a. Top-Surface Deflection: 0.10 inch (2.54 mm).
   b. Permanent Set: 0.010 inch (0.25 mm).

2. Ultimate Loads: 2000 lbf (8896 N).
3. Rolling Loads: With local or overall deformation not to exceed 0.040 inch (1.02 mm).

   a. CISCA Wheel 1: 10 passes at 800 lbf (3559 N).
   b. CISCA Wheel 2: 10,000 passes at 600 lbf (2669 N).

4. Stringer Load Test: 450 lbf (2002 N) at center of span with a permanent set not to exceed 0.010 inch (0.254 mm).
5. Pedestal Axial Load Test: 6000 lbf (26 690 N).
6. Pedestal-Overturning-Moment Test: 1000 lbf x inches (113 N x meters).
7. Drop Impact Load Test: 150 lb (68.0 kg).

B. Fire Performance:

1. Surface-Burning Characteristics: Comply with ASTM E 84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

   a. Flame-Spread Index: 25 or less.
   b. Smoke-Developed Index: 450 or less.

2.2 CEMENTITIOUS-CORE STEEL PANEL ACCESS FLOORING (**096900.A**)

A. General:
1. Fabricate panels from cold-rolled steel sheet, with die-cut flat top sheet and die-formed and stiffened bottom pan welded together. Protect metal surfaces against corrosion using manufacturer's standard factory-applied finish. Fully grout internal spaces of completed units with manufacturer's standard cementitious fill.

a. Basis-of-Design Product: Requests for manufacturer substitutions prior to bidding will be reviewed and responded to in conformance with Division 1 requirements. Subject to compliance with requirements, provide **Tate Access Floors, Inc., ConCore 1000** or comparable product pre-approved during bidding or by a manufacturer listed below:

1) ASM Modular Systems, Inc.
2) Haworth, Inc.

b. Configuration: Provide modular panels with nominal size of 24 by 24 inches (610 by 610 mm), interchangeable with other field panels without disturbing adjacent panels or understructure.

B. Pedestal System Understructure: System consisting of base, column with provisions for height adjustment, and head (cap); made of steel.

1. Attachment to Understructure: Bolted.
2. Base: Square or circular base with not less than 16 sq. in. (103 sq. cm) of bearing area.
3. Column: Of height required to bring finished floor to elevations indicated. Weld column to base plate.
4. Provide vibration-proof leveling mechanism for making and holding fine adjustments in height over a range of not less than 2 inches (51 mm) and for locking at a selected height, so deliberate action is required to change height setting and prevent vibratory displacement.
5. Head: Designed to support the floor panel indicated.

a. Bolted Assemblies: Provide head with four holes aligned with holes in floor panels for bolting of panels to pedestals.

6. Floor Finish: Tile carpeting system. Fabricate panels with alignment pins to accept field-installed carpet tile with receptors designed to engage pins.
7. Location: Emergency Operations Center 118, Conference 122.

C. Stringer System Understructure: Modular steel stringer systems designed to bolt to pedestal heads and form a grid pattern. Protect steel components with manufacturer's standard galvanized or corrosion-resistant paint finish.

1. Attachment to Understructure: Gravity.
2. Continuous Gaskets: At contact surfaces between panel and stringers to deaden sound, seal off the underfloor cavity from above, and maintain panel alignment and position.
3. Floor Finish: Provide factory-applied floor finish fabricated in one piece to cover entire panel face; with integral trim edging.

a. High-Pressure Plastic Laminate: NEMA LD 3, High-Wear type, Grade HDM.

1) Manufacturers: Requests for manufacturer substitutions prior to bidding will be reviewed and responded to in conformance with Division 1 requirements. Subject to compliance with requirements, provide products by one of the following manufacturers or a manufacturer pre-approved during bidding:

a) Formica Corporation.
b) Nevamar; a Panolam Industries International, Inc. brand.

2) Electrical Resistance: Average no less than 1 megohm and no more than 20,000 megohms when installed floor coverings are surface-to-ground tested according to NFPA 99.
3) Colors, Textures, and Patterns: Formica #503-58 “Stone Grafix” OR Nevamar #MR6001T “Gray Matrix”

4. Location: Electrical 120, Data 121.

2.3 FABRICATION

A. Fabrication Tolerances:

1. Size: Plus or minus 0.020 inch (0.50 mm) of required size.
2. Squareness: Plus or minus 0.015 inch (0.38 mm) between diagonal measurements across top of panel.
3. Flatness: Plus or minus 0.035 inch (0.89 mm), measured on a diagonal on top of panel.

B. Panel Markings: Clearly and permanently mark floor panels on their underside with panel type and concentrated-load rating.

C. Bolted Panels: Provide panels with holes drilled in corners to align precisely with threaded holes in pedestal heads and to accept countersunk screws with heads flush with top of panel.

1. Captive Fasteners: Provide fasteners held captive to panels.

D. Cutouts: Fabricate cutouts in floor panels for cable penetrations and service outlets. Provide reinforcement or additional support, if needed, to make panels with cutouts comply with structural performance requirements.

1. Number, Size, Shape, and Location: As indicated.

2.4 ACCESSORIES

A. Post-Installed Anchors: For anchoring pedestal bases to subfloor, provide two post-installed threaded concrete screws made from carbon-steel components, zinc plated to comply with ASTM B 633, Class Fe/Zn 5 (5 microns) for Class SC 1 (Mild), with the capability to sustain, without failure, a load equal to 1.5 times the loads imposed by pedestal-overturning moment on fasteners, as determined by testing according to ASTM E 488/E 488, conducted by a qualified independent testing agency.

B. Panel Lifting Device: Panel manufacturer's standard portable lifting device for each type of panel required.

C. Perimeter Support: Where indicated, provide manufacturer's standard method for supporting panel edge and forming transition between access flooring and adjoining floor coverings at same level as access flooring.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, with Installer and manufacturer's authorized representative present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

1. Verify that substrates comply with tolerances and other requirements specified in other Sections and that substrates are free of conditions and deleterious substances that might interfere with attachment of pedestals.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Lay out floor panel installation to keep the number of cut panels at floor perimeter to a minimum. Avoid using panels cut to less than 6 inches (152 mm).

B. Locate each pedestal, complete any necessary subfloor preparation, and vacuum subfloor to remove dust, dirt, and construction debris before beginning installation.

3.3 INSTALLATION

A. Install access flooring and accessories under supervision of access-flooring manufacturer's authorized representative to produce a rigid, firm installation that complies with performance requirements and is free of instability, rocking, rattles, and squeaks.

B. Mechanical Attachment of Pedestals: Attach pedestals to subfloor with post-installed mechanical anchors.

C. Adjust pedestals so installed panels are flat, level, and at the proper height.

D. Stringer Systems: Secure stringers to pedestal heads according to access-flooring manufacturer's written instructions.

E. Install flooring panels securely in place, leaving them properly seated with panel edges flush. Do not force panels into place.

F. Scribe perimeter panels to provide a close fit, with adjoining construction having no voids greater than 1/8 inch (3 mm) where panels abut vertical surfaces.

G. Cut and trim access flooring and perform other dirt-or-debris-producing activities at a remote location or as required to prevent contamination of subfloor under installed access flooring.

H. Grounded Access Flooring: Ground access flooring as recommended by manufacturer and as needed to comply with performance requirements for electrical resistance of floor coverings.

1. Panel-to-Understructure Resistance: Not more than 10 ohms as measured without floor coverings.

I. Clean dust, dirt, and construction debris caused by floor installation, and vacuum subfloor area as installation of floor panels proceeds.

J. Install access flooring without change in elevation between adjacent panels and within the following tolerances:

1. Plus or minus 1/16 inch (1.5 mm) in any 10-foot (3-m) distance.
2. Plus or minus 1/8 inch (3 mm) from a level plane over entire access flooring area.

3.4 PROTECTION

A. Replace access-flooring panels that are stained, scratched, or otherwise damaged or that do not comply with specified requirements.

END OF SECTION 096900

SECTION 099123 - PAINTING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes surface preparation and the application of paint systems on the following interior substrates:

1. Steel and iron.
2. Galvanized metal.
3. Wood.
4. Gypsum board.
5. Cotton or canvas insulation covering.
6. ASJ insulation covering.

1.3 DEFINITIONS

A. MPI Gloss Level 1: Not more than five units at 60 degrees and 10 units at 85 degrees, according to ASTM D 523.

B. MPI Gloss Level 2: Not more than 10 units at 60 degrees and 10 to 35 units at 85 degrees, according to ASTM D 523.

C. MPI Gloss Level 3: 10 to 25 units at 60 degrees and 10 to 35 units at 85 degrees, according to ASTM D 523.

D. MPI Gloss Level 4: 20 to 35 units at 60 degrees and not less than 35 units at 85 degrees, according to ASTM D 523.

1.4 ACTION SUBMITTALS

A. Samples for Verification: For each type of paint system and in each color and gloss of topcoat.

1. Submit Samples on rigid backing, 8 inches (200 mm) square.
2. Apply coats on Samples in steps to show each coat required for system.
3. Label each coat of each Sample.
4. Label each Sample for location and application area.

B. Product List: Cross-reference to paint system and locations of application areas. Use same designations indicated on Drawings and in schedules. Include color designations.

1.5 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Paint: 5 percent, but not less than 1 gal. (3.8 L) of each material and color applied.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 deg F (7 deg C).

1. Maintain containers in clean condition, free of foreign materials and residue.
2. Remove rags and waste from storage areas daily.

1.7 FIELD CONDITIONS

A. Apply paints only when temperature of surfaces to be painted and ambient air temperatures are between 50 and 95 deg F (10 and 35 deg C).

B. Do not apply paints when relative humidity exceeds 85 percent; at temperatures less than 5 deg F (3 deg C) above the dew point; or to damp or wet surfaces.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Requests for manufacturer substitutions prior to bidding will be reviewed and responded to in conformance with Division 1 requirements. Subject to compliance with requirements, provide products by one of the following manufacturers or a manufacturer pre-approved during bidding:

1. Benjamin Moore & Co.
2. Diamond Vogel Paints.
3. ICI Paints.
4. Kwal Paint.
5. PPG Architectural Finishes, Inc.
6. Pratt & Lambert.
7. Sherwin-Williams Company (The). (SW)

2.2 PAINT, GENERAL

A. Material Compatibility:

1. Materials for use within each paint system shall be compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
2. For each coat in a paint system, products shall be recommended in writing by topcoat manufacturers for use in paint system and on substrate indicated.

B. VOC Content: For field applications that are inside the weatherproofing system, paints and coatings shall comply with VOC content limits of authorities having jurisdiction and the following VOC content limits:

1. Flat Paints and Coatings: 50 g/L.
2. Nonflat Paints and Coatings: 150 g/L.
3. Primers, Sealers, and Undercoaters: 200 g/L.
4. Anticorrosive and Antirust Paints Applied to Ferrous Metals: 250 g/L.
5. Zinc-Rich Industrial Maintenance Primers: 340 g/L.
6. Pretreatment Wash Primers: 420 g/L.

C. Colors: As identified below and in Room Finish Schedule.

1. PNT-1: Benjamin Moore AC-26 “Ozark Shadows”

   a. General Location: Interior walls, HM doors.

2. PNT-2: Custom Color to match Kawneer Fluropon® “Charcoal”

   a. General Location: HM Frames

3. PNT-3: Sherwin Williams SW 7757 “High Reflective White”

   a. General Location: GWB ceilings.

4. PNT-4: TBD

   a. General Location: Exterior mechanical louvers

5. PNT-5: TBD

   a. General Location: Exterior CMU at mechanical intake louver

6. PNT-6: TBD

   a. General Location: Galvanized plates at exterior mechanical louvers.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.

B. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:

1. Wood: 15 percent.
2. Gypsum Board: 12 percent.

C. Gypsum Board Substrates: Verify that finishing compound is sanded smooth.

D. Verify suitability of substrates, including surface conditions and compatibility, with existing finishes and primers.

E. Proceed with coating application only after unsatisfactory conditions have been corrected.

1. Application of coating indicates acceptance of surfaces and conditions.

3.2 PREPARATION

A. Comply with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual" applicable to substrates and paint systems indicated.

B. Remove hardware, covers, plates, and similar items already in place that are removable and are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.

1. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection if any.

C. Clean substrates of substances that could impair bond of paints, including dust, dirt, oil, grease, and incompatible paints and encapsulants.

1. Remove incompatible primers and reprime substrate with compatible primers or apply tie coat as required to produce paint systems indicated.

D. Steel Substrates: Remove rust, loose mill scale, and shop primer, if any. Clean using methods recommended in writing by paint manufacturer.

E. Galvanized-Metal Substrates: Remove grease and oil residue from galvanized sheet metal by mechanical methods to produce clean, lightly etched surfaces that promote adhesion of subsequently applied paints.

F. Wood Substrates:

1. Scrape and clean knots, and apply coat of knot sealer before applying primer.
2. Sand surfaces that will be exposed to view, and dust off.
3. Prime edges, ends, faces, undersides, and backsides of wood.
4. After priming, fill holes and imperfections in the finish surfaces with putty or plastic wood filler. Sand smooth when dried.

G. Cotton or Canvas Insulation Covering Substrates: Remove dust, dirt, and other foreign material that might impair bond of paints to substrates.

3.3 APPLICATION

A. Apply paints according to manufacturer's written instructions and to recommendations in "MPI Manual."

1. Use applicators and techniques suited for paint and substrate indicated.
2. Paint surfaces behind movable equipment and furniture same as similar exposed surfaces. Before final installation, paint surfaces behind permanently fixed equipment or furniture with prime coat only.

3. Paint front and backsides of access panels, removable or hinged covers, and similar hinged items to match exposed surfaces.
4. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.
5. Primers specified in painting schedules may be omitted on items that are factory primed or factory finished if acceptable to topcoat manufacturers.

B. Tint each undercoat a lighter shade to facilitate identification of each coat if multiple coats of same material are to be applied. Tint undercoats to match color of topcoat, but provide sufficient difference in shade of undercoats to distinguish each separate coat.

C. If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, color, and appearance.

D. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.

E. Painting Fire Suppression, Plumbing, HVAC, Electrical, Communication, and Electronic Safety and Security Work:

1. Paint the following work where exposed in equipment rooms:

a. Equipment, including panelboards and switch gear.
b. Uninsulated metal piping.
c. Uninsulated plastic piping.
d. Pipe hangers and supports.
e. Metal conduit.
f. Plastic conduit.
g. Tanks that do not have factory-applied final finishes.
h. Duct, equipment, and pipe insulation having cotton or canvas insulation covering or other paintable jacket material.

2. Paint the following work where exposed in occupied spaces:

a. Equipment, including panelboards.
b. Uninsulated metal piping.
c. Uninsulated plastic piping.
d. Pipe hangers and supports.
e. Metal conduit.
f. Plastic conduit.
g. Duct, equipment, and pipe insulation having cotton or canvas insulation covering or other paintable jacket material.
h. Other items as directed by Architect.

3. Paint portions of internal surfaces of metal ducts, without liner, behind air inlets and outlets that are visible from occupied spaces.

3.4 FIELD QUALITY CONTROL

A. Dry Film Thickness Testing: Owner may engage the services of a qualified testing and inspecting agency to inspect and test paint for dry film thickness.

1. Contractor shall touch up and restore painted surfaces damaged by testing.

2. If test results show that dry film thickness of applied paint does not comply with paint manufacturer's written recommendations, Contractor shall pay for testing and apply additional coats as needed to provide dry film thickness that complies with paint manufacturer's written recommendations.

3.5 CLEANING AND PROTECTION

A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.

B. After completing paint application, clean spattered surfaces. Remove spattered paints by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.

C. Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.

D. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

3.6 INTERIOR PAINTING SCHEDULE

A. Steel Substrates, Acrylic Enamel (Semi-gloss):

1. Prime Coat:

   a. Basis-of-Design: Sherwin-Williams Company, SW-Pro-Industrial Pro-Cryl Universal Waterbased Metal Primer, 3.0 mils DFT.

2. Intermediate Coat:

   a. Basis-of-Design: Sherwin-Williams Company, SW-Pro Industrial 0 VOC B66 Series, 1.4 mils DFT

3. Topcoat:

   a. Basis-of-Design: Sherwin-Williams Company, SW-Pro Industrial 0 VOC B66 Series, 1.4 mils DFT.

B. Galvanized-Metal Substrates, Acrylic System (Semi-gloss):

1. Prime Coat:

   a. Sherwin-Williams Company, SW-Pro-Industrial Pro-Cryl Universal Waterbased metal primer, 3.0 mils DFT.

2. Intermediate Coat:

   a. Sherwin-Williams Company, SW-Pro Industrial 0 VOC B66 Series, 1.4 mils DFT.

3. Topcoat:

   a. Sherwin-Williams Company, SW-Pro Industrial 0 VOC B66 Series, 1.4 mils DFT

C. Gypsum Board Substrates, Latex Enamel (Ceilings-Flat, Walls-Eggshell):

1. Prime Coat:

a. Basis-of-Design: Sherwin-Williams Company, SW-ProMar 200 Zero VOC B28 Series Latex Wall Primer, 1.4 mils DFT.

2. Intermediate Coat:

a. Basis-of-Design: Sherwin-Williams Company, SW-ProMar 200 Zero VOC Latex Enamel, 1.6 mils DFT

3. Topcoat:

a. Basis-of-Design: Sherwin-Williams Company, SW-ProMar 200 Zero VOC Latex Enamel, 1.6 mils DFT.

D. Gypsum Board substrates at Wet Areas and Shower Areas (Semi-Gloss):

1. Prime Coat: Manufacturers recommended primer when required.
2. Intermediate Coat:

a. Basis-of-Design: Sherwin-Williams Company, SW-Macropoxy 646-100 Fast Cure polyamide epoxy, B58 Series, 6.0 mils DFT.

3. Topcoat:

a. Basis-of-Design: Sherwin-Williams Company, SW-Macropoxy 646-100 Fast Cure polyamide epoxy, B58 Series, 6.0 mils DFT

E. Wood Painted Finish (Semi-gloss):

1. First Coat:

a. Sherwin-Williams Company, SW-Premium Wall and Wood Primer B28W8111, 2.0 mils DFT.

2. Second Coat:

a. Basis-of-Design: Sherwin-Williams Company, SW-Pro Industrial 0 VOC B66 Series Acrylic Enamel, 1.4 mils DFT

3. Third Coat:

a. Basis-of-Design: Sherwin-Williams Company, SW-Pro Industrial 0 VOC B66 Series Acrylic Enamel, 1.4 mils DFT

F. Cotton or Canvas Insulation-Covering Substrates Including Pipe and Duct Coverings: Latex Enamel (Flat):

1. Prime Coat:

a. Sherwin-Williams Company, SW-ProMar 200 Zero VOC Primer B28 Series primer/sealer: 1.4 mils DFT.

2. Intermediate Coat:

   a. Basis-of-Design: Sherwin-Williams Company, SW-ProMar 200 Zero VOC Latex Enamel, 1.6 mils DFT

3. Topcoat:

   a. Basis-of-Design: Sherwin-Williams Company, SW-ProMar 200 Zero VOC Latex Enamel, 1.6 mils DFT.

3.7 EXTERIOR PAINTING SCHEDULE

A. CMU Substrates:

1. Latex System:

   a. Prime Coat:

      1) Basis-of-Design: Sherwin-Williams Company, Loxon® Masonry Primer (A24W).

   b. Intermediate Coat:

      1) Basis-of-Design: Sherwin-Williams Company, SuperPaint® (A89W1151)

   c. Topcoat:

      1) Basis-of-Design; Sherwin-Williams Company, SuperPaint® (A89W1151)

B. Galvanized-Metal Substrates:

1. Alkyd System:

   a. Prime Coat:

      1) Basis-of-Design: Sherwin Williams Company, Galvite HS® Galvanized Metal Primer B50WZ30.

   b. Intermediate Coat:

      1) Basis-of-Design: Sherwin Williams Company, Exterior alkyd enamel matching topcoat.

   c. Topcoat:

      1) Basis-of-Design: Sherwin Williams Company, Industrial Urethane Alkyd Enamel B54-150 Series B55W00151

END OF SECTION 099123

SECTION 099600 - HIGH-PERFORMANCE COATINGS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes surface preparation and the application of high-performance coating systems on the following substrates:

1. Interior Substrates:

a. Concrete masonry units (CMUs).
b. Gypsum board.

B. Related Requirements:

1. Section 099123 "Painting" for general field painting.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product. Include preparation requirements and application instructions.

1.4 QUALITY ASSURANCE

A. Manufacturer Qualifications: Provide all products from a single manufacturer specializing in manufacture of high-performance epoxy coatings with a minimum of 10 years' experience.

B. Applicator Qualifications: A firm documented experienced applying paints and coatings similar in material, design, and extent to those indicated for this project, whose work has resulted in applications with a record of successful in-service performance.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 deg F (7 deg C).

1. Maintain containers in clean condition, free of foreign materials and residue.
2. Remove rags and waste from storage areas daily.

1.6 FIELD CONDITIONS

A. Apply coatings only when temperature of surfaces to be coated and ambient air temperatures are between 50 and 95 deg F (10 and 35 deg C).

B. Do not apply coatings when relative humidity exceeds 85 percent; at temperatures less than 5 deg F (3 deg C) above the dew point; or to damp or wet surfaces.

C. Provide ventilation during coating evaporation stage in confined or enclosed areas in accordance with manufacturer's instructions.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Basis-of-Design Product: Requests for manufacturer substitutions prior to bidding will be reviewed and responded to in conformance with Division 1 requirements. Subject to compliance with requirements, provide **Tnemec Inc. Typoxy® Series 27WB** or comparable product pre-approved during bidding.

2.2 HIGH-PERFORMANCE COATINGS, GENERAL

A. Colors: Application will be concealed and never visible in finished assembly. Color selection by applicator.

2.3 COATING SYSTEMS FOR CONCRETE AND MASONRY – INTERIOR

A. Mild to Moderate Conditions:

1. System Type: Inorganic Water-Based Epoxy
2. Surface Preparation: SSPC-SP13/NACE 6, Clean and Dry
3. Primer: Tnemec; Series 27WB Typoxy, DFT 4.0 to 6.0 mils
4. Finish Coat: Tnemec; Series 27WB Typoxy, DFT 4.0 to 6.0 mils
5. Total DFT: 8.0 to 12.0 mils.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.

B. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:

1. Masonry (Clay and CMUs): 12 percent.
2. Gypsum Board: 12 percent.

C. Gypsum Board Substrates: Verify that finishing compound is sanded smooth.

D. Verify suitability of substrates, including surface conditions and compatibility, with existing finishes and primers.

E. Proceed with coating application only after unsatisfactory conditions have been corrected.

1. Application of coating indicates acceptance of surfaces and conditions.

3.2 PREPARATION

A. General: Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

B. Clean substrates of substances that could impair bond of coatings, including dust, dirt, oil, grease, and incompatible paints and encapsulants.

1. Remove incompatible primers and reprime substrate with compatible primers or apply tie coat as required to produce coating systems indicated.

C. Masonry Substrates: Remove efflorescence and chalk. Do not coat surfaces if moisture content, alkalinity of surfaces, or alkalinity of mortar joints exceeds that permitted in manufacturer's written instructions.

D. Gypsum Board Substrates: Sand joint compound smooth and feather edge. Do not apply putty, patching pencils, caulking or masking tape to gypsum board surfaces to be painted. Lightly scuff-sand tape joints after priming to remove raised paper nap. Do not sand through primer.

3.3 APPLICATION

A. Apply coatings in accordance with manufacturer's instructions.

1. Use applicators and techniques suited for coating and substrate indicated.

2. Use application equipment, tools, pressure settings and techniques in accordance with manufacturer’s instructions.

3. Uniformly apply coatings at spreading rate required to achieve specified DFT.

4. Apply coatings to be free of film characteristics or defects that would adversely affect performance or appearance of coating systems.

5. Apply primer as recommended for the application. Components shall be pre-mixed, blended, and applied according to manufacturer's directions.

6. Components for subsequent coats shall be mixed and applied in strict accordance with manufacturer's directions.

3.4 FIELD QUALITY CONTROL

A. Dry Film Thickness Testing: Owner may engage the services of a qualified testing and inspecting agency to inspect and test coatings for dry film thickness.

1. Contractor shall touch up and restore coated surfaces damaged by testing.
2. If test results show that dry film thickness of applied coating does not comply with coating manufacturer's written recommendations, Contractor shall pay for testing and apply additional coats as needed to provide dry film thickness that complies with coating manufacturer's written recommendations.

3.5 CLEANING AND PROTECTION

A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.

B. After completing coating application, clean spattered surfaces. Remove spattered coatings by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.

C. Protect work of other trades against damage from coating operation. Correct damage to work of other trades by cleaning, repairing, replacing, and recoating, as approved by Architect, and leave in an undamaged condition.

D. At completion of construction activities of other trades, touch up and restore damaged or defaced coated surfaces.

END OF SECTION 099600

SECTION 101100 – VISUAL DISPLAY UNITS

Visual display units are not provided by bidder under the scope of this contract, however, the bidder is responsible for the installation of these owner provided items. Locations for the installation of these items have been identified in the contract documents.

END OF SECTION 101100

SECTION 101423.13 – PANEL SIGNAGE AS REQUIRED FOR OCCUPANCY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Panel signs and Field-applied vinyl-character signs.

    a. Room-identification signs as required for occupancy.

B. Related Requirements:

1. Section 015000 "Temporary Facilities and Controls" for temporary Project identification signs and for temporary information and directional signs.
2. Section 220553 "Identification for Plumbing Piping and Equipment" for labels, tags, and nameplates for plumbing systems and equipment.
3. Section 230553 "Identification for HVAC Piping and Equipment" for labels, tags, and nameplates for HVAC systems and equipment.
4. Section 260553 "Identification for Electrical Systems" for labels, tags, and nameplates for electrical equipment.
5. Section 265219 "Emergency and Exit Lighting" for illuminated, self-luminous, and photoluminescent exit sign units.

1.3 DEFINITIONS

A. Accessible: In accordance with the accessibility standard.

1.4 COORDINATION

A. Furnish templates for placement of sign-anchorage devices embedded in permanent construction by other installers.

1.5 ACTION SUBMITTALS

A. Shop Drawings: For panel signs.

1. Include fabrication and installation details and attachments to other work.
2. Show sign mounting heights, locations of supplementary supports to be provided by others, and accessories.
3. Show message list, typestyles, graphic elements, including raised characters and Braille, and layout for each sign at least half size.

B. Sign Schedule: Use same designations specified or indicated on Drawings or in a sign schedule.

1.6 CLOSEOUT SUBMITTALS

A. Maintenance Data: For signs to include in maintenance manuals.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Accessibility Standard: Comply with applicable provisions in the U.S. Architectural & Transportation Barriers Compliance Board's ADA-ABA Accessibility Guidelines for Buildings and Facilities and ICC A117.1 for signs.

2.2 ROOM IDENTIFICATION SIGNS

A. Engineered PVC/Acrylic alloy with integral background colors and high impact resistance.

1. Signs to be constructed with smooth, uniform surfaces; with message and characters having uniform faces, sharp corners, and precisely formed lines and profiles; and as follows:
2. Sign Face: Engineered PVC/Acrylic alloy with integral background colors and high impact resistance.
3. Tactile Graphics and Text: Provide tactile copy and grade 2 braille raised 1/32 inch minimum from plaque surface using manufacturer’s standard process.

    a. Provide lettering and graphics precisely formed, uniformly opaque to comply with relevant ADA regulations and requirements indicated for size, style, spacing, content, position and colors.
    b. Text Colors: As selected by Architect from manufacturer’s full range.

4. Background Colors: High contrast semi-matte integral colors for graphics. All integral colors are to be U.V. stabilized resins utilizing industrial grade pigments.

    a. Colors: Basis-of-Design; Best Sign Systems “IM Dark Gray”

5. Sign-Panel Perimeter: Finish edges smooth.

    a. Edge Condition: Square cut.
    b. Corner Condition in Elevation: Rounded.

6. Mounting: Surface mounted to wall or door with two-face tape.
7. Text and Typeface:

    a. Accessible raised characters and Braille
    b. Font Style: Arial
    c. Provide variable graphic content as scheduled.
    d. Finish raised characters to contrast with background color, and finish Braille to match background color.

1) Color: Basis-of-Design; Best Sign Systems #951 “White”

2.3 SIGN MATERIALS

A. Room Identification Signs may be constructed from any of the following materials:

1. Acrylic Sheet: ASTM D 4802, category as standard with manufacturer for each sign, Type UVF (UV filtering).
2. Polycarbonate Sheet: ASTM C 1349, Appendix X1, Type II (coated, mar-resistant, UV-stabilized polycarbonate), with coating on both sides.
3. PVC Sheet: Manufacturer's standard, UV-light stable, PVC plastic.

B. Paints and Coatings for Sheet Materials: Inks, dyes, and paints that are recommended by manufacturer for optimum adherence to surface and are UV and water resistant for colors and exposure indicated.

2.4 ACCESSORIES

A. Two-Face Tape: Manufacturer's standard high-bond, foam-core tape, 0.045 inch (1.14 mm) thick, with adhesive on both sides.

2.5 GENERAL FINISH REQUIREMENTS

A. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

B. Appearance of Finished Work: Noticeable variations in same piece are not acceptable.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of signage work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. General: Install signs using mounting methods indicated and according to manufacturer's written instructions.

1. Install signs level, plumb, true to line, and at locations and heights indicated, with sign surfaces free of distortion and other defects in appearance.
2. Install signs so they do not protrude or obstruct according to the accessibility standard.
3. Before installation, verify that sign surfaces are clean and free of materials or debris that would impair installation.

B. Room-Identification Signs and Other Accessible Signage: Install in locations on walls as indicated and according to accessibility standard.

C. Mounting Methods:

1. Two-Face Tape: Clean bond-breaking materials from substrate surface and remove loose debris. Apply tape strips symmetrically to back of sign and of suitable quantity to support weight of sign without slippage. Keep strips away from edges to prevent visibility at sign edges. Place sign in position, and push to engage tape adhesive.

3.3 ADJUSTING AND CLEANING

A. Remove and replace damaged or deformed signs and signs that do not comply with specified requirements. Replace signs with damaged or deteriorated finishes or components that cannot be successfully repaired by finish touchup or similar minor repair procedures.

B. Remove temporary protective coverings and strippable films as signs are installed.

C. On completion of installation, clean exposed surfaces of signs according to manufacturer's written instructions, and touch up minor nicks and abrasions in finish. Maintain signs in a clean condition during construction and protect from damage until acceptance by Owner.

3.4 SIGN SCHEDULE

A. Provide signs in the following locations:

1. Men’s Restrooms:

a. Type: Room Identification
b. Size: 6” wide x 8” high
c. Text/Message: “MEN”
d. Graphic: Provide integrated standard graphic of male figure

e. Location: Wall mounted (outside of room)
f. Rooms: Men 116.

g. Quantity: 1

2. Women's Restrooms:

a. Type: Room Identification
b. Size: 6" wide x 8" high
c. Text/Message: "WOMEN"
d. Graphic: Provide integrated standard graphic of female figure

e. Location: Wall mounted (outside of room)
f. Rooms: Women 117.
g. Quantity: 1

3. Shower Room:

a. Type: Room Identification
b. Size: 9" wide x 9" high
c. Text/Message: "UNISEX SHOWER" (In two lines)
d. Graphic: Provide integrated standard graphic of male figure, female figure, ADA wheelchair symbol and shower head

e. Location: Wall mounted (outside of room)
f. Rooms: Shower 111
g. Quantity: 1

END OF SECTION 101423.13

SECTION 102800 - TOILET, BATH, AND LAUNDRY ACCESSORIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Public-use washroom accessories.
2. Public-use shower room accessories.
3. Custodial accessories.

1.3 COORDINATION

A. Coordinate accessory locations with other work to prevent interference with clearances required for access by people with disabilities, and for proper installation, adjustment, operation, cleaning, and servicing of accessories.

B. Deliver inserts and anchoring devices set into concrete or masonry as required to prevent delaying the Work.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.
2. Include anchoring and mounting requirements, including requirements for cutouts in other work and substrate preparation.

B. Product Schedule: Indicating types, quantities, sizes, and installation locations by room of each accessory required.

1. Identify accessories using designations indicated.

1.5 CLOSEOUT SUBMITTALS

A. Maintenance Data: For accessories to include in maintenance manuals.

1.6 WARRANTY

A. Manufacturer's Special Warranty for Mirrors: Manufacturer agrees to repair or replace mirrors that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, visible silver spoilage defects.
2. Warranty Period: 15 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 OWNER-FURNISHED MATERIALS

A. Owner-Furnished Materials:

1. Soap Dispensers. **(102800.D)**
2. Waste Receptacles. **(102800.F)**

2.2 PUBLIC-USE WASHROOM ACCESSORIES

A. Source Limitations: Obtain public-use washroom accessories from single source from single manufacturer.

B. Basis-of-Design Product: Requests for manufacturer substitutions prior to bidding will be reviewed and responded to in conformance with Division 1 requirements. Subject to compliance with requirements, provide product indicated in specifications or comparable product by one of the following or by a manufacturer pre-approved during bidding:

1. A & J Washroom Accessories, Inc.
2. American Specialties, Inc.
3. Bobrick Washroom Equipment, Inc.
4. Bradley Corporation.

C. Toilet Tissue (Roll) Dispenser **(102800.A)**:

1. Basis-of-Design Product: American Specialties, Inc., Model No. 7305-S
2. Description: Single-roll dispenser.
3. Mounting: Surface mounted.
4. Operation: Noncontrol delivery with standard spindle.
5. Capacity: Designed for 5-inch- (127-mm-) diameter tissue rolls.
6. Material and Finish: Stainless steel, No. 4 finish (satin).

D. Paper Towel (Folded) Dispenser **(102800.E)**:

1. Basis-of-Design Product: American Specialties, Inc., Model No. 0210
2. Mounting: Surface mounted.
3. Minimum Capacity: 400 C-fold or 525 multifold towels.
4. Material and Finish: Stainless steel, No. 4 finish (satin).
5. Lockset: Tumbler type.

E. Grab Bar **(102800.B & 102800.B2)**:

1. Basis-of-Design Product: American Specialties, Inc., Model No. 3700

2. Mounting: Flanges with concealed fasteners.
3. Material: Stainless steel, 0.05 inch (1.3 mm) thick.

   a. Finish: Smooth, No. 4 finish (satin).

4. Outside Diameter: 1-1/4 inches (32 mm).
5. Configuration and Length: Straight, 42 inches long.

F. Mirror Unit **(102800.C):**

1. Basis-of-Design Product: American Specialties, Inc., Model No. 8287
2. Frame: Frameless.
3. Hangers: Produce rigid, tamper- and theft-resistant installation, using method indicated below.

   a. Wall bracket of galvanized steel, equipped with concealed locking devices requiring a special tool to remove.

4. Size: 18”x36”.

2.3 PUBLIC-USE SHOWER ROOM ACCESSORIES

A. Source Limitations: Obtain public-use shower room accessories from single source from single manufacturer.

B. Basis-of-Design Product: Requests for manufacturer substitutions prior to bidding will be reviewed and responded to in conformance with Division 1 requirements. Subject to compliance with requirements, provide product indicated in specifications or comparable product by one of the following or by a manufacturer pre-approved during bidding:

1. A & J Washroom Accessories, Inc.
2. American Specialties, Inc.
3. Bobrick Washroom Equipment, Inc.
4. Bradley Corporation.

C. Shower Curtain Rod **(102800.G)**:

1. Basis-of-Design Product: American Specialties, Inc., Model No. 1204
2. Description: 1-1/4-inch (32-mm) OD; fabricated from nominal 0.05-inch- (1.3-mm-) thick stainless steel.
3. Mounting Flanges: Stainless-steel flanges designed for exposed fasteners.
4. Finish: Stainless steel, No. 4 finish (satin).

D. Shower Curtain **(102800.G)**:

1. Basis-of-Design Product: American Specialties, Inc., Model No. 1200-V
2. Size: Minimum 6 inches (152 mm) wider than opening by 72 inches (1828 mm) high.
3. Material: Nylon-reinforced vinyl, minimum 10 oz. (284 g) or 0.008-inch- (0.2-mm-) thick vinyl, with integral antibacterial agent.
4. Color: White.
5. Grommets: Corrosion resistant at minimum 6 inches (152 mm) o.c. through top hem.
6. Shower Curtain Hooks: Chrome-plated or stainless-steel, spring wire curtain hooks with snap fasteners, sized to accommodate specified curtain rod. Provide one hook per curtain grommet.

E. Folding Shower Seat **(102800.K):**

1. Basis-of-Design Product: American Specialties, Inc., Model No. 8203-20
2. Configuration: Rectangular seat.
3. Seat: Phenolic or polymeric composite of slat-type or one-piece construction in color as selected by Architect.
4. Mounting Mechanism: Stainless steel, No. 4 finish (satin).
5. Dimensions: 20” x 16”.

F. Towel Bar **(102800.H)**:

1. Basis-of-Design Product: American Specialties, Inc. Model No. 0755-SS
2. Description: 1 inch OD, fabricated from nominal 0.04-inch thick stainless steel..
3. Mounting: Flanges with concealed fasteners.
4. Length: 24 inches (610 mm).
5. Material and Finish: Stainless steel, No. 4 finish (satin).

G. Robe Hook **(102800.J)**:

1. Basis-of-Design Product: American Specialties, Inc. Model No. 0745-Z
2. Description: Double-prong unit.
3. Material and Finish: Polished chrome-plated zinc alloy (zamac).
4. Mounting Mechanism: Stainless steel wall bracket.

2.4 CUSTODIAL ACCESSORIES

A. Source Limitations: Obtain custodial accessories from single source from single manufacturer.

B. Basis-of-Design Product: Requests for manufacturer substitutions prior to bidding will be reviewed and responded to in conformance with Division 1 requirements. Subject to compliance with requirements, provide product indicated in specifications or comparable product by one of the following or by a manufacturer pre-approved during bidding:

1. A & J Washroom Accessories, Inc.
2. American Specialties, Inc.
3. Bobrick Washroom Equipment, Inc.
4. Bradley Corporation.

C. Mop and Broom Holder <**Insert drawing designation**>:

1. Basis-of-Design Product: American Specialties, Inc. Model No. 8215-4
2. Description: Wall mounted unit for holding mops and brooms.
3. Length: 36 inches (914 mm).
4. Hooks: None
5. Mop/Broom Holders: Four, spring-loaded, rubber hat, cam type.
6. Material and Finish: Stainless steel, No. 4 finish (satin).

2.5 MATERIALS

A. Stainless Steel: ASTM A 666, Type 304, 0.031-inch (0.8-mm) minimum nominal thickness unless otherwise indicated.

B. Steel Sheet: ASTM A 1008/A 1008M, Designation CS (cold rolled, commercial steel), 0.036-inch (0.9-mm) minimum nominal thickness.

C. Galvanized-Steel Sheet: ASTM A 653/A 653M, with G60 (Z180) hot-dip zinc coating.

D. Galvanized-Steel Mounting Devices: ASTM A 153/A 153M, hot-dip galvanized after fabrication.

E. Fasteners: Screws, bolts, and other devices of same material as accessory unit and tamper-and-theft resistant where exposed, and of galvanized steel where concealed.

F. Chrome Plating: ASTM B 456, Service Condition Number SC 2 (moderate service).

2.6 FABRICATION

A. General: Fabricate units with tight seams and joints, and exposed edges rolled. Hang doors and access panels with full-length, continuous hinges. Equip units for concealed anchorage and with corrosion-resistant backing plates.

B. Keys: Provide universal keys for internal access to accessories for servicing and resupplying. Provide minimum of six keys to Owner's representative.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install accessories according to manufacturers' written instructions, using fasteners appropriate to substrate indicated and recommended by unit manufacturer. Install units level, plumb, and firmly anchored in locations and at heights indicated.

B. Grab Bars: Install to withstand a downward load of at least 250 lbf (1112 N), when tested according to ASTM F 446.

3.2 ADJUSTING AND CLEANING

A. Adjust accessories for unencumbered, smooth operation. Replace damaged or defective items.

B. Remove temporary labels and protective coatings.

C. Clean and polish exposed surfaces according to manufacturer's written instructions.

END OF SECTION 102800

SECTION 104413 - FIRE PROTECTION CABINETS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Fire-protection cabinets for the following:

a. Portable fire extinguishers.

B. Related Requirements:

1. Section 104416 "Fire Extinguishers."

1.3 ACTION SUBMITTALS

A. Shop Drawings: For fire-protection cabinets. Include plans, elevations, sections, details, and attachments to other work.

B. Samples for Verification: For each type of exposed finish required, prepared on Samples 6 by 6 inches (150 by 150 mm) square.

1.4 CLOSEOUT SUBMITTALS

A. Maintenance Data: For fire-protection cabinets to include in maintenance manuals.

1.5 COORDINATION

A. Coordinate size of fire-protection cabinets to ensure that type and capacity of fire extinguishers indicated are accommodated.

B. Coordinate sizes and locations of fire-protection cabinets with wall depths.

1.6 SEQUENCING

A. Apply vinyl lettering on field-painted fire-protection cabinets after painting is complete.

PART 2 - PRODUCTS

2.1 FIRE-PROTECTION CABINET **(104413.A)**

1. 102-mm) backbend depth.

B. Cabinet Trim Material: Steel sheet.

C. Door Material: Steel sheet.

D. Door Style: Fully glazed panel with frame.

E. Door Glazing: Tempered float glass (clear).

F. Door Hardware: Manufacturer's standard door-operating hardware of proper type for cabinet type, trim style, and door material and style indicated.

1. Provide manufacturer's standard.
2. Provide continuous hinge, of same material and finish as trim, permitting door to open 180 degrees.

G. Accessories:

1. Mounting Bracket: Manufacturer's standard steel, designed to secure fire extinguisher to fire-protection cabinet, of sizes required for types and capacities of fire extinguishers indicated, with plated or baked-enamel finish.
2. Identification: Lettering complying with authorities having jurisdiction for letter style, size, spacing, and location. Locate as indicated.

a. Identify fire extinguisher in fire-protection cabinet with the words "FIRE EXTINGUISHER."

1) Location: Applied to cabinet glazing.
2) Application Process: Pressure-sensitive vinyl letters.
3) Lettering Color: White.
4) Orientation: Vertical.

H. Materials:

1. Cold-Rolled Steel: ASTM A 1008/A 1008M, Commercial Steel (CS), Type B.

a. Finish: Baked enamel or powder coat.
b. Color: White.

2. Tempered Float Glass: ASTM C 1048, Kind FT, Condition A, Type I, Quality q3, 3 mm thick, Class 1 (clear).

2.2 FABRICATION

A. Fire-Protection Cabinets: Provide manufacturer's standard box (tub) with trim, frame, door, and hardware to suit cabinet type, trim style, and door style indicated.

1. Weld joints and grind smooth.

2. Provide factory-drilled mounting holes.
3. Prepare doors and frames to receive locks.
4. Install door locks at factory.

B. Cabinet Doors: Fabricate doors according to manufacturer's standards, from materials indicated and coordinated with cabinet types and trim styles.

1. Fabricate door frames with tubular stiles and rails and hollow-metal design, minimum 1/2 inch (13 mm) thick.
2. Miter and weld perimeter door frames.

C. Cabinet Trim: Fabricate cabinet trim in one piece with corners mitered, welded, and ground smooth.

2.3 GENERAL FINISH REQUIREMENTS

A. Comply with NAAMM's AMP 500, "Metal Finishes Manual for Architectural and Metal Products," for recommendations for applying and designating finishes.

B. Protect mechanical finishes on exposed surfaces of fire-protection cabinets from damage by applying a strippable, temporary protective covering before shipping.

C. Finish fire-protection cabinets after assembly.

D. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining 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 walls and partitions for suitable framing depth and blocking where semirecessed cabinets will be installed.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Prepare recesses for semirecessed fire-protection cabinets as required by type and size of cabinet and trim style.

3.3 INSTALLATION

A. General: Install fire-protection cabinets in locations and at mounting heights indicated or, if not indicated, at heights indicated below:

1. Fire-Protection Cabinets: 54 inches (1372 mm) above finished floor to top of cabinet.

B. Fire-Protection Cabinets: Fasten cabinets to structure, square and plumb.

1. Unless otherwise indicated, provide recessed fire-protection cabinets. If wall thickness is inadequate for recessed cabinets, provide semirecessed fire-protection cabinets.
2. Fasten mounting brackets to inside surface of fire-protection cabinets, square and plumb.

C. Identification: Apply vinyl lettering at locations indicated.

3.4 ADJUSTING AND CLEANING

A. Remove temporary protective coverings and strippable films, if any, as fire-protection cabinets are installed unless otherwise indicated in manufacturer's written installation instructions.

B. Adjust fire-protection cabinet doors to operate easily without binding. Verify that integral locking devices operate properly.

C. On completion of fire-protection cabinet installation, clean interior and exterior surfaces as recommended by manufacturer.

D. Touch up marred finishes, or replace fire-protection cabinets that cannot be restored to factory-finished appearance. Use only materials and procedures recommended or furnished by fire-protection cabinet and mounting bracket manufacturers.

E. Replace fire-protection cabinets that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION 104413

SECTION 104416 - FIRE EXTINGUISHERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes portable, hand-carried fire extinguishers and mounting brackets for fire extinguishers.

B. Related Requirements:

1. Section 104413 "Fire Protection Cabinets."

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product. Include rating and classification, material descriptions, dimensions of individual components and profiles, and finishes for fire extinguisher and mounting brackets.

1.4 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For fire extinguishers to include in maintenance manuals.

1.5 COORDINATION

A. Coordinate type and capacity of fire extinguishers with fire-protection cabinets to ensure fit and function.

1.6 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace fire extinguishers that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

a. Failure of hydrostatic test according to NFPA 10.
b. Faulty operation of valves or release levers.

2. Warranty Period: Six years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. NFPA Compliance: Fabricate and label fire extinguishers to comply with NFPA 10, "Portable Fire Extinguishers."

B. Fire Extinguishers: Listed and labeled for type, rating, and classification by an independent testing agency acceptable to authorities having jurisdiction.

2.2 PORTABLE, HAND-CARRIED FIRE EXTINGUISHERS

A. Fire Extinguishers: Type, size, and capacity for each fire-protection cabinet and mounting bracket indicated.

1. Manufacturers: Requests for manufacturer substitutions prior to bidding will be reviewed and responded to in conformance with Division 1 requirements. Subject to compliance with requirements, provide products by one of the following manufacturers or a manufacturer pre-approved during bidding:

    a. Guardian Fire Equipment, Inc.
    b. JL Industries, Inc.; a division of the Activar Construction Products Group.
    c. Larsens Manufacturing Company.
    d. Nystrom, Inc.

2. Valves: Manufacturer's standard.
3. Handles and Levers: Manufacturer's standard.
4. Instruction Labels: Include pictorial marking system complying with NFPA 10, Appendix B, and bar coding for documenting fire-extinguisher location, inspections, maintenance, and recharging.

B. Multipurpose Dry-Chemical Type in Steel Container **(104416.A):** UL-rated 2-A:10-B:C, 5-lb (2.3-kg) nominal capacity, with monoammonium phosphate-based dry chemical in enameled-steel container.

2.3 MOUNTING BRACKETS

A. Mounting Brackets: Manufacturer's standard steel, designed to secure fire extinguisher to wall or structure, of sizes required for types and capacities of fire extinguishers indicated, with plated or black baked-enamel finish.

B. Identification: Lettering complying with authorities having jurisdiction for letter style, size, spacing, and location. Locate as indicated by Architect.

1. Identify bracket-mounted fire extinguishers with the words "FIRE EXTINGUISHER" in red letter decals applied to mounting surface.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine fire extinguishers for proper charging and tagging.

1. Remove and replace damaged, defective, or undercharged fire extinguishers.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. General: Install fire extinguishers and mounting brackets in locations indicated and in compliance with requirements of authorities having jurisdiction.

1. Mounting Brackets: 54 inches (1372 mm) above finished floor to top of fire extinguisher.

B. Mounting Brackets: Fasten mounting brackets to surfaces, square and plumb, at locations indicated.

END OF SECTION 104416

SECTION 112800 – OFFICE EQUIPMENT

Equipment is not provided by bidder under the scope of this contract and is considered a Fixture, Furnishing and Equipment item provided by the Owner. Items are either existing items that will be relocated to the new facility or items that will be purchased by the Owner under a separate contract. Identifications of items in the contract documents are for coordination and reference purposes only.

END OF SECTION 112800

SECTION 113100 – RESIDENTIAL APPLIANCES

Appliances are not provided by bidder under the scope of this contract and are considered a Fixture, Furnishing and Equipment item provided by the Owner. Items are either existing items that will be relocated to the new facility or items that will be purchased by the Owner under a separate contract. Identifications of items in the contract documents are for coordination and reference purposes only.

END OF SECTION 113100

SECTION 115200 – AV EQUIPMENT

AV equipment is not provided by bidder under the scope of this contract and is considered a Fixture, Furnishing and Equipment item provided by the Owner. The labor involved in the relocation of these items to the new facility however shall be included as a cost to the project. The General Contractor shall obtain the costs associated with this relocation from Electronic Contracting Company as indicated in Section 011000 “Summary”.

END OF SECTION 115200

SECTION 115213 – PROJECTION SCREENS

Project Screens are not provided by bidder under the scope of this contract and are considered a Fixture, Furnishing and Equipment item provided by the Owner. The labor involved in the relocation of these items to the new facility however shall be included as a cost to the project. The General Contractor shall obtain the costs associated with this relocation from Electronic Contracting Company as indicated in Section 011000 “Summary”.

END OF SECTION 115213

SECTION 123623.13 - PLASTIC-LAMINATE-CLAD COUNTERTOPS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes plastic-laminate-clad countertops.

1.3 ACTION SUBMITTALS

A. Shop Drawings: For plastic-laminate-clad countertops.

1. Show locations and sizes of cutouts and holes for items installed in plastic-laminate-clad countertops.

B. Samples for Verification: As follows:

1. Plastic Laminates: For each type, color, pattern, and surface finish required, 8 by 10 inches (200 by 250 mm) in size.

1.4 QUALITY ASSURANCE

A. Fabricator Qualifications: Shop that employs skilled workers who custom fabricate products similar to those required for this Project and whose products have a record of successful in-service performance.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver countertops only after casework and supports on which they will be installed have been completed in installation areas.

B. Store countertops in areas where environmental conditions comply with requirements specified in "Field Conditions" Article.

C. Keep surfaces of countertops covered with protective covering during handling and installation.

1.6 FIELD CONDITIONS

A. Environmental Limitations: Do not deliver or install countertops until building is enclosed, wet-work is complete, and HVAC system is operating and maintaining temperature and relative humidity at levels planned for building occupants during the remainder of the construction period.

B. Field Measurements: Where countertops are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

C. Established Dimensions: Where countertops are indicated to fit to other construction, establish dimensions for areas where countertops are to fit. Provide allowance for trimming at site, and coordinate construction to ensure that actual dimensions correspond to established dimensions.

PART 2 - PRODUCTS

2.1 PLASTIC-LAMINATE-CLAD COUNTERTOPS

A. Quality Standard: Unless otherwise indicated, comply with the "Architectural Woodwork Standards" for grades of plastic-laminate-clad countertops indicated for construction, finishes, installation, and other requirements.

B. Grade: Custom.

C. High-Pressure Decorative Laminate: NEMA LD 3, Grade HGS.

1. Basis-of-Design Product: Requests for manufacturer substitutions prior to bidding will be reviewed and responded to in conformance with Division 1 requirements. Subject to compliance with requirements, provide product indicated on Drawings or comparable product by manufacturer listed below or one pre-approved during bidding:

a. Nevamar ES 6002 T, “Charcoal Essence”

1) Location: Copy 106, Break 109, Workroom 113, EOC 118

D. Edge Treatment: Same as laminate cladding on horizontal surfaces Provide Futura (double radius) Edge to provide a “slab” effect of stone. Radius to be a 3/8” radius at top and bottom edge of counter front.

E. Core Material: Particleboard.

F. Core Material at Sinks: Particleboard made with exterior glue.

G. Core Thickness: 3/4 inch (19 mm).

1. Build up countertop thickness to 1-1/2 inches (38 mm) at front, back, and ends with additional layers of core material laminated to top.

2.2 WOOD MATERIALS

A. Composite Wood and Agrifiber Products: Provide materials that comply with requirements of referenced quality standard for each type of countertop and quality grade specified unless otherwise indicated.

1. Particleboard: ANSI A208.1, Grade M-2 and Grade M-2-Exterior Glue.

2.3 MISCELLANEOUS MATERIALS

A. Adhesive for Bonding Plastic Laminate: Unpigmented contact cement.

1. Adhesive for Bonding Edges: Hot-melt adhesive or adhesive specified above for faces.

2.4 FABRICATION

A. Fabricate countertops to dimensions, profiles, and details indicated. Provide front and end overhang of 1 inch (25 mm) over base cabinets. Ease edges to radius indicated for the following:

B. Complete fabrication, including assembly, to maximum extent possible before shipment to Project site. Disassemble components only as necessary for shipment and installation. Where necessary for fitting at site, provide ample allowance for scribing, trimming, and fitting.

PART 3 - EXECUTION

3.1 PREPARATION

A. Before installation, condition countertops to average prevailing humidity conditions in installation areas.

B. Before installing countertops, examine shop-fabricated work for completion and complete work as required, including removal of packing.

3.2 INSTALLATION

A. Grade: Install countertops to comply with same grade as item to be installed.

B. Assemble countertops and complete fabrication at Project site to the extent that it was not completed in the shop.

1. Provide cutouts for appliances, plumbing fixtures, electrical work, and similar items. Locate openings accurately, and use templates or roughing-in diagrams to produce accurately sized and shaped openings. Sand edges of cutouts to remove splinters and burrs.
2. Seal edges of cutouts by saturating with varnish.

C. Field Jointing: Where possible, make in the same manner as shop jointing, using dowels, splines, adhesives, and fasteners recommended by manufacturer. Prepare edges to be joined in shop so Project-site processing of top and edge surfaces is not required. Locate field joints where shown on Shop Drawings.

1. Secure field joints in countertops with concealed clamping devices located within 6 inches (150 mm) of front and back edges and at intervals not exceeding 24 inches (600 mm). Tighten according to manufacturer's written instructions to exert a constant, heavy-clamping pressure at joints.

D. Scribe and cut countertops to fit adjoining work, refinish cut surfaces, and repair damaged finish at cuts.

E. Countertop Installation: Anchor securely by screwing through corner blocks of base cabinets or other supports into underside of countertop.

1. Install countertops level and true in line. Use concealed shims as required to maintain not more than a 1/8-inch-in-96-inches (3-mm-in-2400-mm)variation from a straight, level plane.
2. Secure backsplashes to tops with concealed metal brackets at 16 inches (400 mm) o.c. and to walls with adhesive.
3. Seal joints between countertop and backsplash, if any, and joints where countertop and backsplash abut walls with mildew-resistant silicone sealant or another permanently elastic sealing compound recommended by countertop material manufacturer.

3.3 ADJUSTING AND CLEANING

A. Repair damaged and defective countertops, where possible, to eliminate functional and visual defects. Where not possible to repair, replace countertops. Adjust joinery for uniform appearance.

B. Clean countertops on exposed and semiexposed surfaces.

C. Protection: Provide Kraft paper or other suitable covering over countertop surfaces, taped to underside of countertop at a minimum of 48 inches (1220 mm) o.c. Remove protection at Substantial Completion.

END OF SECTION 123623.13

SECTION 123661 - SOLID SURFACING WINDOW SILLS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Solid surface material window sills.

1.3 ACTION SUBMITTALS

A. Samples for Verification: For the following products:

1. Sill material, 6 inches square

1.4 CLOSEOUT SUBMITTALS

A. Maintenance Data: For solid surface material to include in maintenance manuals. Include Product Data for care products used or recommended by Installer and names, addresses, and telephone numbers of local sources for products.

1.5 FIELD CONDITIONS

A. Field Measurements: Verify dimensions of sills by field measurements before sill fabrication is complete. Provide uniform overhang from finished face of wall, scribe as required.

PART 2 - PRODUCTS

2.1 SOLID SURFACE WINDOW SILL MATERIALS

A. Solid Surface Material: Homogeneous-filled plastic resin complying with ICPA SS-1.

1. Basis-of-Design Product: Requests for manufacturer substitutions prior to bidding will be reviewed and responded to in conformance with Division 1 requirements. Subject to compliance with requirements, provide product indicated on Drawings or comparable product by manufacturer listed below or one pre-approved during bidding:

a. Manufacturer: Formica
b. Product: Formica Classics Solid Surfacing
c. Color: #782 “Luna Weather”

2.2 COUNTERTOP FABRICATION

A. Fabricate sills according to solid surface material manufacturer's written instructions and to the AWI/AWMAC/WI's "Architectural Woodwork Standards."

1. Grade: Custom.

B. Sills: 1/2-inch- (12.7-mm-) thick, solid surface material with bullnosed edge.

C. Fabricate with shop-applied edges unless otherwise indicated. Comply with solid surface material manufacturer's written instructions for adhesives, sealers, fabrication, and finishing.

D. Joints: Fabricate sills with minimum joints.

2.3 INSTALLATION MATERIALS

A. Adhesive: Product recommended by solid surface material manufacturer.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates to receive solid surface material countertops and conditions under which countertops will be installed, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of countertops.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Install sills level to a tolerance of 1/8 inch in 8 feet (3 mm in 2.4 m).

B. Secure sills to subtops with adhesive according to solid surface material manufacturer's written instructions. Align adjacent surfaces and, using adhesive in color to match sill, form seams to comply with manufacturer's written instructions. Carefully dress joints smooth, remove surface scratches, and clean entire surface.

C. Bond joints with adhesive and draw tight as sills are set. Mask areas of sills adjacent to joints to prevent adhesive smears.

1. Clamp units to temporary bracing, supports, or each other to ensure that sills are properly aligned and joints are of specified width.

D. Apply sealant to gaps at walls; comply with Section 079200 "Joint Sealants."

END OF SECTION 123661

SECTION 210100 – GENERAL REQUIREMENTS FOR FIRE SUPPRESSION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions apply to this Section.

B. Division 21, 22 and 23 Conditions apply to this Section.

1.2 SUMMARY

A. This Section includes general mechanical requirements and shall apply to all phases of the work specified, indicated on the drawings or required to provide for complete installation of fire suppression systems.

B. Refer to Section 230100 for General Requirements for Mechanical

C. Refer to Section 230500 for Basic Mechanical Materials and Methods

D. Refer to Section 230505 for Basic Piping Materials and Methods

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION 210100

SECTION 211000 - WATER-BASED FIRE-SUPPRESSION SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes fire suppression system renovations and additions in buildings with existing fire suppression system.

B. This Section includes the following fire-suppression piping inside the building:

1. Wet-pipe sprinkler systems.

1.3 SYSTEM DESCRIPTIONS

A. Wet-Pipe Sprinkler System: Automatic sprinklers are attached to piping containing water and that is connected to water supply. Water discharges immediately from sprinklers when they are opened. Sprinklers open when heat melts fusible link or destroys frangible device. Hose connections are included if indicated.

1.4 PERFORMANCE REQUIREMENTS

A. Standard Piping System Component Working Pressure: Listed for at least 175 psig.

B. Fire-suppression system design shall be approved by authorities having jurisdiction.

1. Margin of Safety for Available Water Flow and Pressure: 10 percent, including losses through water-service piping, valves, and backflow preventers.
2. Sprinkler Occupancy Hazard Classifications: Per NFPA 13
3. Minimum Density for Automatic-Sprinkler Piping Design: Per NFPA 13
4. Maximum Protection Area per Sprinkler: Per UL listing
5. Total Combined Hose-Stream Demand Requirement: According to NFPA 13

1.5 SUBMITTALS

A. Qualification Data: fire sprinkler designer with NICET-III certification or registered professional fire protection engineer**.**

B. Product Data: For the following:

1. Piping materials, including sprinkler specialty fittings.
2. Valves, including listed fire-protection valves, unlisted general-duty valves, and specialty valves and trim.

3. Sprinklers, escutcheons, and guards. Include sprinkler flow characteristics, mounting, finish, and other pertinent data.
4. Alarm devices, including electrical data.

C. Fire-hydrant flow test report.

D. Preliminary Sprinkler Piping Drawings: Working plans, prepared according to NFPA 13, submitted to architect/Engineer for preliminary review prior to submitting to authorities having jurisdiction.

E. Approved Sprinkler Piping Drawings: Working plans, prepared according to NFPA 13, that have been approved by authorities having jurisdiction, including hydraulic calculations, if applicable.

F. Field Test Reports and Certificates: Indicate and interpret test results for compliance with performance requirements and as described in NFPA 13 and NFPA 14. Include "Contractor's Material and Test Certificate for Aboveground Piping" and "Contractor's Material and Test Certificate for Underground Piping."

G. Operation and Maintenance Data: For standpipe and sprinkler specialties to include in emergency, operation, and maintenance manuals.

1.6 QUALITY ASSURANCE

A. Installer Qualifications:

1. Installer's responsibilities include designing, fabricating, and installing fire-suppression systems and providing professional engineering services needed to assume engineering responsibility. Base calculations on results of fire-hydrant flow test.

    a. Engineering Responsibility: Preparation of working plans, calculations, and field test reports by a qualified fire sprinkler designer with NICET-III certification or registered professional fire protection engineer**.**

B. Welding: Qualify processes and operators according to ASME Boiler and Pressure Vessel Code: Section IX.

C. NFPA Standards: Fire-suppression-system equipment, specialties, accessories, installation, and testing shall comply with the following:

1. NFPA 13, "Installation of Sprinkler Systems."
2. NFPA 13R, "Installation of Sprinkler Systems in Residential Occupancies up to and Including Four Stories in Height."
3. NFPA 24, "Installation of Private Fire Service Mains and Their Appurtenances."
4. NFPA 230, "Fire Protection of Storage."

1.7 COORDINATION

A. Coordinate layout and installation of sprinklers with other construction that penetrates ceilings, including light fixtures, HVAC equipment, and partition assemblies.

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.

2.2 STEEL PIPE AND FITTINGS

A. Threaded-End, Standard-Weight Steel Pipe: ASTM A 53/A 53M, ASTM A 135, or ASTM A 795, hot-dip galvanized where applicable and with factory- or field-formed threaded ends.

1. Cast-Iron Threaded Flanges: ASME B16.1.
2. Malleable-Iron Threaded Fittings: ASME B16.3.
3. Gray-Iron Threaded Fittings: ASME B16.4.
4. Steel Threaded Pipe Nipples: ASTM A 733, made of ASTM A 53/A 53M or ASTM A 106, Schedule 40, seamless steel pipe hot-dip galvanized where applicable. Include ends matching joining method.
5. Steel Threaded Couplings: ASTM A 865.

B. Plain-End, Standard-Weight Steel Pipe: ASTM A 53/A 53M, ASTM A 135, or ASTM A 795.

1. Steel Welding Fittings: ASTM A 234/A 234M, and ASME B16.9 or ASME B16.11.
2. Steel Flanges and Flanged Fittings: ASME B16.5.

C. Grooved-End, Standard-Weight Steel Pipe: ASTM A 53/A 53M, ASTM A 135, or ASTM A 795, hot-dip galvanized where applicable and with factory- or field-formed, square-cut- or roll-grooved ends.

1. Grooved-End Fittings: UL-listed, ASTM A 536, ductile-iron casting with OD matching steel-pipe OD.
2. Grooved-End-Pipe Couplings: UL 213 and AWWA C606, rigid pattern, unless otherwise indicated; gasketed fitting matching steel-pipe OD. Include ductile-iron housing with keys matching steel-pipe and fitting grooves, prelubricated rubber gasket listed for use with housing, and steel bolts and nuts.

D. Threaded-End, Schedule 30 Steel Pipe: ASTM A 135 or ASTM A 795, with wall thickness less than Schedule 40 and equal to or greater than Schedule 30; or ASTM A 795 and ASME B36.10M, Schedule 30 wrought-steel pipe; with factory- or field-threaded ends.

1. Cast-Iron Threaded Flanges: ASME B16.1.
2. Malleable-Iron Threaded Fittings: ASME B16.3.
3. Gray-Iron Threaded Fittings: ASME B16.4.
4. Steel Threaded Pipe Nipples: ASTM A 733, made of ASTM A 53/A 53M or ASTM A 106, Schedule 40, seamless steel pipe. Include ends matching joining method.
5. Steel Threaded Couplings: ASTM A 865.

E. Plain-End, Schedule 30 Steel Pipe: ASTM A 135 or ASTM A 795, with wall thickness less than Schedule 40 and equal to or greater than Schedule 30; or ASTM A 795 and ASME B36.10M, Schedule 30 wrought-steel pipe.

1. Steel Welding Fittings: ASTM A 234/A 234M, and ASME B16.9 or ASME B16.11.
2. Steel Flanges and Flanged Fittings: ASME B16.5.

F. Grooved-End, Schedule 30 Steel Pipe: ASTM A 135 or ASTM A 795, with wall thickness less than Schedule 40 and equal to or greater than Schedule 30; or ASTM A 795 and ASME B36.10M, Schedule 30 wrought-steel pipe; with factory- or field-formed, roll-grooved ends.

1. Grooved-End Fittings: UL-listed, ASTM A 536, ductile-iron casting with OD matching steel-pipe OD.
2. Grooved-End-Pipe Couplings: UL 213 and AWWA C606, rigid pattern, unless otherwise indicated; gasketed fitting matching steel-pipe OD. Include ductile-iron housing with keys matching steel-pipe and fitting grooves, prelubricated rubber gasket listed for use with housing, and steel bolts and nuts.

G. Threaded-End, Threadable, Thinwall Steel Pipe: ASTM A 135 or ASTM A 795, with wall thickness less than Schedule 40 and greater than Schedule 10, and with factory- or field-formed threaded ends.

1. Cast-Iron Threaded Flanges: ASME B16.1.
2. Malleable-Iron Threaded Fittings: ASME B16.3.
3. Gray-Iron Threaded Fittings: ASME B16.4.
4. Steel Threaded Pipe Nipples: ASTM A 733, made of ASTM A 53/A 53M or ASTM A 106, Schedule 40, seamless steel pipe.
5. Steel Threaded Couplings: ASTM A 865.

H. Grooved-End, Threadable, Thinwall Steel Pipe: ASTM A 135 or ASTM A 795, with wall thickness less than Schedule 40 and greater than Schedule 10, and with factory- or field-formed, roll-grooved ends.

1. Grooved-End Fittings: UL-listed, ASTM A 536, ductile-iron casting with OD matching steel-pipe OD.
2. Grooved-End-Pipe Couplings: UL 213 and AWWA C606, rigid pattern, unless otherwise indicated; gasketed fitting matching steel-pipe OD. Include ductile-iron housing with keys matching steel-pipe and fitting grooves, prelubricated rubber gasket listed for use with housing, and steel bolts and nuts.

I. Plain-End, Schedule 10 Steel Pipe: ASTM A 135 or ASTM A 795, Schedule 10 in NPS 5 and smaller; and NFPA 13 specified wall thickness in NPS 6 to NPS 10.

1. Steel Welding Fittings: ASTM A 234/A 234M, and ASME B16.9 or ASME B16.11.
2. Steel Flanges and Flanged Fittings: ASME B16.5.

J. Grooved-End, Schedule 10 Steel Pipe: ASTM A 135 or ASTM A 795, Schedule 10 in NPS 5 and smaller; and NFPA 13-specified wall thickness in NPS 6 to NPS 10; with factory- or field-formed, roll-grooved ends.

1. Grooved-End Fittings: UL-listed, ASTM A 536, ductile-iron casting with OD matching steel-pipe OD.
2. Grooved-End-Pipe Couplings: UL 213 and AWWA C606, rigid pattern, unless otherwise indicated; gasketed fitting matching steel-pipe OD. Include ductile-iron housing with keys

matching steel-pipe and fitting grooves, rubber gasket listed for use with housing, and steel bolts and nuts.

2.3 COPPER TUBE AND FITTINGS

A. Plain-End, Hard Copper Tube: ASTM B 88, Type K (ASTM B 88M, Type A) or ASTM B 88, Type L (ASTM B 88M, Type B), water tube, drawn temper.

1. Copper Fittings: ASME B16.18, cast-copper-alloy or ASME B16.22, wrought-copper, solder-joint pressure type. Furnish only wrought-copper fittings if indicated.
2. Bronze Flanges: ASME B16.24, Class 150, with solder-joint end. Furnish Class 300 flanges if required to match tubing system.
3. Copper Unions: MSS SP-123, cast-copper-alloy, hexagonal-stock body with ball-and-socket metal-to-metal seating surfaces, and solder-joint or threaded ends.
4. Copper, Mechanically Formed Tee Option: For forming T-branch on copper water tube.
5. Brazing Filler Metals: AWS A5.8, BCuP-3 or BCuP-4.

2.4 DIELECTRIC FITTINGS

A. Assembly shall be copper alloy, ferrous, and insulating materials with ends matching piping system.

B. Dielectric Unions: Factory-fabricated assembly, designed for 250-psig minimum working pressure at 180 deg F. Include insulating material that isolates dissimilar materials and ends with inside threads according to ASME B1.20.1.

C. Dielectric Flanges: Factory-fabricated companion-flange assembly, for 175-psig minimum working-pressure rating as required for piping system.

D. Dielectric Flange Insulation Kits: Components for field assembly shall include CR or phenolic gasket, PE or phenolic bolt sleeves, phenolic washers, and steel backing washers.

E. Dielectric Couplings: Galvanized steel with inert and noncorrosive thermoplastic lining and threaded ends and 300-psig working-pressure rating at 225 deg F.

F. Dielectric Nipples: Electroplated steel with inert and noncorrosive thermoplastic lining, with combination of plain, threaded, or grooved ends and 300-psig working-pressure rating at 225 deg F.

2.5 SPRINKLER SPECIALTY FITTINGS

A. Sprinkler specialty fittings shall be UL listed or FMG approved, with 175-psig minimum working-pressure rating, and made of materials compatible with piping.

B. Sprinkler Drain and Alarm Test Fittings: Cast- or ductile-iron body; with threaded or locking-lug inlet and outlet, test valve, and orifice and sight glass.

C. Sprinkler Branch-Line Test Fittings: Brass body with threaded inlet, capped drain outlet, and threaded outlet for sprinkler.

D. Sprinkler Inspector's Test Fitting: Cast- or ductile-iron housing with threaded inlet and drain outlet and sight glass.

E. Drop-Nipple Fittings: UL 1474, adjustable with threaded inlet and outlet, and seals.

2.6 LISTED FIRE-PROTECTION VALVES

A. Valves shall be UL listed or FMG approved, with 175-psig minimum pressure rating.

B. Ball Valves: Comply with UL 1091, except with ball instead of disc.

1. NPS 1-1/2 and Smaller: Bronze body with threaded ends.
2. NPS 2 and NPS 2-1/2: Bronze body with threaded ends or ductile-iron body with grooved ends.
3. NPS 3: Ductile-iron body with grooved ends.

C. Butterfly Valves: UL 1091.

1. NPS 2 and Smaller: Bronze body with threaded ends.

2. NPS 2-1/2 and Larger: Bronze, cast-iron, or ductile-iron body; wafer type or with flanged or grooved ends.

D. Check Valves NPS 2 and Larger: UL 312, swing type, cast-iron body with flanged or grooved ends.

E. Gate Valves: UL 262, OS&Y type.

1. NPS 2 and Smaller: Bronze body with threaded ends.

2. NPS 2-1/2 and Larger: Cast-iron body with flanged ends.

2.7 UNLISTED GENERAL-DUTY VALVES

A. Ball Valves NPS 2 and Smaller: MSS SP-110, 2-piece copper-alloy body with chrome-plated brass ball, 600-psig minimum CWP rating, blowout-proof stem, and threaded ends.

B. Check Valves NPS 2 and Smaller: MSS SP-80, Type 4, Class 125 minimum, swing type with bronze body, nonmetallic disc, and threaded ends.

C. Gate Valves NPS 2 and Smaller: MSS SP-80, Type 2, Class 125 minimum, with bronze body, solid wedge, and threaded ends.

D. Globe Valves NPS 2 and Smaller: MSS SP-80, Type 2, Class 125 minimum, with bronze body, nonmetallic disc, and threaded ends.

2.8 SPECIALTY VALVES

A. Sprinkler System Control Valves: UL listed or FMG approved, cast- or ductile-iron body with flanged or grooved ends, and 175-psig minimum pressure rating.

B. Automatic Drain Valves: UL 1726, NPS 3/4, ball-check device with threaded ends.

2.9 Flexible Sprinkler Hose Fittings:

1. Manufacturers: Subject to compliance with requirements, provide products by the following:

   a. Victaulic Company.

2. Standard: UL 1474.
3. Type: Flexible hose for connection to sprinkler, and with bracket for connection to ceiling grid.
4. Pressure Rating: 175-psig minimum.
5. Size: Same as connected piping, for sprinkler.

2.10 SPRINKLERS

A. Sprinklers shall be UL listed or FMG approved, with 175-psig minimum pressure rating.

B. Automatic Sprinklers: With heat-responsive element complying with the following:

1. UL 199, for nonresidential applications.

C. Sprinkler Types and Categories: Nominal 1/2-inch orifice for "Ordinary" temperature classification rating, unless otherwise indicated or required by application.

D. Sprinkler types, features, and options as follows:

1. Concealed ceiling sprinklers, including cover plate.
2. Extended-coverage sprinklers.
3. Pendent sprinklers.
4. Quick-response sprinklers.
5. Sidewall sprinklers.
6. Upright sprinklers.

E. Sprinkler Finishes: Chrome plated, bronze, and painted.

F. Sprinkler Escutcheons: Materials, types, and finishes for the following sprinkler mounting applications. Escutcheons for concealed, flush, and recessed-type sprinklers are specified with sprinklers.

1. Ceiling Mounting: Custom color selected by architect.
2. Sidewall Mounting: Custom color selected by architect.

2.11 ALARM DEVICES

A. Alarm-device types shall match piping and equipment connections.

B. Valve Supervisory Switch: UL 753, electrical, single-pole, double-throw switch with normally closed contacts. Include design that signals controlled valve is in other than fully open position.

2.12 PRESSURE GAGES

A. Description: UL 393, 3-1/2- to 4-1/2-inch- diameter, dial pressure gage with range of 0 to 250 psig minimum.

1. Water System Piping: Include caption "WATER" or "AIR/WATER" on dial face.

PART 3 - EXECUTION

3.1 PREPARATION

A. Review previous system design data and modify existing system according to NFPA 13 and NFPA 291. Use results for system design calculations required in Part 1 "Quality Assurance" Article.

B. Report test results promptly and in writing.

3.2 EXAMINATION

A. Examine roughing-in for hose connections and stations to verify actual locations of piping connections before installation.

B. Examine walls and partitions for suitable thicknesses, fire- and smoke-rated construction, framing for hose-station cabinets, and other conditions where hose connections and stations are to be installed.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.3 PIPING APPLICATIONS, GENERAL

A. Shop weld pipe joints where welded piping is indicated.

B. Flanges, flanged fittings, unions, nipples, and transition and special fittings with finish and pressure ratings same as or higher than system's pressure rating may be used in aboveground applications, unless otherwise indicated.

3.4 SPRINKLER SYSTEM PIPING APPLICATIONS

A. Standard-Pressure, Wet-Pipe Sprinkler System, 175-psig Maximum Working Pressure:

1. Sprinkler Mains:

a. Steel piping as allowed by NFPA13 and Authority Having Jurisdiction with wall thickness of schedule 10 or greater.
b. Copper piping as allowed by NFPA13 and Authority Having Jurisdiction**.**

2. Branch Piping:

a. Steel piping as allowed by NFPA13 and Authority Having Jurisdiction with wall thickness of schedule 10 or greater.

b. Copper piping as allowed by NFPA13 and Authority Having Jurisdiction**.**

3.5 VALVE APPLICATIONS

A. Drawings indicate valve types to be used. Where specific valve types are not indicated, the following requirements apply:

1. Listed Fire-Protection Valves: UL listed and FMG approved for applications where required by NFPA 13.

a. Shutoff Duty: Use ball, butterfly, or gate valves.

2. Unlisted General-Duty Valves: For applications where UL-listed and FMG-approved valves are not required by NFPA 13.

a. Shutoff Duty: Use ball, butterfly, or gate valves.
b. Throttling Duty: Use ball or globe valves.

3.6 JOINT CONSTRUCTION

A. Refer to Division 21 Section "Basic Piping Materials and Methods for Fire Suppression" for basic piping joint construction.

B. Threaded Joints: Comply with NFPA 13 for pipe thickness and threads. Do not thread pipe smaller than NPS 8 (DN 200) with wall thickness less than Schedule 40 unless approved by authorities having jurisdiction and threads are checked by a ring gage and comply with ASME B1.20.1.

C. Grooved Joints: Assemble joints with listed coupling and gasket, lubricant, and bolts.

1. Ductile-Iron Pipe: Radius-cut-groove ends of piping. Use grooved-end fittings and grooved-end-pipe couplings.
2. Steel Pipe: Square-cut or roll-groove piping as indicated. Use grooved-end fittings and rigid, grooved-end-pipe couplings, unless otherwise indicated.
3. Copper Tube: Roll-groove tubing. Use grooved-end fittings and grooved-end-tube couplings.

D. Dissimilar-Metal Piping Joints: Construct joints using dielectric fittings compatible with both piping materials.

1. NPS 2 and Smaller: Use dielectric unions, couplings, or nipples.
2. NPS 2-1/2 to NPS 4: Use dielectric flanges.
3. NPS 5 and Larger: Use dielectric flange insulation kits.

3.7 PIPING INSTALLATION

A. Refer to Division 21 Section "Basic Piping Materials and Methods for Fire Suppression" for basic piping installation.

B. Deviations from approved working plans for piping require written approval from authorities having jurisdiction. File written approval with Architect before deviating from approved working plans.

C. Use approved fittings to make changes in direction, branch takeoffs from mains, and reductions in pipe sizes.

D. Install unions adjacent to each valve in pipes NPS 2 and smaller. Unions are not required on flanged devices or in piping installations using grooved joints.

E. Install flanges or flange adapters on valves, apparatus, and equipment having NPS 2-1/2 and larger connections.

F. Install "Inspector's Test Connections" in sprinkler system piping, complete with shutoff valve, sized and located according to NFPA 13.

G. Install sprinkler piping with drains for complete system drainage.

H. Install sprinkler zone control valves, test assemblies, and drain risers adjacent to sprinkler riser.

I. Install alarm devices in piping systems.

J. Hangers and Supports: Comply with NFPA 13 for hanger materials.

K. Install pressure gages on riser or feed main, at each sprinkler test connection, and at top of each sprinkler riser. Include pressure gages with connection not less than NPS 1/4 and with soft metal seated globe valve, arranged for draining pipe between gage and valve. Install gages to permit removal, and install where they will not be subject to freezing.

L. Fill wet-pipe sprinkler system piping with water.

3.8 VALVE INSTALLATION

A. Install listed fire-protection valves, unlisted general-duty valves, specialty valves and trim, controls, and specialties according to NFPA 13 and authorities having jurisdiction.

B. Install listed fire-protection shutoff valves supervised-open, located to control sources of water supply except from fire department connections. Install permanent identification signs indicating portion of system controlled by each valve.

C. Install check valve in each water-supply connection. Install backflow preventers instead of check valves in potable-water supply sources.

D. Specialty Valves:

1. Alarm Check Valves: Install in vertical position for proper direction of flow, including bypass check valve and retarding chamber drain-line connection.

3.9 SPRINKLER APPLICATIONS

A. Drawings indicate sprinkler types to be used. Where specific types are not indicated, use the following sprinkler types:

1. Rooms without Ceilings: Upright sprinklers.
2. Rooms with Suspended Ceilings: Concealed sprinklers.
3. Wall Mounting: Sidewall sprinklers.
4. Sprinkler Finishes:

a. Upright, Pendent, and Sidewall Sprinklers: Custom color selected by architect in finished spaces exposed to view; rough bronze in unfinished spaces not exposed to view;.
b. Concealed Sprinklers: Rough brass, with factory-painted Custom cover plate color selected by architect.

3.10 SPRINKLER INSTALLATION

A. Install sprinklers in suspended ceilings in center of acoustical ceiling panels and tiles.

B. Do not install pendent or sidewall, wet-type sprinklers in areas subject to freezing. Use dry-type sprinklers with water supply from heated space.

C. Install sprinklers into flexible, sprinkler hose fittings, and install hose into bracket on ceiling grid.

3.11 CONNECTIONS

A. Drawings indicate general arrangement of piping, fittings, and specialties.

B. Install piping adjacent to equipment to allow service and maintenance.

C. Electrical Connections: Power wiring is specified in Division 26.

D. Coordinate with Electrical contractor to connect alarm devices to fire alarm.

3.12 LABELING AND IDENTIFICATION

A. Install labeling and pipe markers on equipment and piping according to requirements in NFPA 13.

3.13 FIELD QUALITY CONTROL

A. Perform the following field tests and inspections and prepare test reports:

1. Leak Test: After installation, charge system and test for leaks. Repair leaks and retest until no leaks exist.
2. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
3. Energize circuits to electrical equipment and devices.
4. Flush, test, and inspect sprinkler systems according to NFPA 13, "Systems Acceptance" Chapter.
5. Coordinate with fire alarm tests. Operate as required.
6. Verify that equipment hose threads are same as local fire department equipment.

B. Report test results promptly and in writing to Architect and authorities having jurisdiction.

3.14 CLEANING AND PROTECTION

A. Clean dirt and debris from sprinklers.

B. Remove and replace sprinklers with paint other than factory finish.

C. Protect sprinklers from damage until Substantial Completion.

3.15 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain specialty valves. Refer to Division 01 Section "Demonstration and Training."

END OF SECTION 211000

SECTION 220100 – GENERAL REQUIREMENTS FOR PLUMBING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions apply to this Section.

B. Division 21, 22 and 23 Conditions apply to this Section.

C. The Owner has contracted directly with the Commissioning Authority (CxA) for this project. All Contractors shall cooperate with the CxA to complete all required commissioning. Specification Section 019113 defines the Contractor's responsibilities with respect to the process. The Contractor shall review this section and shall include in their bids the work associated with the commissioning effort described.

1.2 SUMMARY

A. This Section includes general mechanical requirements and shall apply to all phases of the work specified, indicated on the drawings or required to provide for complete installation of plumbing systems.

B. Refer to Section 230100 for General Requirements for Mechanical

C. Refer to Section 230500 for Basic Mechanical Materials and Methods

D. Refer to Section 230505 for Basic Piping Materials and Methods

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION 220100

SECTION 220523 – VALVES FOR PLUMBING

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 general duty valves common to several mechanical piping systems. Special purpose valves are specified in Division 22 piping system Sections.

1.3 SUBMITTALS

A. General: Submit each item in this Article according to the Conditions of the Contract and Division 1 Specification Sections.

B. Product Data for each valve type. Include body material, valve design, pressure and temperature classification, end connection details, seating materials, trim material and arrangement, dimensions and required clearances, and installation instructions. Include list indicating valve and its application.

C. Maintenance data for valves to include in the operation and maintenance manual specified in Division 1. Include detailed manufacturer's instructions on adjusting, servicing, disassembling, and repairing.

1.4 QUALITY ASSURANCE

A. ASME Compliance: Comply with ASME B31.9 for building services piping and ASME B31.1 for power piping.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Ball Valves:

a. Conbraco Industries, Inc.; Apollo Division.
b. Hammond Valve Corporation.
c. Milwaukee Valve Company, Inc.
d. NIBCO Inc.
e. Stockham Valves & Fittings, Inc.

f. Tyler Pipe.
g. Victaulic Company of America.

2. Butterfly Valves:

a. Center Line, Mark Controls Corporation.
b. Crane Company; Valves and Fitting Division.
c. Grinnell Corp.
d. Hammond Valve Corporation.
e. Keystone Valve USA, Inc.
f. Milwaukee Valve Company, Inc.
g. NIBCO Inc.
h. Red-White Valve Corp.
i. Stockham Valves & Fittings, Inc.
j. Tyler Pipe.
k. Victaulic Company of America.

3. Check Valves:

a. Cla-Val Co.
b. Conbraco Industries, Inc.; Apollo Division.
c. Hammond Valve Corporation.
d. Keystone Valve USA, Inc.
e. Metraflex Company.
f. Milwaukee Valve Company, Inc.
g. NIBCO Inc.
h. Red-White Valve Corp.
i. Stockham Valves & Fittings, Inc.
j. Tyler Pipe.
k. Victaulic Company of America.

2.2 BASIC, COMMON FEATURES

A. Pressure and Temperature Ratings: As indicated in the "Application Schedule" of Part 3 of this Section and as required to suit system pressures and temperatures.

B. Sizes: Same size as upstream pipe, unless otherwise indicated.

C. Operators: Use specified operators and handwheels, except provide the following special operator features:

1. Handwheels: For valves other than quarter turn.
2. Lever Handles: For quarter-turn valves 6 inches and smaller, except for plug valves, which shall have square heads. Furnish Owner with 1 wrench for every 10 plug valves.
3. Memory Stops: For balancing applications.

D. Extended Stems: Where insulation is indicated or specified, provide extended stems arranged to receive insulation.

E. Threads: ASME B1.20.1.

F. Flanges: ASME B16.1 for cast iron, ASME B16.5 for steel, and ASME B16.24 for bronze valves.

G. Solder Joint: ASME B16.18.

2.3 BALL VALVES

A. Ball Valves, 4 Inches and Smaller: MSS SP-110, Class 150, 600-psi CWP, ASTM B 584 bronze body and bonnet, 2-piece construction; chrome-plated brass ball, standard port for 1/2-inch valves and smaller and conventional port for 3/4-inch valves and larger; blowout proof; bronze or brass stem; teflon seats and seals; threaded or soldered end connections, lever handle operator.

2.4 BUTTERFLY VALVES

A. Butterfly Valves: MSS SP-67, 200-psi CWP, 150-psi maximum pressure differential, ASTM A 126 cast-iron body and bonnet, extended neck, stainless-steel stem, field-replaceable EPDM or Buna N sleeve and stem seals, wafer, lug, or grooved style, nickel-plated ductile iron, disk per application.

2.5 CHECK VALVES

A. Swing Check Valves, 2-1/2 Inches and Smaller: MSS SP-80; Class 125, 200-psi CWP, or Class 150, 300-psi CWP; horizontal swing, Y-pattern, ASTM B 62 cast-bronze body and cap, rotating bronze disc with rubber seat or composition seat, threaded or soldered end connections:

B. Swing Check Valves, 3 Inches and Larger: MSS SP-71, Class 125, 200-psi CWP, ASTM A 126 cast-iron body and bolted cap, horizontal-swing bronze disc, flanged or grooved end connections.

C. Wafer Check Valves: Class 125, 200-psi CWP, ASTM A 126 cast-iron body, bronze disc/plates, stainless-steel pins and springs, Buna N seals, installed between flanges.

D. Lift Check Valves: Class 125, ASTM B 62 bronze body and cap (main components), horizontal or vertical pattern, lift-type, bronze disc or Buna N rubber disc with stainless-steel holder threaded or soldered end connections.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine piping system for compliance with requirements for installation tolerances and other conditions affecting performance of valves. Do not proceed with installation until unsatisfactory conditions have been corrected.

B. Examine valve interior for cleanliness, freedom from foreign matter, and corrosion. Remove special packing materials, such as blocks, used to prevent disc movement during shipping and handling.

C. Operate valves from fully open to fully closed positions. Examine guides and seats made accessible by such operation.

D. Examine threads on valve and mating pipe for form and cleanliness.

E. Examine mating flange faces for conditions that might cause leakage. Check bolting for proper size, length, and material. Check gasket material for proper size, material composition suitable for service, and freedom from defects and damage.

F. Do not attempt to repair defective valves; replace with new valves.

3.2 INSTALLATION

A. Install valves as indicated, according to manufacturer's written instructions.

B. Piping installation requirements are specified in other Division 22 Sections. Drawings indicate the general arrangement of piping, fittings, and specialties.

C. Install valves with unions or flanges at each piece of equipment arranged to allow servicing, maintenance, and equipment removal without system shutdown.

D. Locate valves for easy access and provide separate support where necessary.

E. Install valves in horizontal piping with stem at or above the center of the pipe.

F. Install valves in a position to allow full stem movement.

G. Installation of Check Valves: Install for proper direction of flow as follows:

1. Swing Check Valves: Horizontal position with hinge pin level.
2. Wafer Check Valves: Horizontal or vertical position, between flanges.
3. Lift Check Valve: With stem upright and plumb.

3.3 VALVE END SELECTION

A. Select valves with the following ends or types of pipe/tube connections:

1. Copper Tube Size, 2-1/2 Inches and Smaller: Solder ends, except provide threaded ends for heating hot water and low-pressure steam service.
2. Steel Pipe Sizes, 2-1/2 Inches and Smaller: Threaded or grooved end.
3. Steel Pipe Sizes, 3 Inches and Larger: Grooved end or flanged.

3.4 APPLICATION SCHEDULE

A. General Application: Use gate, ball, and butterfly valves for shutoff duty; globe, ball, and butterfly for throttling duty. Refer to piping system Specification Sections for specific valve applications and arrangements.

B. Domestic Water Systems: Use the following valve types:

1. Ball Valves: Class 150, 600-psi CWP, with stem extension.
2. Butterfly Valves: Nickel-plated ductile iron, aluminum bronze, or elastomer-coated ductile iron disc; EPDM or Buna N sleeve and stem seals.
3. Bronze Swing Check: Class 125, with rubber seat.
4. Check Valves: Class 125, swing or wafer type as indicated.

3.5 ADJUSTING

A. Adjust or replace packing after piping systems have been tested and put into service, but before final adjusting and balancing. Replace valves if leak persists.

END OF SECTION 220523

SECTION 220720 - PIPE INSULATION FOR PLUMBING

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 preformed, rigid and flexible pipe insulation; insulating cements; field-applied jackets; accessories and attachments; and sealing compounds.

1.3 SUBMITTALS

A. Product Data: Include product data description, list of materials, thickness, density and k-values for each product type, locations, manufacturer's installation instructions, flames spread and smoke developed ratings.

1.4 QUALITY ASSURANCE

A. Fire-Test-Response Characteristics: As determined by testing materials identical to those specified in this Section according to ASTM E 84, by a testing and inspecting agency acceptable to authorities having jurisdiction. Factory label insulation and jacket materials and sealer and cement material containers with appropriate markings of applicable testing and inspecting agency.

1. Insulation Installed Indoors: Flame-spread rating of 25 or less, and smoke-developed rating of 50 or less.
2. Insulation Installed Outdoors: Flame-spread rating of 75 or less, and smoke-developed rating of 150 or less.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Mineral-Fiber Insulation:

a. CertainTeed Manson.
b. Knauf FiberGlass GmbH.
c. Owens-Corning Fiberglas Corp.
d. Schuller International, Inc.

2. Flexible Elastomeric Thermal Insulation:

    a. Armstrong World Industries, Inc.
    b. Rubatex Corp.

2.2 INSULATION MATERIALS

A. Mineral-Fiber Insulation: Glass fibers bonded with a thermosetting resin complying with the following:

1. Preformed Pipe Insulation: Comply with ASTM C 547, Type 1, with factory-applied, all-purpose, vapor-retarder jacket.
2. Blanket Insulation: Comply with ASTM C 553, Type II, without facing.
3. Fire-Resistant Adhesive: Comply with MIL-A-3316C in the following classes and grades:

    a. Class 1, Grade A for bonding glass cloth and tape to unfaced glass-fiber insulation, for sealing edges of glass-fiber insulation, and for bonding lagging cloth to unfaced glass-fiber insulation.
    b. Class 2, Grade A for bonding glass-fiber insulation to metal surfaces.

4. Vapor-Retarder Mastics: Fire- and water-resistant, vapor-retarder mastic for indoor applications. Comply with MIL-C-19565C, Type II.
5. Mineral-Fiber Insulating Cements: Comply with ASTM C 195.
6. Mineral-Fiber, Hydraulic-Setting Insulating and Finishing Cement: Comply with ASTM C 449/C 449M.

B. Flexible Elastomeric Thermal Insulation: Closed-cell, sponge- or expanded-rubber materials. Comply with ASTM C 534, Type I for tubular materials and Type II for sheet materials.

1. Adhesive: As recommended by insulation material manufacturer.
2. Ultraviolet-Protective Coating: As recommended by insulation manufacturer.

C. Prefabricated Thermal Insulating Fitting Covers: Comply with ASTM C 450 for dimensions used in preforming insulation to cover valves, elbows, tees, and flanges.

D. Standard PVC Fitting Covers: Factory-fabricated fitting covers manufactured from 20-mil- thick, high-impact, ultraviolet-resistant PVC.

1. Shapes: 45- and 90-degree, short- and long-radius elbows, tees, valves, flanges, reducers, end caps, soil-pipe hubs, traps, mechanical joints, and P-trap and supply covers for lavatories for the disabled.
2. Adhesive: As recommended by insulation material manufacturer.

E. Aluminum Jacket: Aluminum roll stock, ready for shop or field cutting and forming to indicated sizes. Comply with ASTM B 209, 3003 alloy, H-14 temper.

1. Finish and Thickness: Stucco-embossed finish, 0.016 inch thick.
2. Finish and Thickness: Painted finish, 0.016 inch thick.
3. Moisture Barrier: 1-mil- thick, heat-bonded polyethylene and kraft paper.
4. Elbows: Preformed, 45- and 90-degree, short- and long-radius elbows; same material, finish, and thickness as jacket.

2.3 ACCESSORIES AND ATTACHMENTS

A. Glass Cloth and Tape: Comply with MIL-C-20079H, Type I for cloth and Type II for tape. Woven glass-fiber fabrics, plain weave, pre-sized a minimum of 8 oz./sq. yd, 4 inch tape width.

B. Bands: 3/4 inch wide, materials compatible with jacket:

C. Wire: 0.080-inch, nickel-copper alloy; 0.062-inch, soft-annealed, stainless steel; or 0.062-inch, soft-annealed, galvanized steel.

2.4 VAPOR RETARDERS

A. Mastics: Materials recommended by insulation material manufacturer that are compatible with insulation materials, jackets, and substrates.

PART 3 - EXECUTION

3.1 EXAMINATION AND PREPARATION

A. Examine substrates and conditions for compliance with requirements for installation and other conditions affecting performance of insulation application.

B. Surface Preparation: Clean and dry pipe and fitting surfaces. Remove materials that will adversely affect insulation application.

3.2 GENERAL APPLICATION REQUIREMENTS

A. Apply insulation materials, accessories, and finishes according to the manufacturer's written instructions; with smooth, straight, and even surfaces; free of voids throughout the length of piping, including fittings, valves, and specialties.

B. Refer to schedules at the end of this Section for materials, forms, jackets, and thicknesses required for each piping system.

C. Seal joints and seams with vapor-retarder mastic on insulation indicated to receive a vapor retarder.

D. Apply insulation with tight longitudinal seams and end joints. Bond seams and joints with adhesive recommended by the insulation material manufacturer.

E. Apply insulation with the least number of joints practical.

F. Apply insulation over fittings, valves, and specialties, with continuous thermal and vapor-retarder integrity, unless otherwise indicated. Refer to special instructions for applying insulation over fittings, valves, and specialties.

G. Hangers and Anchors: Where vapor retarder is indicated, seal penetrations in insulation at hangers, supports, anchors, and other projections with vapor-retarder mastic.

H. Insulation Terminations: For insulation application where vapor retarders are indicated, taper insulation ends. Seal tapered ends with a compound recommended by the insulation material manufacturer to maintain vapor retarder.

I. Apply adhesives and mastics at the manufacturer's recommended coverage rate.

J. Apply insulation with integral jackets as follows:

1. Pull jacket tight and smooth.
2. Circumferential Joints: Cover with 3-inch- wide strips, of same material as insulation jacket. Secure strips with adhesive and outward clinching staples along both edges of strip and spaced 4 inches o.c.
3. Longitudinal Seams: Overlap jacket seams at least 1-1/2 inches. Apply insulation with longitudinal seams at bottom of pipe. Clean and dry surface to receive self-sealing lap.
4. Vapor-Retarder Mastics: Where vapor retarders are indicated, apply mastic on seams and joints and at ends adjacent to flanges, unions, valves, and fittings.
5. At penetrations in jackets for thermometers and pressure gages, fill and seal voids with vapor-retarder mastic.

K. Roof Penetrations: Apply insulation for interior applications to a point even with top of roof flashing.

L. Exterior Wall Penetrations: For penetrations of below-grade exterior walls, terminate insulation flush with mechanical sleeve seal. Seal terminations with vapor-retarder mastic.

M. Interior Wall and Partition Penetrations: Apply insulation continuously through walls and floors.

N. Floor Penetrations: Apply insulation continuously through floor assembly.

3.3 MINERAL-FIBER INSULATION APPLICATION

A. Apply insulation to straight pipes and tubes buy securing each layer of preformed pipe insulation to pipe with wire, tape, or bands without deforming insulation materials.

B. Apply preformed pipe insulation to outer diameter of pipe flange.

C. Apply insulation to fittings and elbows as follows:

1. Apply premolded insulation sections of the same material as straight segments of pipe insulation when available. Secure according to manufacturer's written instructions.
2. When premolded insulation elbows and fittings are not available, apply mitered sections of pipe insulation, or glass-fiber blanket insulation, to a thickness equal to adjoining pipe insulation. Secure insulation materials with wire, tape, or bands.
3. Cover fittings with standard PVC fitting covers.

D. Apply insulation to valves and specialties as follows:

1. Apply premolded insulation sections of the same material as straight segments of pipe insulation when available. Secure according to manufacturer's written instructions.
2. When premolded insulation sections are not available, apply glass-fiber blanket insulation to valve body. Arrange insulation to permit access to packing and to allow valve operation without disturbing insulation.
3. Use preformed standard PVC fitting covers for valve sizes where available. Secure fitting covers with manufacturer's attachments and accessories. Seal seams with tape and vapor-retarder mastic.
4. For larger sizes where PVC fitting covers are not available, seal insulation with canvas jacket and sealing compound recommended by the insulation material manufacturer.

3.4 FLEXIBLE ELASTOMERIC THERMAL INSULATION APPLICATION

A. Apply insulation to straight pipes and tubes as follows:

1. Follow manufacturer's written instructions for applying insulation.
2. Seal longitudinal seams and end joints with manufacturer's recommended adhesive. Cement to avoid openings in insulation that will allow passage of air to the pipe surface.

B. Apply pipe insulation to outer diameter of pipe flanges.

C. Apply insulation to fittings and elbows as follows:

1. Apply mitered sections of pipe insulation.
2. Secure insulation materials and seal seams with manufacturer's recommended adhesive. Cement to avoid openings in insulation that will allow passage of air to the pipe surface.

D. Apply insulation to valves and specialties as follows:

1. Apply preformed valve covers manufactured of the same material as pipe insulation and attached according to the manufacturer's written instructions.
2. Apply cut segments of pipe and sheet insulation to valve body. Arrange insulation to permit access to packing and to allow valve operation without disturbing insulation.
3. Secure insulation to valves and specialties and seal seams with manufacturer's recommended adhesive. Cement to avoid openings in insulation that will allow passage of air to the pipe surface.

3.5 INSULATION APPLICATION SCHEDULE

A. Items Not Insulated: Unless otherwise indicated, do not apply insulation to the following systems, materials, and equipment:

1. Flexible connectors.
2. Vibration-control devices.
3. Fire-suppression piping.
4. Drainage piping located in crawl spaces, unless otherwise indicated.
5. Below-grade piping, unless otherwise indicated.
6. Chrome-plated pipes and fittings, unless potential for personnel injury.
7. Air chambers, unions, strainers, check valves, plug valves, and flow regulators.

B. Service: Domestic cold water (CW).

1. Insulation Material: Mineral fiber.
2. Insulation Thickness: 1/2”
3. Vapor Retarder Required: Yes.

C. Service: Domestic hot water and circulating water (HW, HWC).

1. Insulation Material: Mineral fiber
2. Insulation Thickness: Apply the following insulation thicknesses:

a. Systems without recirculation: 1/2”
b. 1/2” to 2” pipe: 1”
c. 2 ½” and larger: 1-1/2”

3. Vapor Retarder Required: No.

D. Service: Domestic hot and cold water, direct buried.

1. Insulation Material: Flexible elastomeric.
2. Insulation Thickness: 3/4”
3. Vapor Retarder Required: Yes.

E. Service: Storm drain (ST).

1. Insulation Material: Mineral fiber.
2. Insulation Thickness: 1/2”
3. Vapor Retarder Required: Yes Service:

F. Service: Sanitary waste piping.

1. Insulation Material: None.

END OF SECTION 220720

SECTION 221116 - WATER DISTRIBUTION 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 water distribution piping from locations indicated to fixtures and equipment inside building.

1.3 SYSTEM PERFORMANCE REQUIREMENTS

A. Provide components and installation capable of producing piping systems with the 125 psig minimum working-pressure ratings, unless otherwise indicated:

1.4 QUALITY ASSURANCE

A. Provide listing/approval stamp, label, or other marking on piping made to specified standards.

B. Comply with ASME B31.9, "Building Services Piping," for materials, products, and installation.

PART 2 - PRODUCTS

2.1 PIPES AND TUBES

A. General: Applications of the following pipe and tube materials are indicated in Part 3 "Piping Applications" Article.

B. Soft Copper Tube: ASTM B 88, Types K, water tube, annealed temper.

C. Hard Copper Tube: ASTM B 88, Types L, water tube, drawn temper.

2.2 PIPE AND TUBE FITTINGS

A. General: Applications of the following pipe and tube fitting materials are indicated in Part 3 "Piping Applications" Article.

B. Copper, Solder-Joint Pressure Fittings: ASME B16.18 cast-copper alloy or ASME B16.22 wrought copper.

C. Copper, Grooved-End Fittings: ASTM B 75 copper tube or ASTM B 584 bronze castings.

D. Bronze Flanges: ASME B16.24, Class 150, with solder-joint end. Furnish Class 300 flanges if required to match piping.

E. Copper Unions: ASME B16.18, cast-copper-alloy, hexagonal-stock body with ball-and-socket joint, metal-to-metal seating surfaces, and solder-joint, threaded, or solder-joint and threaded ends. Include threads conforming to ASME B1.20.1 on threaded ends.

2.3 JOINING MATERIALS

A. General: Applications of the following piping joining materials are indicated in Part 3 "Piping Applications" Article.

B. Refer to Division 22 Section "Basic Materials and Methods for Plumbing" for commonly used joining materials.

C. Solder: ASTM B 32, Alloy Sn95, Sn94, or E; lead free.

D. Brazing Filler Metal: AWS A5.8, BCuP, copper phosphorus or BAg, silver classification.

E. Transition Couplings: Coupling or other manufactured fitting same size as, with pressure rating at least equal to, and with ends compatible with piping to be joined.

F. Mechanical Couplings for Grooved-End Copper Tubing: Copper-tube dimensions and design similar to AWWA C606, ferrous housing sections, EPDM-rubber gaskets suitable for domestic hot and cold water (gasket to serve as dielectric fitting), bolts and nuts. Minimum pressure rating = 300 psig.

2.4 VALVES

A. Refer to Division 22 Section "Valves" for general-duty valves.

B. Refer to Division 22 Section "Plumbing Specialties" for special-duty valves.

PART 3 - EXECUTION

3.1 PIPING APPLICATIONS

A. Transition and special fittings with pressure ratings at least equal to piping pressure rating may be used in applications below, unless otherwise indicated.

B. Fitting Option: Mechanically formed tee-branch outlets and brazed joints may be used on aboveground copper tubing.

C. Water Distribution Piping:

1. Aboveground: Hard copper tube, Type L; copper, solder-joint fittings; and soldered joints.

3.2 VALVE APPLICATIONS

A. Drawings indicate valve types to be used. Where specific valve types are not indicated, the following requirements apply:

1. Shutoff Duty: Use ball, or butterfly valves.
2. Throttling Duty: Use ball, or butterfly valves.

B. Grooved-end butterfly valves may be used with grooved-end piping.

3.3 PIPING INSTALLATION, GENERAL

A. Refer to Division 22 Section "Basic Piping Materials and Methods for Plumbing" for basic piping installation.

B. Install piping level without pitch or with 0.25 percent slope downward toward drain when drains are indicated.

3.4 JOINT CONSTRUCTION

A. Refer to Division 22 Section "Basic Materials and Methods for Plumbing" for basic piping joint construction.

3.5 VALVE INSTALLATION

A. Sectional Valves: Install sectional valves close to main on each branch and riser serving plumbing fixtures or equipment, and where indicated. Use ball valves for piping 2-inch NPS and smaller. Use butterfly valves for piping 2-1/2-inch NPS and larger.

B. Shutoff Valves: Install shutoff valve on each water supply to equipment, on each supply to plumbing fixtures without supply stops, and where indicated. Use ball valves for piping 2-inch NPS and smaller. Use butterfly valves for piping 2-1/2-inch NPS and larger.

C. Drain Valves: Install hose-end drain valves for equipment, at base of each water riser, at low points in horizontal piping, and where required to drain water piping.

D. Calibrated Balancing Valves: Install in each hot-water circulation return branch, discharge side of each pump and circulator, and where indicated. Refer to Division 22 Section "Plumbing Specialties" for calibrated balancing valves.

3.6 FIELD QUALITY CONTROL

A. Do not enclose, cover, or put piping into operation until it is inspected and approved by authorities having jurisdiction.

3.7 CLEANING

A. Clean and disinfect service entrance piping and water distribution piping as follows:

1. Purge new piping and parts of existing water piping that have been altered, extended, or repaired before using.

2. Use purging and disinfecting procedure prescribed by authorities having jurisdiction or, if method is not prescribed, procedure described in either AWWA C651 or AWWA C652 or as described below:

    a. Flush piping system with clean, potable water until dirty water does not appear at outlets.
    b. Fill and isolate system according to either of the following:

        1) Fill system or part thereof with water/chlorine solution with at least 50 ppm of chlorine. Isolate with valves and allow to stand for 24 hours.
        2) Fill system or part thereof with water/chlorine solution with at least 200 ppm of chlorine. Isolate and allow to stand for 3 hours.

    c. Flush system with clean, potable water until chlorine is no longer in water coming from system after the standing time.

B. Prepare and submit reports for purging and disinfecting activities.

C. Clean interior of piping system. Remove dirt and debris as work progresses.

3.8 START-UP

A. Fill water piping. Check components to determine that they are not air bound and that piping is full of water.

B. Perform the following steps before putting into operation:

1. Close drain valves, hydrants, and hose bibbs.
2. Open shutoff valves to fully open position.
3. Open throttling valves to proper setting.
4. Remove plugs used during testing of piping and plugs used for temporary sealing of piping during installation.
5. Remove and clean strainer screens. Close drain valves and replace drain plugs.

C. Check plumbing equipment and verify proper settings, adjustments, and operation. Do not operate water heaters before filling with water.

D. Set water-pressure regulators at 80 psig maximum outlet pressure, unless otherwise indicated.

END OF SECTION 221116

SECTION 221316 - DRAINAGE 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 sanitary drainage and vent piping, and storm drainage piping inside building and to locations indicated.

1.3 SYSTEM PERFORMANCE REQUIREMENTS

A. Provide components and installation capable of producing piping systems with following minimum working-pressure ratings, unless otherwise indicated:

1. Soil, Waste, and Vent Piping: 10-foot head of water.
2. Storm Drainage Piping: 10-foot head of water.

1.4 SUBMITTALS

A. Test Results and Reports: Specified in "Field Quality Control" Article.

B. See “Submittal Schedule” located at the end of Section 220100 – General Requirements for Plumbing.

1.5 QUALITY ASSURANCE

A. Provide listing/approval stamp, label, or other marking on piping made to specified standards.

B. Comply with ASME B31.9, "Building Services Piping," for materials, products, and installation.

PART 2 - PRODUCTS

2.1 PIPES AND TUBES

A. General: Applications of the following pipe and tube materials are indicated in Part 3 "Piping Applications" Article.

B. Hub-and-Spigot, Cast-Iron Soil Pipe: ASTM A 74, Service and Extra Heavy classes. Include ASTM C 564 rubber gasket, with dimensions required for pipe class, for each hub.

C. Hubless, Cast-Iron Soil Pipe: ASTM A 888 or CISPI 301.

D. Hard Copper Tube: ASTM B 88, Types L and M, water tube, drawn temper.

E. Hard Copper Tube: ASTM B 306, drainage tube, drawn temper.

F. Galvanized Steel Pipe: ASTM A 53, Type E or S, Grade A or B, Schedule 40.

2.2 PIPE AND TUBE FITTINGS

A. General: Applications of the following pipe and tube fitting materials are indicated in Part 3 "Piping Applications" Article.

B. Threaded-Fitting, End Connections: ASME B1.20.1.

C. Hub-and-Spigot, Cast-Iron, Soil-Pipe Fittings: ASTM A 74, Service and Extra Heavy classes, hub and spigot. Include ASTM C 564 rubber gasket, with dimensions required for pipe class, for each hub.

D. Hubless, Cast-Iron, Soil-Pipe Fittings: CISPI 301.

E. Copper, Solder-Joint Drainage Fittings: ASME B16.23 cast copper or ASME B16.29 wrought copper.

2.3 JOINING MATERIALS

A. Refer to Division 22 Section "Basic Piping Materials and Methods for Plumbing" for commonly used joining materials.

B. Solder: ASTM B 32, Alloy Sn95, Sn94, or E; lead free.

C. Hubless, Cast-Iron, Soil-Piping Couplings: CISPI 310/NSF assembly of metal housing, corrosion-resistant fasteners, and ASTM C 564 rubber sleeve or gasket with integral, center pipe stop. Neoprene Couplings with stainless steel clamps.

PART 3 - EXECUTION

3.1 PIPING APPLICATIONS

A. Transition and special fittings with pressure ratings at least equal to piping pressure rating may be used in applications below, unless otherwise indicated.

B. Aboveground, Sanitary Waste and Vent Piping and Storm Piping: Use the following:

1. 1-1/2 to 10-Inch NPS: Hubless, cast-iron soil pipe; hubless, cast-iron, soil-pipe fittings; and hubless, cast-iron, soil-piping couplings:
2. 1-1/4 to 4-Inch NPS: Hard copper drainage tube; copper, solder-joint drainage fittings; and soldered joints.

C. Underground, Sanitary Waste, and Vent Piping: Use the following:

1. 2- to 12-Inch NPS: Hub-and-spigot, cast-iron soil pipe, Service class; hub-and-spigot, cast-iron, soil-pipe fittings, Service class; and compression joints.

3.2 PIPING INSTALLATION

A. Refer to Division 22 Section "Basic Piping Materials and Methods for Plumbing" for basic piping installation.

B. Extend building sanitary drain piping and connect to sanitary sewer piping in sizes and locations indicated for service entrances into building. Install double grade cleanout and extension to grade at connections of building sanitary drains with building sanitary sewers.

C. Extend building storm drain piping and connect to storm sewer piping in sizes and locations indicated for service entrances into building. Install double grade cleanout and extension to grade at connections of building storm drains and building storm sewers.

D. Install wall penetration system at each service entrance pipe penetration through foundation wall. Make installation watertight. Refer to Division 22 Section "Basic Mechanical Materials and Methods for Plumbing" for wall penetration systems.

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."

F. Make changes in direction for 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 make change in direction of flow greater than 90 degrees. Use proper size of standard increasers and reducers if different sizes of piping are connected. Reducing size of drainage piping in direction of flow is prohibited.

G. Lay buried building drain 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 drainage and vent piping at the following minimum slopes, unless otherwise indicated:

1. Sanitary Drain: 1/4” per foot downward in direction of flow for piping 3-inch NPS and smaller; 1/8” per foot downward in direction of flow for piping 4-inch NPS and larger.
2. Storm Drain: 1/8” per foot downward in direction of flow.
3. Vent Piping: 1/8” per foot downward toward vertical fixture vent or toward vent stack.

I. Cast-Iron, Soil-Piping Joints: Make joints according to CISPI's "Cast Iron Soil Pipe and Fittings Handbook," Chapter IV, "Installation of Cast Iron Soil Pipe and Fittings."

1. Compression Joints: Make with rubber gasket matching class of pipe and fittings.
2. Hubless Joints: Make with rubber gasket and sleeve or clamp.

J. Install indirect waste piping per local code requirements. Maintain code required air gaps.

3.3 FIELD QUALITY CONTROL

A. Do not enclose, cover, or put piping into operation until it is inspected and approved by authorities having jurisdiction.

B. Test drainage and vent piping according to procedures of authorities having jurisdiction or, in absence of published procedure, 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 has been covered or concealed before it has been tested and approved.
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 feet of head. Water level must not drop from 15 minutes before inspection starts through completion of inspection. 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. 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 using new materials and retest piping or portion thereof until satisfactory results are obtained.
6. Prepare reports for tests and required corrective action.

3.4 CLEANING AND PROTECTING

A. Clean interior of piping system. Remove dirt and debris as work progresses.

B. Protect drains during remainder of construction period to avoid clogging with dirt and debris and to prevent damage from traffic and construction work.

C. Place plugs in ends of uncompleted piping at end of day and when work stops.

END OF SECTION 221316

SECTION 221319 - 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 plumbing specialties for the following:

1. Water distribution systems.
2. Soil, waste, and vent systems.
3. Storm drainage systems.

1.3 SYSTEM PERFORMANCE REQUIREMENTS

A. Provide components and installation capable of producing piping systems with following minimum working-pressure ratings, unless otherwise indicated:

1. Water Distribution Piping: 125 psig.
2. Soil, Waste, and Vent Piping: 10-foot head of water.
3. Storm Drainage Piping: 10-foot head of water.

1.4 SUBMITTALS

A. Product Data: For each plumbing specialty indicated. Include rated capacities of selected equipment 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 plumbing specialty products:

1. Backflow preventers.
2. Water regulators.
3. Balancing valves.
4. Water hammer arresters.
5. Drain valves.
6. Hose bibbs and hydrants.
7. Outlet boxes.
8. Backwater valves.
9. Cleanouts.
10. Floor drains.
11. Vent caps, vent terminals, and roof flashing assemblies.

B. Reports: Specified in "Field Quality Control" Article.

C. Maintenance Data: For specialties to include in the maintenance manuals. Include the following:

1. Backflow preventers.
2. Water regulators.
3. Hose stations.
4. Sanitary hydrants.
5. Backwater valves.

D. See “Submittal Schedule” located at the end of Section 220100 – General Requirements for Plumbing.

1.5 QUALITY ASSURANCE

A. Product Options: Drawings indicate size, profiles, dimensional requirements, and characteristics of plumbing specialties and are based on the specific types and models indicated. Other manufacturers' products with equal performance characteristics may be considered. Refer to Division 1 Section "Substitutions."

B. Provide listing/approval stamp, label, or other marking on plumbing specialties made to specified standards.

C. Listing and Labeling: Provide electrically operated plumbing specialties specified in this Section that are listed and labeled as defined in National Electrical Code, Article 100.

D. Comply with ASME B31.9, "Building Services Piping," for materials, products, and installation.

E. Comply with NFPA 70, "National Electrical Code," for electrical components.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Backflow Preventers:

   a. Ames Co., Inc.
   b. B & K Industries, Inc.
   c. Cla-Val Co.
   d. CMB Industries; Febco Div.
   e. Conbraco Industries, Inc.
   f. FLOMATIC Corp.
   g. Grinnell Corp.; Mueller Co. Marketing Group for Hersey Products Div.
   h. IMI Cash Valve.
   i. Sparco, Inc.
   j. Watts Industries, Inc.; Water Products Div.
   k. Zurn Industries, Inc.; Wilkins Div.

2. Water Pressure Regulators:

   a. Bermad, Inc.
   b. Cashco, Inc.
   c. Cla-Val Co.

d. Conbraco Industries, Inc.
e. FLOMATIC Corp.
f. G A Industries, Inc.
g. Honeywell Braukmann.
h. IMI Cash Valve.
i. Kaye & Mac Donald, Inc.
j. Keckley: O.C. Keckley Co.
k. Spence Engineering Co., Inc.
l. Watts Industries, Inc.; Water Products Div.
m. Zurn Industries, Inc.; Wilkins Div.

3. Calibrated Balancing Valves:

a. Amtrol, Inc.
b. Armstrong Pumps, Inc.
c. Flow Design, Inc.
d. ITT Fluid Technology Corp.; ITT Bell & Gossett Div.
e. Taco, Inc.
f. Tour & Andersson, Inc.; Valve Div.
g. Watts Industries, Inc.; Water Products Div.

4. Memory-Stop Balancing Valves:

a. Crane Co.; Valve Div.
b. Grinnell Corp.
c. Hammond Valve Corp.
d. Milwaukee Valve Co., Inc.
e. Nibco, Inc.

5. Outlet Boxes:

a. Acorn Engineering Co.
b. Guy Gray Manufacturing Co., Inc.
c. IPS Corp.
d. LSP-Specialty Products Co.
e. Oatey Co.
f. Plastic Oddities, Inc.
g. Symmons Industries, Inc.

6. Water Hammer Arresters:

a. Amtrol, Inc.
b. Enpoco, Inc.
c. Josam Co.
d. Precision Plumbing Products, Inc.
e. Sioux Chief Manufacturing Co., Inc.
f. Smith: Jay R. Smith Mfg. Co.
g. Sparco, Inc.
h. Tyler Pipe; Wade Div.
i. Watts Industries, Inc.; Ancon Drain Div.
j. Watts Industries, Inc.; Water Products Div.
k. Zurn Industries, Inc.; Hydromechanics Div.
l. MIFAB, Inc.

7. Floor Drains, Roof drains, Drain Specialties

a. Josam Co.
b. Sioux Chief Manufacturing Co., Inc.
c. Smith: Jay R. Smith Mfg. Co.
d. Tyler Pipe, Wade Div.
e. Watts Industries, Inc., Ancon Drain Div.
f. Zurn Industries, Inc., Hydromechanics Div.
g. MIFAB, Inc.

2.2 BACKFLOW PREVENTERS

A. General: ASSE standard, backflow preventers, of size indicated for maximum flow rate and maximum pressure loss indicated.

1. 2-Inch NPS and Smaller: Bronze body with threaded ends.
2. 2-1/2-Inch NPS 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.

B. Pipe-Applied, Atmospheric-Type Vacuum Breakers: ASSE 1001, with floating disc and atmospheric vent.

C. 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.

D. Intermediate Atmospheric-Vent Backflow Preventers: ASSE 1012, suitable for continuous pressure application. Include inlet screen and 2 independent check valves with intermediate atmospheric vent.

E. 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 2 positive-seating check valves.

F. Double-Check Backflow Prevention Assemblies: ASSE 1015, suitable for continuous pressure application. Include shutoff valves on inlet and outlet, and strainer on inlet; and test cocks with 2 positive-seating check valves.

G. 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, 1/4- or 3/8-inch NPS as required.

H. Hose-Connection Backflow Preventers: ASSE 1052, suitable for at least 3-gpm flow and applications with up to 10-foot head back pressure. Include 2 check valves; intermediate atmospheric vent; and nonremovable, ASME B1.20.7 garden-hose thread on outlet.

2.3 WATER PRESSURE REGULATORS

A. General: water regulators, rated for initial working pressure of 150 psig minimum, of size, flow rate, and inlet and outlet pressures indicated. Include integral factory-installed or separate field-installed Y-pattern strainer.

1. 2-Inch NPS and Smaller: Bronze body, renewable nickel alloy seats, stainless steel internal parts, with threaded ends.
2. 2-1/2-Inch NPS and Larger: Water-control valve – pilot operated, diaphragm-type, single seated, main water-pressure control valve. Provide with low flow bypass, speed controller, specialty fittings, sensor piping and valves to isolate pilot and bypass valve trim without disrupting main building service. Cast or ductile iron body, flanged ends with initial working pressure rating of 150 psig minimum. Provide with AWWA C550 or FDA-approved, interior epoxy coating.

2.4 BALANCING VALVES

A. Calibrated Balancing Valves: Adjustable, with 2 readout ports and memory setting indicator. Include manufacturer's standard hoses, fittings, valves, differential pressure meter, and carrying case.

1. 2-Inch NPS and Smaller: Bronze body with brass ball, adjustment knob, calibrated nameplate, and threaded or solder-joint ends.
2. 2-Inch NPS and Smaller: Bronze, Y-pattern body with adjustment knob and threaded ends.
3. 2-1/2-Inch NPS and Larger: Cast-iron, Y-pattern body with bronze disc and flanged or grooved ends.

B. Memory-Stop Balancing Valves, 2-Inch NPS and Smaller: ball valve, rated for 400-psig minimum CWP. Include 2-piece, ASTM B 62 bronze body with standard port, chrome-plated brass ball, replaceable seats and seals, blowout-proof stem, solder-joint ends, and vinyl-covered steel handle with memory-stop device.

2.5 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 round perforations, unless otherwise indicated. Screwed screen retainer with centered blowdown with hose-end drain valve

2.6 OUTLET BOXES

A. General: Recessed-mounting outlet boxes with fittings complying with ASME A112.18.1M. Include box with faceplate, services indicated for equipment connections, and wood-blocking reinforcement.

B. Clothes Washer Outlet Boxes: With recessed box and faceplate, two ½” hose connections with shut-off valves, 2” standpipe and drain, as indicated on drawings.

C. Ice Maker Outlet Boxes: With recessed box and faceplate, hose connection and shut-off valve.

2.7 CLEANOUTS

A. Cleanout Plugs: Cast iron or brass, threads complying with ANSI B2.1, countersunk head. Engrave heads to identify system.

B. Floor Cleanouts: Cast iron body and frame with cleanout plug and adjustable round nickel bronze top. Provide to match floor system:

1. Exposed finish type, standard mill finish.
2. Exposed flush type, standard non-slip scored or abrasive finish.
3. Exposed flush type, standard mill finish and carpet marker.
4. Heavy duty for traffic applications.

C. Wall Cleanouts: Cast iron body adaptable to pipe with cast bronze, brass cleanout plug; stainless steel cover, vandal proof screws.

2.8 FLOOR DRAINS

A. Floor Drain D-1: J. R. Smith #2005, cast iron body, flashing collar, 5” or 6” round, adjustable nickel bronze grate.

2.9 FLASHING

A. Shower Drains: Non-plasticized , chlorinated, polyethylene, concealed, water-proof membrane, 0.40” thick, solvent weldable. Full size of shower basin plus 12”.

B. Floor Drains: Non-plasticized , chlorinated, polyethylene, concealed, water-proof membrane, 0.40” thick, solvent weldable. 48” square minimum.

2.10 MISCELLANEOUS PIPING SPECIALTIES

A. Water Hammer Arresters: ASME A112.26.1M, ASSE 1010, or PDI-WH 201, bellows or piston type with pressurized cushioning chamber. Sizes are based on water-supply fixture units, ASME A112.26.1M sizes A through F and PDI-WH 201 sizes A through F.

B. Floor-Drain Inlet Fittings: Cast iron, with threaded inlet and threaded or spigot outlet, and trap seal primer valve connection.

C. Air-Gap Fittings: ASME A112.1.2, cast iron or cast bronze, with fixed air gap, inlet for drain pipe or tube, and threaded or spigot outlet.

D. 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.

E. Vent Terminals: Commercially manufactured, shop-fabricated or field-fabricated, frost-proof assembly constructed of galvanized steel, copper, or lead-coated copper. Size to provide 1-inch enclosed air space between outside of pipe and inside of flashing collar extension, with counterflashing, as indicated.

PART 3 - EXECUTION

3.1 PLUMBING SPECIALTY INSTALLATION

A. General: Install plumbing specialty components, connections, and devices according to manufacturer's written instructions.

B. Install backflow preventers of type, size, and capacity indicated, at each water-supply connection to mechanical equipment and systems, and to other equipment and water systems as indicated. Comply with authorities having jurisdiction. Locate backflow preventers in same room as connected equipment. Install air-gap fitting on units with atmospheric-vent connection and pipe relief outlet drain to nearest floor drain. Do not install bypass around backflow preventer.

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, and where indicated.

E. Install cleanouts in aboveground piping and building drain piping as indicated, and where not indicated, according to the following:

1. Size same as drainage piping up to 4-inch NPS. Use 4-inch NPS 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 for piping 4-inch NPS and smaller and 100 feet for larger piping.
4. Locate at base of each vertical soil and waste stack.

F. Install cleanout deck plates with top flush with finished floor, for floor cleanouts for piping below floors.

G. Install cleanout wall access covers with frame and cover flush with finished wall, for cleanouts located in concealed piping.

H. Install flashing flange and clamping device with each stack and cleanout passing through floors with waterproof membrane.

I. Install vent flashing sleeves on stacks passing through roof. Secure over stack flashing according to manufacturer's written instructions.

J. Install frost-proof vent caps on each vent pipe passing through roof. Maintain 1-inch clearance between vent pipe and roof substrate.

K. Install floor drains at low points of surface areas to be drained. Set grates of drains flush with finished floor or as indicated. Size outlets as indicated.

L. Install individual traps for floor drains connected to sanitary building drain, unless otherwise indicated.

M. Install floor-drain flashing collar or flange so no leakage occurs between drain and adjoining flooring. Maintain integrity of waterproof membranes where penetrated.

N. Position floor drains for easy access and maintenance.

O. Install roof drains at low points of roof areas according to roof membrane manufacturer's written installation instructions. Size outlets as indicated.

P. Install roof-drain flashing collar or flange so no leakage occurs between drain and adjoining roofing. Maintain integrity of waterproof membranes where penetrated.

Q. Position roof drains for easy access and maintenance.

R. Install individual stop valve in each water supply to plumbing specialties. Use ball, or globe valve if specific valve is not indicated. Install water-supply stop valves in accessible locations.

S. Install traps on plumbing specialty drain outlets. Omit traps on indirect wastes unless trap is indicated.

T. Locate drainage piping as close as possible to bottom of floor slab supporting fixtures and drains.

U. 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.

V. Install water hammer arrestor at each battery of plumbing fixture connections and additionally as required to eliminate water hammer. Locate in easily accessible location.

W. Install flashing on pipes, sleeves, and specialties passing through or embedded in floors and roofs with waterproof membrane.

3.2 CONNECTIONS

A. Piping installation requirements are specified in other Division 22 Sections. Drawings indicate general arrangement of piping, fittings, and specialties.

B. Arrange for electric-power connections to plumbing specialties and devices that require power. Electric power, wiring, and disconnect switches are specified in Division 26 Sections.

C. Supply Runouts to Plumbing Specialties: Install hot- and cold-water-supply piping of sizes indicated, but not smaller than required by authorities having jurisdiction

D. Drainage Runouts to Plumbing Specialties: Install drainage and vent piping, with approved trap, of sizes indicated, but not smaller than required by authorities having jurisdiction.

3.3 START-UP

A. Before startup, perform the following checks:

1. System tests are complete.
2. Damaged and defective specialties and accessories have been replaced or repaired.
3. Clear space is provided for servicing specialties.

B. Before operating systems, perform the following steps:

1. Close drain valves, hydrants, and hose bibbs.
2. Open general-duty valves to fully open position.
3. Remove and clean strainers.
4. Verify that drainage and vent piping are clear of obstructions. Flush with water until clear.

C. Startup Procedures: Follow manufacturer's written instructions. If no procedures are prescribed by manufacturer, energize circuits for electrically operated units. Start and run units through complete sequence of operations.

D. Adjust operation and correct deficiencies discovered during commissioning.

3.4 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.

3.5 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner’s maintenance personnel to adjust, operate, and maintain, plumbing specialties.

END OF SECTION 221319

SECTION 224000 - PLUMBING FIXTURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes plumbing fixtures and trim, faucets, other fittings, and related components.

1.3 DEFINITIONS

A. Accessible: Plumbing fixture, building, facility, or portion thereof that can be approached, entered, and used by physically handicapped, disabled, and elderly people.

1.4 SUBMITTALS

A. Product Data for each plumbing fixture category and type specified. Include selected fixture, trim, fittings, accessories, appliances, appurtenances, equipment, and supports. Indicate materials and finishes, dimensions, construction details, and flow-control rates.

B. Wiring diagrams from manufacturer for electrically operated units.

C. Maintenance data for plumbing fixtures and components to include in the operation and maintenance manuals.

D. See “Submittal Schedule” located at the end of Section 230100 – “General Requirements for Mechanical Systems”.

1.5 QUALITY ASSURANCE

A. Regulatory Requirements: Comply with requirements of CABO A117.1, "Accessible and Usable Buildings and Facilities"; Public Law 90-480, "Architectural Barriers Act"; and Public Law 101-336, "Americans with Disabilities Act"; regarding plumbing fixtures for physically handicapped people.

B. Energy Policy Act Requirements: Comply with requirements of Public Law 102-486, "Energy Policy Act," regarding water flow rate and water consumption of plumbing fixtures.

C. Select combinations of fixtures and trim, faucets, fittings, and other components that are compatible.

1.6 EXTRA MATERIALS

A. Repair kits complete with all necessary washers, springs, pins, retainers, packings, O-rings, sleeves and seats: Furnish quantity of identical units not less than 5 percent of each type and size installed.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Vitreous-China and Enameled Fixtures:

    a. Kohler Co.
    b. American Standard, Inc.
    c. Briggs Industries, Inc.
    d. ProFlo (Manufactured by Briggs, supplied by Ferguson)
    e. Crane Plumbing.
    f. Eljer Industries.
    g. Gerber Plumbing Fixtures Corp.
    h. Mansfield Plumbing Products, Inc.
    i. Universal-Rundle Corp.
    j. Sloan Valve Co.

2. Flushometer Valves:

    a. Sloan Valve Co
    b. Coyne & Delany Co.
    c. Speakman Co.
    d. TOTO KIKI USA, Inc.
    e. Zurn Industries, Inc.; Flush Valve Operations.

3. Toilet Seats:

    a. American Standard, Inc.
    b. Bemis Mfg. Co.
    c. Centoco Manufacturing Corp.
    d. Church Seat Co.
    e. Eljer Industries.
    f. Kohler Co.
    g. Olsonite Corp.
    h. Sanderson Plumbing Products, Inc.; Beneke Industries, Ltd.
    i. Sperzel.

4. Tub/Shower basin:

    a. Mustee
    b. Aqua Bath Co., Inc.
    c. Aqua Glass Corp.
    d. Aquarius/Pinnacle.
    e. Lasco Bathware, Inc.

5. Supply Fittings and Faucets:

a. American Standard, Inc.
b. Chicago Faucet Co.
c. Crane Plumbing.
d. Eljer Industries.
e. Kohler Co.
f. Masco Canada, Ltd.; Cambridge Brass Div.
g. Masco Corp.; Delta Faucet Co.
h. Moen, Inc.
i. Price Pfister, Inc.
j. Speakman Co.
k. Symmons Industries, Inc.
l. T & S Brass and Bronze Works, Inc.
m. Zurn Industries, Inc.

6. Shower Mixing-Valve Faucet and Miscellaneous Fittings:

a. Alsons Corp.
b. American Standard, Inc.
c. Crane Plumbing.
d. Eljer Industries.
e. Kohler Co.
f. Leonard Valve Co.
g. Mark Controls Corp.; Powers Process Controls.
h. Moen, Inc.
i. Speakman Co.
j. Sterling Plumbing Group, Inc.
k. Symmons Industries, Inc.
l. Wrightway Mfg.
m. Zurn Industries, Inc.; Temp-Gard Operations.

7. Stainless-Steel Sinks:

a. Elkay Manufacturing Co.
b. Just Manufacturing Co.
c. Kohler Co.
d. Moen, Inc.

8. Disposers:

a. Emerson Electric Co.; In-Sink-Erator Div.
b. General Electric Co.; GE Answer Center.
c. Kitchen Aid, Inc.
d. Maytag Co.
e. Waste King, Inc.
f. White Consolidated Industries, Inc.; Major Appliance Group.

9. Fitting Insulation Kit:

a. Brocar Products, Inc.
b. Engineered Brass Co.
c. McGuire Manufacturing Co., Inc.
d. Plumberex Specialty Products.
e. TCI Products.
f. TRUEBRO, Inc.

10. Mop-Sinks and Basins:

    a. Fiat Products, Inc.
    b. Stern-Williams Co., Inc.
    c. Aqua Glass Corp.
    d. Mustee: E.L. Mustee & Sons, Inc.

11. Electric Water Coolers

    a. EBCO Manufacturing Co.
    b. Elkay Manufacturing Co.
    c. Halsey Taylor.
    d. Haws Drinking Faucet Co.
    e. Sunroc Corp.
    f. Oasis

12. Fixture Carriers

    a. J. R. Smith
    b. Josam
    c. Zurn
    d. Wade
    e. Acorn

2.2 FITTINGS

A. Fittings for Plumbing Fixtures: Refer to plumbing fixture schedules at the end of this Section for materials for supplies, supply stops, supply risers, traps, and other fittings.

1. Supply Inlets: Brass pipe or copper tube, size required for final connection.
2. Supply Stops: Chrome-plated brass, angle or straight; compression, wheel-handle or loose-key type; same size as supply inlet and with outlet matching supply riser.
3. Supply Risers: flexible copper tube with knob end. Use chrome-plated tube for exposed applications.
4. Traps: Tubular brass with 0.045-inch wall thickness, slip-joint inlet, cleanout, wall flange, escutcheons, and size to match equipment. Use chrome-plated tube for exposed applications.
5. Continuous Waste: Tubular brass, 0.045-inch wall thickness, with slip-joint inlet, and size to match equipment.
6. Indirect Waste: Tubular brass, 0.045-inch wall thickness, and size to match equipment.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine roughing-in for potable, hot- and cold-water supply piping systems; soil, waste, and vent piping systems; and supports. Verify that locations and sizes of piping and locations and types of supports match those indicated, before installing and connecting fixtures. Use manufacturer's roughing-in data when roughing-in data are not indicated.

3.2 APPLICATIONS

A. Include supports for plumbing fixtures according to the following:

1. Carriers: For wall-hanging water closets and fixtures supported from wall construction.
2. Chair Carriers: For wall-hanging urinals, lavatories, sinks, drinking fountains, and electric water coolers.
3. Heavy-Duty Chair Carriers: For accessible urinals, lavatories, and other fixtures where indicated.

B. Include fitting insulation kits for accessible fixtures according to the following:

1. Lavatories: Cover hot- and cold-water supplies, stops and handles, drain, trap, and waste to wall.
2. Sinks: Cover hot- and cold-water supplies, stops and handles, drain, trap, and waste to wall.
3. Other Fixtures: Cover exposed fittings below fixture.

3.3 PLUMBING FIXTURE INSTALLATION

A. Field Measurements: Coordinate roughing-in and final fixture locations and verify that plumbing fixtures can be installed to comply with original design and referenced standards.

B. Assemble plumbing fixtures and trim, fittings, faucets, and other components according to manufacturers' written instructions.

C. Install fixtures level and plumb according to manufacturers' written instructions, roughing-in drawings, and referenced standards.

D. Install floor-mounted, floor-outlet water closets with closet flanges and gasket seals.

E. Install wall hanging, back-outlet water closets with support manufacturer's tiling frame or setting gage.

F. Install toilet seats on water closets.

G. Install wall hanging, back-outlet urinals with gasket seals.

H. Install flushometer valves for accessible water closets and urinals with handle mounted on wide side of compartment. Install other actuators in locations that are easy for handicapped people to reach.

I. Fasten wall-hanging plumbing fixtures securely to supports attached to building substrate when supports are specified, and to building wall construction where no support is indicated.

J. Fasten floor-mounted fixtures to substrate. Fasten fixtures having holes for securing fixture to wall construction, to reinforcement built into walls.

K. Fasten recessed, wall-mounted fittings to reinforcement built into walls.

L. Fasten wall-mounted fittings to reinforcement built into walls.

M. Fasten counter-mounting plumbing fixtures to casework.

N. Secure supplies to supports or substrate within pipe space behind fixture.

O. Set shower receptors and mop basins in leveling bed of cement grout.

P. Install individual stop valve in each water supply to fixture. Use gate or globe valve where specific stop valve is not specified.

1. Exception: Omit stop valves on supplies to emergency equipment, except when permitted by authorities having jurisdiction. When permitted, install valve chained and locked in OPEN position.

Q. Install water supply stop valves in accessible locations.

R. Install faucet, laminar-flow fittings with specified flow rates and patterns in faucet spouts when faucets are not available with required rates and patterns. Include adapters when required.

S. Install supply, flow-control fittings with specified flow rates in fixture supplies at stop valves.

T. Install faucet, flow-control fittings with specified flow rates and patterns in faucet spouts when faucets are not available with required rates and patterns. Include adapters when required.

U. Install shower, flow-control fittings with specified maximum flow rates in shower arms.

V. Install traps on fixture outlets. Omit traps on fixtures having integral traps. Omit traps on indirect wastes, except where otherwise indicated.

W. Install disposers in sink outlets. Install switch where indicated, or in wall adjacent to sink if location is not indicated.

X. Install hot-water dispensers in back top surface of sink or in counter with spout over sink.

Y. Install escutcheons at wall, floor, and ceiling penetrations in exposed, finished locations and within cabinets and millwork. Use deep-pattern escutcheons where required to conceal protruding pipe fittings.

Z. Seal joints between fixtures and walls, floors, and counters using sanitary-type, 1-part, mildew-resistant, silicone sealant. Match sealant color to fixture color.

3.4 CONNECTIONS

A. Supply and Waste Connections to Plumbing Fixtures: Refer to plumbing fixture schedules at the end of this Section for fitting sizes and connection requirements for each plumbing fixture. Install hot- and cold-water-supply, waste and vent piping of sizes indicated, but not smaller than required by authorities having jurisdiction.

3.5 FIELD QUALITY CONTROL

A. Check that fixtures are complete with trim, faucets, fittings, and other specified components.

B. Inspect installed fixtures for damage. Replace damaged fixtures and components.

C. Test installed fixtures after water systems are pressurized and demonstrate proper operation. Replace malfunctioning fixtures and components, then retest. Repeat procedure until units operate properly.

3.6 ADJUSTING AND CLEANING

A. Operate and adjust faucets and controls. Replace damaged and malfunctioning fixtures, fittings, and controls.

B. Operate and adjust disposers, hot-water dispensers, and controls. Replace damaged and malfunctioning units and controls.

C. Adjust water pressure at drinking fountains, electric water coolers, faucets, shower valves, and flushometer valves having controls, to produce proper flow and stream.

D. Replace washers and seals of leaking and dripping faucets and stops.

E. Clean fixtures, faucets, and other fittings with manufacturers' recommended cleaning methods and materials.

3.7 PROTECTION

A. Provide protective covering for installed fixtures and fittings.

B. Do not allow use of fixtures for temporary facilities, except when approved in writing by Owner.

3.8 PLUMBING FIXTURE SCHEDULE

A. See drawings.

END OF SECTION 224000

SECTION 230100 – GENERAL REQUIREMENTS FOR MECHANICAL SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions apply to this Section.

1.2 SUMMARY

A. This Section includes general mechanical requirements and shall apply to all phases of the work specified, indicated on the drawings or required to provide for complete installation of all mechanical systems including: fire protection systems, plumbing systems; and heating, ventilation, and air conditioning (HVAC) systems.

1.3 WARRANTIES

A. All materials, workmanship and equipment shall be warranted against defects or against injury from proper and usual wear for a period of one year after the date of substantial completion. Any item which becomes defective within the warranty period shall be repaired or replaced, at no additional cost to the Owner.

B. All manufacture’s warranties shall run to the benefit of the Owner. No manufacturer’s warranties shall be voided or impaired.

C. Warranty shall include repair of faulty workmanship.

1.4 ALTERNATES

A. Alternates, if required, shall be as described in the “Alternates” section of this specification, as described on the proposal form of as indicated on the drawings.

1.5 INTERPRETATION OF DOCUMENTS

A. Any questions regarding the meaning of any portion of the contract documents shall be submitted to the Architect/Engineer for interpretation. Definitive interpretations or clarification will be published by addenda or supplemental information. Verbal interpretation not issued by addendum or supplemental information shall not be considered part of the contract documents.

B. The Architect/Engineer shall be the sole judge of interpretations of discrepancies within the contract documents.

C. If ambiguities should appear in the contract documents, the Contractor shall request clarification from the Architect/Engineer before proceeding with the work. If the Contractor fails to make such request, no excuse will thereafter be entertained for failure to carry out the work in a manner satisfactory to the Architect/Engineer. Should a conflict occur within the contract documents, the Contractor is deemed to have estimated the more expensive way of doing the

work unless a written clarification from the Architect/Engineer was requested and obtained before submission of proposed methods or materials.

1.6 DEFINITIONS ABREVIATIONS

A. The following shall apply throughout the contract documents

1. Code All applicable national state and local codes
2. Furnish Supply and deliver to site ready for installation
3. Indicated Noted, scheduled or specified
4. Provide Furnish, install and connect complete and ready for final use by owner
5. ADA Americans with Disabilities Act
6. ANSI American National Standards Institute
7. ARI Air-Conditioning and Refrigeration Institute
8. ASHRAE American Society of Heating, Refrigerating and Air-Conditioning Engineers
9. ASME American Society of Mechanical Engineers
10. ASTM American Society for Testing and Materials
11. NEC National Electric Code (NFPA 70)
12. NEMA National Electrical Manufacturers Association
13. NFPA National Fire Protection Association
14. SMACNA Sheet Metal and Air Conditioning Contractors' National Association
15. UL Underwriters Laboratories Inc.

1.7 CODES AND STANDARDS

A. All work shall be performed by competent craftsmen skilled in the trade involved and shall be done in a manner consistent with normal industry standards.

B. All work shall conform to the currently adopted edition of the National Electric Code (NEC), Local International Building Code with Lincoln amendments, International Mechanical Code with Lincoln amendments, International Plumbing Code with Lincoln amendments, International Energy Code, and all other applicable state and local codes or standards.

C. Where there is a conflict between the code and the contract documents, the code shall have precedence only then it is more stringent than the contract documents. Items that are allowed by the code but are less stringent than those specified shall not be substituted.

1.8 PERMITS

A. Contractor shall become familiar and comply with all requirements regarding permits, fees, licenses, etc. All permits, licenses, inspections and arrangements required for the work shall be obtained by Contractor’s effort and expense. All utilities shall be installed in accordance with the local rules and regulations and all charges shall be paid by the Contractor.

1.9 SUBMITTALS

A. Division 1 section “Submittals” shall be adhered to if more stringent than this section.

B. Shop drawings shall be submitted to Architect/Engineer for review when required by other sections of this specification and for all equipment scheduled or specified on drawings.

1. A letter of transmittal shall be accompany each submittal. Submittals shall be numbered consecutively and list products covered.
2. Unless otherwise noted, submit a minimum of six (6) copies of shop drawing and product data for review. Submit one (1) sample of each item required.

C. Shop Drawings

1. Shop drawings include fabrication and installation drawings, diagrams, schedules of other data specifically prepared for the project. Include dimensions and notations showing compliance with specified standards.
2. Drawing sheet size shall be at least 8 ½" x 11" and not larger than 30"x42". For sheets larger than 11"x17", submit one sheet of reproducible media and one blue-line or photocopy print. Architect/Engineer action will be returned on reproducible media.

D. Product Data

1. Product data includes printed information, such as manufacture's installation instructions, catalog cuts, standard color charts, rough-in diagrams, wiring diagrams and performance curves.
2. Each copy shall clearly indicate conformance with specified capacities, characteristics, dimensions and details. Mark all equipment with same item number as used on drawings. Mark each copy to clearly indicate applicable choices and options.

E. Samples

1. Samples are physical examples used to illustrate materials, equipment or workmanship

F. Architect/Engineer will review or take appropriate action for submittals. Review is only to determine general conformance with design shown in contract documents.

G. Architect/Engineer review of submittals shall not relieve contractor of responsibility for deviation from requirements of the contract documents or from errors or omissions within submittals.

H. No portion of the work requiring submittals shall be commenced until the Architect/Engineer has reviewed the submittal.

I. The use of these drawings is intended solely for preparation of drawings required by this specification. Copyright law prohibits any other use. The user of the electronic files assumes full responsibility for the accuracy and scale of the drawings.

J. See "Submittal Schedule" at the end of Section 230100 – General Requirements for HVAC.

1.10 OPERATION AND MAINTENANCE MANUALS

A. Assemble (3) complete sets of operation and maintenance data indicating the operation and maintenance of each system, subsystem, and piece of equipment not part of a system. Include operation and maintenance data required in individual Specification Sections and as follows:

1. Operation Data:

a. Emergency instructions and procedures.
b. System, subsystem, and equipment descriptions, including operating standards.
c. Operating procedures, including startup, shutdown, seasonal, and weekend operations.

d. Description of controls and sequence of operations.
e. Piping and wiring diagrams.

2. Maintenance Data:

a. Manufacturer's information, including list of spare parts.
b. Name, address, and telephone number of installer or supplier.
c. Maintenance procedures.
d. Maintenance and service schedules for preventive and routine maintenance.
e. Maintenance record forms.
f. Sources of spare parts and maintenance materials.
g. Copies of maintenance service agreements.
h. Copies of warranties and bonds.

B. Organize operation and maintenance manuals into suitable sets of manageable size. Bind and index data in heavy-duty, 3-ring, vinyl-covered, loose-leaf binders, in thickness necessary to accommodate contents, with pocket inside the covers to receive folded oversized sheets. Identify each binder on front and spine with the printed title "OPERATION AND MAINTENANCE MANUAL," Project name, and subject matter of contents.

1.11 PROJECT RECORD DOCUMENTS

A. Record Drawings: Maintain and submit one set of blue- or black-line white prints of Contract Drawings and Shop Drawings.

1. Mark Record Prints to show the actual installation where installation varies from that shown originally.
2. Mark record sets with erasable, red-colored pencil. Use other colors to distinguish between changes for different categories of the Work at the same location.
3. Mark important additional information that was either shown schematically or omitted from original Drawings.
4. Note Construction Change Directive numbers, Change Order numbers, alternate numbers, and similar identification where applicable.
5. Identify and date each Record Drawing; include the designation "PROJECT RECORD DRAWING" in a prominent location.

B. Record Specifications: Submit one copy of Project's Specifications, including addenda and contract modifications. Mark copy to indicate the actual product installation where installation varies from that indicated in Specifications, addenda, and contract modifications.

C. Record Product Data: Submit one copy of each Product Data submittal. Mark one set to indicate the actual product installation where installation varies substantially from that indicated in Product Data.

PART 2 - PRODUCTS

2.1 MATERIALS

A. All materials and equipment used in the construction of the project shall be new unused and undamaged unless otherwise specified. Materials and equipment shall be of latest design standards of manufacturer specified.

B. Materials and equipment are limited by the requirements of the contract documents. Material and equipment shall be provided in accordance with the following:

1. Basis of Design Products: Basis of Design Products are those products around which the project was designed in terms of capacity, performance, physical size and quality. Basis of Design Products shall be provided unless substitutions are made in accordance with this specification.
2. Substitutions: Substitutions are product of manufacturers other than listed as Basis of Design. Substitutions shall meet each of the following requirements:

a. The product shall be manufactured by one of the acceptable manufacturers listed in the contract documents.
b. The product shall meet or exceed the requirements of the contract documents in terms of quality, performance, suitability, appearance and characteristics.
c. The contractor providing the substitution shall bear the total cost of all changes due to substitutions. These may include but are not limited to redesign costs and increased work by other contractors or the owner.
d. The Architect/Engineer shall be the sole judge of the suitability of the substation items.

C. Verify installation details and requirements for materials and equipment furnished by others and installed under this contract.

PART 3 - EXECUTION

3.1 DEMONSTRATION AND TRAINING

A. Instruction: Instruct Owner's personnel to adjust, operate, and maintain systems, subsystems, and equipment not part of a system.

1. Provide instructors experienced in operation and maintenance procedures.
2. Provide instruction at mutually agreed-on times. For equipment that requires seasonal operation, provide similar instruction at the start of each season.
3. Schedule training with Owner and Architect/Engineer with at least seven days' advance notice.

B. Program Structure. Include instruction for the following:

1. System design and operational philosophy.
2. Review of documentation.
3. Operations.
4. Adjustments.
5. Troubleshooting.
6. Maintenance.
7. Safety.

3.2 STARTING AND ADJUSTING

A. Start and test all equipment and operating components to confirm proper operation. Test and adjust all systems to achieve designed capacity and performance.

B. Provide three (3) copies of all test report to the Architect/Engineer for review prior to date of substantial completion.

C. All equipment and systems discrepancies shall be corrected prior to final acceptance.

MECHANICAL SUBMITTAL SCHEDULE

Section #	Section Name	Shop Drwgs	Product Data	Samples	Warranty	Other
220100	General Requirements for Plumbing	√	√			√
220500	Basic Materials and Methods for Plumbing	√	√			
220505	Basic Piping Materials and Methods for Plumbing		√			√
220523	Valves for Plumbing		√			√
220720	Pipe Insulation for Plumbing		√			√
221116	Water Distribution Piping					√
221316	Drainage and Vent Piping					√
221319	Plumbing Specialties		√			√
223300	Domestic Water Heaters	√	√		√	√
224000	Plumbing Fixtures		√			√
230100	General Requirements for HVAC	√	√			√
230500	Basic Materials and Methods for HVAC	√	√			
230505	Basic Piping Materials and Methods for HVA		√			√
230593	Testing, Adjusting, and Balancing					√
230700	Duct Insulation		√			
230720	Pipe Insulation For HVAC		√			
230900	HVAC Instrumentation and Controls	√	√			√
230960	Variable Frequency Drives	√	√			√
230993	Sequence of Operation for HVAC Controls	√				√
232300	Refrigerant Piping and Accessories		√			√
233113	Metal Ducts and Accessories	√	√			√
233423	Power Ventilators	√	√			√
238126	Split System Air-Conditioning Units	√	√			√
238127	Variable Refrigerant Volume HVAC System	√	√	√	√	√

END OF SECTION 230100

SECTION 230500 – BASIC 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 and shall apply to all phases of the work specified, indicated on the drawings or required to provide for complete installation of mechanical systems.

1. Indenting Devices and Labels
2. Grout
3. Sealants
4. Access Doors
5. Electrical Requirements
6. Motors
7. Mechanical Equipment Installation
8. Labeling and Identifying
9. Construction Layout
10. Data and Measurements

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.

1.4 SUBMITTALS

A. Product Data: For sealants and identification materials and devices.

B. Shop Drawings: Detail fabrication and installation for metal and wood supports and anchorage for mechanical materials and equipment.

C. See “Submittal Schedule” at the end of Section 230100 – General Requirements for HVAC.

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. Each contractor shall make provisions for delivery and safe storage of materials. Materials shall be delivered in a timely manner to expedite the work.

B. Protect stored piping, supplies and equipment from cold, moisture and dirt. Elevate above grade. Do not exceed structural capacity of floor, if stored inside.

1.7 COORDINATION

A. Coordinate mechanical equipment installation with other building components.

B. Arrange for pipe, duct and equipment 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.

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.

H. Motors, equipment, controls, etc. shall be furnished, mounted and connected according to the following schedule unless otherwise noted (E =Electrical Contractor, M = Mechanical Contractor):

I.

Item	Furnished By	Set in place or mounted by	Power wiring and connection by	Control Wiring and connection by
1) Disconnect switches, thermal overload switches, manual operating switches				
a) Furnished as part of factory wired mechanical equipment	M	M	E	--
b) Loose mounted	E	E	E	--
2) Transformers				
a) Serving 24 Volt control power	M(1)	M	E	M
3) Low voltage controls and thermostats	M	M	M	M (2)
4) Temperature control panels	M	M	E	M
5) Motorized control valves, damper motors, solenoid valves, etc.				
a) Line Voltage	M	M	E	M
b) Low Voltage	M	M	M	M
6) Factory pre-wired control/power panels including remote sensing devices	M	M	E	M(3)
7) Fire protection controls	M	M	E	E
8) Fire Smoke Dampers				
a) In space (120 Volt)	M	M	E	E(4)
9) Fire and smoke detectors including relays for fan shutdown	E	E	E	E(5)

J. Notes:

1. When control power is not available, mechanical contractor shall provide control transformers as required to power all valves, dampers, etc.
2. Conduit rough-in for thermostats by electrical contractor.
3. Fan coil units, and heat pumps control wiring including wiring of remote sensors by mechanical. Control circuit feeders by mechanical unless shown otherwise.
4. Smoke dampers will be specified as 115 volt (verify) with wiring by Electrical Contractor and control from the fire alarm panel. Smoke detectors furnished by electrical contractor are required to make dampers operate.
5. Wiring from alarm contacts to alarm system by Electrical; control function wiring by Mechanical.

PART 2 - PRODUCTS

2.1 IDENTIFYING DEVICES AND LABELS

A. General: Manufacturer's standard products of categories and types required for each application as referenced in other Division 23 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. 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.

D. Fasteners: Self-tapping stainless-steel screws or contact-type permanent adhesive.

E. Valve Tags: 19 gauge, 1-1/2” diameter, polished brass, stamped or engraved ¼” high piping system abbreviation in and ½” high sequenced valve numbers.

1. Valve tag fastener: solid brass wire link or beaded chain, or ‘S’-hook or size required for proper attachment of tags to valves.

F. Snap-on Plastic Pipe Markers: Manufacturer's standard preprinted, semirigid, snap on, color-coded, complying with ASME A13.1.

G. 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.

2.2 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.

2.3 SEALANTS

A. Polyurethane Sealant: Single component, chemical curing, non-staining, non-bleeding, capable of continuous water immersion, non-sagging for application in vertical and horizontal joints. Color as selected by architect.

B. Accessories: Primer, joint cleaner, joint backing and bond breaker as recommended by sealant manufacturer to suit application.

C. Firestopping Materials: Provide firestopping material to maintain required rating of all fire-resistive assemblies according to requirements of “Firestopping” section of this specification.

2.4 ACCESS DOORS

A. Prime Coated 14 gauge steel, flush, with screw driver operated cam lock. Frame to accommodate construction type; size as indicated.

B. Architectural access panel with concealed hardware and gypsum board inlay. Provide with concealed frame, latch, and hinge. Panel shall be Access Panel Solutions Inc. Bauco Plus II or approved equal.

2.5 ELECTRICAL REQUIREMENTS

A. Compliance for HVAC Equipment

1. Comply with applicable requirements of the National Electric Code (NFPA 70)
2. Provide equipment and accessories that are listed and labeled as defined in NFPA 70
3. Comply with applicable requirements of Underwriters Laboratory (UL)
4. Comply with applicable requirements of NEMA standards

B. Electrical Wire

1. Wiring material shall be in accordance with the latest version of the National Electric Code (NFPA 70) and all applicable local codes and carry the UL label where applicable.
2. All exposed wiring in return air plenums shall be rate cable for fire and smoke spread.

2.6 MOTORS

A. BASIC MOTOR REQUIREMENTS

1. Motors ¾ HP and Larger shall be polyphase. Motors Smaller than ¾ HP shall be single phase unless otherwise indicated
2. Frequency Rating shall be 60 Hz. Voltage Rating is determined by voltage of circuit to which motor is connected.
3. Service Factor: According to NEMA MG 1, unless otherwise indicated.
4. Capacity and Torque Characteristics: Rated for continuous duty and sufficient to start, accelerate, and operate connected loads at designated speeds, in indicated environment, with indicated operating sequence, and without exceeding nameplate ratings or considering service factor.
5. Enclosure: Open dripproof, unless otherwise indicated.
6. Minimum Efficiencies:

    a. a. Up to 1.0 HP - 86%
    b. b. 1.5 to 5 HP - 89.5%
    c. c. 7.5 to 10 HP - 91%
    d. d. 15 to 50 HP - 94.1%
    e. e. 75 Hp and larger - 95.1%

B. POLYPHASE MOTORS

1. General

    a. Design Characteristics: NEMA MG 1, Design B, Energy-Efficient Design, unless otherwise indicated.

b. Stator: Copper windings, unless otherwise indicated. Multispeed motors have separate winding for each speed.
c. Rotor: Squirrel cage, unless otherwise indicated.
d. Bearings: Double-shielded, prelubricated ball bearings suitable for radial and thrust loading.
e. Temperature Rise: Match insulation rating, unless otherwise indicated.
f. Insulation: Class F, unless otherwise indicated.

2. Motors Used with Reduced-Inrush Controllers: Match wiring connection requirements for indicated controller, with required motor leads brought to motor terminal box to suit control method.
3. Motors Used with Variable-Frequency Controllers: Ratings, characteristics, and features coordinated with and approved by controller manufacturer. Inverter rated motors used in conjunction with variable speed drives shall be equipped with a shaft grounding ring. Grounding ring shall be AEGIS Model SGR uKIT, either solid or split ring design. Grounding ring may be epoxy mounted if manufacturer's conductive epoxy adhesive is used.
4. Rugged-Duty Motors: Where indicated, motors are totally enclosed with 1.25 minimum service factor, greased bearings, integral condensate drains, and capped relief vents. Windings are insulated with nonhygroscopic material. External finish is chemical-resistant paint over corrosion-resistant primer.

C. ELECTRONICALLY COMMUTATED MOTORS (ECM)

1. Permanent magnet type motor with near-zero rotor losses designed for synchronous rotation.
2. Brushless DC motor controlled by an integrated controller/inverter that operates the wound stator and senses rotor position to electrically commutate the stator as indicated or selected by manufacturer, to suit starting torque and other requirements of specific motor application. Coordinate input signal for speed with specific application.
3. Motor shall be designed to maintain a minimum 70 percent efficiency over the entire operating range.
4. Thermal Protection: Where indicated or required, internal protection automatically opens power supply circuit to motor when winding temperature exceeds a safe value calibrated to temperature rating of motor insulation. Thermal protection device automatically resets when motor temperature returns to normal range, unless otherwise indicated.
5. Bearings: Sealed, prelubricated ball bearing type for poly-phase or single-phase motors.

D. SINGLE-PHASE MOTORS

1. Permanent-split capacitor, Split-phase start, capacitor run or capacitor start, capacitor run as indicated or selected by manufacturer, to suit starting torque and other requirements of specific motor application.
2. Thermal Protection: Where indicated or required, internal protection automatically opens power supply circuit to motor when winding temperature exceeds a safe value calibrated to temperature rating of motor insulation. Thermal protection device automatically resets when motor temperature returns to normal range, unless otherwise indicated.
3. Bearings: Ball-bearing type for belt-connected motors and other motors with high radial forces on motor shaft. Sealed, prelubricated sleeve bearings for other single-phase motors.

PART 3 - EXECUTION

3.1 EQUIPMENT INSTALLATION

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.

3.2 POSITION OF DEVICES

A. Devices shall be installed at the height indicated below unless otherwise noted. All heights of outlets are measured from finished floor to centerline of device. Locate devices mounted on finish surfaces with regards to furring, trim, etc. Heights may be adjusted as necessary to clear wall mounted cabinets, electrical devices, etc. Where installed in masonry walls, mounting heights may be adjusted to correspond to block coursing. In no case shall devices requiring handicapped accessibility be mounted above 54”.

1. Thermostats located where side wheelchair accessibility can be achieved 54”
2. Thermostats located where front wheelchair accessibility can only be achieved 48”
3. Space Sensors (without set point adjustment) 54”
4. Temperature Control Panels (not requiring occupant interface) 60”

3.3 LABELING AND IDENTIFYING

A. Piping Systems: Install pipe markers on each system. Include arrows showing normal direction of flow.

1. Plastic markers, with application systems. Install on insulation segment if required for hot, uninsulated piping.
2. 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.

C. Valve Tags:

1. Install valve tag at all valves in piping systems listed below

a. Domestic water (excluding individual fixture isolation valves)

Provide reproducible set of drawings indicating all valve locations.

D. Adjusting: Relocate identifying devices as necessary for unobstructed view in finished construction.

3.4 FIRESTOPPING

A. Apply firestopping to all duct and pipe penetrations of fire-rated floor and wall assemblies to achieve fire-resistance rating of the assembly.

3.5 CONCRETE BASES

A. Construct concrete bases of dimensions indicated, but not less than 3-1/2” 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

3.6 DEMOLITION

A. Disconnect, demolish, and remove Work specified in Division 23 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.

3.7 CUTTING AND PATCHING

A. Cut, channel, chase, and drill floors, walls, partitions, ceilings, and other surfaces necessary for installations. Perform cutting by skilled mechanics of trades involved.

B. Repair cut surfaces to match adjacent surfaces.

3.8 CONSTRUCTION LAYOUT

A. Layout work in advance of installation using data and measurements from the site, the appropriate architectural and structural drawings and shop drawings.

B. Confirm adequate clearance for installation, operation, maintenance and code required clearance including items installed by other contractors.

C. If layout to provide clearance is not possible, promptly notify Architect/Engineer for clarification.

3.9 DATA AND MEASUREMENTS

A. The data given herein and on the drawings is as accurate as could be secured. The existence and location of construction as indicated is not guaranteed. Before beginning work investigate and verify the existence and location of items affecting work. Obtain exact locations, measurements, levels, etc., at the site and adapt work to actual conditions.

B. Only Architectural drawings, Structural drawings, and site measurements may be utilized in calculations. Mechanical and electrical drawings are diagrammatic or schematic.

3.10 PAINTING AND FINISHING

A. Refer to individual sections for paint materials, surface preparation, and application of paint.

B. Do not paint piping specialties with factory-applied finish.

C. Damage and Touchup: Repair marred and damaged factory-painted finishes with materials and procedures to match original factory finish.

3.11 ERECTION 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 applicable codes and standards.

3.12 GROUTING

A. Install nonmetallic, non-shrink, grout for mechanical equipment base bearing surfaces, pump and other equipment base plates, and anchors. Mix and place and cure grout according to manufacturer's written instructions.

3.13 ACCESS

A. Provide access to all equipment, valves, controls, etc. as required for operation, repair and maintenance.

B. Access doors shall be provided when access through ceilings, chases, etc. is not provided by others.

3.14 ELECTRICAL WIRING

A. Install all electrical wiring in accordance with the National Electric Code and Division 26 of this specification.

B. All line voltage and low voltage wire shall be installed in metal raceways.

C. All low voltage wire in equipment rooms or exposed in space shall be installed in metal raceways.

END OF SECTION 230500

SECTION 230505 - BASIC MECHANICAL PIPING 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 21, 22 and 23 Sections.

1. Piping materials and installation instructions common to mechanical piping systems.
2. Escutcheons.
3. Dielectric fittings.
4. Flexible connectors.
5. Mechanical sleeve seals.
6. Pipe hangers and supports
7. Meters and gages

B. Pipe and pipe fitting materials are specified in Division 23 piping system Sections.

1.3 DEFINITIONS

A. MSS: Manufacturer’s Standardization Society for the Valve and Fittings Industry.

B. Terminology: As defined in MSS SP-90, "Guidelines on Terminology for Pipe Hangers and Supports."

1.4 PERFORMANCE REQUIREMENTS

A. Design support systems for piping to support multiple pipes capable of supporting combined weight of supported systems, system contents, and test water.

1.5 SUBMITTALS

A. Product Data: For dielectric fittings, mechanical sleeve seals, and each type of pipe hanger, channel support system component, and thermal-hanger shield insert indicated. Include scale range, ratings, and calibrated performance curves for each meter, gage, fitting, specialty, and accessory specified.

B. Maintenance Data: For meters and gages to include in maintenance manuals. Submit valve schedules to include in maintenance manuals for each piping system. Valve schedule shall indicate valve number, piping system and location of valve.

1.6 QUALITY ASSURANCE

A. Welders shall be qualified in accordance with applicable codes. Welding procedures and testing shall comply with ANSI B31.10 “Standard for Pressure Piping. Power Piping” and AWS Welding Handbook.

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:

1. Dielectric Unions, Couplings, Flanges:

    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. Mechanical Sleeve Seals:

    a. Calpico, Inc.
    b. Metraflex Co.
    c. Thunderline/Link-Seal.

3. Pipe Hangers and Supports:

    a. AAA Technology and Specialties Co., Inc.
    b. B-Line Systems, Inc.
    c. Carpenter & Patterson, Inc.
    d. Grinnell Corp. B-Line Systems, Inc.
    e. Grinnell Corp.; Power-Strut Unit.
    f. GS Metals Corp.
    g. Michigan Hanger Co., Inc.; O-Strut Div.
    h. National Pipe Hanger Corp.
    i. Thomas & Betts Corp.
    j. Unistrut Corp.
    k. Wesanco, Inc.
    l. Thermal-Hanger Shield Inserts

4. Light-Powered Digital Thermometers:

    a. Weiss Instruments, Inc.

5. Pressure Gages:

    a. AMETEK, Inc.; U.S. Gauge Div.
    b. Dresser Industries, Inc.; Instrument Div.; Ashcroft Commercial Sales Operation.
    c. Dresser Industries, Inc.; Instrument Div.; Weksler Instruments Operating Unit.

d. Ernst Gage Co.
e. Marsh Bellofram.
f. Miljoco Corporation
g. Noshok, Inc.
h. Trerice: H. O. Trerice Co.
i. Weiss Instruments, Inc.
j. WIKA Instruments Corp.
k. Winter's Thermogauges, Inc.

6. Test Plugs:

a. Flow Design, Inc.
b. MG Piping Products Co.
c. Miljoco Corporation
d. National Meter.
e. Peterson Equipment Co., Inc.
f. Sisco Manufacturing Co.
g. Trerice: H. O. Trerice Co.
h. Watts Industries, Inc.; Water Products Div.

2.2 PIPE AND PIPE FITTINGS

A. Refer to individual Division 23 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 23 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. 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.

E. Brazing Filler Metals: AWS A5.8.

1. BCuP Series: Copper-phosphorus alloys.
2. BAg1: Silver alloy.

F. Welding Filler Metals: Comply with AWS D10.12 for welding materials appropriate for wall thickness and chemical analysis of steel pipe being welded.

G. Flanged, Ductile-Iron Pipe Gasket, Bolts, and Nuts: AWWA C110, rubber gasket, carbon-steel bolts and nuts.

H. 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. Factory-fabricated, union assembly, for 250-psig minimum working pressure at 180 deg F.

2.5 PIPE HANGERS AND SUPPORTS

A. Pipe Hangers, Supports, and Components: factory-fabricated components.

1. Galvanized, Metallic Coatings: For piping and equipment that will not have field-applied finish.
2. Nonmetallic Coatings: On attachments for electrolytic protection where attachments are in direct contact with copper tubing.

B. Channel Support Systems: MFMA-2, factory-fabricated components for field assembly.

1. Coatings: Manufacturer's standard finish, unless bare metal surfaces are indicated.
2. Nonmetallic Coatings: On attachments for electrolytic protection where attachments are in direct contact with copper tubing.

C. Thermal-Hanger Shield Inserts: 100-psi minimum compressive-strength insulation, encased in sheet metal shield. ASTM C 552, Type I cellular glass or water-repellent-treated, ASTM C 533, Type I calcium silicate with vapor barrier

2.6 MISCELLANEOUS PIPE SUPPORTING MATERIALS

A. Powder-Actuated Drive-Pin Fasteners: Powder-actuated-type, drive-pin attachments with pull-out and shear capacities appropriate for supported loads and building materials where used.

B. Mechanical-Anchor Fasteners: Insert-type attachments with pull-out and shear capacities appropriate for supported loads and building materials where used.

C. Structural Steel: ASTM A 36/A 36M, steel plates, shapes, and bars, black and galvanized.

D. Grout: ASTM C 1107, Grade B, factory-mixed and -packaged, nonshrink and nonmetallic, dry, hydraulic-cement grout.

2.7 LIGHT-POWERED DIGITAL THERMOMETERS, GENERAL

A. Manufacturer: Weiss Instruments, Inc.

1. Model No: DVU35
2. Case: Hi-impact ABS
3. Range: -40/300 deg F.
4. Display: 3/8” LCD digits, wide ambient formula
5. Accuracy: 1% of reading or 1 deg whichever is greater
6. Lux Rating 10 Lux (one foot-candle)
7. Update: 10 seconds
8. Ambient Operating: -30/140 deg F.
9. Sensor: Glass passivated thermistor
10. Stem Assemblies: Industrial Galss, and Bimetallic

2.8 SEPARABLE SOCKETS (THERMOWELLS)

A. Description: Fitting with protective socket for installation in threaded pipe fitting to hold fixed thermometer stem.

1. Material: to match piping.
2. Extension-Neck Length: Nominal thickness of 2 inches, but not less than thickness of insulation. Omit extension neck for sockets for piping not insulated.
3. Insertion Length: To extend to one-third of diameter of pipe or 2 inches into pipe.

2.9 PRESSURE GAGES

A. Description: ASME B40.1, phosphor-bronze bourdon-tube type with bottom connection; dry type, unless liquid-filled-case type is indicated.

B. Case: Stainless steel with 4-1/2-inch diameter, clear acrylic lens.

C. Connector: Brass, NPS 1/4.

D. Scale: White-coated aluminum with permanently etched markings or white finished aluminum with black markings.

E. Accuracy: Grade 1A, plus or minus 1 percent of full scale.

F. Range: Comply with the following:

1. Vacuum: 30 inches Hg of vacuum to 15 psig of pressure.
2. Fluids under Pressure: Two times the operating pressure.

G. Gage Fitting Valves: NPS 1/4 brass or stainless-steel needle type.

2.10 TEST PLUGS

A. Description: Brass-body test plug in NPS 1/2 fitting.

B. Body: Length as required to extend beyond insulation.

C. Pressure Rating: 500 psig minimum.

D. Core Inserts: Two self-sealing valves, suitable for inserting 1/8-inch OD probe from dial-type thermometer or pressure gage adapter with probe.

E. Core Material for Air and Water: Nordel, good up to 350 deg F.

F. Core material for Natural Gas: Neoprene, good up to 200 deg F.

G. Test-Plug Cap: Gasketed and threaded cap, of same material as plug.

H. Test Kit: Pressure gage and adapter with probe, two 5-inch pocket testing thermometers with magnifying lens, and protective carrying case.

1. Pressure Gage and Thermometer Ranges: Approximately two times the system's operating conditions.
2. Provide Owner with one test kit.

PART 3 - EXECUTION

3.1 PIPING SYSTEMS - COMMON REQUIREMENTS

A. General: Install piping as described below, unless piping Sections specify otherwise. Individual Division 21, 22 and 23 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.

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. Fire-Barrier Penetrations: Maintain indicated fire rating of walls, partitions, ceilings, and floors at pipe penetrations. Seal pipe penetrations with firestopping materials

N. Verify final equipment locations for roughing-in.

O. Refer to equipment specifications in other Sections of these Specifications for roughing-in requirements.

P. Piping Joint Construction: Join pipe and fittings as follows and as specifically required in individual piping specification Sections:

1. Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.
2. Remove scale, slag, dirt, and debris from inside and outside of pipe and fittings before assembly.
3. Soldered Joints: Construct joints according to AWS's "Soldering Manual," Chapter "The Soldering of Pipe and Tube"; or CDA's "Copper Tube Handbook."
4. Brazed Joints: Construct joints according to AWS's "Brazing Handbook," Chapter "Pipe and Tube."
5. Threaded Joints: Thread pipe with tapered pipe threads according to ASME B1.20.1. Cut threads full and clean using sharp dies. Ream threaded pipe ends to remove burrs and restore full ID. Join pipe fittings and valves as follows:
6. Welded Joints: Construct joints according to AWS D10.12, "Recommended Practices and Procedures for Welding Low Carbon Steel Pipe," using qualified processes and welding operators according to "Quality Assurance" Article.
7. Flanged Joints: Align flange surfaces parallel. Select appropriate gasket material, size, type, and thickness for service application. Install gasket concentrically positioned. Assemble joints by sequencing bolt tightening to make initial contact of flanges and gaskets as flat and parallel as possible. Use suitable lubricants on bolt threads. Tighten bolts gradually and uniformly using torque wrench.

Q. 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. Install dielectric unions and flanges to connect piping materials of dissimilar metals.

3.2 HANGER AND SUPPORT APPLICATIONS

A. Comply with MSS SP-69 for pipe hanger selections and applications.

B. Comply with MSS SP-89 for fabrication and installation procedures.

C. Horizontal-Piping Hangers and Supports: Use swivel ring or clelvis type hangers.

D. Saddles and Shields: Install of length recommended by manufacturer to prevent crushing insulation.

3.3 HANGER AND SUPPORT INSTALLATION

A. Pipe Hanger and Support Installation: Comply with MSS SP-69 and MSS SP-89. Install hangers, supports, clamps, and attachments as required to properly support piping from building structure.

B. Channel Support System Installation: Arrange for grouping of parallel runs of piping and support together on field-assembled channel systems. Field assemble and install according to manufacturer's written instructions.

C. Install building attachments within concrete slabs or attach to structural steel. Install additional attachments at concentrated loads, including valves, flanges, guides, strainers, and expansion joints, and at changes in direction of piping. Install concrete inserts before concrete is placed; fasten inserts to forms and install reinforcing bars through openings at top of inserts.

D. Install hangers and supports complete with necessary inserts, bolts, rods, nuts, washers, and other accessories.

E. Install hangers and supports to allow controlled thermal 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.

F. Load Distribution: Install hangers and supports so that piping live and dead loads and stresses from movement will not be transmitted to connected equipment.

G. Pipe Slopes: Install hangers and supports to provide indicated pipe slopes and so maximum pipe deflections allowed by ASME B31.9, "Building Services Piping," is not exceeded.

H. Insulated Piping: Comply with the following:

1. Piping Operating above Ambient Air Temperature: Clamp may project through insulation.
2. Piping Operating below Ambient Air Temperature: Use thermal-hanger shield insert with clamp sized to match OD of insert.
3. Do not exceed pipe stress limits according to ASME B31.9.
4. Install protection saddles or thermal hanger shields, if insulation without vapor barrier is indicated. Fill interior voids with insulation that matches adjoining insulation.
5. Install protective shields on cold piping with vapor barrier. Shields shall span arc of 180 degrees.

I. Support vertical piping and tubing at base and at each floor.

J. Install hangers for copper tubing with the following maximum spacing and minimum rod diameters:

1. 3/4-Inch NPS and Smaller: Maximum horizontal spacing, 60 inches with 3/8-inch minimum rod diameter; maximum vertical spacing, 10 feet.
2. 1-Inch NPS: Maximum horizontal spacing, 72 inches with 3/8-inch minimum rod diameter; maximum vertical spacing, 10 feet.
3. 1-1/4-Inch NPS: Maximum horizontal spacing, 72 inches with 3/8-inch minimum rod diameter; maximum vertical spacing, 10 feet.
4. 1-1/2 and 2-Inch NPS: Maximum horizontal spacing, 96 inches with 3/8-inch minimum rod diameter; maximum vertical spacing, 10 feet.
5. 2-1/2-Inch NPS: Maximum horizontal spacing, 108 inches with 1/2-inch minimum rod diameter; maximum vertical spacing, 10 feet.
6. 3-Inch NPS: Maximum horizontal spacing, 10 feet with 1/2-inch minimum rod diameter; maximum vertical spacing, 10 feet.

K. Install hangers for steel and ductile-iron piping with the following maximum spacing and minimum rod diameters:

1. 1-1/4-Inch NPS and Smaller: Maximum horizontal spacing, 84 inches with 3/8-inch minimum rod diameter; maximum vertical spacing, 15 feet.
2. 1-1/2-Inch NPS: Maximum horizontal spacing, 108 inches with 3/8-inch minimum rod diameter; maximum vertical spacing, 15 feet.
3. 2-Inch NPS: Maximum horizontal spacing, 10 feet with 3/8-inch minimum rod diameter; maximum vertical spacing, 15 feet.
4. 2-1/2-Inch NPS: Maximum horizontal spacing, 11 feet with 1/2-inch minimum rod diameter; maximum vertical spacing, 15 feet.
5. 3-Inch NPS: Maximum horizontal spacing, 12 feet with 1/2-inch minimum rod diameter; maximum vertical spacing, 15 feet.
6. 4- and 5-Inch NPS: Maximum horizontal spacing, 12 feet with 5/8-inch minimum rod diameter; maximum vertical spacing, 15 feet.
7. 6-Inch NPS: Maximum horizontal spacing, 12 feet with 3/4-inch minimum rod diameter; maximum vertical spacing, 15 feet.
8. 8- through 12-Inch NPS: Maximum horizontal spacing, 12 feet with 7/8-inch minimum rod diameter; maximum vertical spacing, 15 feet.

3.4 EQUIPMENT SUPPORTS

A. Fabricate structural-steel stands to suspend equipment from structure above or to support equipment above floor.

B. Grouting: Place grout under supports for equipment and make smooth bearing surface.

C. Cut, drill, and fit miscellaneous metal fabrications for heavy-duty steel trapezes and equipment supports.

D. Hanger Adjustment: Adjust hangers to distribute loads equally on attachments and to achieve indicated slope of pipe.

3.5 METER AND GAGE INSTALLATION, GENERAL

A. Install meters, gages, and accessories according to manufacturer's written instructions for applications where used.

B. Install meters and gages adjacent to machines and equipment to allow service and maintenance.

C. Calibrate meters and gauges according to manufacturer's written instructions, after installation

3.6 THERMOMETER INSTALLATION

A. Install thermometers and adjust vertical and tilted positions.

B. Install thermometers at the following locations and at locations indicated on plans.

1. Inlet and outlet of each hydronic boiler and chiller.

C. Install separable sockets in vertical position in piping tees where fixed thermometers are indicated.

D. When thermometers are installed in piping 1” and smaller, install well in 1-1/4” with reducers to prevent restriction of flow.

3.7 PRESSURE-GAGE INSTALLATION

A. Install pressure gages in piping tees with pressure-gage valve located on pipe at most readable position.

B. Install pressure gages at the following locations and at locations indicated on plans.

1. Discharge of each pressure-reducing valve.

END OF SECTION 230505

SECTION 230593 - 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.

1.2 SUMMARY

A. This Section includes testing, adjusting, and balancing HVAC systems to produce design objectives.

1.3 DEFINITIONS

A. Adjust: To regulate fluid flow rate and air patterns at the terminal equipment, such as to reduce fan speed or adjust a damper.

B. Balance: To proportion flows within the distribution system, including submains, branches, and terminals, according to design quantities.

C. Static Head: The pressure due to the weight of the fluid above the point of measurement. In a closed system, static head is equal on both sides of the pump.

D. Suction Head: The height of fluid surface above the centerline of the pump on the suction side.

E. System Effect: A phenomenon that can create undesired or unpredicted conditions that cause reduced capacities in all or part of a system.

F. Testing, Adjusting, and Balancing Agent: The entity responsible for performing and reporting the testing, adjusting, and balancing procedures.

G. AABC: Associated Air Balance Council.

H. AMCA: Air Movement and Control Association.

I. NEBB: National Environmental Balancing Bureau.

J. SMACNA: Sheet Metal and Air Conditioning Contractors' National Association.

1.4 SUBMITTALS

A. Quality-Assurance Submittals: Within 30 days from the Contractor's Notice to Proceed, submit 2 copies of evidence that the testing, adjusting, and balancing Agent and this Project's testing, adjusting, and balancing team members meet the qualifications specified in the "Quality Assurance" Article below.

B. Certified Testing, Adjusting, and Balancing Reports: Submit 2 copies of reports prepared, as specified in this Section, on approved forms certified by the testing, adjusting, and balancing Agent.

C. Sample Report Forms: Submit 2 sets of sample testing, adjusting, and balancing report forms.

1.5 QUALITY ASSURANCE

A. Agent Qualifications: Engage a testing, adjusting, and balancing agent certified by either AABC or NEBB.

B. Testing, Adjusting, and Balancing Conference: Meet with the Owner's and the Architect's representatives on approval of the testing, adjusting, and balancing strategies and procedures plan to develop a mutual understanding of the details. Ensure the participation of testing, adjusting, and balancing team members, equipment manufacturers' authorized service representatives, HVAC controls Installer, and other support personnel.

C. Certification of Testing, Adjusting, and Balancing Reports: Certify the testing, adjusting, and balancing field data reports. This certification includes the following:

1. Review field data reports to validate accuracy of data and to prepare certified testing, adjusting, and balancing reports.
2. Certify that the testing, adjusting, and balancing team complied with the approved testing, adjusting, and balancing plan and the procedures specified and referenced in this Specification.

D. Testing, Adjusting, and Balancing Reports: Use testing, adjusting, and balancing Agent's standard forms approved by the Architect/Engineer.

E. Instrumentation Type, Quantity, and Accuracy: As described in NEBB standards.

F. Instrumentation Calibration: Calibrate instruments at least every 6 months or more frequently if required by the instrument manufacturer.

1.6 PROJECT CONDITIONS

A. Owner Occupancy: The Owner may occupy completed areas of the building before Substantial Completion. Cooperate with the Owner during testing, adjusting, and balancing operations to minimize conflicts with the Owner's operations.

1.7 COORDINATION

A. Coordinate the efforts of factory-authorized service representatives for systems and equipment, HVAC controls installers, and other mechanics to operate HVAC systems and equipment to support and assist testing, adjusting, and balancing activities.

B. Perform testing, adjusting, and balancing 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 Contract Documents to become familiar with project requirements and to discover conditions in systems' designs that may preclude proper testing, adjusting, and balancing of systems and equipment.

B. Examine approved submittal data of HVAC systems and equipment.

C. Examine equipment performance data, including fan and pump curves. Relate performance data to project conditions and requirements, including system effects that can create undesired or unpredicted conditions that cause reduced capacities in all or part of a system.

D. Examine system and equipment installations to verify that they are complete and that testing, cleaning, adjusting, and commissioning specified in individual Specification Sections have been performed.

E. Examine HVAC system and equipment installations to verify that indicated balancing devices, such as test ports, gage cocks, thermometer wells, flow-control devices, balancing valves and fittings, and manual volume dampers, are properly installed, and their locations are accessible and appropriate for effective balancing and for efficient system and equipment operation.

F. Examine systems for functional deficiencies that cannot be corrected by adjusting and balancing.

G. Examine air-handling equipment to ensure clean filters have been installed, bearings are greased, belts are aligned and tight, and equipment with functioning controls is ready for operation.

H. Examine terminal units, such as variable-air-volume boxes and mixing boxes, to verify that they are accessible and their controls are connected and functioning.

I. Examine strainers for clean screens and proper perforations.

J. Examine 3-way valves for proper installation for their intended function of diverting or mixing fluid flows.

K. Examine heat-transfer coils for correct piping connections and for clean and straight fins.

L. Examine automatic temperature system components to verify proper operation.

M. Report deficiencies discovered before and during performance of testing, adjusting, and balancing procedures.

3.2 GENERAL TESTING AND BALANCING PROCEDURES

A. Perform testing and balancing procedures on each system according to the procedures contained in NEBB's "Procedural Standards for Testing, Adjusting, and Balancing of Environmental Systems" and this Section.

B. Cut insulation, ducts, pipes, and equipment cabinets for installation of test probes to the minimum extent necessary to allow adequate performance of procedures. After testing and

balancing, close probe holes and patch insulation with new materials identical to those removed. Restore vapor barrier and finish according to the insulation Specifications for this Project.

C. Mark equipment settings with paint or other suitable, permanent identification material, including damper-control positions, valve indicators, fan-speed-control levers, and similar controls and devices, to show final settings.

3.3 FUNDAMENTAL AIR SYSTEMS' BALANCING PROCEDURES

A. Prepare test reports for both fans and outlets. Obtain manufacturer's outlet factors and recommended testing procedures. Crosscheck the summation of required outlet volumes with required fan volumes.

B. Prepare schematic diagrams of systems' "as-built" duct layouts.

C. For variable-air-volume systems, develop a plan to simulate diversity.

D. Determine the best locations in main and branch ducts for accurate duct airflow measurements.

E. Check dampers for proper position to achieve desired airflow path.

F. Check for airflow blockages.

G. Check condensate drains for proper connections and functioning.

3.4 CONSTANT-VOLUME AIR SYSTEMS' BALANCING PROCEDURES

A. Adjust fans to deliver total design airflows within the maximum allowable rpm listed by the fan manufacturer.

1. Measure fan static pressures to determine actual static pressure as follows:
2. Measure static pressure across each air-handling unit component.
3. Adjust fan speed higher or lower than design with the approval of the Architect/Engineer. Make required adjustments to pulley sizes, motor sizes, and electrical connections to accommodate fan-speed changes. Do not make fan-speed adjustments that result in motor overload.

B. Adjust volume dampers for main duct, submain ducts, and major branch ducts to design airflows within specified tolerances.

3.5 TEMPERATURE TESTING

A. During testing, adjusting, and balancing, report need for adjustment in temperature regulation within the automatic temperature-control system.

B. Measure indoor wet- and dry-bulb temperatures. Measure when the building or zone is occupied.

C. Measure outside-air, wet- and dry-bulb temperatures.

3.6 TOLERANCES

A. Set HVAC system airflow rates within the following tolerances:

1. Supply, Return, and Exhaust Fans: minus 10 to plus 10 percent.
2. Air Outlets and Inlets: minus 10 to plus 10 percent.

3.7 FINAL REPORT

A. General: Typewritten, or computer printout in letter-quality font, on standard bond paper, in 3-ring binder, tabulated and divided into sections by tested and balanced systems.

B. Include a certification sheet in front of binder signed and sealed by the certified testing and balancing engineer.

C. General Report Data: In addition to the form titles and entries, include the following data in the final report, as applicable:

1. Title page.
2. Name and address of testing, adjusting, and balancing Agent.
3. Project name.
4. Project location.
5. Architect's name and address.
6. Engineer's name and address.
7. Contractor's name and address.
8. Report date.
9. Signature of testing, adjusting, and balancing Agent who certifies the report.
10. Summary of contents.
11. Notes to explain why certain final data in the body of reports vary from design values.
12. Test conditions for fans and pump performance forms.

D. System Diagrams: Include schematic layouts of air and hydronic distribution systems.

E. Air Outlet Reports:

1. Air outlet data

a. Make and type.
b. Model number and size.

2. Test data: Include design and actual data for the following:

a. Airflow rate in cfm.

F. System-Coil Reports: For reheat coils and water coils of terminal units, include the following:

1. Unit Data: Include the following:

a. System and air-handling unit identification.
b. Location and zone.
c. Room or riser served.
d. Coil make and size.
e. Flowmeter type.

2. Test Data: Include design and actual values for the following:

   a. Airflow rate in cfm.
   b. Air pressure drop in inches wg.
   c. Water pressure drop in feet of head or psig.

G. Instrument Calibration Reports: For instrument calibration, include the following:

1. Report Data: Include the following:

   a. Instrument type and make.
   b. Serial number.
   c. Application.
   d. Dates of use.
   e. Dates of calibration.

3.8 ADDITIONAL TESTS

A. Within 90 days of completing testing, adjusting, and balancing, perform additional testing and balancing to verify that balanced conditions are being maintained throughout and to correct unusual conditions.

B. Seasonal Periods: If initial testing, adjusting, and balancing procedures were not performed during near-peak summer and winter conditions, perform additional inspections, testing, and adjusting during near-peak summer and winter conditions.

END OF SECTION 230593

SECTION 230700 - DUCT 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 semi-rigid and flexible duct, plenum; acoustical duct liner; accessories and attachments; and sealing compounds.

1.3 SUBMITTALS

A. Product Data: Include product data description, list of materials, thickness, density, k-values and r-values for each product type, locations, manufacturer's installation instructions, flames spread and smoke developed ratings.

B. See "Submittal Schedule" located at the end of Section 230100 – General Requirements for HVAC.

1.4 QUALITY ASSURANCE

A. Fire-Test-Response Characteristics: As determined by testing materials identical to those specified in this Section according to ASTM E 84, by a testing and inspecting agency acceptable to authorities having jurisdiction. Factory label insulation and jacket materials and sealer and cement material containers with appropriate markings of applicable testing and inspecting agency.

1. Insulation Installed Indoors: Flame-spread rating of 25 or less, and smoke-developed rating of 50 or less.
2. Insulation Installed Outdoors: Flame-spread rating of 75 or less, and smoke-developed rating of 150 or less.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Insulation:

a. CertainTeed
b. Armaflex

c. Rubatex
d. Knauf
e. Owens-Corning
f. Halstead
g. Armstrong
h. Manville
i. Pittsburgh Corning

2.2 INSULATION MATERIALS

A. Mineral-Fiber Board Thermal Insulation: Glass fibers bonded with a thermosetting resin. Comply with ASTM C 612, Type IB, without facing and with all-service jacket manufactured from kraft paper, reinforcing scrim, aluminum foil, and vinyl film.

B. Mineral-Fiber Blanket Thermal Insulation: Glass fibers bonded with a thermosetting resin. Comply with ASTM C 553, Type I, 0.75 pcf density, without facing and with all-service jacket manufactured from kraft paper, reinforcing scrim, aluminum foil, and vinyl film.

C. Acoustical duct liner: ASTM C 518 with resin and black mat coated surface exposed to air stream to prevent erosion of glass fibers. Thermal Conductivity (k-Value): 0.26 at 75 deg F mean temperature. Nominal Density 1.5 lbs per cubic foot, minimum noise reduction characteristic shall be 0.55 for 1” thickness; rated for 6000 fpm air velocity; air friction multiplier less than 1.6 at 2000 fpm.

D. other projections with vapor retarder mastic bonded with a thermosetting resin.

E. Exterior Jacket: Alumaguard 60 or equal. UV Resistant, watertight, laminated waterproofing and vapor barrier membrane.

2.3 ACCESSORIES AND ATTACHMENTS

A. Glass Cloth and Tape: Comply with MIL-C-20079H, Type I for cloth and Type II for tape. Woven glass-fiber fabrics, plain weave, pre-sized a minimum of 8 oz./sq. yd..

B. Bands: 3/4 inch wide, materials compatible with jacket:

C. Wire: 0.080-inch, nickel-copper alloy; 0.062-inch, soft-annealed, stainless steel; or 0.062-inch, soft-annealed, galvanized steel.

D. Weld-Attached Anchor Pins and Washers: Copper-coated steel pin for capacitor-discharge welding and galvanized speed washer. Pin length sufficient for insulation thickness indicated.

E. Adhesive-Attached Anchor Pins and Speed Washers: Galvanized steel plate, pin, and washer manufactured for attachment to duct and plenum with adhesive. Pin length sufficient for insulation thickness indicated.

2.4 VAPOR RETARDERS

A. Mastics: Materials recommended by insulation material manufacturer that are compatible with insulation materials, jackets, and substrates.

PART 3 - EXECUTION

3.1 EXAMINATION AND PREPARATION

A. Examine substrates and conditions for compliance with requirements for installation and other conditions affecting performance of insulation application. Proceed with installation only after unsatisfactory conditions have been corrected.

B. Surface Preparation: Clean and dry surfaces to receive insulation. Remove materials that will adversely affect insulation application.

3.2 MINERAL-FIBER INSULATION APPLICATION

A. Apply insulation materials, accessories, and finishes according to the manufacturer's written instructions; with smooth, straight, and even surfaces; and free of voids throughout the length of ducts and fittings.

B. Refer to schedules at the end of this Section for materials, forms, jackets, and thicknesses required for each duct system.

C. Seal joints and seams with vapor-retarder mastic on insulation indicated to receive a vapor retarder.

D. Apply insulation with tight longitudinal seams and end joints. Bond seams and joints with adhesive recommended by the insulation material manufacturer.

E. Apply insulation with the least number of joints practical.

F. Apply insulation over fittings and specialties, with continuous thermal and vapor-retarder integrity, unless otherwise indicated.

G. Hangers and Anchors: Where vapor retarder is indicated, seal penetrations in insulation at hangers, supports, anchors, and other projections with vapor-retarder mastic. Apply insulation continuously through hangers and around anchor attachments.

H. Apply insulation with integral jackets as follows:

1. Pull jacket tight and smooth.
2. Joints and Seams: Cover with tape and vapor retarder as recommended by insulation material manufacturer to maintain vapor seal.
3. Vapor-Retarder Mastics: Where vapor retarders are indicated, apply mastic on seams and joints and at ends adjacent to duct flanges and fittings.

I. Roof Penetrations: Apply insulation for interior applications to a point even with top of roof flashing.

J. Interior Wall and Partition Penetrations: Apply insulation continuously through walls and partitions, except fire-rated walls and partitions.

K. Fire-Rated Wall and Partition Penetrations: Terminate insulation at fire/smoke damper sleeves for fire-rated wall and partition penetrations.

L. Floor Penetrations: Terminate insulation at underside of floor assembly and at floor support at top of floor.

M. Secure insulation with adhesive and anchor pins and speed washers.

3.3 SHOP APPLICATION OF LINER IN RECTANGULAR DUCTS

A. Adhere a single layer of indicated thickness of duct liner with 90 percent coverage of adhesive at liner contact surface area. Multiple layers of insulation to achieve indicated thickness are prohibited.

B. Butt transverse joints without gaps and coat joint with adhesive.

C. Fold and compress liner in corners of rectangular ducts or cut and fit to ensure butted-edge overlapping.

D. Do not apply liners in rectangular ducts with longitudinal joints, except at corners of ducts, unless duct size and standard liner product dimensions make longitudinal joints necessary.

E. Secure liner with mechanical fasteners 4 inches from corners and at intervals not exceeding 12 inches transversely around perimeter; at 3 inches from transverse joints and at intervals not exceeding 18 inches longitudinally.

F. Secure transversely oriented liner edges facing the airstream with metal nosings that have either channel or "Z" profile or are integrally formed from duct wall.

G. Ductwork sizes indicated on drawings are the free area size. Ductwork sizes shall be increased to accommodate the addition of liner to maintain the plan indicated free area size.

3.4 DUCT AND PLENUM APPLICATION SCHEDULE

A. Items Not Insulated: Unless otherwise indicated, do not apply insulation to the following systems, materials, and equipment:

1. Fibrous-glass ducts.
2. Factory-insulated flexible ducts.
3. Factory-insulated plenums, casings, terminal boxes, and filter boxes and sections.
4. Flexible connectors.
5. Vibration-control devices.
6. Testing agency labels and stamps.
7. Nameplates and data plates.
8. Access panels and doors in air-distribution systems.

B. Service: SUPPLY AIR – Rectangular, exposed in finished spaces.

1. Thickness / Material: None

C. Service: SUPPLY AIR - Rectangular, concealed, in return air plenum, shaft except in mechanical room.

1. Thickness / Material: 2” Mineral-fiber blanket
2. Minimum R-Value: R5
3. Vapor Retarder Required: Yes.

D. Service: SUPPLY AIR - Rectangular, in mechanical room.

1. Thickness / Material: 1-1/2” Mineral-fiber board.
2. Minimum R-Value: R5
3. Vapor Retarder Required: Yes.

E. Service: SUPPLY AIR -Round, concealed, in return air plenum, shaft, in mechanical room.

1. Thickness / Material: 2” Mineral-fiber blanket.
2. Minimum R-Value: R5
3. Vapor Retarder Required: Yes.

F. Service: RETURN AIR - All.

1. Thickness / Material: None.

END OF SECTION 230700

SECTION 230720 - PIPE INSULATION FOR HVAC

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 preformed, rigid and flexible pipe insulation; insulating cements; field-applied jackets; accessories and attachments; and sealing compounds.

1.3 SUBMITTALS

A. Product Data: Include product data description, list of materials, thickness, density, k-values and r-values for each product type, locations, manufacturer's installation instructions, flames spread and smoke developed ratings.

B. See "Submittal Schedule" located at the end of Section 230100 – General Requirements for HVAC.

1.4 QUALITY ASSURANCE

A. Fire-Test-Response Characteristics: As determined by testing materials identical to those specified in this Section according to ASTM E 84, by a testing and inspecting agency acceptable to authorities having jurisdiction. Factory label insulation and jacket materials and sealer and cement material containers with appropriate markings of applicable testing and inspecting agency.

1. Insulation Installed Indoors: Flame-spread rating of 25 or less, and smoke-developed rating of 50 or less.
2. Insulation Installed Outdoors: Flame-spread rating of 75 or less, and smoke-developed rating of 150 or less.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Mineral-Fiber Insulation:

a. CertainTeed Manson.
b. Knauf FiberGlass GmbH.

c. Owens-Corning Fiberglas Corp.
d. Schuller International, Inc.

2. Flexible Elastomeric Thermal Insulation:

a. Armstrong World Industries, Inc.
b. Rubatex Corp.

2.2 INSULATION MATERIALS

A. Mineral-Fiber Insulation: Glass fibers bonded with a thermosetting resin complying with the following:

1. Preformed Pipe Insulation: Comply with ASTM C 547, Type 1, with factory-applied, all-purpose, vapor-retarder jacket.
2. Blanket Insulation: Comply with ASTM C 553, Type II, without facing.
3. Fire-Resistant Adhesive: Comply with MIL-A-3316C in the following classes and grades:

a. Class 1, Grade A for bonding glass cloth and tape to unfaced glass-fiber insulation, for sealing edges of glass-fiber insulation, and for bonding lagging cloth to unfaced glass-fiber insulation.
b. Class 2, Grade A for bonding glass-fiber insulation to metal surfaces.

4. Vapor-Retarder Mastics: Fire- and water-resistant, vapor-retarder mastic for indoor applications. Comply with MIL-C-19565C, Type II.
5. Mineral-Fiber Insulating Cements: Comply with ASTM C 195.
6. Mineral-Fiber, Hydraulic-Setting Insulating and Finishing Cement: Comply with ASTM C 449/C 449M.

B. Flexible Elastomeric Thermal Insulation: Closed-cell, sponge- or expanded-rubber materials. Comply with ASTM C 534, Type I for tubular materials and Type II for sheet materials.

1. Adhesive: As recommended by insulation material manufacturer.
2. Ultraviolet-Protective Coating: As recommended by insulation manufacturer.

C. Prefabricated Thermal Insulating Fitting Covers: Comply with ASTM C 450 for dimensions used in preforming insulation to cover valves, elbows, tees, and flanges.

D. Standard PVC Fitting Covers: Factory-fabricated fitting covers manufactured from 20-mil- thick, high-impact, ultraviolet-resistant PVC.

1. Shapes: 45- and 90-degree, short- and long-radius elbows, tees, valves, flanges, reducers, end caps, soil-pipe hubs, traps, mechanical joints, and P-trap and supply covers for lavatories for the disabled.
2. Adhesive: As recommended by insulation material manufacturer.

E. Aluminum Jacket: Aluminum roll stock, ready for shop or field cutting and forming to indicated sizes. Comply with ASTM B 209, 3003 alloy, H-14 temper.

1. Finish and Thickness: Stucco-embossed finish, 0.020 inch thick.
2. Moisture Barrier: 1-mil- thick, heat-bonded polyethylene and kraft paper.
3. Elbows: Preformed, 45- and 90-degree, short- and long-radius elbows; same material, finish, and thickness as jacket.

2.3 ACCESSORIES AND ATTACHMENTS

A. Glass Cloth and Tape: Comply with MIL-C-20079H, Type I for cloth and Type II for tape. Woven glass-fiber fabrics, plain weave, pre-sized a minimum of 8 oz./sq. yd, 4 inch tape width.

B. Bands: 3/4 inch wide, materials compatible with jacket:

C. Wire: 0.080-inch, nickel-copper alloy; 0.062-inch, soft-annealed, stainless steel; or 0.062-inch, soft-annealed, galvanized steel.

2.4 VAPOR RETARDERS

A. Mastics: Materials recommended by insulation material manufacturer that are compatible with insulation materials, jackets, and substrates.

PART 3 - EXECUTION

3.1 EXAMINATION AND PREPARATION

A. Examine substrates and conditions for compliance with requirements for installation and other conditions affecting performance of insulation application.

B. Surface Preparation: Clean and dry pipe and fitting surfaces. Remove materials that will adversely affect insulation application.

3.2 GENERAL APPLICATION REQUIREMENTS

A. Apply insulation materials, accessories, and finishes according to the manufacturer's written instructions; with smooth, straight, and even surfaces; free of voids throughout the length of piping, including fittings, valves, and specialties.

B. Refer to schedules at the end of this Section for materials, forms, jackets, and thicknesses required for each piping system.

C. Seal joints and seams with vapor-retarder mastic on insulation indicated to receive a vapor retarder.

D. Apply insulation with tight longitudinal seams and end joints. Bond seams and joints with adhesive recommended by the insulation material manufacturer.

E. Apply insulation with the least number of joints practical.

F. Apply insulation over fittings, valves, and specialties, with continuous thermal and vapor-retarder integrity, unless otherwise indicated. Refer to special instructions for applying insulation over fittings, valves, and specialties.

G. Hangers and Anchors: Where vapor retarder is indicated, seal penetrations in insulation at hangers, supports, anchors, and other projections with vapor-retarder mastic.

H. Insulation Terminations: For insulation application where vapor retarders are indicated, taper insulation ends. Seal tapered ends with a compound recommended by the insulation material manufacturer to maintain vapor retarder.

I. Apply adhesives and mastics at the manufacturer's recommended coverage rate.

J. Apply insulation with integral jackets as follows:

1. Pull jacket tight and smooth.
2. Circumferential Joints: Cover with 3-inch- wide strips, of same material as insulation jacket. Secure strips with adhesive and outward clinching staples along both edges of strip and spaced 4 inches o.c.
3. Longitudinal Seams: Overlap jacket seams at least 1-1/2 inches. Apply insulation with longitudinal seams at bottom of pipe. Clean and dry surface to receive self-sealing lap.
4. Vapor-Retarder Mastics: Where vapor retarders are indicated, apply mastic on seams and joints and at ends adjacent to flanges, unions, valves, and fittings.
5. At penetrations in jackets for thermometers and pressure gages, fill and seal voids with vapor-retarder mastic.

K. Roof Penetrations: Apply insulation for interior applications to a point even with top of roof flashing.

L. Exterior Wall Penetrations: For penetrations of below-grade exterior walls, terminate insulation flush with mechanical sleeve seal. Seal terminations with vapor-retarder mastic.

M. Interior Wall and Partition Penetrations: Apply insulation continuously through walls and floors.

N. Floor Penetrations: Apply insulation continuously through floor assembly.

3.3 MINERAL-FIBER INSULATION APPLICATION

A. Apply insulation to straight pipes and tubes buy securing each layer of preformed pipe insulation to pipe with wire, tape, or bands without deforming insulation materials.

B. Apply preformed pipe insulation to outer diameter of pipe flange.

C. Apply insulation to fittings and elbows as follows:

1. Apply premolded insulation sections of the same material as straight segments of pipe insulation when available. Secure according to manufacturer's written instructions.
2. When premolded insulation elbows and fittings are not available, apply mitered sections of pipe insulation, or glass-fiber blanket insulation, to a thickness equal to adjoining pipe insulation. Secure insulation materials with wire, tape, or bands.
3. Cover fittings with standard PVC fitting covers.

D. Apply insulation to valves and specialties as follows:

1. Apply premolded insulation sections of the same material as straight segments of pipe insulation when available. Secure according to manufacturer's written instructions.
2. When premolded insulation sections are not available, apply glass-fiber blanket insulation to valve body. Arrange insulation to permit access to packing and to allow valve operation without disturbing insulation.

3. Use preformed standard PVC fitting covers for valve sizes where available. Secure fitting covers with manufacturer's attachments and accessories. Seal seams with tape and vapor-retarder mastic.
4. For larger sizes where PVC fitting covers are not available, seal insulation with canvas jacket and sealing compound recommended by the insulation material manufacturer.

3.4 FLEXIBLE ELASTOMERIC THERMAL INSULATION APPLICATION

A. Apply insulation to straight pipes and tubes as follows:

1. Follow manufacturer's written instructions for applying insulation.
2. Seal longitudinal seams and end joints with manufacturer's recommended adhesive. Cement to avoid openings in insulation that will allow passage of air to the pipe surface.

B. Apply pipe insulation to outer diameter of pipe flanges.

C. Apply insulation to fittings and elbows as follows:

1. Apply mitered sections of pipe insulation.
2. Secure insulation materials and seal seams with manufacturer's recommended adhesive. Cement to avoid openings in insulation that will allow passage of air to the pipe surface.

D. Apply insulation to valves and specialties as follows:

1. Apply preformed valve covers manufactured of the same material as pipe insulation and attached according to the manufacturer's written instructions.
2. Apply cut segments of pipe and sheet insulation to valve body. Arrange insulation to permit access to packing and to allow valve operation without disturbing insulation.
3. Secure insulation to valves and specialties and seal seams with manufacturer's recommended adhesive. Cement to avoid openings in insulation that will allow passage of air to the pipe surface.

3.5 INSULATION APPLICATION SCHEDULE

A. Items Not Insulated: Unless otherwise indicated, do not apply insulation to the following systems, materials, and equipment:

1. Flexible connectors.
2. Vibration-control devices.
3. Fire-suppression piping.
4. Drainage piping located in crawl spaces, unless otherwise indicated.
5. Below-grade piping, unless otherwise indicated.
6. Chrome-plated pipes and fittings, unless potential for personnel injury.
7. Air chambers, unions, strainers, check valves, plug valves, and flow regulators.

B. Service: Condensate drain piping (CD).

1. Insulation Material: Mineral fiber.
2. Insulation Thickness: Apply the following insulation thicknesses:

a. Copper pipe: 1/2”

3. Vapor Retarder Required: Yes.

C. Service: Refrigerant suction (RS).

1. Insulation Material: Flexible elastomeric
2. Insulation Thickness: 1-1/2”
3. Vapor Retarder Required: Yes.
4. Finish: Two coats of manufacturer’s coating when exposed to outside.

D. Service: Refrigerant liquid (RL)

1. Insulation Material: Flexible elastomeric
2. Insulation Thickness: 1-1/2”
3. Vapor Retarder Required: Yes.
4. Finish: Two coats of manufacturer’s coating when exposed to outside.

END OF SECTION 230720

SECTION 230800 - COMMISSIONING OF HVAC

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions apply to this Section.

1.2 SUMMARY

A. Section includes commissioning process requirements to be completed by the contractor for the following HVAC systems, assemblies, and equipment:

1. Heating/Cooling generation systems, including variable refrigerant flow systems.
2. Controls and instrumentation, including BAS.
3. Systems testing and balancing verification, including condenser water piping systems.

B. A third-party commissioning authority (CxA) will be contracted directly by the Owner. The CxA has overall responsibility for planning and coordinating the commissioning process.

C. This section of the specifications defines the Contractor's responsibilities with respect to the commissioning process.

D. Each Contractor and subcontractor shall review this section and shall include in their bids for carrying out the work described, as it applies to each division and section of these specifications, individually and collectively.

E. Commissioning, including functional tests, O&M documentation review, and training is to occur after startup and initial checkout and be completed before Substantial Completion.

1.3 DEFINITIONS

A. BAS: Building automation system.

B. BoD: Basis of Design. A document that records concepts, calculations, decisions, and product selections used to meet the OPR and to satisfy applicable regulatory requirements, standards, and guidelines. The document includes both narrative descriptions and lists of individual items that support the design process.

C. Commissioning Plan: A document that outlines the organization, schedule, allocation of resources, and documentation requirements of the commissioning process.

D. CxA: Commissioning Authority

E. DDC: Direct digital controls.

F. HVAC: Heating, Ventilating, and Air Conditioning.

G. OPR: Owner's Project Requirements. A document that details the functional requirements of a project and the expectations of how it will be used and operated. These include Project goals, measurable performance criteria, cost considerations, benchmarks, success criteria, and supporting information.

H. "Systems," "Subsystems," "Equipment," and "Components": Where these terms are used together or separately, they shall mean "as-built" systems, subsystems, equipment, and components.

I. TAB: Testing, adjusting, and balancing.

1.4 COMMISSIONING AUTHORITY

A. CxA will be selected and employed by the Owner for this project. The CxA has overall responsibility for planning and coordinating the commissioning process.

B. CxA shall meet all necessary requirements as defined by U.S. Green Building Council LEED Reference Guide (version 2009, BD+C – New Construction).

1.5 QUALITY ASSURANCE

A. BAS Testing Technician Qualifications: Technicians to perform BAS construction checklist verification tests, construction checklist verification test demonstrations, commissioning tests, and commissioning test demonstrations shall have the following minimum qualifications:

1. Journey-level or equivalent skill level with knowledge of BAS, HVAC, electrical concepts, and building operations.

B. HVAC Testing Technician Qualifications: Technicians to perform HVAC construction checklist verification tests, construction checklist verification test demonstrations, commissioning tests, and commissioning test demonstrations shall have the following minimum qualifications:

1. Journey-level or equivalent skill level. Vocational School four-year program graduate or an Associates degree in mechanical systems, air conditioning, or similar field. Degree may be offset by three years' experience in servicing mechanical systems in the HVAC industry. Generally, required knowledge includes HVAC systems, electrical concepts, building operations, and application and use of tools and instrumentation to measure performance of HVAC equipment, assemblies, and systems.

1.6 SCOPE OF COMMISSIONING

A. The following shall be commissioned:

1. HVAC Systems, including:

a. Variable Refrigerant Flow Systems.
b. Exhaust fans.
c. Variable frequency drives.
d. Building automation system.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 GENERAL TESTING REQUIREMENTS

A. Certify that HVAC systems, subsystems, and equipment have been installed, calibrated, started and operating according to the Contract Documents and approved Shop Drawings and submittals.

B. Certify that HVAC instrumentation and control systems have been completed and calibrated, that they are operating according to the Contract Documents and approved Shop Drawings and submittals, and that pretest set points have been recorded.

C. Certify that TAB procedures have been completed and that TAB reports have been submitted, discrepancies corrected, and corrective work approved.

D. Set systems, subsystems, and equipment into operating mode to be tested according to approved test procedures (e.g., normal shutdown, normal auto position, normal manual position, unoccupied cycle, emergency power, and alarm conditions).

E. Measure capacities and effectiveness of systems, assemblies, subsystems, equipment, and components, including operational and control functions to verify compliance with acceptance criteria.

F. Test systems, assemblies, subsystems, equipment, and components operating modes, interlocks, control responses, and responses to abnormal or emergency conditions, and response according to acceptance criteria.

G. If seasonal testing is specified, complete appropriate initial performance tests and documentation and schedule seasonal tests.

H. Coordinate schedule with, and perform the following activities at the direction of CxA.

I. Comply with construction checklist requirements, including material verification, installation checks, start-up, and performance tests requirements specified in Sections specifying HVAC systems and equipment.

J. Provide technicians, instrumentation, tools, and equipment to complete and document the following:

1. Performance tests.
2. Demonstration of a sample of performance tests.
3. Commissioning tests.
4. Commissioning test demonstrations.

END OF SECTION 230800

SECTION 230900 – HVAC INSTRUMENTATION AND CONTROLS

PART 1 - GENERAL

1.1 PRODUCTS NOT FURNISHED OR INSTALLED UNDER BUT INTEGRATED WITH THE WORK OF THIS SECTION

A. General:

1. Coordination Meeting: The Installer furnishing the DDC network shall meet with the Installer(s) furnishing each of the following products to coordinate details of the interface between these products and the DDC network. The Owner or his designated representative shall be present at this meeting. Each Installer shall provide the Owner and all other Installers with details of the proposed interface including PICS for BACnet equipment, hardware and software identifiers for the interface points, network identifiers, wiring requirements, communication speeds, and required network accessories. The purpose of this meeting shall be to insure there are no unresolved issues regarding the integration of these products into the DDC network. Submittals for these products shall not be approved prior to the completion of this meeting.

B. Section 236315 – Variable Refrigerant Flow System

1. Packaged Variable Refrigerant Flow System: Unit shall be furnished configured to accept control inputs from an external building automation system controller as specified in Section 230993. Factory mounted safeties and other controls shall not interfere with this controller.
2. The Temperature Control Contractor shall furnish and install all wiring for the VRF control system. Coordinate wiring requirements with VRF system supplier.

C. Communications with Third Party Equipment:

1. Any additional integral control systems included with the products integrated with the work of this section shall be furnished with a BACnet interface for integration into the Direct Digital Control System described in this section.

1.2 RELATED SECTIONS

A. The General Conditions of the Contract, Supplementary Conditions, and General Requirements are part of this specification and shall be used in conjunction with this section as part of the contract documents.

1.3 APPROVED CONTROL SYSTEM PRIMARY MANUFACTURERS

A. The new control system shall be an extension of the existing Honeywell building automation system. Expand and update existing system to meet the new control specification requirements.

1.4 QUALITY ASSURANCE

A. Installer and Manufacturer Qualifications

1. Installer shall have an established working relationship with Control System Manufacturer of not less than three years.
2. Installer shall have a local staff within 50 miles of the project site that are trained and capable of giving instructions and providing routine and emergency maintenance of the BAS, all components and software/firmware and all other elements of the BAS.
3. Have comprehensive local service and support facilities for the total BAS as provided.
4. Maintain local, or have approved local contracted access to, supplies of essential expendable parts.

1.5 CODES AND STANDARDS

A. Work, materials, and equipment shall comply with the most restrictive of local, state, and federal authorities' codes and ordinances or these plans and specifications.

1.6 SUBMITTALS

A. Product Data and Shop Drawings: Meet requirements of Division 1 on Shop Drawings, Product Data, and Samples. In addition, Contractor shall provide shop drawings or other submittals on all hardware, software, and installation to be provided. No work may begin on any segment of this project until submittals have been successfully reviewed for conformity with the design intent. Six (6) copies are required. Provide drawings as AutoCAD 2004 (or newer) compatible files on optical disk (file format: .dwg, .dxf, .vsd, or comparable) with three 11" x 17" prints of each drawing. When manufacturer's cutsheets apply to a product series rather than a specific product, the data specifically applicable to the project shall be highlighted or clearly indicated by other means. Each submitted piece of literature and drawings shall clearly reference the specification and/or drawing that the submittal is to cover. General catalogs shall not be accepted as cut sheets to fulfill submittal requirements. Submittals shall be provided within 12 weeks of contract award. Submittals shall include:

1. Direct Digital Control System Hardware:

a. A complete bill of materials of equipment to be used indicating quantity, manufacturer, model number, and other relevant technical data.
b. Schedule of dampers including size, leakage, and flow characteristics.
c. Schedule of valves including flow characteristics.
d. Manufacturer's description and technical data, such as performance curves, product specification sheets, and installation/maintenance instructions for the items listed below and other relevant items not listed below:

1) Direct Digital Controller (controller panels)
2) Transducers/Transmitters
3) Sensors (including accuracy data)
4) Actuators
5) Relays/Switches
6) Control Panels
7) Power Supply
8) Batteries
9) Operator Interface Equipment
10) Wiring

e. Wiring diagrams and layouts for each control panel. Show all termination numbers.
f. Schematic diagrams for all field sensors and controllers.
g. Schematic diagrams for all control, communication, and power wiring. Provide a schematic drawing of the central system installation. Label all cables and ports with computer manufacturers' model numbers and functions. Show all interface wiring to the control system.
h. Riser diagrams of wiring between central control unit and all control panels.
i. A schematic diagram of each controlled system. The schematics shall have all control points labeled with point names shown or listed. The schematics shall graphically show the location of all control elements in the system.
j. A schematic wiring diagram for each controlled system. Each schematic shall have all elements labeled. Where a control element is the same as that shown on the control system schematic, it shall be labeled with the same name. All terminals shall be labeled.
k. An instrumentation list for each controlled system. Each element of the controlled system shall be listed in table format. The table shall show element name, type of device, manufacturer, model number, and product data sheet number.
l. A complete description of the operation of the control system, including sequences of operation. The description shall include and reference a schematic diagram of the controlled system.
m. A point list for each system controller including both inputs and outputs (I/O), point number, the controlled device associated with the I/O point, and the location of the I/O device. Software flag points, alarm points, etc.

2. Quantities of items submitted shall be reviewed but are the responsibility of the Contractor.
3. A BACnet Protocol Implementation Conformance Statement (PICS) for each type of controller and operator interface included in the submittal.

B. Project Record Documents: Upon completion of installation, submit three copies of record (as-built) documents. The documents shall be submitted for approval prior to final completion and shall include:

1. Project Record Drawings. As-built versions of the submittal shop drawings provided as AutoCAD 2004 (or newer) compatible files on optical media and as 11" x 17" prints.
2. Testing and Commissioning Reports and Checklists. Completed versions of reports, checklists, and trend logs used to meet requirements of Part 3: "Control System Demonstration and Acceptance."
3. Operation and Maintenance (O & M) Manual.
4. As-built versions of submittal product data.
5. Names, addresses, and 24-hour telephone numbers of installing contractors and service representatives for equipment and control systems.
6. Operator's manual with procedures for operating control systems: logging on and off, handling alarms, producing point reports, trending data, overriding computer control, and changing setpoints and variables.
7. Programming manual or set of manuals with description of programming language and syntax, of statements for algorithms and calculations used, of point database creation and modification, of program creation and modification, and of editor use.
8. Engineering, installation, and maintenance manual or set of manuals that explains how to design and install new points, panels, and other hardware; how to perform preventive maintenance and calibration; how to debug hardware problems; and how to repair or replace hardware.
9. Documentation of all programs created using custom programming language including setpoints, tuning parameters, and object database.
10. Graphic files, programs, and database on magnetic or optical media.
11. List of recommended spare parts with part numbers and suppliers.

12. Complete original-issue documentation, installation, and maintenance information for furnished third-party hardware including computer equipment and sensors.
13. Complete original-issue copies of furnished software, including operating systems, custom programming language, operator workstation software, and graphics software.
14. Licenses, guarantees, and warranty documents for equipment and systems.
15. Recommended preventive maintenance procedures for system components, including schedule of tasks such as inspection, cleaning, and calibration; time between tasks; and task descriptions.

C. Training Materials. Provide course outline and manual for each class at least six weeks before first class. Engineer will modify course outlines and manuals if necessary to meet Owner's needs. Engineer will review and approve course outlines and manuals at least three weeks before first class.

1.7 WARRANTY

A. Warrant work as follows:

1. Warrant labor and materials for specified control system free from defects for a period of 12 months after final acceptance. Control system failures during warranty period shall be adjusted, repaired, or replaced at no additional cost or reduction in service to Owner. Respond during normal business hours within 24 hours of Owner's warranty service request.
2. Work shall have a single warranty date, even if Owner receives beneficial use due to early system start-up. If specified work is split into multiple contracts or a multi-phase contract, each contract or phase shall have a separate warranty start date and period.
3. Any software modifications or upgrades that become standard product offerings from the BAS contractor and/or BAS equipment vendors during the warranty period shall be brought to the attention of the Owner and, if the Owner wishes, shall be provided at no additional cost to the Owner. If available, Owner can purchase in-warranty service agreement to receive upgrades for functional enhancements associated with above-mentioned items. Do not install updates or upgrades without Owner's written authorization.

1.8 OWNERSHIP OF PROPRIETARY MATERIAL

A. Project-specific software and documentation shall become Owner's property. This includes, but is not limited to:

1. Graphics
2. Record drawings
3. Database
4. Application programming code
5. Documentation
6. All software and hardware licenses

PART 2 - PRODUCTS

2.1 MATERIALS

A. Use new products that the manufacturer is currently manufacturing and that have been installed in a minimum of 25 installations. Do not use this installation as a product test site unless explicitly approved in writing by Owner or Owner's representative. Spare parts shall be available for at least five years after completion of this contract.

2.2 COMMUNICATION

A. Control products, communication media, connectors, repeaters, hubs, and routers shall comprise a BACnet internetwork. Only the open protocols BACnet will be accepted on this project. BACnet controllers shall follow the standard BACnet templates and conform to ANSI/ASHRAE Standard 135-2004, BACnet. No other communication protocols will be accepted.

B. All Building Controllers shall have a communications port for connections with the operator interfaces. This may be either a network interface node for connection to the Ethernet network or an RS-232/RS-485 port for Point to Point connection.

C. Internetwork operator interface and value passing shall be transparent to internetwork architecture.

1. An operator interface connected to a controller shall allow the operator to interface with each internetwork controller as if directly connected. Controller information such as data, status, reports, system software, and custom programs shall be viewable and editable from each internetwork controller.
2. Inputs, outputs, and control variables used to integrate control strategies across multiple controllers shall be readable by each controller on the internetwork. Program and test all cross-controller links required to execute specified control system operation. An authorized operator shall be able to edit cross-controller links by typing a standard object address.

2.3 OPERATOR INTERFACE

A. Operator Interface: Existing operator interface shall be used.

2.4 CONTROLLERS

A. General. Provide Building Controllers (BC), Advanced Application Controllers (AAC), Application Specific Controllers (ASC), Smart Actuators (SA), and Smart Sensors (SS) as required to achieve performance specified in Section 1.6.

B. Communication.

1. Service Port. Each controller shall provide a service communication port for connection to a Portable Operator's Terminal. Connection shall be extended to space temperature sensor ports where shown on drawings.

2. Signal Management. BC and ASC operating systems shall manage input and output communication signals to allow distributed controllers to share real and virtual object information and to allow for central monitoring and alarms.
3. Data Sharing. Each BC and AAC shall share data as required with each networked BC and AAC.
4. Stand-Alone Operation. Each piece of equipment specified in Section 230993 shall be controlled by a single controller to provide stand-alone control in the event of communication failure. All I/O points specified for a piece of equipment shall be integral to its controller. Provide stable and reliable stand-alone control using default values or other method for values normally read over the network.

C. Environment. Controller hardware shall be suitable for anticipated ambient conditions.

1. Controllers used outdoors or in wet ambient conditions shall be mounted in waterproof enclosures and shall be rated for operation at -29°C to 60°C (-20°F to 140°F).
2. Controllers used in conditioned space shall be mounted in dust-protective enclosures and shall be rated for operation at 0°C to 50°C (32°F to 120°F).

D. Real-Time Clock. Controllers that perform scheduling shall have a real-time clock.

E. Memory.

1. Controller memory shall support operating system, database, and programming requirements.
2. Each BC and AAC shall retain BIOS and application programming for at least 72 hours in the event of power loss.
3. Each ASC and SA shall use nonvolatile memory and shall retain BIOS and application programming in the event of power loss. System shall automatically download dynamic control parameters following power loss.

F. Immunity to Power and Noise. Controllers shall be able to operate at 90% to 110% of nominal voltage rating and shall perform an orderly shutdown below 80% nominal voltage. Operation shall be protected against electrical noise of 5 to 120 Hz and from keyed radios up to 5 W at 1 m (3 ft).

G. Transformer. ASC power supply shall be fused or current limiting and shall be rated at a minimum of 125% of ASC power consumption

2.5 INPUT/OUTPUT INTERFACE

A. Hardwire inputs and output points into the system through building, custom application, or application specific controllers.

B. All input points and output points shall be protected such that shorting of the point to itself, to another point, or to ground will cause no damage to the controller. All input and output points shall be protected from voltage up to 24 V of any duration, such that contact with this voltage will cause no damage to the controller.

C. Binary inputs shall allow the monitoring of On/Off signals from remote devices. The binary inputs shall provide a wetting current of at least 12 mA to be compatible with commonly available control devices and shall be protected against the effects of contact bounce and noise. Binary inputs shall sense “dry contact” closure without external power (other than that provided by the controller) being applied.

D. Pulse accumulation input objects. This type of object shall conform to all the requirements of binary input objects and also accept up to 10 pulses per second for pulse accumulation.

E. Analog inputs shall allow the monitoring of low-voltage (0 to 10 VDC), current (4 to 20 mA), or resistance signals (thermistor, RTD). Analog inputs shall be compatible with—and field configurable to— commonly available sensing devices.

F. Binary outputs shall provide for On/Off operation or a pulsed low-voltage signal for pulse width modulation control.

G. Analog outputs shall provide a modulating signal for the control of end devices. Outputs shall provide either a 0 to 10 VDC or a 4 to 20 mA signal as required to provide proper control of the output device.

H. Tri-State Outputs. Provide tri-state outputs (two coordinated binary outputs) for control of three-point floating type electronic actuators without feedback. Use of three-point floating devices shall be limited to zone control and terminal unit control applications (VAV terminal units, duct-mounted heating coils, zone dampers, radiation, etc.). Control algorithms shall run the zone actuator to one end of its stroke once every 24 hours for verification of operator tracking.

I. Input/Output points shall be the universal type, i.e., controller input or output may be designated (in software) as either a binary or analog type point with appropriate properties. Application specific controllers are exempted from this requirement.

J. System Object Capacity. The system size shall be expandable to at least twice the number of input/ output objects required for this project. Additional controllers (along with associated devices and wiring) shall be all that is necessary to achieve this capacity requirement. The operator interfaces installed for this project shall not require any hardware additions or software revisions in order to expand the system.

2.6 POWER SUPPLIES AND LINE FILTERING

A. Control transformers shall be UL listed. Furnish Class 2 current-limiting type or furnish over-current protection in both primary and secondary circuits for Class 2 service in accordance with NEC requirements. Limit connected loads to 80% of rated capacity.

B. Power line filtering.

1. Provide transient voltage and surge suppression for all workstations and controllers either internally or as an external component. Surge protection shall have the following at a minimum:

   a. Dielectric strength of 1000 volts minimum
   b. Response time of 10 nanoseconds or less
   c. Transverse mode noise attenuation of 65 dB or greater
   d. Common mode noise attenuation of 150 dB or better at 40 Hz to 100 Hz

2.7 ACTUATORS

A. Electronic Actuators: Direct-coupled type designed for minimum 60,000 full-stroke cycles at rated torque.

1. Manufacturers:

a. Belimo Aircontrols (USA), Inc.
b. Honeywell
c. Johnson Controls
d. Siemens Controls

2. Dampers: Size for running torque calculated as follows:

a. Parallel-Blade Damper with Edge Seals: 7 inch-lb/sq. ft. of damper.
b. Opposed-Blade Damper with Edge Seals: 5 inch-lb/sq. ft. of damper.
c. Parallel-Blade Damper without Edge Seals: 4 inch-lb/sq. ft of damper.
d. Opposed-Blade Damper without Edge Seals: 3 inch-lb/sq. ft. of damper.
e. Dampers with 2- to 3-Inch wg of Pressure Drop or Face Velocities of 1000 to 2500 fpm: Increase running torque by 1.5.
f. Dampers with 3- to 4-Inch wg of Pressure Drop or Face Velocities of 2500 to 3000 fpm: Increase running torque by 2.0.

3. Coupling: V-bolt and V-shaped, toothed cradle.
4. Overload Protection: Electronic overload or digital rotation-sensing circuitry.
5. Fail-Safe Operation: Mechanical, spring-return mechanism. Provide external, manual gear release on nonspring-return actuators.
6. Power Requirements (Two-Position Spring Return): 24 V ac.
7. Power Requirements (Modulating): Maximum 10 VA at 24-VAC or 8 W at 24-VDC.
8. Proportional Signal: 2- to 10-VDC or 4 to 20 mA, and 2- to 10-VDC position feedback signal.
9. Temperature Rating: Minus 20 to plus 122 deg F.
10. Temperature Rating (Smoke Dampers): Minus 20 to plus 250 deg F.
11. Exterior applications: Housing shall be NEMA 4 rated and provided with an anti-condensation heater.
12. Run Time: Stroke dampers from fully closed to fully open according to the following:

a.	Two position normal service	75 seconds
b.	Modulating normal service	150 seconds

2.8 DAMPERS

A. Manufacturers:

1. Air Balance Inc.
2. Johnson Controls
3. Honeywell
4. Nailor Industries
5. Ruskin

B. Dampers: AMCA-rated, parallel or opposed-blade design; 0.108-inch minimum thick, galvanized steel or 0.125-inch minimum thick, extruded aluminum frames with holes for duct mounting; damper blades shall not be less than 0.064-inch thick galvanized steel with maximum blade width of 8 inches and length of 48 inches.

1. Secure blades to 1/2-inch diameter, zinc-plated axles using zinc-plated hardware, with oil-impregnated 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.
3. Edge Seals, Standard Pressure Applications: Closed-cell neoprene.

4. Edge Seals, Low-Leakage Applications: Use replaceable rubber blade seals and spring-loaded stainless-steel side seals, rated for leakage at less than 10 cfm per sq. ft of damper area, at differential pressure of 4-inch wg when damper is held by torque of 50 in. x lbf when tested according to AMCA 500D.
5. Use parallel blade dampers in all mixing applications.

2.9 ELECTRONIC SENSORS

A. Temperature sensors.

1. Manufacturers:

   a. BEC Controls Corporation
   b. Honeywell
   c. I.T.M. Instruments Inc.
   d. MAMAC Systems, Inc.
   e. Precon
   f. RDF Corporation
   g. TAC
   h. Veris Industries

2. Accuracy:

   a. Thermistor sensors: Plus or minus 0.5 deg F at calibration point.
   b. RTDs and transmitters: Plus or minus 0.2 percent at calibration point.

3. Wire: Twisted, shielded-pair cable.
4. Insertion Elements in Ducts: Single point, 8 inches long; use where not affected by temperature stratification or where ducts are smaller than 9 sq. ft.
5. Averaging Elements in Ducts: minimum 72” long or (one linear foot per square foot) of duct cross-sectional area, whichever is greater. Use where prone to temperature stratification or where ducts are larger than 10 sq. ft.
6. Insertion Elements for Liquids: Brass or stainless-steel socket with minimum insertion length of 2-1/2 inches.
7. Room Sensors:

   a. Set-Point Adjustment and Indication: Yes
   b. Color: Color from manufacturer's standard.
   c. Insulating Bases: For sensors located on exterior walls.

2.10 AUXILIARY CONTROL DEVICES

A. Binary Temperature Devices

1. Low-voltage space thermostat shall be 24 V, bimetal-operated, mercury-switch type, with either adjustable or fixed anticipation heater, concealed setpoint adjustment, 13°C to 30°C (55°F to 85°F) set point range, 1°C (2°F) maximum differential, and vented ABS plastic cover.
2. Line-voltage space thermostat shall be bimetal-actuated, open contact type, or bellows-actuated, enclosed, snap-switch type or equivalent solid-state type, with heat anticipator, UL listed for electrical rating, concealed setpoint adjustment, 13°C to 30°C (55°F to 85°F) setpoint range, 1°C (2°F) maximum differential, and vented ABS plastic cover.

B. Relays

1. Control relays shall be UL listed plug-in type with dust cover and LED “energized” indicator. Contact rating, configuration, and coil voltage shall be suitable for application.
2. Time delay relays shall be UL listed solid-state plug-in type with adjustable time delay. Delay shall be adjustable ±200% (minimum) from set point shown on plans. Contact rating, configuration, and coil voltage shall be suitable for application. Provide NEMA 1 enclosure when not installed in local control panel.

C. Current transformers

1. AC current transformers shall be UL/CSA Recognized and completely encased (except for terminals) in approved plastic material.
2. Transformers shall be available in various current ratios and shall be selected for ±1% accuracy at 5 A full-scale output.
3. Transformers shall be fixed-core or split-core type for installation on new or existing wiring, respectively.

2.11 LOCAL CONTROL PANELS

A. All indoor control cabinets shall be fully enclosed NEMA 1 construction with (hinged door) key-lock latch and removable subpanels. A single key shall be common to all field panels and subpanels.

B. Interconnections between internal and face-mounted devices shall be prewired with color-coded stranded conductors neatly installed in plastic troughs and/or tie-wrapped. Terminals for field connections shall be UL listed for 600 volt service, individually identified per control/ interlock drawings, with adequate clearance for field wiring. Control terminations for field connection shall be individually identified per control drawings.

C. Provide ON/OFF power switch with overcurrent protection for control power sources to each local panel.

2.12 CONTROL RACEWAYS

A. EMT: ANSI C80.3, zinc-coated steel, with steel or cast set-screw or compression fittings.

B. FMC: Zinc-coated steel.

C. Raceway Fittings: Specifically designed for the raceway type with which used.

2.13 CONTROL CONDUCTORS

A. Conductors, No. 10 AWG and Smaller: Solid or stranded copper.

B. Conductors, Larger Than No. 10 AWG: Stranded copper.

C. Insulation: Thermoplastic, rated at 75 deg C minimum.

D. Wire Connectors and Splices: Units of size, ampacity rating, material, type, and class suitable for service indicated.

2.14 LOW VOLTAGE CONDUCTORS

A. Provide conductors including the following:

1. Control panel to control panel – Systimax (or equal) CAT 5E plenum cable or manufactures recommendation
2. Control panel to net or sub LAN Controller – Belden RS 485 shielded cable or manufacturer's recommendation.
3. Controller or panel to controlled devices – Belden (or equal) 2 or 3 wire shielded cable or manufacturers recommendation.
4. All wiring shall be plenum rated unless installed in conduit.
5. Utilize riser rated cable if applicable.

2.15 RACEWAY AND CABLE SUPPORTING DEVICES

A. Material: Cold-formed steel, with corrosion-resistant coating acceptable to authorities having jurisdiction.

B. Metal Items for Use Outdoors or in Damp Locations: Hot-dip galvanized steel.

C. Slotted-Steel Channel Supports: Flange edges turned toward web, and 9/16-inch diameter slotted holes at a maximum of 2 inches o.c., in webs.

D. Delete paragraph below if only metal supports are used.

E. Raceway and Cable Supports: Manufactured clevis hangers, riser clamps, straps, threaded C-clamps with retainers, ceiling trapeze hangers, wall brackets, and spring-steel clamps or click-type hangers.

F. Pipe Sleeves: ASTM A 53, Type E, Grade A, Schedule 40, galvanized steel, plain ends.

G. Expansion Anchors: Carbon-steel wedge or sleeve type.

H. Toggle Bolts: All-steel springhead type.

I. Powder-Driven Threaded Studs: Heat-treated steel.

2.16 BOXES

A. Hollow wall and ceiling spaces: Outlet boxes for concealed applications shall be 4" square with single or multiple gang plaster ring in round or square configuration to match the device being installed. Depth of ring shall be selected so that face of ring is recessed back from face of finished surface by approximately 1/8".

B. Masonry walls: Outlet boxes in masonry walls shall be 4" square with single or multiple gang masonry rings with square edges. Masonry boxes may also be used where 4" square boxes are impractical. Slush boxes in place to prevent movement with in walls. Flush mounted boxes and conduit are to be used unless otherwise indicated.

C. Exposed Exterior boxes: Where exposed boxes are required, they shall be the cast type with threaded hubs and gasketed covers. Use of these boxes is by approval only. Flush mounted boxes and conduit are to be used unless otherwise indicated.

D. Interior junction boxes: Interior junction boxes shall be 4” square minimum with knock outs as required. Provide a flat steel coverplate.

PART 3 - EXECUTION

3.1 EXAMINATION

A. The project plans shall be thoroughly examined for control device and equipment locations. Any discrepancies, conflicts, or omissions shall be reported to the architect/engineer for resolution before rough-in work is started.

B. The contractor shall inspect the site to verify that equipment may be installed as shown. Any discrepancies, conflicts, or omissions shall be reported to the engineer for resolution before rough-in work is started.

C. The contractor shall examine the drawings and specifications for other parts of the work. If head room or space conditions appear inadequate—or if any discrepancies occur between the plans and the contractor’s work and the plans and the work of others—the contractor shall report these discrepancies to the engineer and shall obtain written instructions for any changes necessary to accommodate the contractor’s work with the work of others. Any changes in the work covered by this specification made necessary by the failure or neglect of the contractor to report such discrepancies shall be made by—and at the expense of—this contractor.

3.2 PROTECTION

A. The contractor shall protect all work and material from damage by his/her work or employees and shall be liable for all damage thus caused.

B. The contractor shall be responsible for his/her work and equipment until finally inspected, tested, and accepted. The contractor shall protect any material that is not immediately installed. The contractor shall close all open ends of work with temporary covers or plugs during storage and construction to prevent entry of foreign objects.

3.3 COORDINATION

A. Site

1. Where the mechanical work will be installed in close proximity to, or will interfere with, work of other trades, the contractor shall assist in working out space conditions to make a satisfactory adjustment. If the contractor installs his/her work before coordinating with other trades, so as to cause any interference with work of other trades, the contractor shall make the necessary changes in his/her work to correct the condition without extra charge.
2. Coordinate and schedule work with all other work in the same area, or with work that is dependent upon other work, to facilitate mutual progress.

B. Test and Balance

1. The contractor shall furnish a single set of all tools necessary to interface to the control system for test and balance purposes.

2. The contractor shall provide training in the use of these tools. This training will be planned for a minimum of 4 hours.
3. In addition, the contractor shall provide a qualified technician to assist in the test and balance process, until the first 20 terminal units are balanced.
4. The tools used during the test and balance process will be returned at the completion of the testing and balancing.

C. Life Safety

1. Smoke dampers and actuators required for duct smoke isolation are provided under a Section of Division 23.
2. Fire/smoke dampers and actuators required for fire rated walls are provided under another Section of Division 23. Control of these dampers shall be by Division 26. The contractor shall provide control air to the dampers.

D. Coordination with controls specified in other sections or divisions. Other sections and/or divisions of this specification include controls and control devices that are to be part of or interfaced to the control system specified in this section. These controls shall be integrated into the system and coordinated by the contractor as follows:

1. All communication media and equipment shall be provided as specified in Part 2, “Communication” of this specification.
2. Each supplier of a controls product is responsible for the configuration, programming, start-up, and testing of that product to meet the sequences of operation described in this section.
3. The Contractor shall coordinate and resolve any incompatibility issues that arise between the control products provided under this section and those provided under other sections or divisions of this specification.
4. The contractor is responsible for providing all controls described in the contract documents regardless of where within the contract documents these controls are described.
5. The contractor is responsible for the interface of control products provided by multiple suppliers regardless of where this interface is described within the contract documents.

3.4 GENERAL WORKMANSHIP

A. Install equipment, piping, and wiring/raceway parallel to building lines (i.e., horizontal, vertical, and parallel to walls) wherever possible.

B. Provide sufficient slack and flexible connections to allow for vibration of piping and equipment.

C. Install all equipment in readily accessible locations as defined by Chapter 1, Article 100, Part A of the National Electrical Code (NEC).

D. Verify integrity of all wiring to ensure continuity and freedom from shorts and grounds.

E. All equipment, installation, and wiring shall comply with acceptable industry specifications and standards for performance, reliability, and compatibility and be executed in strict adherence to local codes and standard practices.

3.5 FIELD QUALITY CONTROL

A. All work, materials, and equipment shall comply with the rules and regulations of applicable local, state, and federal codes and ordinances as identified in Part 1 of this specification.

B. Contractor shall continually monitor the field installation for code compliance and quality of workmanship.

C. Contractor shall have work inspected by local and/ or state authorities having jurisdiction over the work.

3.6 WIRING

A. All control and interlock wiring shall comply with national and local electrical codes and Division 26 of this specification. Where the requirements of this section differ from those in Division 26, the requirements of this section shall take precedence.

B. All NEC Class 1 (line voltage) wiring shall be UL Listed in approved raceway according to NEC and Division 26 requirements.

C. All low-voltage wiring shall meet NEC Class 2 requirements. (Low-voltage power circuits shall be subfused when required to meet Class 2 current limit.)

D. Where NEC Class 2 (current-limited) wires are in concealed and accessible locations, including ceiling return air plenums, approved cables not in raceway may be used provided that cables are UL Listed for the intended application. For example, cables used in ceiling plenums shall be UL Listed specifically for that purpose.

E. All wiring in mechanical, electrical, or service rooms—or where subject to mechanical damage— shall be installed in raceway.

F. Do not install Class 2 wiring in raceway containing Class 1 wiring. Boxes and panels containing high-voltage wiring and equipment may not be used for low-voltage wiring except for the purpose of interfacing the two (e.g., relays and transformers).

G. Do not install wiring in raceway containing tubing.

H. Where Class 2 wiring is run exposed, wiring is to be run parallel along a surface or perpendicular to it and neatly tied at 10 ft intervals.

I. Where plenum cables are used without raceway, they shall be supported from or anchored to structural members. Cables shall not be supported by or anchored to ductwork, electrical raceways, piping, or ceiling suspension systems.

J. All wiring within enclosures shall be neatly bundled and anchored to permit access and prevent restriction to devices and terminals.

K. Maximum allowable voltage for control wiring shall be 120 V. If only higher voltages are available, the contractor shall provide step-down transformers.

L. All wiring shall be installed as continuous lengths, with no splices permitted between termination points.

M. Install plenum wiring in sleeves where it passes through walls and floors. Maintain fire rating at all penetrations.

N. Size of raceway and size and type of wire shall be the responsibility of the contractor, in keeping with the manufacturer's recommendations and NEC requirements, except as noted elsewhere.

O. Include one pull string in each raceway 1 in. or larger.

P. Use coded conductors throughout with conductors of different colors.

Q. Control and status relays are to be located in designated enclosures only. These enclosures include packaged equipment control panel enclosures unless they also contain Class 1 starters.

R. Conceal all raceways, except within mechanical, electrical, or service rooms. Install raceway to maintain a minimum clearance of 6 in. from high-temperature equipment (e.g., steam pipes or flues).

S. Secure raceways with raceway clamps fastened to the structure and spaced according to code requirements. Raceways and pull boxes may not be hung on flexible duct strap or tie rods. Raceways may not be run on or attached to ductwork.

T. Adhere to this specification's Division 26 requirements where raceway crosses building expansion joints.

U. Install insulated bushings on all raceway ends and openings to enclosures. Seal top end of all vertical raceways.

V. The Contractor shall terminate all control and/or interlock wiring and shall maintain updated (as-built) wiring diagrams with terminations identified at the job site.

W. Flexible metal raceways and liquid-tight, flexible metal raceways shall not exceed 3 ft in length and shall be supported at each end. Flexible metal raceway less than ½ in. electrical trade size shall not be used. In areas exposed to moisture, including chiller and boiler rooms, liquid-tight, flexible metal raceways shall be used.

X. Raceway must be rigidly installed, adequately supported, properly reamed at both ends, and left clean and free of obstructions. Raceway sections shall be joined with couplings (according to code). Terminations must be made with fittings at boxes, and ends not terminating in boxes shall have bushings installed.

3.7 COMMUNICATION WIRING

A. The contractor shall adhere to the items listed in the "Wiring" article in Part 3 of the specification.

B. All cabling shall be installed in a neat and workmanlike manner. Follow manufacturer's installation recommendations for all communication cabling.

C. Do not install communication wiring in raceway and enclosures containing Class 1 or other Class 2 wiring.

D. Maximum pulling, tension, and bend radius for cable installation, as specified by the cable manufacturer, shall not be exceeded during installation.

E. Contractor shall verify the integrity of the entire network following the cable installation. Use appropriate test measures for each particular cable.

F. When a cable enters or exits a building, a lightning arrestor must be installed between the lines and ground. The lighting arrestor shall be installed according to the manufacturer's instructions.

G. All runs of communication wiring shall be unspliced length when that length is commercially available.

H. All communication wiring shall be labeled to indicate origination and destination data.

I. Grounding of coaxial cable shall be in accordance with NEC regulations article on "Communications Circuits, Cable, and Protector Grounding."

3.8 INSTALLATION OF SENSORS

A. Install sensors in accordance with the manufacturer's recommendations.

B. Mount sensors rigidly and adequately for the environment within which the sensor operates.

C. Room temperature sensors shall be installed on concealed junction boxes properly supported by the wall framing. Coordinate location of wall mounted devices with other devices to provide symmetrical and aligned installation. Review final locations with Architect/Engineer prior to installation. Install occupant adjustable devices 48 inches above the floor in compliance with ADA regulations. Install all other devices 60 inches above the floor unless otherwise shown.

D. All wires attached to sensors shall be air sealed in their raceways or in the wall to stop air transmitted from other areas affecting sensor readings.

E. Sensors used in mixing plenums and hot and cold decks shall be of the averaging type. Averaging sensors shall be installed in a serpentine manner vertically across the duct. Each bend shall be supported with a capillary clip.

3.9 ACTUATORS

A. Mount and link control damper actuators according to manufacturer's instructions.

1. To compress seals when spring-return actuators are used on normally closed dampers, power actuator to approximately 5° open position, manually close the damper, and then tighten the linkage.
2. Check operation of damper/actuator combination to confirm that actuator modulates damper smoothly throughout stroke to both open and closed positions.
3. Provide all mounting hardware and linkages for actuator installation.

B. Electric/Electronic

1. Dampers: Actuators shall be direct-mounted on damper shaft or jackshaft unless shown as a linkage installation. For low-leakage dampers with seals, the actuator shall be mounted with a minimum 5° available for tightening the damper seals. Actuators shall be mounted following manufacturer's recommendations.

3.10 IDENTIFICATION OF HARDWARE AND WIRING

A. All wiring and cabling, including that within factory-fabricated panels, shall be labeled at each end within 5 cm (2 in.) of termination with the DDC address or termination number.

B. Permanently label or code each point of field terminal strips to show the instrument or item served.

C. Identify control panels and enclosures with minimum 0.5” high letters on laminated plastic nameplates.

1. Maintain consistency throughout project.
2. Indicated and cross referenced in the record documentation.

D. Identify all other control components with permanent labels. All plug-in components shall be labeled such that removal of the component does not remove the label.

E. Identify room sensors relating to terminal box or valves with nameplates.

F. Manufacturers’ nameplates and UL or CSA labels are to be visible and legible after equipment is installed.

G. Identifiers shall match record documents.

3.11 CONTROLLERS

A. A DDC controller may control more than one system provided that all points associated with the system are assigned to the same DDC controller. Points used for control loop reset, such as outside air or space temperature, are exempt from this requirement.

3.12 PROGRAMMING

A. Point Naming: System point names shall be modular in design, allowing easy operator interface without the use of a written point index. Software Programming

1. Provide programming for the system and adhere to the sequences of operation provided. All other system programming necessary for the operation of the system, but not specified in this document, also shall be provided by the contractor. Imbed into the control program sufficient comment statements to clearly describe each section of the program. The comment statements shall reflect the language used in the sequences of operation.

B. Operator Interface

1. Standard graphics—Provide graphics for all mechanical systems and floor plans of the building. This includes each chilled water system, hot water system, chiller, boiler, air handler, and all terminal equipment. Point information on the graphic displays shall dynamically update. Show on each graphic all input and output points for the system. Also show relevant calculated points such as set points.
2. Show terminal equipment information on a “graphic” summary table. Provide dynamic information for each point shown.
3. The contractor shall provide all the labor necessary to install, initialize, start up, and troubleshoot all operator interface software and its functions as described in this section.

This includes any operating system software, the operator interface database, and any third-party software installation and integration required for successful operation of the operator interface.

3.13 CONTROL SYSTEM CHECKOUT AND TESTING

A. Start-up Testing: All testing listed in this article shall be performed by the contractor and shall make up part of the necessary verification of an operating control system. This testing shall be completed before the owner's representative is notified of the system demonstration.

1. The contractor shall furnish all labor and test apparatus required to calibrate and prepare for service of all instruments, controls, and accessory equipment furnished under this specification.
2. Verify that all control wiring is properly connected and free of all shorts and ground faults. Verify that terminations are tight.
3. Enable the control systems and verify calibration of all input devices individually. Perform calibration procedures according to manufacturers' recommendations.
4. Verify that all binary output devices (relays, solenoid valves, two-position actuators and control valves, magnetic starters, etc.) operate properly and that the normal positions are correct.
5. Verify that all analog output devices (I/Ps, actuators, etc.) are functional, that start and span are correct, and that direction and normal positions are correct. The contractor shall check all control valves and automatic dampers to ensure proper action and closure. The contractor shall make any necessary adjustments to valve stem and damper blade travel.
6. Verify that the system operation adheres to the sequences of operation. Simulate and observe all modes of operation by overriding and varying inputs and schedules. Tune all DDC loops and optimum start/stop routines.
7. Alarms and Interlocks:

    a. Check each alarm separately by including an appropriate signal at a value that will trip the alarm.
    b. Interlocks shall be tripped using field contacts to check the logic, as well as to ensure that the fail-safe condition for all actuators is in the proper direction.
    c. Interlock actions shall be tested by simulating alarm conditions to check the initiating value of the variable and interlock action.

3.14 CONTROL SYSTEM DEMONSTRATION AND ACCEPTANCE

A. Demonstration

1. Prior to acceptance, the control system shall undergo a series of performance tests to verify operation and compliance with this specification. These tests shall occur after the Contractor has completed the installation, started up the system, and performed his/her own tests.
2. The tests described in this section are to be performed in addition to the tests that the contractor performs as a necessary part of the installation, start-up, and debugging process and as specified in the "Control System Checkout and Testing" article in Part 3 of this specification. The engineer will be present to observe and review these tests. The engineer shall be notified at least 10 days in advance of the start of the testing procedures.
3. The demonstration process shall follow that approved in Part 1, "Submittals." The approved checklists and forms shall be completed for all systems as part of the demonstration.

4. The contractor shall provide at least two persons equipped with two-way communication and shall demonstrate actual field operation of each control and sensing point for all modes of operation including day, night, occupied, unoccupied, fire/smoke alarm, seasonal changeover, and power failure modes. The purpose is to demonstrate the calibration, response, and action of every point and system. Any test equipment required to prove the proper operation shall be provided by and operated by the contractor.
5. As each control input and output is checked, a log shall be completed showing the date, technician's initials, and any corrective action taken or needed.
6. Demonstrate compliance with Part 1, "System Performance."
7. Demonstrate compliance with sequences of operation through all modes of operation.
8. Demonstrate complete operation of operator interface.
9. Additionally, the following items shall be demonstrated:

    a. DDC loop response. The contractor shall supply trend data output in a graphical form showing the step response of each DDC loop. The test shall show the loop's response to a change in set point, which represents a change of actuator position of at least 25% of its full range. The sampling rate of the trend shall be from 10 seconds to 3 minutes, depending on the speed of the loop. The trend data shall show for each sample the set point, actuator position, and controlled variable values. Any loop that yields unreasonably under-damped or over-damped control shall require further tuning by the Contractor.
    b. Operational logs for each system that indicate all set points, operating points, valve positions, mode, and equipment status shall be submitted to the architect/engineer. These logs shall cover three 48-hour periods and have a sample frequency of not more than 10 minutes. The logs shall be provided in both printed and electronic formats.

10. Any tests that fail to demonstrate the operation of the system shall be repeated at a later date. The contractor shall be responsible for any necessary repairs or revisions to the hardware or software to successfully complete all tests.

B. Acceptance

1. All tests described in this specification shall have been performed to the satisfaction of both the engineer and owner prior to the acceptance of the control system as meeting the requirements of completion. Any tests that cannot be performed due to circumstances beyond the control of the contractor may be exempt from the completion requirements if stated as such in writing by the engineer. Such tests shall then be performed as part of the warranty.
2. The system shall not be accepted until all forms and checklists completed as part of the demonstration are submitted and approved as required in Part 1, "Submittals."

3.15 CLEANING

A. The contractor shall clean up all debris resulting from his/her activities daily. The contractor shall remove all cartons, containers, crates, etc., under his/her control as soon as their contents have been removed. Waste shall be collected and placed in a designated location.

B. At the completion of work in any area, the contractor shall clean all work, equipment, etc., keeping it free from dust, dirt, and debris, etc.

C. At the completion of work, all equipment furnished under this section shall be checked for paint damage, and any factory-finished paint that has been damaged shall be repaired to match the

adjacent areas. Any cabinet or enclosure that has been deformed shall be replaced with new material and repainted to match the adjacent areas.

3.16 TRAINING

A. Provide a minimum of 4 hours of on-site or classroom training throughout the contract period for personnel designated by the owner.

B. Provide course outline and materials in accordance with the “Submittals” article in Part 1 of this specification. The instructor(s) shall provide one copy of training material per student.

C. The instructor(s) shall be factory-trained instructors experienced in presenting this material.

D. Classroom training shall be done using a network of working controllers representative of the installed hardware.

3.17 ON-SITE ASSISTANCE

A. Occupancy Adjustments: Within one year of date of Substantial Completion, provide up to three Project site visits, when requested by Owner, to adjust and calibrate components and to assist Owner's personnel in making program changes and in adjusting sensors and controls to suit actual conditions.

END OF SECTION 230900

SECTION 230960 – VARIABLE FREQUENCY DRIVES

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 variable frequency drives for use on ac circuits rated 600 V and less.

1.3 SUBMITTALS

A. Product Data: For products specified in this Section. Include dimensions, ratings, and data on features and components.

B. Shop Drawings: For each variable frequency drive specified in this Section. Include dimensioned plans, elevations, and component lists.

1. Schedule of features, characteristics, ratings, and factory settings of individual motor-control center units.
2. Wiring Diagrams: Interconnecting wiring diagrams pertinent to class and type specified for drive. Schematic diagram of each type of controller unit indicated.

C. Maintenance Data: For products to include in maintenance manuals.

D. See “Submittal Schedule” located at the end of Section 230100 – General Mechanical Requirements.

1.4 QUALITY ASSURANCE

A. Manufacturer Qualifications: Maintain, within 100 miles of Project site, a service center capable of providing training, parts, and emergency maintenance and repairs.

B. Source Limitations: Obtain variable frequency drives through one source from a single manufacturer.

C. Comply with NFPA 70.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Store so condensation will not occur on or in variable frequency drives. Provide temporary heaters as required to prevent condensation.

1.6 COORDINATION

A. Coordinate features of controllers and accessory devices with pilot devices and control circuits to which they connect.

1.7 EXTRA MATERIALS

A. Furnish extra materials described below that match products installed, are packaged with protective covering for storage, and are identified with labels describing contents.

1. Spare Indicating Lights: Furnish 6 of each type required.

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. Asea Brown Boveri (ABB)
2. Yaskawa
3. Danfoss
4. Reliance Electric HVAC Drive

2.2 VARIABLE-FREQUENCY CONTROLLERS

A. Description: NEMA 1, variable-frequency controller, listed and labeled as a complete unit and arranged to provide variable speed of a energy efficient NEMA MG 1, Design B, 3-phase, induction motor by adjusting output voltage and frequency.

B. Design and Rating: Match load type, such as fans, blowers, and pumps; and type of connection used between motor and load such as direct or through a power-transmission connection.

C. Starting Torque: 100 percent of rated torque or as indicated.

D. Speed Regulation: Plus or minus one percent.

E. Ambient Temperature: 0 to 40 deg C.

F. Efficiency: 95 percent minimum at full load and 60 Hz.

G. Isolated control interface allows controller to follow 1 of the following over an 11:1 speed range:

1. Electrical Signal: 4 to 20 mA at 24 V, 0 to 5 VDC, 0 to 10 VDC

H. Internal Adjustability: Include the following internal adjustment capabilities:

1. Minimum Speed: 5 to 25 percent of maximum rpm.
2. Maximum Speed: 80 to 100 percent of maximum rpm.
3. Acceleration: 2 to 22 seconds.

4. Deceleration: 2 to 22 seconds.
5. Current Limit: 50 to 110 percent of maximum rating.

I. Self-protection and reliability features include the following:

1. Input transient protection by means of surge suppressors.
2. Snubber networks to protect against malfunction due to system voltage transients.
3. Motor Overload Relay: Adjustable and capable of NEMA 250, Class 10 performance.
4. Notch filter to prevent operation of the controller-motor-load combination at a natural frequency of the combination.
5. Instantaneous overcurrent trip.
6. Loss of phase protection.
7. Reverse phase protection.
8. Under- and overvoltage trips.
9. Overtemperature trip.
10. Short-circuit protection.

J. Automatic Reset/Restart: Attempt 3 restarts after controller fault or on return of power after an interruption and before shutting down for manual reset or fault correction. Restarting during deceleration will not damage controller, motor, or load.

K. Power-Interruption Protection: Prevents motor from reenergizing after a power interruption until motor has stopped.

L. Status: Door-mounted LED readouts to indicate the following conditions:

1. Power on.
2. Run.
3. Overvoltage.
4. Line fault.
5. Overcurrent.
6. External fault.

M. Panel-Mounted Operator Station: Start-stop and auto-manual selector switches with manual speed control adjustment and lapsed time meter.

N. Indicating Devices: Meters or digital readout devices and selector switch, mounted flush in controller door and connected to indicate controller output current, voltage, and frequency.

O. [Bypass: Manual three contactor bypass (or two contactor bypass with additional inverter disconnect) with thermal overload relays to protect the motor during bypass operation. Bypass shall be incorporated in same enclosure as drive or in attached enclosure assembled as a single unit.]

P. Integral fused disconnect.

Q. Phase loss protection relay.

R. Input AC line reactors for harmonics control.

S. EMI and RFI Filters.

T. [Direct digital control interface card in communication protocol (LON, BacNet, or Modbus) coordinated with temperature control contractor.]

PART 3 - EXECUTION

3.1 APPLICATIONS

A. Select features of each motor controller to coordinate with ratings and characteristics of supply circuit and motor; required control sequence; duty cycle of motor, drive, and load; and configuration of pilot device and control circuit affecting controller functions.

B. Select horsepower rating of controllers to suit motor controlled.

3.2 INSTALLATION

A. Furnish Variable frequency drives to electrical contractor for installation.

1. Fuses: Furnish fuses for each fusible disconnect.

B. All Power wiring shall be by electrical contractor per Division 26 specifications.

3.3 CONTROL WIRING INSTALLATION

A. Temperature control contractor shall install wiring between variable frequency drives and control devices or energy management system.

B. Bundle, train, and support wiring in enclosures.

3.4 FIELD QUALITY CONTROL

A. Provide factory authorized representative to start drive and set operating parameters.

B. Training: Engage a factory-authorized service representative to demonstrate variable-speed controllers and train Owner's maintenance personnel.

1. Schedule training with at least 7 days' advance notice.

END OF SECTION 230960

SECTION 230993 - SEQUENCE OF OPERATION FOR HVAC CONTROLS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes control sequences for the following HVAC systems, subsystems, and equipment. Sequence of Control indicated illustrates basic control function only. Provide all control devices required for controlling air handling units, exhaust fans, terminal equipment, and all related items.

B. The Control Contractor shall perform the initial input of all required operational data for each point that is to be used based on information supplied to the Contractor by the Owner. The Contractor shall assist the Owner's staff in developing the schedule and shall demonstrate the operation of the system using the data.

C. Provide adequate English language notation in the software to assist the operator in understanding the intent of the programmed sequences.

D. The Control Contractor shall be responsible for the stable operation of all control loops. If the Control Contractor has not provided self-tuning PID control algorithms then the Control Contractor shall manually tune all control loops. Verify all control loops are stable whether or not they are self-tuning.

E. The Control Contractor shall provide any modifications to the operating sequences as requested by the Owner without additional costs until the final acceptance of the entire control system.

F. Related Sections include the following:

1. Division 23 Section 230900 "HVAC Instrumentation and Controls" for control equipment and devices and for submittal requirements.

1.3 DEFINITIONS

A. DDC: Direct Digital Control System.

B. VRF: Variable Refrigerant Flow.

C. PID: Proportional-integral-derivative.

D. Points List:

1. AI = Analog Input
2. AO = Analog Output
3. BI = Binary Input

4. BO = Binary Output
5. HI = Indicated a hardwired interface requirement. These points are not monitored by the DDC SYSTEM unless indicated in any of the previous columns.
6. AV = Analog Value. A software point that may be editable or read-only.
7. BV = Binary Value. A software point that may be editable or read-only.
8. Trend = The DDC SYSTEM shall be configured to collect and display a trend log of this object.

    a. Temperature points: Initially set to sample data every 15 minutes unless noted otherwise.
    b. Pressure points: Initially set to sample data every 1 minute unless noted otherwise.
    c. Binary points: Initially set to sample data anytime there is a change of value.

9. Alarm = The DDC SYSTEM shall be configured to generate an alarm when this object exceeds user definable limits, as described in the Sequence of Controls.

E. Abbreviations: The following abbreviations may be used in graphics, schematic, point names, and other applications where space is limited.

1. AC - Air Conditioning
2. ACU - Air Conditioning Unit
3. AHU - Air Handling Unit
4. BYP - Bypass
5. CHW - Chilled Water
6. CHWP - Chilled Water Pump
7. CHWR - Chilled Water Return
8. CHWS - Chilled Water Supply
9. CO – Carbon Monoxide
10. CO2 – Carbon Dioxide
11. COND - Condenser
12. CW - Condenser Water
13. CWP - Condenser Water Pump
14. CWR - Condenser Water Return
15. CWS - Condenser Water Supply
16. DA - Discharge Air
17. DP – Differential Pressure
18. DMP - Damper
19. EA - Exhaust Air
20. EF - Exhaust Fan
21. EVAP - Evaporators
22. FCU - Fan Coil Unit
23. FPB – Fan Powered Box
24. FPTU – Fan Powered Terminal Unit
25. HOA - Hand / Off / Auto
26. HP - Heat Pump
27. HRU - Heat Recovery Unit
28. HW - Hot Water
29. HWP - Hot Water Pump
30. HWR - Hot Water Return
31. HWS - Hot Water Supply
32. MAX - Maximum
33. MIN - Minimum
34. NO2 – Nitrogen Dioxide
35. OAT - Outdoor Air Temperature
36. OAH – Outdoor Air Humidity

37. RA - Return Air
38. RAT – Return Air Temperature
39. RF - Return Fan
40. RH - Relative Humidity
41. RTU - Roof-top Unit
42. SA - Supply Air
43. SAT – Supply Air Temperature
44. SF - Supply Fan
45. SP - Static Pressure
46. TEMP - Temperature
47. UH - Unit Heater
48. UV - Unit Ventilator
49. VAV - Variable Air Volume
50. VFD – Variable Frequency Drive
51. VVTU - Variable Volume Terminal Unit
52. WSHP - Water Source Heat Pump

1.4 AIR COOLED VRF HEAT PUMP SYSTEM CONTROL

A. System Off – When the system is off:

1. Room intake Isolation damper shall be closed.
2. Transfer fan shall be off.
3. VRF System is off.

B. Initiation of System Start-Up – The system shall be started:

1. Automatically by the stand alone VRF system controls based on Emergency Operations Center (room 118) temperature rises above setpoint of 75 degrees F (adjustable)

C. System Operation – After system start-up has been initiated the following shall occur:

1. The VRF unit shall run continuously on the factory provided internal controls to maintain space setpoint temperature of 75 degrees F (adjustable).

D. System Shutdown – Shall be initiated as follows:

1. Automatically by the stand-alone controls based on Emergency Operations Center (room 118) temperature drops below 73 degrees F.

1.5 MECHANICAL ROOM 119 TEMPERATURE CONTROL

A. System Off – When the room temperature is below 80 degrees F:

1. Room intake Isolation damper shall be closed.
2. Transfer fan shall be off.
3. The transfer fan discharge damper shall be closed.

B. Initiation of System Start-Up – The system shall be started:

1. Automatically based on room temperature rises above setpoint of 75 degrees F (adjustable) the building DDC system (through a stand alone controller in the mechanical room 119) shall initiate system operation.

C. System Operation – After system start-up has been initiated the following shall occur:

1. The mechanical room intake isolation damper shall open when mechanical room temperatures rise above 75 degrees F (adjustable).
2. If the room temperature continues to rise above 80 degrees F, the mechanical room transfer fan discharge damper shall open and the fan shall start and modulate through the fan variable frequency drive and remain operational to maintain the mechanical room temperatures at 80 degrees F (adjustable).
3. The mechanical room electric heater shall maintain room minimum temperature of 65 degrees F (adjustable) through the stand-alone controller.

D. System Shutdown – Shall be initiated as follows:

1. When room temperatures drop below 75 degrees F, the transfer fan shall shutoff, the fan discharge damper shall close, and the intake damper shall close.

1.6 EXISTING HVAC SYSTEM CONTROL

A. The existing spaces to be renovated is served by an existing multi-zone air handling unit. The zone temperature sensors shall be relocated as shown and the multizone system shall operate as previously programmed to maintain space temperature setpoint 72 degrees F (adjustable) for normal operation. See plans for the zones and temperature sensors to be relocated.

B. The zone serving the Emergency Operations Center (Room 118) shall be set for 71 degrees F setpoint such that the existing system will serve the space as primary for normal operation. The VRF system setpoint of 75 degrees F will allow the VRF to operate as a backup system should the existing system fail for any reason.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION 230993

SECTION 232300 - REFRIGERANT PIPING AND ACCESSORIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes refrigerant piping used for variable refrigerant flow and split system air conditioning system applications.

1.3 PERFORMANCE REQUIREMENTS

A. Line Test Pressure for Refrigerant R-410A:

1. All Lines for Variable Refrigerant Flow Applications: 535 psig.

1.4 SUBMITTALS

A. Product Data: For each type of valve and refrigerant piping specialty indicated. Include pressure drop, based on manufacturer's test data, for the following:

1. Filter dryers.
2. Strainers.
3. Branch Circuit (BC) Controllers

B. Shop Drawings: Show layout of refrigerant piping and specialties, including pipe, tube, and fitting sizes, flow capacities, valve arrangements and locations, slopes of horizontal runs, oil traps, double risers, wall and floor penetrations, and equipment connection details. Show interface and spatial relationships between piping and equipment.

1. Refrigerant piping indicated on Drawings is schematic only. Size piping and design actual piping layout, including oil traps, double risers, specialties, and pipe and tube sizes to accommodate, as a minimum, equipment provided, elevation difference between compressor and evaporator, and length of piping to ensure proper operation and compliance with warranties of connected equipment.

1.5 QUALITY ASSURANCE

A. Brazing: Qualify procedures and personnel according to ASME Boiler and Pressure Vessel Code: Section IX, "Welding and Brazing Qualifications."

B. Comply with ASHRAE 15, "Safety Code for Refrigeration Systems."

C. Comply with ASME B31.5, "Refrigeration Piping and Heat Transfer Components."

1.6 PRODUCT STORAGE AND HANDLING

A. Store piping in a clean and protected area with end caps in place to ensure that piping interior and exterior are clean when installed.

PART 2 - PRODUCTS

2.1 COPPER TUBE AND FITTINGS

A. Copper Tube: ASTM B 280, Type ACR.

B. Wrought-Copper Fittings: ASME B16.22.

C. Wrought-Copper Unions: ASME B16.22.

D. Brazing Filler Metals: AWS A5.8.

2.2 VALVES AND SPECIALTIES

A. Service Valves:

1. Body: Forged brass with brass cap including key end to remove core.
2. Core: Removable ball-type check valve with stainless-steel spring.
3. Seat: Polytetrafluoroethylene.
4. End Connections: Copper spring.
5. Working Pressure Rating: 500 psig.

PART 3 - EXECUTION

3.1 PIPING APPLICATIONS FOR REFRIGERANT R-410A

A. All Refrigerant Lines NPS 4 and Smaller for Variable Refrigerant Flow Applications: Copper, Type ACR, drawn-temper tubing and wrought-copper fittings with brazed joints.

3.2 VALVE AND SPECIALTY APPLICATIONS

A. Install service valves for gage taps at inlet and outlet of hot-gas bypass valves and strainers if they are not an integral part of valves and strainers.

3.3 PIPING INSTALLATION

A. 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 Shop Drawings.

B. Install refrigerant piping according to ASHRAE 15.

C. Install piping in concealed locations unless otherwise indicated and except in equipment rooms and service areas.

D. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.

E. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal.

F. Install piping adjacent to machines to allow service and maintenance.

G. Install piping free of sags and bends.

H. Install fittings for changes in direction and branch connections.

I. Select system components with pressure rating equal to or greater than system operating pressure.

J. Install piping as short and direct as possible, with a minimum number of joints, elbows, and fittings.

K. Arrange piping to allow inspection and service of refrigeration equipment. Install valves and specialties in accessible locations to allow for service and inspection. Install access doors or panels as specified in Provide ceiling access doors if valves or equipment requiring maintenance is concealed behind finished surfaces.

L. Slope refrigerant piping per the manufacturer directions:

M. When brazing, remove solenoid-valve coils and sight glasses; also remove valve stems, seats, and packing, and accessible internal parts of refrigerant specialties. Do not apply heat near expansion-valve bulb.

N. Install piping with adequate clearance between pipe and adjacent walls and hangers or between pipes for insulation installation.

O. Identify refrigerant piping and valves according to Division 23 Section "Identification for HVAC Piping and Equipment."

P. Install sleeves for piping penetrations of walls, ceilings, and floors. Comply with requirements for sleeves specified in Division 23 Section " Basic Mechanical Piping Materials And Methods."

Q. Install sleeve seals for piping penetrations of concrete walls and slabs.

R. Install escutcheons for piping penetrations of walls, ceilings, and floors.

3.4 PIPE JOINT CONSTRUCTION

A. Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.

B. Remove scale, slag, dirt, and debris from inside and outside of pipe and fittings before assembly.

C. Fill pipe and fittings with an inert gas (nitrogen or carbon dioxide), during brazing or welding, to prevent scale formation.

D. Brazed Joints: Construct joints according to AWS's "Brazing Handbook," Chapter "Pipe and Tube."

1. Use Type BcuP, copper-phosphorus alloy for joining copper socket fittings with copper pipe.
2. Use Type BAg, cadmium-free silver alloy for joining copper with bronze or steel.

3.5 HANGERS AND SUPPORTS

A. Hanger, support, and anchor products are specified in Division 23 Section Basic Mechanical Materials And Methods.

3.6 FIELD QUALITY CONTROL

A. Perform tests and inspections and prepare test reports.

B. Tests and Inspections:

1. Comply with ASME B31.5, Chapter VI.
2. Test refrigerant piping, specialties, and receivers. Isolate compressor, condenser, evaporator, and safety devices from test pressure if they are not rated above the test pressure.
3. Test high- and low-pressure side piping of each system separately at not less than the pressures indicated in Part 1 "Performance Requirements" Article.

    a. Fill system with nitrogen to the required test pressure.
    b. System shall maintain test pressure at the manifold gage throughout duration of test.
    c. Test joints and fittings with electronic leak detector or by brushing a small amount of soap and glycerin solution over joints.
    d. Remake leaking joints using new materials, and retest until satisfactory results are achieved.

3.7 SYSTEM CHARGING

A. Charge system using the following procedures:

1. Install core in filter dryers after leak test but before evacuation.
2. Evacuate entire refrigerant system with a vacuum pump to 500 micrometers. If vacuum holds for 12 hours, system is ready for charging.
3. Break vacuum with refrigerant gas, allowing pressure to build up to 2 psig.
4. Charge system with a new filter-dryer core in charging line.

3.8 ADJUSTING

A. Adjust thermostatic expansion valve to obtain proper evaporator superheat.

B. Adjust high- and low-pressure switch settings to avoid short cycling in response to fluctuating suction pressure.

C. Adjust set-point temperature of chilled-water controllers to the system design temperature.

D. Replace core of replaceable filter dryer after system has been adjusted and after design flow rates and pressures are established.

END OF SECTION 232300

SECTION 233113 - METAL DUCTS AND 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 metal ducts and accessories for heating, ventilating, and air-conditioning systems, diffusers, registers and grilles, and gas vents.

1.3 DEFINITIONS

A. Pressure Classification for Ductwork: As defined by to SMACNA's "HVAC Duct Construction Standards--Metal and Flexible" and applicable codes.

1. Low Pressure: Maximum 2500 fpm velocity; maximum 2.0" WG positive or –2.0" WG negative static pressure class.

1.4 SUBMITTALS

A. Product data including product construction, installation instructions and performance data for the following:

1. Sealing materials.
2. Manual-volume dampers.
3. Fire and smoke dampers.
4. Duct-mounted access doors and panels.
5. Flexible ducts
6. Diffuser's Registers & Grilles
7. Louvers
8. Hangers and Supports

B. No requirement for shop drawings if after examining the contract documents and actual conditions, contractor agrees system can be installed as shown.

C. Shop Drawings: Show details of the following:

1. Fabrication, assembly, and installation, including plans, elevations, sections, components, and attachments to other work.
2. Duct layout indicating pressure classifications and sizes on plans.
3. Fittings.
4. Reinforcement and spacing.
5. Seam and joint construction.
6. Penetrations through fire-rated and other partitions.
7. VRF terminal unit installations.

8. Hangers and supports, including methods for building attachment, vibration isolation, and duct attachment.

D. Field Test Reports: Indicate and interpret test results for compliance with performance requirements.

E. Record Drawings: Indicate actual routing, fitting details, reinforcement, support, and installed accessories and devices.

F. See “Submittal Schedule” located at the end of Section 230100 – General Requirements for HVAC.

1.5 QUALITY ASSURANCE

A. Comply with NFPA 90A, "Installation of Air Conditioning and Ventilating Systems," unless otherwise indicated.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Backdraft and Volume Dampers

a. Greenheck
b. Air Balance
c. American Warming
d. Cesco
e. Louvers and Dampers, Inc.
f. Penn
g. Prefco
h. Carnes
i. Ruskin
j. Vent Products

2. Fire and Smoke Dampers

a. Greenheck
b. Air Balance
c. American Warming
d. Cesco
e. Louvers and Dampers, Inc.
f. Penn
g. Pottorff
h. Prefco
i. Carnes
j. Ruskin
k. Vent Products
l. Nailor Industries

3. Flexible Ducts

    a. Flexible Air Products
    b. Flexmaster
    c. Thermaflex
    d. Certainteed
    e. Wiremold
    f. General Flex Corp
    g. H.K. Porter

4. Duct Access Doors

    a. Air Balance
    b. American Warming
    c. Cesco
    d. Ventfrabrics
    e. Penn
    f. Prefco
    g. Carnes
    h. Ruskin
    i. Kees
    j. United McGill
    k. Nailor Industries

5. Diffusers, Registers, Grilles

    a. Carnes
    b. J & J Register
    c. Krueger
    d. Reliable
    e. Price
    f. Tuttle and Bailey
    g. Metal-Aire
    h. Titus
    i. Hart and Cooly
    j. Anemostat
    k. Nailor Industies

6. Louvers

    a. American Warming
    b. Dowco
    c. Louvers and Dampers, Inc.
    d. Airline
    e. Greenheck
    f. Ruskin
    g. Aerolite
    h. Vent Products
    i. Arrow
    j. Reliable
    k. Pottorff

7. Duct Hangers & Supports:

    a. Ductmate Industries, Inc.

b. Duro Dyne
c. Eberl Iron Works, Inc.
d. Gripple
e. Miro Industries, Inc.
f. The Pate Company
g. PHP Systems / Design

2.2 SHEET METAL MATERIALS

A. Galvanized, Sheet Steel: Lock-forming quality; ASTM A 653/A 653M, G90 coating designation; mill-phosphatized finish for surfaces of ducts exposed to view.

B. Carbon-Steel Sheets: ASTM A 366/A 366M, cold-rolled sheets; commercial quality; with oiled, exposed matte finish.

C. Stainless Steel: ASTM A 480/A 480M, Type 316, sheet form with No. 4 finish for surfaces of ducts exposed to view; and Type 304, sheet form with No. 1 finish for concealed ducts.

D. Aluminum Sheets: ASTM B 209, Alloy 3003, Temper H14, sheet form with standard, one-side bright finish for ducts exposed to view and with mill finish for concealed ducts.

E. Reinforcement Shapes and Plates: Galvanized steel reinforcement where installed on galvanized, sheet metal ducts; compatible materials for aluminum and stainless-steel ducts.

F. Tie Rods: Galvanized steel, 1/4-inch minimum diameter for 36-inch length or less; 3/8-inch minimum diameter for lengths longer than 36 inches.

2.3 SEALANT MATERIALS

A. Duct Sealant: UL classified, non-combustible, flame spread 25 or less, smoke developed rating of 540 or less, resistant to water, pressure rupture rating of 16” WG minimum, suitable for use alone or with tape, application an operational temperature ranges appropriate for usage.

2.4 MANUFACTURED DUCT JOINTS

A. Manufactured duct joining system to consistent of roll formed angles, corner pieces, metal cleats and gasket material. Construct and join ductwork in accordance with the latest SMACNA test data and joint reinforcement schedule corresponding to duct gauge used. Corners to be down set design, no bolt design except bolting is required for medium pressure applications. Reinforcements requirement for sheet metal to comply with latest SMACNA for manufactured duct Joining technique appropriate to get to pressure class.

2.5 MANUAL-VOLUME DAMPERS

A. Fabricate in accordance with latest edition of SMACNA HVAC Duct Construction Standards – Metal and Flexible and as indicated.

B. Fabricate single blade dampers for duct sizes 9 ½: high x 30” width maximum. Single blade dampers to have spring end bearing regulator. Provide end brace for static pressure greater than 2.0” WG. Provide end brace for static pressure greater than 2.0”.

C. Fabricate multi-blade damper of opposed blade pattern using minimum 16 gauge steel with maximum blade sizes 6” x 48”. Where width exceeds 48”, provide regulator at both ends. Assemble center and edge crimped blades in 16 gauge channel frame with suitable hardware. Blades and frame to be galvanized or prime coated steel except where indicated for special application.

D. Provide end bearings with end seals for pressure class required except in round duct 12” in diameter and smaller.

2.6 FIRE DAMPERS

A. General: Labeled to UL 555

1. 1-1/2 hour fire rating with 165ºF fusible link unless otherwise indicated. Where wall or ceiling rating requires longer more than 1-1/2 hour rating, provide appropriate rated dampers. Where application requires higher temperature rating, use appropriate temperature rating.
2. All fire dampers shall be rated for dynamic closure unless otherwise noted.
3. Dynamic fire dampers shall be rated for minimum velocity of 2000 fpm. When duct velocity exceeds 2000 fpm, use appropriate velocity rating.
4. Static rated dampers may be used only where HVAC systems are automatically shut down in the event of a fire or for transfer duct openings in walls or partitions.

B. Frame: SMACNA Type A with blades in airstream; fabricated with roll-formed, 0.034-inch- thick galvanized steel; with mitered and interlocking corners. Allowed only if duct free area loss is less than 5%.

C. Frame: SMACNA Type B with blades out of airstream; fabricated with roll-formed, 0.034-inch-thick galvanized steel; with mitered and interlocking corners.

D. Mounting Sleeve: Factory- or field-installed galvanized, sheet steel.

1. Minimum Thickness: 0.052 inch or 0.138 inch thick as indicated, and length to suit application.
2. Exceptions: Omit sleeve where damper frame width permits direct attachment of perimeter mounting angles on each side of wall or floor, and thickness of damper frame complies with sleeve requirements.

E. Mounting Orientation: Vertical or horizontal as indicated.

F. Blades: Roll-formed, interlocking, 0.034-inch- thick, galvanized, sheet steel. In place of interlocking blades, use full-length, 0.034-inch- thick, galvanized steel blade connectors.

G. Horizontal Dampers: Include a blade lock and stainless-steel negator closure spring.

2.7 SMOKE DAMPERS

A. General: Labeled to UL 555S. Combination fire and smoke dampers shall be labeled for one-and-one-half-hour rating to UL 555.

B. Fusible Link: Replaceable, 165 deg F unless otherwise as indicated.

C. Frame and Blades: 0.064-inch- thick, galvanized, sheet steel.

D. Mounting Sleeve: Factory-installed, 0.052-inch- thick, galvanized, sheet steel; length to suit wall or floor application.

E. Damper Motors: 115 V, single phase, 60 Hz., provide for modulating or two-position action per application.

2.8 TURNING VANES

A. Fabricate to comply with SMACNA's "HVAC Duct Construction Standards--Metal and Flexible."

B. Manufactured Turning Vanes: Fabricate of 1-1/2-inch- wide, curved blades set 3/4 inch o.c.; support with bars perpendicular to blades set 2 inches on center; and set into side strips suitable for mounting in ducts.

2.9 DUCT-MOUNTED ACCESS DOORS AND PANELS

A. General: Fabricate doors and panels airtight and suitable for duct pressure class.

B. Frame: Galvanized, sheet steel, with bend-over tabs and foam gaskets.

C. Door: Double-wall, galvanized, sheet metal construction with insulation fill and thickness, and number of hinges and locks as indicated for duct pressure class. Include vision panel where indicated. Include 1-by-1-inch butt or piano hinge and cam latches.

D. Seal around frame attachment to duct and door to frame with neoprene or foam rubber.

E. Insulation: 1-inch- thick, fibrous-glass or polystyrene-foam board.

F. Label: Label access doors at fire and smoke damper locations per NFPA 90A.

2.10 FLEXIBLE CONNECTORS

A. General: Flame-retarded or noncombustible fabrics, coatings, and adhesives complying with UL 181, Class 1.

B. Neoprene double-coated woven glass fibber fabric in accordance with NFPA 90A, suitable for temperatures and pressures of application, approximately 6” wide, crimped into metal edge strip.

2.11 FLEXIBLE DUCTS

A. General: Comply with UL 181, Class 1.

B. Factory-fabricated, insulated, round duct, with an outer jacket enclosing glass-fiber insulation around a continuous inner liner.

1. Reinforcement: Steel-wire helix encapsulated in inner liner.
2. Outer Jacket: Polyethylene film or Glass-reinforced, silver Mylar with a continuous hanging tab, integral fibrous-glass tape, and nylon hanging cord.
3. Inner Liner: Polyethylene film.

C. Pressure Rating: 4-inch wg positive, 3/4-inch wg negative.

D. Minimum R-value: R-5 for ducts inside building envelope. R-8 for ducts in unconditioned spaces.

2.12 DIFFUSER, REGISTERS AND GRILLES

A. General: Sizes, types and capacities as indicated. Verify ceiling and wall frame types and dimensions from architectural drawings. Factory baked enamel finish with color selected by Architect unless otherwise indicated.

B. Diffusers: Circular, square, or rectangular air distribution outlet comprised of deflecting members discharging supply air in various directions and planes and arranged to promote mixing of primary air with secondary room air. Opposed blade dampers.

C. Grilles: Streamlined blades, single or double deflection as indicated.

D. Registers: Combination grille and opposed damper assembly.

2.13 LOUVERS

A. Greenheck AFL-501 EMA 361 rated louver. Extruded aluminum; 5-1/2” deep frame, drainable and storm proof chevron blade configuration, 0..25” frame and 0.25” nominal wall thickness blades, 47% minimum free area based on 48”x 48” louver size; ¾” aluminum mesh bird screen. Baked enamel finish, color selected by architect.

2.14 ACCESSORY HARDWARE

A. Flexible Duct Clamps: Stainless-steel band with cadmium-plated hex screw to tighten band with a worm-gear action, in sizes 3 to 18 inches to suit duct size.

B. Adhesives: High strength, quick setting, neoprene based, waterproof, and resistant to gasoline and grease.

2.15 HANGERS AND SUPPORTS

A. Building Attachments: Concrete inserts, powder-actuated fasteners, or structural-steel fasteners appropriate for building materials.

B. Hanger Rods for Noncorrosive Environments: Cadmium-plated steel rods and nuts.

C. Hanger Rods for Corrosive Environments: Electrogalvanized, all-thread rods or galvanized rods with threads painted with zinc-chromate primer after installation.

D. Strap and Rod Sizes: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Table 5-1, "Rectangular Duct Hangers Minimum Size," and Table 5-2, "Minimum Hanger Sizes for Round Duct."

E. Steel Cables for Galvanized-Steel Ducts: Galvanized steel complying with ASTM A 603.

F. Steel Cables for Stainless-Steel Ducts: Stainless steel complying with ASTM A 492.

G. 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.

H. Duct Attachments: Sheet metal screws, blind rivets, or self-tapping metal screws; compatible with duct materials.

I. 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.

PART 3 - EXECUTION

3.1 DUCT FABRICATION

A. General: Fabricate ducts, elbows, transitions, offsets, branch connections, and other construction with galvanized, sheet steel, according to SMACNA's "HVAC Duct Construction Standards--Metal and Flexible." Comply with requirements for metal thickness, reinforcing types and intervals, tie-rod applications, and joint types and intervals.

B. Low Pressure duct (All supply and return, exhaust duct)

1. Seams and Joints (Rectangular Ducts): Longitudinal seams shall be Pittsburg lock, grooved seams or button punch snap lock. Transverse joints shall be drive slip. Joints 36” and larger shall be manufactured duct joining system with downset corners, or SMACNA T-25 formed on flanges with corner and cleat. Contractor option on smaller sizes
2. Seams and Joints (Concealed Round Duct): Transverse joints in low velocity concealed round ducts shall be slip type secured with sheet metal screws equally spaced on 6” centers maximum with a minimum of three screws per joint. Joints shall be sealed with mastic during joining. Exposed inside edge of duct at joint shall point in direction of airflow. All duct joints exposed to weather shall be caulked weathertight.
3. Seams and joints (Exposed Round Duct): Longitudinal seams shall be lock type spiral or grooved seams rolled spirally. Transverse joints shall be slip type up to 36” in diameter and shall be sealed with mastic during joining. Flanged and gasketed joints shall be used on size larger than 36” diameter.

C. Rectangular fittings: Construct tees, bends and elbows with centerline radius of 1-1/2 times width of duct.

D. Round Elbows: Fabricate in die-formed, gored, pleated, or mitered construction. Fabricate bend radius of die-formed, gored, and pleated elbows one and one-half times elbow diameter. Unless elbow construction type is indicated, fabricate elbows as follows:

E. Static-Pressure Classifications: Unless otherwise indicated, construct ducts to the following:

1. Supply air duct: Low Pressure
2. Return air duct: Low Pressure
3. Exhaust Ducts: Low Pressure.

F. Cross Breaking or Cross Beading: Cross break or cross bead duct sides 19 inches and larger and 0.0359 inch thick or less, with more than 10 sq. ft. of unbraced panel area, unless ducts are lined.

G. Sizes shown on plans are inside clear dimensions. Ductwork utilizing duct liner shall be increased in size to accommodate the duct liner thickness.

3.2 DUCT INSTALLATION

A. Drawings indicate general arrangement of ducts, fittings, and accessories. Minor modifications to route, size and shape of duct may be required to meet structural and other interference. Changes which could affect system performance shall be reviewed by Architect/Engineer prior to fabrication or installation of duct.

B. Construct and install each duct system for the specific duct pressure classification indicated.

C. Install ducts with fewest possible joints.

D. Install fabricated fittings for changes in directions, changes in size and shape, and connections.

E. Install couplings tight to duct wall surface with a minimum of projections into duct.

F. Install ducts, unless otherwise indicated, vertically and horizontally, parallel and perpendicular to building lines; avoid diagonal runs.

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, plus allowance for insulation thickness.

I. Conceal ducts from view in finished spaces. Do not encase horizontal runs in solid partitions, unless specifically indicated.

J. Coordinate layout with suspended ceiling, fire- and smoke-control dampers, lighting layouts, and similar finished work.

K. Electrical Equipment Spaces: Route ductwork to avoid passing through transformer vaults and electrical equipment spaces and enclosures.

L. Non-Fire-Rated Partition Penetrations: Where ducts pass through interior partitions and exterior walls, and are exposed to view, conceal space between construction opening and duct or duct insulation with sheet metal flanges of same metal thickness as duct. Overlap opening on four sides by at least 1-1/2 inches.

M. Fire-Rated Partition Penetrations: Where ducts pass through interior partitions and exterior walls, install appropriately rated fire damper, sleeve, and fire-stopping sealant. Contractor shall be responsible to coordinate appropriately rated fire damper with supplier and engineer. All fire dampers shall be dynamically rated unless otherwise approved by Engineer and Authority Having Jurisdiction.

3.3 HANGER AND SUPPORT INSTALLATION

A. Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Chapter 5, "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 thick.
4. Do not use powder-actuated concrete fasteners for lightweight-aggregate concretes or for slabs less than 4 inches 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 5-1, "Rectangular Duct Hangers Minimum Size," and Table 5-2, "Minimum Hanger Sizes for Round Duct," for maximum hanger spacing; install hangers and supports within 24 inches of each elbow and within 48 inches 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.

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.

3.4 PROTECTION OF DUCTWORK ON SITE

A. Ductwork stored on site as well as installed ductwork that is left open to construction activities shall be covered. Provide protective coverings on open ends of ductwork to prevent excessive accumulation of dust and debris on interior surfaces. Protection and storage of ductwork shall be in accordance to SMACNA's 'Duct Cleanliness for New Construction'.

3.5 SEAM AND JOINT SEALING

A. Low Pressure Ductwork: Seal per SMACNA Seal Class “C”. Sealant material shall be installed per manufacturer’s recommendations.

B. Medium Pressure Ductwork: Seal per SMACNA Seal Class “B”. Sealant material shall be installed per manufacturer’s recommendations

C. Seal externally insulated ducts before insulation installation.

3.6 HANGING AND SUPPORTING

A. Install rigid round, rectangular, and flat-oval metal duct with support systems indicated in SMACNA's "HVAC Duct Construction Standards--Metal and Flexible."

B. Support horizontal ducts within 24 inches of each elbow and within 48 inches of each branch intersection.

C. Support vertical ducts at a maximum interval of 16 feet and at each floor.

3.7 DUCT ACCESSORY INSTALLATION

A. Install duct accessories according to applicable details shown in SMACNA's "HVAC Duct Construction Standards--Metal and Flexible" for metal ducts.

B. Install volume dampers at locations indicated and at all branch take-offs to air outlets and inlets.

C. Provide fire and smoke dampers at locations indicated and where required by applicable codes. Install fire and smoke dampers according to manufacturer's UL-approved written instructions.

D. Provide turning vanes in all mitered elbows and duct turns.

E. Install duct access panels for access to inlet side of coils, equipment, control dampers, fire dampers, and smoke dampers.

F. Final connections to air outlets and terminal units may be made with flexible duct. Install flexible ducts with metal collars or sleeves with draw bands. Length of flexible duct shall not exceed 36”, path shall not exceed 45º.

G. Provide flexible connections to motor driven equipment. Secure fabric to duct or fan collar with 3/16” rivets space not more than 5” on center. Provide thrust restraints so that connections are not in tension with equipment in operation.

H. Install diffusers, registers, and grilles level and plumb, according to manufacturer's written instructions, Coordination Drawings, original design, and referenced standards. Examine areas where diffusers, registers, and grilles are to be installed for compliance with requirements for installation tolerances and other conditions affecting performance of equipment. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.8 ADJUSTING

A. Adjust volume-control dampers in ducts, outlets, and inlets to achieve design airflow. Refer to Division 23 Section "Testing, Adjusting, and Balancing" for detailed procedures.

B. Adjust duct accessories for proper settings and actions.

3.9 CLEANING

A. After completing system installation, inspect the system. Vacuum ducts before final acceptance to remove dust and debris.

B. After installation of diffusers, registers, and grilles, inspect exposed finish. Clean exposed surfaces to remove burrs, dirt, and smudges. Replace diffusers, registers, and grilles that have damaged finishes.

END OF SECTION 233113

SECTION 233423 - POWER VENTILATORS

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. Propeller fans

1.3 SUBMITTALS

A. Product Data: Include rated capacities, furnished specialties, and accessories for each type of product indicated and include the following:

1. Certified fan performance curves with system operating conditions indicated.
2. Certified fan sound-power ratings.
3. Motor ratings and electrical characteristics, plus motor and electrical accessories.
4. Material gages and finishes, including color charts.
5. Dampers, including housings, linkages, and operators.

B. Shop Drawings: Detail equipment assemblies and indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.

1. Wiring Diagrams: Power, signal, and control wiring. Differentiate between manufacturer-installed and field-installed wiring.

C. Maintenance Data: For power ventilators to include in operation and maintenance manuals.

1.4 QUALITY ASSURANCE

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

B. AMCA Compliance: Products shall comply with performance requirements and shall be licensed to use the AMCA-Certified Ratings Seal.

C. NEMA Compliance: Motors and electrical accessories shall comply with NEMA standards.

D. UL Standard: Power ventilators shall comply with UL 705.

1.5 COORDINATION

A. Coordinate installation of roof curbs, equipment supports, and roof penetrations.

1.6 EXTRA MATERIALS

A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Belts: One set for each belt-driven unit.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Propeller Fans:

a. Acme Engineering & Mfg. Corp.
b. Carnes Company HVAC.
c. Cook, Loren Company.
d. Greenheck Fan Corp.
e. ILG Industries, Inc./American Coolair Corp.
f. Penn Ventilation Companies, Inc.

2.2 PROPELLER FANS

A. Description: Belt-driven or direct-driven propeller fans consisting of fan blades, hub, housing, orifice ring, motor, drive assembly, and accessories.

B. Housing: Galvanized steel sheet with flanged edges and integral orifice ring with baked-enamel finish coat applied after assembly.

C. Steel Fan Wheels: Formed-steel blades riveted to heavy-gage steel spider bolted to cast-iron hub.

D. Fan Wheel: Replaceable, aluminum, airfoil blades fastened to cast-aluminum hub; factory set pitch angle of blades.

E. Belt-Driven Drive Assembly: Resiliently mounted to housing, statically and dynamically balanced and selected for continuous operation at maximum rated fan speed and motor horsepower, with final alignment and belt adjustment made after installation.

1. Service Factor Based on Fan Motor: 1.4.
2. Fan Shaft: Turned, ground, and polished steel; keyed to wheel hub.
3. Shaft Bearings: Permanently lubricated, permanently sealed, self-aligning ball bearings.

a. Ball-Bearing Rating Life: ABMA 9, L_{10} of 100,000 hours.

4. Pulleys: Cast iron with split, tapered bushing; dynamically balanced at factory.
5. Motor Pulleys: Adjustable pitch for use with motors through 5 hp; fixed pitch for use with motors larger than 5 hp. Select pulley so pitch adjustment is at the middle of adjustment range at fan design conditions.
6. Belts: Oil resistant, nonsparking, and nonstatic; matched sets for multiple belt drives.
7. Belt Guards: Fabricate of steel for motors mounted on outside of fan cabinet.

F. Accessories:

1. Motorized Dampers: Fail open parallel-blade dampers mounted in frame with 24 volt damper electric actuator; wired to close when fan stops.
2. Motor-Side Back Guard: Galvanized steel, complying with OSHA specifications, removable for maintenance.
3. Disconnect Switch: Nonfusible type, with thermal-overload protection mounted inside fan housing, factory wired through an internal aluminum conduit.

2.3 MOTORS

A. Comply with requirements in Division 23 Section "Basic Materials and Methods for HVAC."

B. Enclosure Type: Guarded dripproof.

2.4 SOURCE QUALITY CONTROL

A. Sound-Power Level Ratings: Comply with AMCA 301, "Methods for Calculating Fan Sound Ratings from Laboratory Test Data." Factory test fans according to AMCA 300, "Reverberant Room Method for Sound Testing of Fans." Label fans with the AMCA-Certified Ratings Seal.

B. Fan Performance Ratings: Establish flow rate, pressure, power, air density, speed of rotation, and efficiency by factory tests and ratings according to AMCA 210, "Laboratory Methods of Testing Fans for Rating."

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install power ventilators level and plumb.

B. Support suspended units from structure using threaded steel rods and vibration isolators.

C. Install units with clearances for service and maintenance.

3.2 CONNECTIONS

A. Duct installation and connection requirements are specified in other Division 23 Sections. Drawings indicate general arrangement of ducts and duct accessories. Make final duct connections with flexible connectors.

B. Install ducts adjacent to power ventilators to allow service and maintenance.

3.3 FIELD QUALITY CONTROL

A. Equipment Startup Checks:

1. Verify that shipping, blocking, and bracing are removed.
2. Verify that unit is secure on mountings and supporting devices and that connections to ducts and electrical components are complete. Verify that proper thermal-overload protection is installed in motors, starters, and disconnect switches.
3. Verify that cleaning and adjusting are complete.
4. Disconnect fan drive from motor, verify proper motor rotation direction, and verify fan wheel free rotation and smooth bearing operation. Reconnect fan drive system, align and adjust belts, and install belt guards.
5. Verify lubrication for bearings and other moving parts.
6. Verify that manual and automatic volume control and fire and smoke dampers in connected ductwork systems are in fully open position.
7. Disable automatic temperature-control operators.

B. Starting Procedures:

1. Energize motor and adjust fan to indicated rpm.
2. Measure and record motor voltage and amperage.

C. Operational Test: After electrical circuitry has been energized, start units to confirm proper motor rotation and unit operation. Remove malfunctioning units, replace with new units, and retest.

D. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

E. Refer to Division 23 Section "Testing, Adjusting, and Balancing" for testing, adjusting, and balancing procedures.

F. Repair or replace malfunctioning units. Retest as specified above after repairs or replacements are made.

3.4 ADJUSTING

A. Adjust damper linkages for proper damper operation.

B. Lubricate bearings.

3.5 CLEANING

A. On completion of installation, internally clean fans according to manufacturer's written instructions. Remove foreign material and construction debris. Vacuum fan wheel and cabinet.

B. After completing system installation, including outlet fitting and devices, inspect exposed finish. Remove burrs, dirt, and construction debris and repair damaged finishes.

3.6 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain power ventilators.

1. Train Owner's maintenance personnel on procedures and schedules for starting and stopping, troubleshooting, servicing, and maintaining equipment and schedules.
2. Review data in maintenance manuals.
3. Schedule training with Owner, through Architect, with at least seven days' advance notice.

END OF SECTION 233423

SECTION 238126 - SPLIT-SYSTEM AIR-CONDITIONING UNITS

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 split-system air-conditioning and heat pump units consisting of separate evaporator-fan and compressor-condenser components. Units are designed for exposed or concealed mounting, and may be connected to ducts.

1.3 SUBMITTALS

A. Product Data: Include rated capacities, furnished specialties, and accessories for each type of product indicated. Include performance data in terms of capacities, outlet velocities, static pressures, sound power characteristics, motor requirements, and electrical characteristics.

B. Shop Drawings: Diagram power, signal, and control wiring.

C. Samples for Initial Selection: For units with factory-applied color finishes.

D. Field quality-control test reports.

E. Operation and Maintenance Data: For split-system air-conditioning units to include in emergency, operation, and maintenance manuals.

F. Warranty: Special warranty specified in this Section.

G. See “Submittal Schedule” located at the end of Section 23 – “General Requirements for HVAC”.

1.4 QUALITY ASSURANCE

A. Product Options: Drawings indicate size, profiles, and dimensional requirements of split-system units and are based on the specific system indicated. Refer to Division 1 Section "Product Requirements."

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. Energy-Efficiency Ratio: Equal to or greater than prescribed by ASHRAE 90.1, "Energy Efficient Design of New Buildings except Low-Rise Residential Buildings."

D. Coefficient of Performance: Equal to or greater than prescribed by ASHRAE 90.1, "Energy Efficient Design of New Buildings except Low-Rise Residential Buildings."

1.5 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of split-system air-conditioning units that fail in materials or workmanship within specified warranty period.

1. Warranty Period: Five years from date of Substantial Completion.

1.6 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. Filters: One set of filters for each unit.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Carrier Air Conditioning; Div. of Carrier Corporation.
2. Mitsubishi
3. Sanyo
4. LG

2.2 EVAPORATOR-FAN COMPONENTS

A. Wall Mounted Cabinet: Enameled steel with removable panels on front and ends in color selected by Architect, and discharge drain pans with drain connection

B. Refrigerant Coil: Copper tube, with mechanically bonded aluminum fins, complying with ARI 210/240, and with thermal-expansion valve.

C. Fan: Forward-curved, double-width wheel of galvanized steel; directly connected to motor.

D. Fan Motors: Multitapped, multispeed with internal thermal protection and permanent lubrication.

E. Disposable Filters: 1 inch thick, in fiberboard frames.

F. Wiring Terminations: Connect motor to chassis wiring with plug connection.

2.3 AIR-COOLED, COMPRESSOR-CONDENSER COMPONENTS

A. Casing: Steel, finished with baked enamel in color selected by Architect, with removable panels for access to controls, weep holes for water drainage, and mounting holes in base. Provide brass service valves, fittings, and gage ports on exterior of casing.

B. Compressor: Hermetically sealed with crankcase heater and mounted on vibration isolation. Compressor motor shall have thermal- and current-sensitive overload devices, start capacitor, relay, and contactor.

1. Compressor Type: Rotary.
2. Provide with automatic-reset low-pressure switch.
3. Refrigerant Charge: R-410A.

C. Refrigerant Coil: Copper tube, with mechanically bonded aluminum fins, complying with ARI 210/240.

D. Fan: Aluminum-propeller type, directly connected to motor.

E. Motor: Permanently lubricated, with integral thermal-overload protection.

F. Low Ambient Kit: Permits operation down to 0° F.

2.4 ACCESSORIES

A. Thermostat: Wireless infrared functioning to remotely control compressor and evaporator fan, with the following features:

1. Compressor time delay.
2. 24-hour time control of system stop and start.
3. Liquid-crystal display indicating temperature, set-point temperature, time setting, operating mode, and fan speed.
4. Fan-speed selection, including auto setting.

B. Refrigerant Line Kits: Soft-annealed copper suction and liquid lines factory cleaned, dried, pressurized, and sealed; factory-insulated suction line with flared fittings at both ends.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install units level and plumb.

B. Install evaporator-fan components using manufacturer's standard mounting devices securely fastened to building structure.

C. Install refrigerant piping per manufacturer’s recommendations. Install piping to allow access to unit.

3.2 CONNECTIONS

A. Drawings indicate general arrangement of piping, fittings, and specialties.

B. Install piping adjacent to unit to allow service and maintenance.

3.3 STARTUP SERVICE

A. Engage a factory-authorized service representative to perform startup service. Complete installation and startup checks according to manufacturer's written instructions.

3.4 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain units. Refer to Division 1 Sections.

END OF SECTION 238126

SECTION 238127 – VARIABLE REFRIGERANT FLOW (VRF) HVAC SYSTEM

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. The variable capacity, air conditioning system shall be a variable refrigerant flow system as specified. The system shall consist of multiple indoor fan coil units, a two or three pipe refrigeration distribution system using PID control, and VRF indoor water source heat pump units. The heat pump units shall be a direct expansion (DX), water-cooled, multi-zone air-conditioning system with variable speed driven compressors using R-410A refrigerant. The water source heat pump unit connects to multiple indoor evaporator fan coil units. All zones are capable of operating separately with individual temperature control.

B. Each fan coil unit shall be able to maintain local setpoint temperature independently via local thermostat controllers**.**

C. The system shall accommodate heat recovery; simultaneous heating and cooling by different indoor units served by the same indoor water source VRF heat pump unit. Branch selector boxes or other manufacturer recommended means to provide heat recovery shall be provided.

D. Control wiring shall be per the manufacturer's recommendation.

E. Refrigerant piping sizing and routing shall be per the manufacturer's recommendation.

1.3 SUBMITTALS

A. Product Data/Shop Drawings: For each type of product indicated. Include rated capacities, operating characteristics, and furnished specialties and accessories. Include performance data in terms of capacities, outlet velocities, static pressures, sound power characteristics, motor requirements, and electrical characteristics.

B. Provide shop drawings for the following items:

1. Detail equipment assemblies and indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
2. Wiring Diagrams: For power, signal, and control wiring.
3. Indoor VRF Units (include rated capacities, airflow, static pressure, installation configurations, required clearance, electrical connection data, etc.)
4. All required accessory equipment
5. System schematics showing refrigerant piping system
6. System schematics showing control wiring requirements

C. Operation and Maintenance Data: For all HVAC system equipment to include in emergency, operation, and maintenance manuals.

D. Warranty: Sample of special warranty.

1.4 QUALITY ASSURANCE

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

B. The units shall be listed by Electrical Laboratories (ETL) and bear the cETL label.

C. All wiring shall be in accordance with the National Electric Code (NEC).

D. The system will be produced in an ISO 9001 and ISO 14001 facility, which are standards set by the International Standard Organization (ISO). The system shall be factory tested for safety and function.

E. The water source indoor units will be factory charged with R-410A.

F. ASHRAE Compliance:

1. Fabricate and label refrigeration system to comply with ASHRAE 15, "Safety Standard for Refrigeration Systems."
2. ASHRAE Compliance: Applicable requirements in ASHRAE 62.1-2004, Section 4 - "Outdoor Air Quality," Section 5 - "Systems and Equipment," Section 6 - " Procedures," and Section 7 - "Construction and System Start-Up."

G. ASHRAE/IESNA Compliance: Applicable requirements in ASHRAE/IESNA 90.1-2004.

1.5 COORDINATION

A. Coordinate sizes and locations of equipment with actual equipment provided, building structure, ceilings, architectural features, other mechanical and electrical equipment.

B. Ceiling space may be limited. Acceptable alternate manufacturers must coordinate with space available.

1.6 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace any components of the HVAC system that fails in materials or workmanship within specified warranty period.

1. Warranty Period:

a. For Compressor: Five year(s) from date of Substantial Completion.
b. For other equipment: One year from date of Substantial Completion.
c. For Parts: One year from date of Substantial Completion.
d. For Labor: One year from date of Substantial Completion.

B. Installation Requirements

1. The system must be installed by a factory trained contractor/dealer. The bidders shall be required to submit training certification proof with bid documents. The mechanical contractor's installation price shall be based on the systems installation requirements. The mechanical contractor bids with complete knowledge of the HVAC system requirements. Untrained contractors who wish to bid this project may contact local manufacturer's representative to coordinate. Training must be completed prior to installation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Basis of Design: Mitsubishi
2. Alternate Manufacturers:

   a. Daikin
   b. Sanyo
   c. LG

B. Alternate Manufacturer**:** Alternate equipment supplier shall provide a complete submittal indicating any changes in electrical requirements, refrigerant pipe design and routing, or control systems wiring or requirements different than the base specified system.

2.2 VRF WATER SOURCE INDOOR HEAT PUMP UNITS

A. General:

1. The Water source indoor unit shall be factory assembled and pre-wired with all necessary electronic and refrigerant controls. The refrigeration circuit of the condensing unit shall consist of scroll compressors, coil, electronic expansion valves, solenoid valves, 4-way valve, distribution headers, capillaries, filters, shut off valves, oil separators, service ports and refrigerant regulator.
2. High/low pressure gas line, liquid and suction lines must be individually insulated between the water source unit and fan coil units.
3. Each water source indoor system shall be able to support the connection of multiple indoor units as indicated on the plans.
4. The system will automatically restart operation after a power failure without loss of system control settings.
5. The following safety devices shall be included on the condensing unit; high pressure switch, control circuit fuses, crankcase heaters, fusible plug, high pressure switch, overload relay, inverter overload protector, thermal protectors for compressor and fan motors, over current protection for the inverter and anti-recycling timers.
6. To ensure the liquid refrigerant does not flash when supplying the fan coil units, the circuit shall be provided with a sub-cooling feature.
7. Oil recovery cycle shall be automatic; occurring 2 hours after start of operation and then every 8 hours of operation.

B. Unit Cabinet:

1. The water source indoor unit shall be completely weatherproof and corrosion resistant. The unit shall be constructed from rust-proofed mild steel panels coated with a baked enamel finish.

C. Compressor:

1. Provide hermetically sealed inverter scroll compressors, variable speed controlled to follow the variations in total cooling and heating load.
2. Compressors shall be spring mounted.
3. Each compressor shall be equipped with a high pressure safety switch, internal thermal overload protector, and oil separators as required.

D. Control: The water source indoor unit shall have controls provided by the manufacturer to perform input functions necessary to operate the system. Controls shall be installed by the mechanical contractor.Retain one of first two subparagraphs below if heating coil is required.

2.3 VRF FAN COIL UNITS

A. General: Indoor fan coil units shall operate with R-410A refrigerant and shall be equipped with an electronic expansion valve and computerized PID controls.

B. General

1. DX cooling using R-410A refrigerant
2. Factory assembled and tested with factory wiring, piping, expansion valve, control circuit board, and fan motor.
3. Direct drive fan motor
4. Condensate pan and factory condensate pump where indicated on plans.

C. Filter: Manufacturer's standard washable filter in ceiling cartridge units. 1" pleated disposable filters with ducted units.

D. Coil: Copper direct expansion refrigerant coil.

E. Control: Manufacturer's standard microprocessor based controls will be provided for each fan coil to allow occupant adjustment of temperature. Model PAC-YT53CRAU or equivalent.

F. Provide branch selector boxes for VRF systems requiring heat recover; simultaneous heating and cooling for indoor units served by the same water source indoor unit.

G. Accessories:

1. Fresh air intake and supply air duct connections where indicated on plans.
2. Remote wall mounted temperature sensor or thermostat where indicated on plans.
3. Condensate pumps where required and not integral, factory-provided.

2.4 VRF BRANCH CONTROLLERS

A. The unit cabinet shall be fabricated of galvanized steel. Each cabinet shall house a liquid-gas separator, multiple refrigeration control valves, and tube-in-tube heat exchangers. The cabinet will include an integral resin drain pan and drain connection. The branch controller shall be completely factory assembled, piped and wired. Each unit shall be run tested at the factory.

This unit shall be mounted indoors, with access and service clearance provided for each controller. The branch controller shall be suitable for use in plenums in accordance with UL1995

B. The BC (Branch Circuit) Controllers shall include multiple branches to allow simultaneous heating and cooling by allowing either hot gas refrigerant to flow to indoor unit(s) for heating or subcooled liquid refrigerant to flow to indoor unit(s) for cooling. The unit shall be furnished with multiple two position refrigerant valves. Each circuit shall have one two-position liquid line valve and a two-position suction line valve. Linear electronic expansion valves shall be used to control the variable refrigerant flow.

C. The branch controllers shall be equipped with a circuit board that interfaces to the system controls system and shall perform all functions necessary for operation. The unit shall have a galvanized steel finish

2.5 VRF CONTROLS

A. The variable refrigerant flow system shall be provided with a complete control system capable of supporting remote controllers, centralized controllers, an integrated web based interface, graphical user workstation, and system integration to the existing Building Management Systems via BACnet®.

B. The system shall operate at 30VDC. Wiring shall be 2-conductor (16 AWG), twisted, stranded, shielded wire approved by manufacturer of the system.

C. Controller power and communications shall be via a common non-polar communications bus. Control wiring shall be installed in a daisy chain configuration from indoor fan coil unit to indoor fan coil unit, to the BC controller (main and subs, if applicable) and to the water source heat pump unit. Control wiring to remote controllers shall be run from the indoor unit terminal block to the controller associated with that unit.

D. Control wiring for centralized controllers shall be installed in a daisy chain configuration from water source heat pump unit to water source heat pump unit, to the system controllers (centralized controllers and/or integrated web based interface), to the power supply

E. A centralized controller shall be capable of controlling a maximum of two hundred (200) indoor fan coil units across multiple water source heat pump units with the use of three expansion controllers. The centralized controller shall be powered with an integrated 100-240 VAC power supply. The centralized controller shall support system configuration, daily/weekly scheduling, monitoring of operation status, night setback settings, free contact interlock configuration and malfunction monitoring. This basic set of operation controls shall include on/off, operation mode selection (cool, heat, auto setback, temperature setting, and fan speed setting.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install units level and plumb.

B. Install evaporator-fan components using manufacturer's standard mounting devices securely fastened to building structure.

C. Install water source indoor equipment per support details on plans or manufacturer's recommendations.

D. Install and connect refrigerant piping per manufacturer’s recommendations. All refrigerant lines from the water-source unit to the BC (Branch Circuit) Controller(s) and from the BC Controllers to the indoor unit(s) shall be individually insulated in accordance with the installation manual.

3.2 CONNECTIONS

A. Piping installation requirements are specified in other Division 23 Sections. Drawings indicate general arrangement of piping, fittings, and specialties.

B. Where piping is installed adjacent to unit, allow space for access, service and maintenance of unit.

C. Duct Connections: Duct installation requirements are specified in Division 23 Section "Metal Ducts." Drawings indicate the general arrangement of ducts. Connect supply and return ducts to indoor VRF units with flexible duct connectors. Flexible duct connectors are specified in Division 23 Section "Duct Accessories."

D. All control wiring is specified in Section 230900. Install all control components and coordinate control wiring with temperature control contractor.

E. All power wiring will be provided by Division 26 contractor. Coordinate all power requirements.

3.3 FIELD QUALITY CONTROL

A. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust components, assemblies, and equipment installations, including connections.

B. 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.

C. Tests and Inspections:

1. Leak Test: After installation, charge system and test for leaks. Repair leaks and retest until no leaks exist.
2. Operational Test: After electrical circuitry has been energized, start units to confirm proper motor rotation and unit operation.
3. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

D. Remove and replace malfunctioning units and retest as specified above.

E. Prepare test and inspection reports.

3.4 STARTUP SERVICE

A. Engage a factory-authorized service representative to perform startup service for the entire VRF HVAC system.

B. Factory-authorized service representative shall provide full training of the VRF system to the owner/operator.

3.5 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain units.

END OF SECTION 238127

SECTION 260100 – GENERAL ELECTRICAL REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions apply to this Section.

1.2 SUMMARY

A. This Section includes general electrical requirements and shall apply to all phases of the work specified, indicated on the drawings or required to provide for complete installation of electrical systems.

1.3 WARRANTIES

A. All materials, workmanship and equipment shall be warranted against defects or against injury from proper and usual wear for a period of one year after the date of substantial completion. Certain equipment shall be warranted beginning at the time of final acceptance or for longer periods of time as specified in those sections of the Project Manual. Any item which becomes defective within the warranty period shall be repaired or replaced, at no additional cost to the Owner.

B. All manufactures warranties shall run to the benefit of the Owner. No manufacturer's warranties shall be voided or impaired.

C. Warranty shall include repair of faulty workmanship.

1.4 ALTERNATES

A. Alternates, if required, shall be as described in the "Alternates" section of this specification, as described on the proposal form or as indicated on the drawings.

1.5 INTERPRETATION OF DOCUMENTS

A. Any questions regarding the meaning of any portion of the contract documents shall be submitted to the Architect/Engineer for interpretation. Addenda or supplemental information will publish definitive interpretations or clarification. Verbal interpretation not issued by addendum or supplemental information shall not be considered part of the contract documents.

B. The Architect/Engineer shall be the sole judge of interpretations of discrepancies within the contract documents.

C. If ambiguities should appear in the contract documents, the Contractor shall request clarification from the Architect/Engineer before proceeding with the work. If the Contractor fails to make such request, no excuse will thereafter be entertained for failure to carry out the work in a manner satisfactory to the Architect/Engineer. Should a conflict occur within the contract documents, the

Contractor is deemed to have estimated the more expensive way of doing the work unless a written clarification from the Architect/Engineer was requested and obtained before submission of proposed methods or materials.

1.6 DEFINITIONS ABREVIATIONS

A. The following shall apply throughout the contract documents

1. Code All applicable national state and local codes
2. Furnish Supply and deliver to site ready for installation
3. Indicated Noted, scheduled or specified
4. Provide Furnish, install and connect complete and ready for final use by Owner
5. ADA Americans with Disabilities Act
6. ANSI American National Standards Institute
7. ASTM American Society for Testing and Materials
8. FM Factory Mutual System
9. IRI HSB Industrial Risk Insurers
10. NEC National Electric Code (NFPA 70)
11. NEMA National Electrical Manufacturers Association
12. NFPA National Fire Protection Association
13. UL Underwriters Laboratories Inc.

1.7 CODES AND STANDARDS

A. All work shall be performed by competent craftsmen skilled in the trade involved and shall be done in a manner consistent with normal industry standards.

B. All work shall conform to the currently adopted edition of the National Electric Code (NEC), Local Building Code, and all other applicable state and local codes or standards.

C. Where there is a conflict between the code and the contract documents, the code shall have precedence only when it is more stringent than the contract documents. Items that are allowed by the code but are less stringent than those specified shall not be substituted.

1.8 PERMITS

A. Contractor shall become familiar and comply with all requirements regarding permits, fees, licenses, etc. All permits, licenses, inspections and arrangements required for the work shall be obtained by Contractor's effort and expense. All utilities shall be installed in accordance with the local rules and regulations and all charges shall be paid by the Contractor. Capital facilities fees will be paid by Owner.

1.9 SUBMITTALS

A. Division 1 section "Submittals" shall be adhered to if more stringent than this section.

B. Shop drawings shall be submitted to Architect/Engineer for review when required by other sections of this specification and for all equipment scheduled or specified on drawings.

1. A letter of transmittal shall accompany each submittal. Submittals shall be numbered consecutively and list products covered.

2. Unless otherwise noted, submit a minimum of six (6) copies of shop drawing and product data for review.

C. Shop Drawings

1. Shop drawings include fabrication and installation drawings, diagrams, schedules of other data specifically prepared for the project. Include dimensions and notations showing compliance with specified standards.
2. Drawing sheet size shall be at least 8 ½" x 11" and no longer than 30" x 42". For sheets larger than 11" x 17", submit one sheet of reproducible media and one blue-line or photocopy print. Architect/Engineer action will be returned on reproducible media.

D. Product Data

1. Product data includes printed information, such as manufacturer's installation instructions, catalog cuts, standard color charts, rough-in diagrams, wiring diagrams and performance curves.
2. Each copy shall clearly indicate conformance with specified capacities, characteristics, dimensions and details. Mark all equipment with same item number as used on drawings. Mark each copy to clearly indicate applicable choices and options.

E. Architect/Engineer will review or take appropriate action for submittals. Review is only to determine general conformance with design shown in contract documents.

F. Architect/Engineer review of submittals shall not relieve contractor of responsibility for deviation from requirements of the contract documents or from errors or omissions within submittals.

G. No portion of the work requiring submittals shall be commenced until the Architect/Engineer has reviewed the submittal.

H. Electronic Floor Plan Drawings in AutoCAD 2002 format may be requested for use in preparation of shop drawings. Morrissey Engineering reserves the right to reject requests for electronic drawings. Electronic files shall be prepaid at $50/sheet. Submit written request to Morrissey Engineering or email request to info@morrisseyengineering.com. Indicate the project name, and floor plan sheets requested. The use of these drawings is intended solely for preparation of drawings required by this specification. Copyright law prohibits any other use. The user of the electronic files assumes full responsibility for the accuracy and scale of the drawings.

I. See "Submittal Schedule" at the end of Section 260100 – General Electrical Requirements.

1.10 OPERATION AND MAINTENANCE MANUALS

A. Assemble three (3) complete sets of operation and maintenance data indicating the operation and maintenance of each system, subsystem, and piece of equipment not part of a system. Include operation and maintenance data required in individual Specification Sections and as follows:

1. Operation Data:

a. Emergency instructions and procedures.
b. System, subsystem, and equipment descriptions, including operating standards.
c. Operating procedures, including startup, shutdown, seasonal, and weekend operations.
d. Description of controls and sequence of operations.

e. Piping and wiring diagrams.

2. Maintenance Data:

a. Manufacturer's information, including list of spare parts.
b. Name, address, and telephone number of installer or supplier.
c. Maintenance procedures.
d. Maintenance and service schedules for preventive and routine maintenance.
e. Maintenance record forms.
f. Sources of spare parts and maintenance materials.
g. Copies of maintenance service agreements.
h. Copies of warranties and bonds.

B. Organize operation and maintenance manuals into suitable sets of manageable size. Bind and index data in heavy-duty, 3-ring, vinyl-covered, loose-leaf binders, in thickness necessary to accommodate contents, with pocket inside the covers to receive folded oversized sheets. Identify each binder on front and spine with the printed title "OPERATION AND MAINTENANCE MANUAL," Project name, and subject matter of contents.

1.11 PROJECT RECORD DOCUMENTS

A. Record Drawings: Maintain and submit one set of blue- or black-line white prints of Contract Drawings and Shop Drawings.

1. Mark Record Prints to show the actual installation where installation varies from that shown originally.
2. Mark record sets with erasable, red-colored pencil. Use other colors to distinguish between changes for different categories of the Work at the same location.
3. Mark important additional information that was either shown schematically or omitted from original Drawings.
4. Note Construction Change Directive numbers, Change Order numbers, alternate numbers, and similar identification where applicable.
5. Identify and date each Record Drawing; include the designation "PROJECT RECORD DRAWING" in a prominent location.

B. Record Specifications: Submit one copy of Project's Specifications, including addenda and contract modifications. Mark copy to indicate the actual product installation where installation varies from that indicated in Specifications, addenda, and contract modifications.

C. Record Product Data: Submit one copy of each Product Data submittal. Mark one set to indicate the actual product installation where installation varies substantially from that indicated in Product Data.

PART 2 - PRODUCTS

2.1 MATERIALS

A. All materials and equipment used in the construction of the project shall be new unused and undamaged unless otherwise specified. Materials and equipment shall be of latest design standards of manufacturer specified.

B. Materials and equipment are limited by the requirements of the contract documents. Material and equipment shall be provided in accordance with the following:

1. Basis of Design Products: Basis of Design Products are those products around which the project was designed in terms of capacity, performance, physical size and quality. Basis of Design Products shall be provided unless substitutions are made in accordance with this specification.
2. Substitutions: Substitutions are product of manufacturers other than listed as Basis of Design. Substitutions shall meet each of the following requirements and shall be subject to prior approval. Submissions requesting prior approval shall be received by the engineer no less than ten (10) days prior to project bid date.

    a. The product shall be manufactured by one of the acceptable manufacturers listed in the contract documents.
    b. The product shall meet or exceed the requirements of the contract documents in terms of quality, performance, suitability, appearance and characteristics.
    c. The contractor providing the substitution shall bear the total cost of all changes due to substitutions. These may include but are not limited to redesign costs and increased work by other contractors or the Owner.
    d. The Architect/Engineer shall be the sole judge of the suitability of the substitution items.

C. Verify installation details and requirements for materials and equipment furnished by others and installed under this contract.

PART 3 - EXECUTION

3.1 DEMONSTRATION AND TRAINING

A. Instruction: Instruct Owner's personnel to adjust, operate, and maintain systems, subsystems, and equipment not part of a system. Provide 4 hours training in up to two separate sessions.

1. Provide instructors experienced in operation and maintenance procedures.
2. Provide instruction at mutually agreed-on times. For equipment that requires seasonal operation, provide similar instruction at the start of each season.
3. Schedule training with Owner and Architect/Engineer with at least seven days' advance notice.

3.2 STARTING AND ADJUSTING

A. Start and test all equipment and operating components to confirm proper operation. Test and adjust all systems to achieve designed capacity and performance.

B. Provide three (3) copies of all test report to the Architect/Engineer for review prior to date of substantial completion.

C. All equipment and systems discrepancies shall be corrected prior to final acceptance.

3.3 TEMPORARY POWER AND LIGHTING

A. Electric Power Service: Provide temporary electric power from Owners electric system without payment of use charges.

B. Electric Distribution: Provide receptacle outlets adequate for connection of power tools and construction equipment.

C. Lighting: Provide temporary lighting with local switching that provides adequate illumination for construction operations and traffic conditions.

ELECTRICAL SUBMITTAL SCHEDULE
Refer to individual specification sections for additional requirements and detail on each submittal.

Section	Section Name	Product Data	Shop Dwgs	Test Reports / Quality Control	Warranty	Extra Materials	O&M Data	Record Docs	Demonstration / Training
260100	General Electrical Requirements	√	√		√		√		√
260500	Basic Electrical Materials and Meth	√	√						
260536	Cable Trays	√	√						
260600	Grounding and Bonding	√							
262200	Dry Type Transformers	√			√		√		
262416	Panelboards	√	√		√		√	√	
262726	Wiring Devices	√	√						
262816	Disconnect Switches	√					√		
263213	Packaged Engine Generators	√	√		√	√	√		√
264313	Surge Protective Devices (SPD's)	√			√				
265100	Lighting & Lighting Control	√	√		√				
268100	Fire Alarm	√	√		√		√		
271500	Communication Cabling Systems	√	√	√	√		√	√	
274134	Audio Visual Systems	√	√		√				
281300	Access Control Systems	√	√		√		√		

END OF SECTION 260100

SECTION 260500 - BASIC ELECTRICAL MATERIALS AND METHODS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes the following basic electrical materials and methods and shall apply to all phases of the work specified, indicated on the drawings or required to provide for complete installation of electrical systems.

1. Conduits.
2. Building wire and connectors.
3. Supporting devices for electrical components.
4. Outlet boxes.
5. Electrical identification.
6. Electrical demolition.
7. Work in existing buildings.
8. Cutting and patching for electrical construction.
9. Fire Stopping.
10. Touchup painting.

1.3 MATERIAL QUALITY ASSURANCE

A. Electrical components, devices, and accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

B. Comply with NFPA 70.

1.4 COORDINATION

A. Coordinate chases, slots, inserts, sleeves, and openings with general construction work and arrange in building structure during progress of construction to facilitate the electrical installations that follow.

1. Set inserts and sleeves in poured-in-place concrete, masonry work, and other structural components as they are constructed.

B. Sequence, coordinate, and integrate installing of electrical materials and equipment with other trades.

C. Coordinate location of access panels and doors for electrical items that are concealed by finished surfaces.

D. Where electrical identification devices are applied to field-finished surfaces, coordinate installation of identification devices with completion of finished surface.

E. Where electrical identification markings and devices will be concealed by acoustical ceilings and similar finishes, coordinate installation of these items before ceiling installation.

F. Motors, equipment, controls, etc. shall be furnished, mounted and connected according to the following schedule unless otherwise noted (E =Electrical Contractor, M =Mechanical Contractor):

G.

Item	Furnished By	Set in place or mounted by	Power wiring and connection by	Control Wiring and connection by
1) Disconnect switches, thermal overload switches, manual operating switches				
a) Furnished as part of factory wired mechanical equipment	M	M	E	--
b) Loose mounted	E	E	E	--
2) Transformers				
a) Serving 24 Volt control power	M(1)	M	E	M
3) Low voltage controls and thermostats	M	M	M	M (2)
4) Temperature control panels	M	M	E	M
5) Motorized control valves, damper motors, solenoid valves, etc.				
a) Line Voltage	M	M	E	M
b) Low Voltage	M	M	M	M
6) Factory pre-wired control/power panels including remote sensing devices	M	M	E	M(3)
7) Fire protection controls	M	M	E	E
8) Fire Smoke Dampers				
a) In space (120 Volt)	M	M	E	E(4)
9) Fire and smoke detectors including relays for fan shutdown	E	E	E	E(5)

H. Notes:

1. When control power is not available, mechanical contractor shall provide control transformers as required to power all valves, dampers, etc.
2. Conduit rough-in for thermostats by electrical contractor.
3. Fan coil units, and heat pumps control wiring including wiring of remote sensors by mechanical. Control circuit feeders by mechanical unless shown otherwise.
4. Smoke dampers will be specified as 115 volt (verify) with wiring by Electrical Contractor and control from the fire alarm panel. Smoke detectors furnished by electrical contractor are required to make dampers operate.
5. Wiring from alarm contacts to alarm system by Electrical; control function wiring by Mechanical.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Each contractor shall make provisions for delivery and safe storage of materials. Materials shall be delivered in a timely manner to expedite the work.

B. Protect stored piping, supplies and equipment from cold, moisture and dirt. Elevate above grade. Do not exceed structural capacity of floor, if stored inside.

PART 2 - PRODUCTS

2.1 CONDUITS

A. Electrical metallic tubing (EMT): ANSI C80.3 and UL 797, zinc-coated steel with steel or die cast, set-screw or compression type fittings.

1. Color coded exterior for system identification:

a. Fire Alarm – Red.
b. Power – Silver.

B. Flexible metal conduit (FMC): UL 1, Zinc-coated steel.

C. Intermediate metal conduit (IMC): ANSI C80.6 and UL 1242, zinc-coated steel, with threaded fittings.

D. Liquidtight flexible metal conduit (LFMC): Flexible steel conduit with PVC jacket and complying with UL 360.

E. Rigid nonmetallic conduit (RNC): NEMA TC 2 and UL 651, EPC-40 (schedule 40) PVC, with NEMA TC3 fittings.

F. Installation location shall determine conduit type permitted.

1. For indoor installations:

a. Exposed: EMT.
b. Concealed: EMT.
c. Connection to vibrating equipment: FMC; except in wet or damp locations, use LFMC.
d. Boxes and enclosures: NEMA 250, Type 1, unless otherwise indicated.

2. Use the following conduits for outdoor installations:

a. Exposed: IMC.
b. Underground: RNC.
c. Boxes and enclosures: NEMA 250, Type 3R or Type 4.

3. At motors:

a. Connect motors and equipment subject to vibration, noise transmission, or movement with FMC of 72-inch maximum length.
b. Damp locations: LFMC.

G. Conduit fittings: Specifically designed for the conduit type with which used. Comply with NEMA FB 1 and UL 514B.

2.2 CONDUCTORS

A. Conductors and conductor insulation: Comply with NEMA WC 70.

B. Conductors, No. 10 AWG and Smaller: Solid or stranded copper.

C. Conductors, larger than No. 10 AWG: Stranded copper.

D. Insulation: thermoplastic, rated at 75 deg C minimum.

1. Feeders: Type THHN/THWN insulated conductors in conduit.
2. Underground Feeders and Branch Circuits: Type THWN in conduit.
3. Branch Circuits: Type THHN/THWN insulated conductors in conduit.
4. Circuits over 100 feet from GFCI devices and all circuits from line isolation panels: Low-leakage XHHW in conduit.

E. Wire connectors and splices: Units of size, ampacity rating, material, type, and class suitable for service indicated.

F. Unless otherwise indicated on the drawings, circuits are to be 20 amps with #12 AWG wire.

G. **A green ground shall be installed with all branch and feeder circuits.** Unless otherwise indicated on the drawings, ground wires are to be #12 AWG.

H. Provide a dedicated neutral conductor for each 120V and 277V branch circuit unless otherwise indicated on drawings.

2.3 SUPPORTING DEVICES

A. Material: Cold-formed steel, with corrosion-resistant coating acceptable to authorities having jurisdiction.

B. Metal items for use outdoors or in damp locations: Hot-dip galvanized steel.

C. Slotted-steel channel supports: Flange edges turned toward web, and 9/16-inch- diameter slotted holes at a maximum of 2 inches o.c., in webs.

D. Conduit and cable supports: Manufactured clevis hangers, riser clamps, straps, threaded C-clamps with retainers, ceiling trapeze hangers, wall brackets, and spring-steel clamps or click-type hangers.

1. In general, use the following support methods for outdoor conduit installations:

a. Individual exposed conduit: 1” and smaller; 2 hole straps.
b. Individual exposed conduit: 1-1/4” and larger; Minerallac.
c. Paired individual exposed conduit: Minerallac.
d. Rack exposed conduit: Unistrut with strut straps.
e. Concealed in concrete pour: Approved iron tie wire.

2. In general, use the following support methods for indoor conduit installations:

a. Individual exposed conduit: 1” and smaller; 2 hole straps.
b. Individual exposed conduit: 1-1/4” and larger; Minerallac.
c. Individual lighting and power above lay-in ceilings: Dedicated ceiling wire with Caddy clips.
d. Racked exposed or concealed conduit: Unistrut with strut straps.

E. Pipe sleeves: ASTM A 53, Type E, Grade A, Schedule 40, galvanized steel, plain ends.

F. Expansion anchors: Carbon-steel wedge or sleeve type.

G. Toggle bolts: All-steel springhead type.

H. Powder-driven threaded studs: Heat-treated steel.

2.4 BOXES

A. Hollow wall and ceiling spaces: Outlet boxes for concealed applications shall be 4” square with single or multiple gang plaster ring in round or square configuration to match the device or fixture being installed. Depth of ring shall be selected so that face of ring is recessed back from face of finished surface by approximately 1/8”.

B. Masonry walls: Outlet boxes in masonry walls shall be 4” square with single or multiple gang masonry rings with square edges. Masonry boxes may also be used where 4” square boxes are impractical. Slush boxes in place to prevent movement within walls. **Flush mounted boxes and conduit are to be used unless otherwise indicated**.

C. Exposed exterior boxes: Where exposed boxes are required, they shall be the cast type with threaded hubs and gasketed covers. **Use of these boxes is by approval only. Flush mounted boxes and conduit are to be used unless otherwise indicated**.

D. Interior junction boxes: Interior junction boxes shall be 4” square minimum with knock outs as required. Larger boxes may be required and shall be sized per NEC. Provide a flat steel coverplate.

E. Specialty junction boxes larger than 4 11/16”: Junction and pull boxes shall be sized per NEC and arranged to facilitate pulling or splicing. Boxes shall be steel without knock outs, with hinged or screw on cover plates.

F. Floor boxes: See “Wiring Devices” Specification or the drawings.

2.5 ELECTRICAL IDENTIFICATION

A. Underground warning tape: Permanent, bright-colored, continuous-printed, vinyl tape with the following features:

1. Not less than 6 inches wide by 4 mils thick.
2. Compounded for permanent direct-burial service.
3. Embedded continuous metallic strip or core.
4. Printed legend that indicates type of underground line.

B. Tape markers for wire: Vinyl or vinyl-cloth, self-adhesive, wraparound type with preprinted numbers and letters.

C. Engraved-plastic labels, signs, and instruction plates: Engraving stock, melamine plastic laminate punched or drilled for mechanical fasteners 1/16-inch minimum thickness for signs up to 20 sq. in. and 1/8-inch minimum thickness for larger sizes. Engraved legend in black letters on white background.

2.6 ACCESS DOORS

A. Prime coated 14 gauge steel, flush, with screw driver operated cam lock. Frame to accommodate construction type; size as indicated.

PART 3 - EXECUTION

3.1 UTILITY COORDINATION

A. Utility locations indicated on drawings are approximate and the most accurate information available at the time of design. Prior to equipment and conduit installation, the contractor shall coordinate exact installation details and modify work plan accordingly to meet utility requirements. Correspond with utility company prior to any site development that may impact the installation such as irrigation installation, concrete or asphalt installation, landscaping, etc.

B. Contact utility locating services prior to digging.

3.2 ELECTRICAL EQUIPMENT INSTALLATION

A. Quality of workmanship: A neat and workmanlike installation shall be provided as defined in the National Electrical Installation Standards (NEIS) established by the National Electrical Contractors Association (NECA). NEIS standards shall be followed for all work including that which is concealed by construction.

B. Neatness and craftsmanship shall be a priority. Installations shall be subject to regular observations performed by the Engineer or the Engineer's Representative. If an installation is deemed unsatisfactory by the Engineer or the Engineer's Representative due to quality of workmanship, code conflicts or deviations from the Construction Drawings or Specifications, the Contractor shall remedy the installation to the satisfaction of the Engineer.

C. Inspect installed components for damage and faulty work, including the following:

1. Conduits.
2. Building wire and connectors.
3. Supporting devices for electrical components.
4. Electrical identification.
5. Concrete bases.
6. Cutting and patching for electrical construction.
7. Touchup painting.

D. Headroom maintenance: If mounting heights or other location criteria are not indicated, arrange and install components and equipment to provide the maximum possible headroom.

E. Materials and components: Install level, plumb, and parallel and perpendicular to other building systems and components, unless otherwise indicated.

F. Equipment: Install to facilitate service, maintenance, and repair or replacement of components. Connect for ease of disconnecting, with minimum interference with other installations.

G. Right of way: Give to conduits and piping systems installed at a required slope.

3.3 CONDUIT AND CABLE INSTALLATION

A. Conceal conduit and cables, unless otherwise indicated, within finished walls, ceilings, and floors.

B. Install conduit and cables at least 6 inches away from parallel runs of flues or hot-water pipes. Locate horizontal conduit runs above water piping.

C. Use temporary conduit caps to prevent foreign matter from entering.

D. Make conduit bends and offsets so ID is not reduced. Keep legs of bends in the same plane and straight legs of offsets parallel, unless otherwise indicated.

E. Use conduit and cable fittings compatible with conduit and cables and suitable for use and location.

F. Conduits may be installed embedded in concrete under the following conditions:

1. Contractor shall receive approval from a structural engineer if conduit is to be located in structural concrete.
2. Leave at least 2-inch concrete cover.
3. Do not displace more than 1/3 of the concrete thickness of the slab. For example, if the slab thickness is 3”, maximum conduit size is to be 1” OD.
4. Secure conduit to reinforcing rods to prevent sagging or shifting during concrete placement.
5. Where multiple conduits are run in an area, space conduit laterally to prevent voids in concrete. Fan out conduit runs for a minimum spacing of no less than 3 times the diameter of the larger conduit in a group. Do not place conduits within 12” of supporting beams, walls and columns.
6. Install conduit larger than 1-inch trade size parallel to or at right angles to main reinforcement. Where conduit is at right angles to reinforcement, place conduit close to slab support.
7. Where floor finish is to be exposed concrete, avoid excessive underfloor conduits and maximize cover over conduits to avoid floor cracking.
8. Transition from nonmetallic tubing to Schedule 80 nonmetallic conduit, rigid steel conduit, or IMC before rising above floor.

G. Make bends in exposed parallel or banked runs from same centerline to make bends parallel. Use factory elbows where elbows can be installed parallel; otherwise, provide field bends for exposed parallel conduits.

H. Install pull wires in empty conduits. Use No. 14 AWG zinc-coated steel or monofilament plastic line with not less than 200-lb tensile strength. Leave at least 12 inches of slack at each end of the pull wire.

I. Install interior telephone and signal system conduits in maximum lengths of 150 feet and with a maximum of two 90-degree bends or equivalent. Separate lengths with pull or junction boxes where necessary to comply with these requirements, in addition to requirements above.

J. Install exterior telephone and signal system conduits in maximum lengths of 500 feet and with a minimal number of 90-degree bends.

K. Utilize sweep elbows for all telephone and signal system conduits 2” and larger.

L. All **conduits routed through unfinished spaces** shall be routed as high as allowable to avoid future conflicts with build out.

M. Route conduits parallel to building structural members in a neat and orderly manner.

N. Set floor boxes level and trim after installation to fit flush to finished floor surface.

3.4 CONDUIT SUPPORT INSTALLATION

A. Install support devices to securely and permanently fasten and support electrical components.

B. Install individual and multiple conduit hangers and riser clamps to support conduits. Provide U-bolts, clamps, attachments, and other hardware necessary for hanger assemblies and for securing hanger rods and conduits.

C. Size supports for multiple conduits so capacity can be increased by **a 25 percent minimum** in the future.

D. Install 1/4-inch diameter or larger threaded steel hanger rods, unless otherwise indicated.

E. Simultaneously install vertical conductor supports with conductors.

F. Separately support cast boxes that are threaded to conduits and used for fixture support. Support sheet-metal boxes directly from the building structure or by bar hangers. If bar hangers are used, attach bar to conduits on opposite sides of the box and support the conduit with an approved fastener not more than 24 inches from the box.

G. Install metal channel racks for mounting cabinets, panelboards, disconnect switches, control enclosures, pull and junction boxes, transformers, and other devices unless components are mounted directly to structural elements of adequate strength. Use factory hardware for all connections and assemblies including 45 and 90 degree attachment hardware.

H. Install sleeves for cable and conduit penetrations of concrete slabs and walls unless core-drilled holes are used. Install sleeves for cable and conduit penetrations of masonry and fire-rated gypsum walls and of all other fire-rated floor and wall assemblies. Install sleeves during erection of concrete and masonry walls.

I. Install PVC sleeves for grounding cable riser penetrations of concrete slabs. Where ground wires are run through metal sleeves use grounding bushings on both ends of the conduit or sleeve.

J. Securely fasten electrical items and their supports to the building structure, unless otherwise indicated. Perform fastening according to the following unless other fastening methods are indicated:

1. Masonry: Toggle bolts on hollow masonry units and expansion bolts on solid masonry units.
2. New concrete: Concrete inserts with machine screws and bolts.
3. Light steel: Sheet-metal screws.
4. Fasteners: Select so the load applied to each fastener does not exceed 25 percent of its proof-test load.

3.5 WIRING INSTALLATION

A. Install splices and taps that are compatible with conductor material and that possess equivalent or better mechanical strength and insulation ratings than unspliced conductors.

B. Install wiring at outlets with at least 12 inches of slack conductor at each outlet.

C. Connect outlet and component connections to wiring systems and to ground. Tighten electrical connectors and terminals, according to manufacturer's published torque-tightening values.

3.6 POSITION OF DEVICE OUTLETS

A. Outlets shall be installed at the height indicated below unless otherwise noted. All heights of outlets are measured from finished floor to centerline of device. Heights may be adjusted as necessary to clear wall mounted cabinets, fin tube convectors, unit heaters, etc. Where installed in masonry walls, mounting heights may be adjusted to correspond to block coursing. In no case shall outlets be mounted below 15” or switches above 48”:

1.	Wall switches	44”
2.	Receptacle outlet (general)	16”
3.	Receptacle outlet serving countertops	4” above counter or top of backsplash unless otherwise noted.
4.	Exterior receptacles	24”
5.	Communications outlet	Match adjacent outlets.
6.	Communication system call station	44”
7.	Fire alarm signals	82” or 6” below ceiling (whichever is lower).
8.	Fire alarm pull stations	44”.
9.	Exit lights	4” between top of door frame and bottom of exit light where possible.

3.7 ELECTRICAL IDENTIFICATION

A. Install at locations for most convenient viewing without interference with operation and maintenance of equipment.

B. Coordinate names, abbreviations, colors, and other designations used for electrical identification with corresponding designations indicated in the Contract Documents or required by codes and standards. Use consistent designations throughout Project.

C. Self-Adhesive Identification Products: Clean surfaces before applying.

D. Tag and label circuits designated to be extended in the future. Identify source and circuit numbers in each cabinet, pull and junction box, and outlet box. Color-coding may be used for voltage and phase identification.

E. Install warning markers directly above power and communication lines during trench backfilling for underground power, control, signal, and communication lines. Locate marker 6 to 8 inches below finished grade unless required otherwise by NEC. Markers shall be continuous and detectable with a metal detector from above ground after backfilling. Provide one strip of marker for each 16 inches of width if multiple lines are installed in a common trench or concrete envelope.

F. Color-code 208/120-V system secondary service, feeder, and branch-circuit conductors throughout the secondary electrical system as follows:

1. Match existing building identification

G. Color-code 480/277-V system secondary service, feeder, and branch-circuit conductors throughout the secondary electrical system as follows:

1. Match existing building identification

3.8 FIRESTOPPING

A. Apply firestopping to cable and raceway penetrations of fire-rated floor and wall assemblies to achieve fire-resistance rating of the assembly and to resist passage of smoke and other gases. Products designed to achieve a fire or smoke resistance rating shall not be used in locations where such ratings are not required by AHJ. Coordinate location requirements with other disciplines and AHJ prior to installation.

1. Limit air leakage to 5.0cfm per square foot tested in accordance with UL 1479.
2. Materials labeled by a qualified testing agency acceptable to AHJ.
3. Comply with manufacturer's written installation instructions and published drawings
4. Identify penetration firestopping with preprinted metal or plastic labels. Attach labels permanently to surfaces adjacent to and within 6 inches of firestopping edge so labels will be visible to anyone seeking to remove penetrating items or firestopping. Use mechanical fasteners or self-adhering-type labels with adhesives capable of permanently bonding labels to surfaces on which labels are placed. Include the following information on labels:

   a. The words "Warning - Penetration Firestopping - Do Not Disturb. Notify Building Management of Any Damage."
   b. Contractor's name, address, and phone number.
   c. Designation of applicable testing and inspecting agency.
   d. Date of installation.
   e. Manufacturer's name.
   f. Installer's name.

B. All firestopping assemblies shall be from one manufacturer. Match manufacturer used by other trades or as directed by general contractor.

C. Where electrical outlets are to be installed in fire rated walls, provide FlameSafe FSP1077 putty pads or equal to maintain adequate fire rating.

D. Where lighting fixtures or other electrical devices are to be installed in fire rated ceilings, provide Tenmat Fire Rated Light Covers or equal to maintain adequate fire rating.

3.9 HOUSEKEEPING PADS

A. Provide a 3-1/2 inch tall concrete housekeeping pad for all floor mounted interior electrical equipment as follows:

1. Pad shall extend 4-6” beyond all sides of equipment, except in the back for switchboards mounted tight against the wall.
2. Constructed of 3000 psi concrete.
3. Provide 6” x 6” #4 welded wire mesh.
4. Securely bond pad to floor by roughing the floor and coating with cement grout.

3.10 DEMOLITION

A. Disconnect, demolish, and remove construction indicated in specifications and drawings.

B. The Owner shall have first salvage rights to all fixtures, devices and equipment removed. Present removed materials to owner's representative. Materials not retained by owner's representative shall be removed from project site.

C. If equipment to remain is damaged or disturbed, remove damaged portions and install new products of equal capacity and quality.

D. Remove, store, clean, reinstall, reconnect, and make operational equipment indicated for relocation.

E. Remove all accessible conduit unless otherwise noted.

F. Remove branch circuit conductors and low voltage cable in area of demolition not reused in new work or planned for future use. Where left for future use, label wire at both ends and at each junction box.

G. Power to existing areas not being remodeled shall be maintained at all times except for short term outages necessary for reconnection of existing circuits. Coordinate and schedule outages with owner.

H. Coordinate demolition with the work of other trades. Provide temporary power as required to allow the work of other trades to proceed or as required to allow the owner to occupy the space.

I. See architectural plans to determine project phasing requirements. Electrical circuits serving areas not under construction shall remain active until those areas are turned over to the contractor for construction.

J. Work abandoned in place: Cut and remove underground conduit a minimum of 2 inches beyond face of adjacent construction. Cap and patch surface to match existing finish.

3.11 WORK IN EXISTING BUILDINGS

A. Full Owner Occupancy: The Owner will occupy the site and existing building during the construction period. Cooperate with the Owner to minimize conflicts with the Owner's operations.

B. Schedule all work in advance with the owner. Do not proceed with work without the Owner's written approval.

C. Notify Owner of noisy operations and schedule in advance.

D. The Owner shall have the right to direct work to secure safe and proper progress and quality of work.

E. Do not interrupt utilities without Owner's written approval of time and duration. Interruptions shall be the minimum required for completion of work and performed during the hours of 10:00 PM-6:00 AM Monday through Friday or 6:00 PM Saturday through 6:00 AM Monday.

F. The existing fire alarm system shall remain functional throughout the project. The Owner and the Fire Marshall shall approve required outages.

G. The Owner shall be notified before starting welding or cutting. Fire extinguishers shall be immediately accessible when welding or cutting with an open flame or arc. Welding or cutting with an open flame or arc shall be stopped not less than one hour before leaving the premises.

H. Existing electrical items that interfere with the proper installation new work shall be removed or relocated as required or as directed by the Architect/Engineer.

I. Maintain downstream circuit continuity to equipment to remain active.

J. Where breakers are indicated to be installed in existing panelboards, remove panel covers and verify all connection details prior to ordering of breakers. Provide all required hardware for installation of breakers in existing panels.

3.12 CUTTING AND PATCHING

A. Cut, channel, chase, and drill floors, walls, partitions, ceilings, and other surfaces necessary for electrical installations. Perform cutting by skilled mechanics of trades involved.

B. Repair cut surfaces to match adjacent surfaces.

3.13 CONSTRUCTION LAYOUT

A. Layout work in advance of installation using data and measurements from the site, the appropriate architectural and structural drawings and shop drawings.

B. Confirm adequate clearance for installation, operation, maintenance and code required clearance including items installed by other contractors.

C. If layout to provide clearance is not possible, promptly notify Architect/Engineer for clarification.

3.14 DATA AND MEASUREMENTS

A. The data given herein and on the drawings is as accurate as could be secured. The existence and location of construction as indicated is not guaranteed. Before beginning work investigate and verify the existence and location of items affecting work. Obtain exact locations, measurements, levels, etc., at the site and adapt work to actual conditions.

B. Only site measurements may be utilized in calculations. Mechanical and electrical drawings are diagrammatic or schematic.

3.15 REFINISHING AND TOUCHUP PAINTING

A. Refinish and touch up paint.

1. Clean damaged and disturbed areas and apply primer, intermediate, and finish coats to suit the degree of damage at each location.
2. Follow paint manufacturer's written instructions for surface preparation and for timing and application of successive coats.
3. Repair damage to galvanized finishes with zinc-rich paint recommended by manufacturer.
4. Repair damage to PVC or paint finishes with matching touchup coating recommended by manufacturer.

3.16 CLEANING AND PROTECTION

A. On completion of installation, including outlets, fittings, and devices, inspect exposed finish. Remove burrs, dirt, paint spots, and construction debris.

B. Protect equipment and installations and maintain conditions to ensure that coatings, finishes, and cabinets are without damage or deterioration at time of Substantial Completion.

END OF SECTION 260500

SECTION 260536 - CABLE TRAYS

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 cable trays, cable tray firestopping fittings, and accessories.

B. Related Sections include the following:

1. Division 26 Section "Basic Electrical Materials and Methods" for cable tray supports not specified in this Section.
2. Division 26 Section “Grounding and Bonding” for cable management bonding and grounding.

C. Provide all equipment, materials, labor, and services, not specifically mentioned or shown, which may be necessary to complete or perfect all parts of the installation. Ensure that they are in compliance with requirements stated or reasonably inferred by the contract documents.

1.3 SUBMITTALS

A. Product Data: Include data on features, ratings, and performance for each component specified.

1. Cable Management Tray:

a. Tray
b. Mounting Hardware
c. Fire Stop Devices

2. Grounding and Bonding:

a. Grounding connectors.
b. Lugs
c. Wire

B. Shop Drawings: Detail fabrication and installation of cable tray, including plans, elevations, and sections of components and attachments to other construction elements. Designate components and accessories, including clamps, brackets, hanger rods, splice-plate connectors, straight lengths, and fittings.

C. Warranty documents for equipment.

D. Qualification Data: For installer/ technician, installation supervisor, and field inspector.

E. Operation and Maintenance Data:

1. Provide three (3) copies of operations and maintenance manuals. As a minimum, manuals should include:

    a. Complete schematics of each system component

1.4 QUALITY ASSURANCE

A. Source Limitations: Obtain cable tray components through one source from a single manufacturer.

B. Listing and Labeling: Provide cable trays and accessories specified in this Section that are listed and labeled.

1. The Terms "Listed" and "Labeled": As defined in NFPA 70, Article 100.
2. Listing and Labeling Agency Qualifications: A "Nationally Recognized Testing Laboratory" as defined in OSHA Regulation 1910.7.

C. 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.

D. Telecommunications Pathways and Spaces: Comply with TIA/EIA-569-A/B.

E. Grounding: Comply with ANSI-J-STD-607-A.

1.5 COORDINATION

A. Coordinate layout and installation of cable tray with other trades and installations.

1. Revise locations and elevations from those indicated as required to suit field conditions with prior approval of Architect/Engineer.

PART 2 - PRODUCTS

2.1 UNDER RAISED FLOOR CABLE MANAGEMENT TRAY

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the work include the following:

1. Cablofil Inc.
1. Cooper B-Line, Inc.
2. Chatsworth Products Inc.
3. MP Husky
4. MonoSystems, Inc.
5. Hubbell Wiring Devices

B. Under Raised Floor Basket Cable Tray:

1. Nominal Dimensions: Wire mesh spacing shall not exceed 2 inches by 4 inches.
2. Sizes and Layout: Depths, widths, and layout as indicated on drawings.

3. Pedestal Mount:

a. Raised floor stanchion support: Factory pedestal mount bracket.
b. Support tray as low to floor as possible.

4. Tray Intersection: Factory intersection fitting with radius cable protectors at each corner.

C. Material: Carbon steel wire, ASTM A 510, Grade 1008. Finish for carbon steel wire shall be applied after welding and bending of mesh and shall be electro-plated zinc galvanizing, ASTM B633, Type III, SC-1 or hot dip galvanizing, ASTM A 123.

D. Fabrication: Fabricate cable tray products with rounded edges and smooth surfaces to protect cables from damage during installation. Wire welded, bent and surface treatment shall be after manufacture.

E. Support System: Provide supports as recommended by manufacturer. Supports may be floor-mounted or mounted to raised-floor support structure..

F. Hardware: Hardware, including support components, splice connectors, grounding connectors, etc. furnished by manufacturer.

G. Grounding: Provide grounding lugs for attachment of ground conductor to tray.

H. Horizontal transition pieces (90s, 45s, etc.) shall be factory manufactured assemblies and shall not be cut and bent from straight runs.

2.2 CABLE TRAY FIRESTOPPING FITTINGS

A. Thru-Wall Sleeve Fittings: Hilti CP 653 series Speed Sleeve (or approved equal).

1. Sizes: 2” or 4” diameter as indicated on plans.

B. Thru-Wall Fittings: STI EZ Path system (or approved equal).

1. Sizes 1.5” square, STI Catalog #EZD22
2. Size: 3” square, STI Catalog #EXDP33
3. Size: 4” square, STI Catalog #EZDP44

C. Rating: Maintain fire rating of penetrated wall. Install firestopping thru-wall fitting on each side of penetrated wall. Assembly shall have a minimum UL rating of 3 hours when used with 4-pair cable.

D. Identification: Pre-printed factory label for each thru-wall fitting.

E. Accessories: Provide all accessories as required for a complete installation.

2.3 IDENTIFICATION PRODUCTS

A. Comply with TIA/EIA-606-A and UL 969 for labeling materials, including label stocks, laminating adhesives, and inks used by label printers.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install cable tray level and plumb according to manufacturer's written instructions, layout on Drawings, and referenced standards.

B. Install bottom of all wire basket cable tray nominally 4” above finished ceilings where possible. Allow space for removal of accessible ceiling tiles. Route cable tray around building obstructions as required with prior approval by Architect/Engineer. A minimum of 6" access space shall be maintained above all points in cable tray system to allow accessibility for cabling. Less than 6" access space shall not be allowed without prior permission from engineer.

C. Remove burrs and sharp edges from cable trays prior to installing cables.

D. Fasten cable tray supports securely to building structure as specified in Division 26 Section "Basic Electrical Materials and Methods," unless otherwise indicated.

1. Locate and install supports no farther apart than 5’-0” on center.
2. Locate and install factory anti-sway braces no farther apart than 15’-0” on center.
3. Design supports, including fastenings to the structure, to carry the greater of the calculated load multiplied by a safety factor of 4 or the calculated load plus 200 lb.
4. All ceiling-mounted supports must attach at two or more points – Center hung or single point ceiling supports shall not be accepted.
5. A support should be placed within 24" on each side of any connection to a bend, tee, or cross.

E. Make changes in direction and elevation using field fabricated fittings following manufacturer’s instructions.

F. Cutting: Cut tray in accordance with manufacturer’s instructions.

G. Make cable tray connections using standard fittings.

H. Firestopping: Firestop penetrations through fire and smoke barriers using factory thru-wall firestopping fittings on each side of each penetration. Install factory identification on each fitting. Follow manufacturer’s instructions and maintain rating of penetrated wall.

I. Workspace: Install cable trays with sufficient space to permit access for installing cables.

3.2 GROUNDING AND BONDING

A. Ground cable trays according to manufacturer's instructions. Grounding shall conform to ANSI/TIA/EIA 607(A) - Commercial Building Grounding and Bonding Requirements for Telecommunications, National Electrical Code®, ANSI/NECA/BICSI-568 and manufacturer's grounding requirements as minimum. Bond cable tray across discontinuous sections.

B. Bond cable tray to nearest telecommunications room ground bar using #6 AWG conductor.

C. Tighten electrical connectors and terminals according to manufacturer’s published torque-tightening values. Where manufacturer’s torque values are not indicated, use those specified in UL 486A and UL 486B.

3.3 FIELD QUALITY CONTROL

A. Grounding: Test cable trays to ensure electrical continuity of bonding and grounding connections.

B. Anchorage: Examine supports and anchors.

3.4 EXAMINATION

A. Examine substrates for compliance with requirements for installation tolerances and other conditions affecting performance of cable trays. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.5 CLEANING

A. On completion of cable tray installation, including fittings, inspect exposed finish. Remove burrs, dirt, and construction debris and repair damaged finishes, including chips, scratches, and abrasions.

3.6 PROTECTION

A. Provide final protection and maintain conditions that ensure cable tray is without damage or deterioration at the time of Substantial Completion.

1. Repair damage to galvanized finishes with zinc-rich paint recommended by cable tray manufacturer.

END OF SECTION 260536

SECTION 260600 - 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.

1.3 SUBMITTALS

A. Field quality-control test reports.

B. Operation and Maintenance Data: For grounding, include the following in emergency, operation, and maintenance manuals:

1. Instructions for periodic testing and inspection of grounding features at grounding connections for separately derived systems based on NFPA 70B.

    a. Tests shall be to determine if ground resistance or impedance values remain within specified maximums, and instructions shall recommend corrective action if they do not.
    b. Include recommended testing intervals.

1.4 QUALITY ASSURANCE

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

B. 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 Conductor: See riser diagram.

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.
2. Bus Bars: Compression type, two hole.

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, 5/8” diameter by 120 inches.

B. Ufer Ground (Concrete-Encased Grounding Electrode): #3/0 bare copper in 25’ of concrete footing.

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 bare **[tinned]** copper conductor, No. 3/0 **[insert size]** AWG minimum.

1. Bury at least 24 inches (600 mm) below grade.

C. Conductor Terminations and Connections:

1. Pipe and Equipment Grounding Conductor Terminations: Bolted connectors.
2. Underground Connections: Welded connectors
3. Connections to Ground Rods: Bolted connectors.
4. Connections to Conduits: Insulated grounding bushings
5. Connections to Busbars: Bolted connections.

3.2 GROUNDING UNDERGROUND DISTRIBUTION SYSTEM COMPONENTS

A. Comply with IEEE C2 grounding requirements.

B. Install 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 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. All feeders and branch circuits, including:

a. Feeders and branch circuits.
b. Lighting circuits.
c. Receptacle circuits.
d. Single-phase motor and appliance branch circuits.
e. Three-phase motor and appliance branch circuits.
f. Flexible raceway runs.

3.4 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. 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.

C. 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.

D. Signal Reference Grid (SRG): Install in raised floor areas per detail on the drawings:

1. Provide #2/0 bare stranded copper around perimeter with two connections to the RFGB.
2. #4 AWG bare stranded copper bonded to every 4th floor pedestal.
3. Bond CRAC frames to the perimeter #2/0 conductor with #4 AWG and C-tap crimp connection.
4. Bond FPC frames to the perimeter #2/0 conductor with #4 AWG and C-tap crimp connection.
5. Bond all other conducting materials to the SRG per detail on the drawings.
6. Bond all metal conduits entering data center at nearest point of entry using conduit pipe clamp.

E. Bonding for Metal Enclosed Panelboards: Provide insulated grounding bushings and #4 AWG jumper on conduit that does not terminate in panelboard enclosure bottom plate.

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. Ufer Ground (Concrete-Encased Grounding Electrode): Install according to NFPA 70, using a minimum of 25’ of bare copper conductor not smaller than No. 3/0 in concrete footing.

1. Bond grounding conductor to reinforcing steel in at least four locations and to anchor bolts.

3.5 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. Tests and Inspections:

1. After installing grounding system but before permanent electrical circuits have been energized, test for compliance with requirements.

2. Inspect physical and mechanical condition. Verify tightness of accessible, bolted, electrical connections with a calibrated torque wrench according to manufacturer's written instructions.
3. Test completed grounding system at each location where a maximum ground-resistance level is specified, at service disconnect enclosure grounding terminal and at individual ground rods. Make tests at ground rods before any conductors are connected.

    a. Measure ground resistance no fewer 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.

4. 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.

E. Grounding system will be considered defective if it does not pass tests and inspections.

F. Prepare test and inspection reports.

G. Excessive Ground Resistance: If resistance to ground exceeds specified values, notify Architect/Engineer promptly and include recommendations to reduce ground resistance.

END OF SECTION 260600

SECTION 262200 - DRY-TYPE TRANSFORMERS

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 dry-type distribution and specialty transformers rated 1000 V and less.

1.3 SUBMITTALS

A. Product Data: Include data on features, components, ratings, and performance for each type of transformer specified including the following:

1. Outline dimensions
2. Weight
3. Impedance
4. Temperature rating
5. Quantity of voltage taps
6. Noise levels

B. Maintenance Data: For transformers to include in the maintenance manuals specified in Division 1.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Temporary Heating: Apply temporary heat according to manufacturer's written instructions within the enclosure of each ventilated-type unit throughout periods during which equipment is not energized and is not in a space that is continuously under normal control of temperature and humidity.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide transformers by one the following:

1. Acme Electric Corp.; Transformer Division.
2. Challenger Electrical Equipment Corp.
3. Cutler-Hammer/Eaton Corp.
4. GE Electrical Distribution & Control.
5. MagneTek Inc.

6. Siemens Energy & Automation, Inc.
7. Square D; Groupe Schneider.

2.2 TRANSFORMERS, GENERAL

A. Description: Factory-assembled and -tested, air-cooled units of types specified, designed for 60-Hz service.

B. Cores: Grain-oriented, nonaging silicon steel.

C. Coils: Continuous windings without splices, except for taps.

D. Internal Coil Connections: Brazed or pressure type.

E. Enclosure: Class complies with NEMA 250 for the environment in which installed.

F. Energy Efficiency: DOE 2016 rated.

G. Sound levels (measured at 1 foot):

1. 25 to 50 kva, 45 db
2. 51 to 150 kva, 50 db
3. 151 to 300 kva, 55 db
4. 301 to 500 kva, 60 db

2.3 GENERAL-PURPOSE DISTRIBUTION AND POWER TRANSFORMERS

A. Comply with NEMA ST 20 and list and label as complying with UL 1561.

B. Cores: One leg per phase.

C. Windings: One coil per phase in primary and secondary.

1. Internal Coil Connections: Brazed or pressure type.
2. Coil Material: Aluminum

D. Enclosure: Indoor, ventilated.

E. Insulation Class: 185 or 220 deg C class for transformers 15 kVA or smaller; 220 deg C class for transformers larger than 15 kVA.

1. Rated Temperature Rise: 115 deg C maximum rise above 40 deg C. for transformers 300 kVA and smaller.

F. Taps: For transformers 3 kVA and larger, full-capacity taps in high-voltage windings are as follows:

1. Taps, 3 through 15 kVA: Two 5-percent taps below rated high voltage.
2. Taps, 15 through 300 kVA: Six 2.5-percent taps, 2 above and 4 below rated high voltage.
3. Taps, 301 kVA and Above: Four 2.5-percent taps, 2 above and 2 below rated high voltage.

G. Electrostatic Shielding: Each winding is independently single shielded with a full-width copper electrostatic shield arranged to minimize interwinding capacitance.

1. Coil leads and terminal strips are arranged to minimize capacitive coupling between input and output connections.
2. Shield Terminal: Separate; marked "Shield" for grounding connection.
3. Capacitance: Shield limits capacitance between primary and secondary to a maximum of 33 picofarads over a frequency range of 20 Hz to 1 MHz.
4. Common-Mode Noise Attenuation: Minus 120 dB minimum, 0.5 to 1.5 kHz; minus 65 dB minimum, 1.5 to 100 kHz.
5. Normal-Mode Noise Attenuation: Minus 52 dB minimum, 1.5 to 10 kHz.

H. Drive isolation transformers shall be designed for use with variable frequency drives.

I. Wall-Mounting Brackets: Manufacturer's standard brackets for transformers up to 75 kVA.

2.4 FINISHES

A. Indoor Units: Manufacturer's standard paint over corrosion-resistant pretreatment and primer.

B. Outdoor Units: Comply with ANSI C57.12.28.

PART 3 - EXECUTION

3.1 INSTALLATION

A. All connections to transformers shall be made with flexible metal conduit. Do not connect conduits to the top of transformers.

B. Arrange equipment to provide adequate spacing for access and for circulation of cooling air.

C. Label transformers in accordance with Basic Materials and Methods.

D. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values.

3.2 GROUNDING

A. Separately Derived Systems: Comply with NFPA 70 requirements for connecting to grounding electrodes and for bonding to metallic piping near the transformer.

B. Ground core of transformer to enclosure using braided grounding strap sized in accordance with NEC.

3.3 CLEANING

A. On completion of installation, inspect components. Remove paint splatters and other spots, dirt, and debris. Repair scratches and mars on finish to match original finish. Clean components internally using methods and materials recommended by manufacturer.

3.4 ADJUSTING

A. After installing and cleaning, touch up scratches and mars on finish to match original finish.

B. Adjust transformer taps to provide optimum voltage conditions at utilization equipment throughout normal operating cycle of facility. Record primary and secondary voltages and tap settings and submit with test results.

C. Occupancy Adjustments: When requested within 12 months of date of Substantial Completion, provide on-site assistance in readjusting transformer tap settings to suit actual occupied conditions. Provide up to 2 visits to Project site for this purpose without additional cost.

1. Voltage Recordings: Contractor performed. Provide up to 48 hours of recording on the low-voltage system of each medium-voltage transformer.
2. Point of Measurement: Make voltage recordings at load outlets selected by Owner.

END OF SECTION 262200

SECTION 262416 - PANELBOARDS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes load centers and panelboards, overcurrent protective devices and associated auxiliary equipment rated 600V and less for the following types:

1. Lighting and appliance branch-circuit panelboards.
2. Distribution panelboards.

B. Related Sections include the following:

1. Division 26 Section "General Electrical Requirements."
2. Division 26 Section "Basic Electrical Materials and Methods."
3. Division 26 Section "Grounding."
4. Division 26 Section "Surge Protective Devices (SPDs)."

1.3 SUBMITTALS

A. Product Data: For each type of panelboard, overcurrent protective device, accessory, and component indicated. Include dimensions and manufacturers' technical data on features, performance, electrical characteristics, ratings, and finishes.

B. Shop Drawings: For each panelboard and related equipment.

1. Dimensioned plans, elevations, sections, and details. Show tabulations of installed devices, equipment features, and ratings. Include the following:

a. Enclosure types and details for types other than NEMA 250, Type 1.
b. Panel designation (same as on drawings).
c. Bus configuration, current, and voltage ratings.
d. Short-circuit current rating of panelboards and overcurrent protective devices.
e. UL listing for series rating of installed devices.
f. Features, characteristics, ratings, and factory settings of individual overcurrent protective devices, and auxiliary components.
g. SPD devices when integrated into equipment.
h. Accessories (ground bar, contactor, door lock, etc.)
i. Mounting (flush or surface).

2. Wiring Diagrams: Diagram power, signal, and control wiring and differentiate between manufacturer-installed and field-installed wiring.

C. Maintenance Data: For panelboards and components to include in maintenance manuals specified in Division 1. In addition to requirements specified in Division 1 Section "Contract Closeout," include the following:

1. Manufacturer's written instructions for testing and adjusting overcurrent protective devices.
2. Time-current curves, including selectable ranges for each type of overcurrent protective device.

1.4 COORDINATION

A. Coordinate layout and installation of panelboards and components with other construction that penetrates walls or is supported by them, including electrical and other types of equipment, raceways, piping, and encumbrances to workspace clearance requirements.

1.5 EXTRA MATERIALS

A. Keys: Four spares of each type of panelboard cabinet lock.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Panelboards, Overcurrent Protective Devices, Controllers, Contactors, and Accessories:

a. Eaton Corp.; Cutler-Hammer Products.
b. General Electric Co.; Electrical Distribution & Control Div.
c. Siemens Energy & Automation, Inc.
d. Square D Co.

2. Fused Coordination Panelboards, Overcurrent Protective Devices, and Accessories:

a. Cooper-Bussman – Quick Spec Coordination Panelboard.
b. Mersen Fused Coordination Panelboard

2.2 FABRICATION AND FEATURES

A. Enclosures: Surface-mounted cabinets. NEMA PB 1, Type 1, to meet environmental conditions at installed location.

B. Front: Secured to box with concealed trim clamps. For surface-mounted fronts, match box dimensions; for flush-mounted fronts, overlap box.

C. Finish: Manufacturer's standard enamel finish over corrosion-resistant treatment or primer coat.

D. Directory Card: With transparent protective cover, mounted inside metal frame, inside panelboard door.

E. Bus: Tin-plated aluminum.

F. Main and Neutral Lugs: Mechanical type suitable for use with conductor material.

G. Equipment Ground Bus: Adequate for feeder and branch-circuit equipment ground conductors; bonded to box.

H. Future Devices: Mounting brackets, bus connections, and necessary appurtenances required for future installation of devices.

I. Feed-through Lugs: Mechanical type suitable for use with conductor material. Locate at opposite end of bus from incoming lugs or main device.

2.3 PANELBOARD SHORT-CIRCUIT RATING

A. Fully rated to interrupt symmetrical short-circuit current available at terminals.

2.4 LOAD CENTERS

A. Overcurrent Protective Devices: Plug-in, full-module circuit breaker.

B. Conductor Connectors: Mechanical type for main, neutral, and ground lugs and buses.

2.5 LIGHTING AND APPLIANCE BRANCH-CIRCUIT PANELBOARDS

A. Branch Overcurrent Protective Devices: Bolt-on circuit breakers, replaceable without disturbing adjacent units.

B. Doors: Front mounted with concealed hinges; secured with flush latch with tumbler lock; keyed alike.

C. Load center construction shall not be acceptable.

2.6 SURGE PROTECTIVE DEVICE (SPD)

A. Panelboard configured to physically accommodate integration of a SPD.

B. Panelboard phase, neutral, and ground busses configured to accommodate an integral SPD with leads for each mode no longer than 12”.

2.7 FUSED COORDINATION PANELBOARDS

A. Branch overcurrent protective devices: 1-, 2-, and 3-pole branch disconnects of ampacity listed on the schedule.

B. Doors: Front mounted with concealed hinges; secured with flush latch with tumbler lock; keyed alike.

C. Selective Coordination: Panelboards shall be specifically designed to address NEC selective coordination requirements.

D. Provide with integral SPD

2.8 OVERCURRENT PROTECTIVE DEVICES

A. Molded-Case Circuit Breaker: NEMA AB 1, with interrupting capacity to meet available fault currents.

1. Thermal-Magnetic Circuit Breakers: Inverse time-current element for low-level overloads, and instantaneous magnetic trip element for short circuits. Adjustable magnetic trip setting for circuit-breaker frame sizes 250 A and larger.

B. Molded-Case Circuit-Breaker Features and Accessories. Standard frame sizes, trip ratings, and number of poles.

1. Lugs: Mechanical style, suitable for number, size, trip ratings, and material of conductors.
2. Application Listing: Appropriate for application; Type SWD for switching fluorescent lighting loads; Type HACR for heating, air-conditioning, and refrigerating equipment.

2.9 ACCESSORY COMPONENTS AND FEATURES

A. Accessory Set: Tools and miscellaneous items required for overcurrent protective device test, inspection, maintenance, and operation.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install panelboards and accessories according to NEMA PB 1.1.

B. Mounting Heights: Top of trim 74 inches above finished floor, unless otherwise indicated.

C. Mounting: Plumb and rigid without distortion of box. Mount recessed panelboards with fronts uniformly flush with wall finish.

D. Circuit Directory: Create a directory to indicate installed circuit loads after balancing panelboard loads. Obtain approval before installing. Use a computer or typewriter to create directory; handwritten directories are not acceptable.

E. Install filler plates in unused spaces.

F. Provision for Future Circuits at Flush Panelboards: Stub four 1-inch empty conduits from panelboard into accessible ceiling space or space designated to be ceiling space in the future. Stub four 1-inch empty conduits into raised floor space or below slab not on grade.

G. Wiring in Panelboard Gutters: Arrange conductors into groups and bundle and wrap with wire ties after completing load balancing.

3.2 IDENTIFICATION

A. Identify field-installed conductors, interconnecting wiring, and components; provide warning signs as specified in Division 26 Section "Basic Electrical Materials and Methods"

B. Panelboard Nameplates: Label each panelboard with engraved metal or laminated-plastic nameplate mounted with corrosion-resistant screws.

3.3 CONNECTIONS

A. Install equipment grounding connections for panelboards with ground continuity to main electrical ground bus.

B. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values.

3.4 FIELD QUALITY CONTROL

A. Prepare for acceptance tests as follows:

1. Test insulation resistance for each panelboard bus, component, connecting supply, feeder, and control circuit.
2. Test continuity of each circuit.

B. Testing Agency: Engage a qualified independent testing agency to perform specified testing.

C. Balancing Loads: After Substantial Completion, but not more than 60 days after Final Acceptance, measure load balancing and make circuit changes as follows:

1. Measure as directed during period of normal system loading.
2. Perform load-balancing circuit changes outside normal occupancy/working schedule of the facility and at time directed. Avoid disrupting critical 24-hour services such as fax machines and on-line data-processing, computing, transmitting, and receiving equipment.
3. After circuit changes, recheck loads during normal load period. Record all load readings before and after changes and submit test records.
4. Tolerance: Difference exceeding 20 percent between phase loads, within a panelboard, is not acceptable. Rebalance and recheck as necessary to meet this minimum requirement.

3.5 ADJUSTING

A. Set field-adjustable switches and circuit-breaker trip ranges.

3.6 CLEANING

A. On completion of installation, inspect interior and exterior of panelboards. Remove paint splatters and other spots. Vacuum dirt and debris; do not use compressed air to assist in cleaning. Repair exposed surfaces to match original finish.

END OF SECTION 262416

SECTION 262726 - WIRING DEVICES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes receptacles, connectors, switches, and finish plates.

B. This Section includes floor boxes.

1.3 DEFINITIONS

A. GFCI: Ground-fault circuit interrupter.

B. DL: Damp location as defined in NFPA 70, Article 100.

C. WP: Weatherproof for wet locations as defined in NFPA 70, Article 100.

1.4 SUBMITTALS

A. Product Data: For each product specified.

1.5 QUALITY ASSURANCE

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction.

B. Comply with NEMA WD 1.

C. Comply with NFPA 70.

1.6 COORDINATION

A. Receptacles for Owner-Furnished Equipment: Match plug configurations.

1. Cord and Plug Sets: Match equipment requirements.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Floor Boxes

a. Hubbell
b. Wiremold

2. Other Wiring Devices

a. Bryant Electric, Inc.
b. Cooper Wiring Devices.
c. Hubbell, Inc.; Wiring Devices Div.
d. Leviton Manufacturing Co., Inc.
e. Pass & Seymour/Legrand; Wiring Devices Div.

2.2 RECEPTACLES

A. Description: Impact-resistant nylon face with finder groove, thermoplastic back body, and one-piece triple-wipe power contacts. Side and back wired, back wire terminals use screw pressure plates.

B. Duplex Straight-Blade Receptacles: Specification grade; 20 ampere, 125 volt rated.

1. Equal to: Pass & Seymour #5362

C. GFCI Receptacles: Design units for installation in a 2-3/4-inch deep outlet box without an adapter.

1. Equal to: Pass & Seymour #2095.

2.3 CORD AND PLUG SETS

A. Description: Match voltage and current ratings and number of conductors to requirements of equipment being connected.

1. Cord: Rubber-insulated, stranded-copper conductors, with type SOW-A jacket. Green-insulated grounding conductor, and equipment-rating ampacity plus a minimum of 30 percent.
2. Plug: Nylon body and integral cable-clamping jaws. Match cord and receptacle type for connection.

2.4 SWITCHES

A. Snap Switches: Specification grade; 20 ampere, 120/277 volt rated; side and back wired; quiet type.

1. Poles: Provide switches in single-pole, double-pole, three-way, and four-way configurations as indicated on the drawings.
2. Equal to: Pass & Seymour #20AC Select one of two paragraphs below.

2.5 WALL PLATES

A. Single and combination types match corresponding wiring devices.

1. Plate-Securing Screws: Metal with head color to match plate finish.
2. Select one of five subparagraphs below. Coordinate with Division 9 Section "Painting."
3. Material for Finished Spaces: 0.04-inch thick, Type 302, satin-finished stainless steel.
4. Material for Finished Spaces: Match Existing for material and finish

    a. Ceiling mounted wall plates to match ceiling color.

5. Material for Unfinished Spaces: Galvanized steel.
6. Weatherproof plates in damp locations (DL): Heavy cast aluminum; hinged, gasketed, equal to Pass & Seymour #4511 for horizontal mount or #4512 for vertical mount. These covers shall be installed outdoors in a location protected from the weather such as roofed open porches, canopies, eves, and the like or in other damp locations where the receptacle will not be subject to beating rain or water run-off.
7. Weatherproof while-in-use plates in wet locations (WP): Self-closing white non-metallic flat flush cover integral to one-piece non-metallic backbox for full recess mounting in building exterior, the integrity of which is not affected when the attachment plug cap is inserted. Equal to Arlington Industries Low Profile In-Box, select box and trim types to coordinate with building materials at installed location.

2.6 FLOOR BOXES

A. Fully Recessed in Concrete Slab-On-Grade: Multi-service floor box with power and communications outlets. Cover prevents entry of water into box and is UL listed for scrub water exclusion.

1. Round PVC Floor Box: Nominal 6” floor box with 8” round cover.

    a. Box Hubs: Two (2) 1-1/2” hubs for communications, two (2) 1” hubs for power, and reducers as required for conduit connections indicated on Drawings.
    b. Box Divider: Isolate power and communications compartments.
    c. Activation Sub-Plate: Two (2) openings for designer-style device frames, black finish.
    d. Cover: Cast aluminum with powder coat finish and carpet flange. Two (2) oversized hinged doors rotate 180 degrees and seat flush with carpet flange in open position.
    e. Power Receptacle: Provide 20 amp receptacle in sub-plate power compartment.
    f. Communications Outlets: Provide device frame for designer-style opening in sub-plate communications compartment. Device frame shall have openings for Owner’s communications outlets, coordinate configuration with Owner’s communications vendor prior to ordering. Device frame shall be blank-off plate.
    g. Wiremold shallow RFB4-SS-OG floor box and S36BBTC flanged cover.

B. Fully Recessed in Structural Floors (Steel Deck Application): Multi-service shallow-depth floor box with power and communications outlets. Coordinate box depth with available concrete topping of structural floor system. Cover prevents entry of water into box and is UL listed for scrub water exclusion.

1. Rectangular Stamped Steel Floor Box: Nominal 10”x13” floor box with 7”x8” rectangular cover, shallow depth of 2-7/16”.

    a. Conduit Knockouts: Multiple sizes ranging from ½” to 1” on each of four sides of box.

b. Box Compartments: Four (4) independent and separated compartments, each equivalent to a single gang opening.
c. Cover: Die-cast aluminum with brushed aluminum finish [plated brass finish] [powder coat black finish], carpet flange, without flooring insert area (smooth flat top). Removable inserts in cover allow for cover lid to be closed and in-use cords to pass through cover.
d. Power Receptacles: Provide two (2) 20A receptacles in power compartments.
e. Communications Outlets: Provide two (2) mounting frames in communications compartments. Mounting frames shall have openings for Owner's communications outlets, coordinate configuration with Owner's communications vendor prior to ordering. Mounting frames shall be blank-off plate.
f. Wiremold shallow RFB4-SS floor box and S36BBTC flanged cover. S36PPTC cover at furniture feed applications.

2.7 FINISHES

A. Color:

1. Match existing device colors.

a. Ceiling mounted devices to match ceiling color.

2.8 CIRCUIT LABELS FOR RECEPTACLES

A. Brother PC clear adhesive with Arial #14 black lettering for normal circuits.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install devices and assemblies plumb and secure.

B. Install wall plates when painting is complete.

C. Arrangement of Devices: Unless otherwise indicated, mount flush, with long dimension vertical, and grounding terminal of receptacles on bottom. Group adjacent switches under single, multigang wall plates.

D. Protect devices and assemblies during painting.

E. Provide a GFCI receptacle for each device indicated on the drawings. Do not connect GFCI receptacles to protect downstream devices.

F. Set floor boxes level and trim after installation to fit flush to finished floor surface.

G. Provide full-capacity external conduit connections between all compartments of multi-service floor boxes. All compartments shall be capable of installed devices regardless of internal wire tunneling arrangement of floor box.

3.2 IDENTIFICATION

A. Comply with Division 26 Section "Basic Electrical Materials and Methods."

1. Switches: Where three or more switches are ganged, and elsewhere as indicated, identify each switch with approved legend engraved on wall plate.
2. Receptacles: Identify serving panelboard and circuit number on faceplate of all receptacles.
3. Conductors Serving Receptacles: Identify serving panelboard and circuit number. Use durable wire markers or tags within outlet boxes.

3.3 CONNECTIONS

A. Connect wiring device grounding terminal to outlet box with bonding jumper.

B. Connect wiring device grounding terminal to branch-circuit equipment grounding conductor.

C. Tighten electrical connectors and terminals according to manufacturers published torque-tightening values.

3.4 FIELD QUALITY CONTROL

A. Test wiring devices for proper polarity and ground continuity.

B. Test GFCI operation with fault simulations according to manufacturer's written instructions.

C. Replace damaged or defective components.

3.5 CLEANING

A. Internally clean devices, device outlet boxes, and enclosures. Replace stained or improperly painted wall plates or devices.

END OF SECTION 262726

SECTION 262816 - DISCONNECT SWITCHES

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 enclosed individually mounted switches and circuit breakers used for the following:

1. Service disconnect switches.
2. Feeder and equipment disconnect switches.
3. Feeder branch-circuit protection.
4. Motor disconnect switches.
5. Elevator feeder switches.

B. Related Sections: The following Sections contain requirements that relate to this Section:

1. Division 26 Section "Wiring Devices" for attachment plugs and receptacles, and snap switches used for disconnect switches.

1.3 SUBMITTALS

A. General: Submit each item in this Article according to the Conditions of the Contract and Division 1 Specification Sections.

B. Product Data: For each type of switch, circuit breaker, accessory, and component indicated. Include dimensions and manufacturers' technical data on features, performance, electrical characteristics, ratings, and finishes. Include data for overcurrent protective device coordination:

1. Descriptive data and time-current curves.
2. Let-through current curves for overcurrent protective devices with current-limiting characteristics.
3. Coordination charts and tables and related data.

C. Shop Drawings: For each switch, circuit breaker, and related equipment.

1. Dimensioned plans, elevations, sections, and details, including required clearances and service space around equipment. Show tabulations of installed devices and accessories, equipment features, and ratings. Include the following:

a. Enclosure types and details.
b. Bus materials, configuration, current, and voltage ratings.
c. Short-circuit current rating of switches and circuit breakers.
d. Descriptive documentation of options or accessories such as auxiliary devices, controls, interlocks, etc.

e. Features, characteristics, ratings, and factory settings of overcurrent protective devices and auxiliary components.
f. Fuse product data for fusible devices.

2. Wiring Diagrams: Diagram power, signal, and control wiring and differentiate between manufacturer-installed and field-installed wiring.

D. Field test results indicating and interpreting test results.

E. Maintenance Data: For switches and circuit breakers to include in operation and maintenance manuals specified in Division 1. In addition to requirements specified in Division 1 Section "Contract Closeout," include the following:

1. Routine maintenance requirements for switches, circuit breakers, and all installed components.
2. Manufacturer's written instructions for testing and adjusting switches and overcurrent protective devices.
3. Time-current curves, including selectable ranges for each type of overcurrent protective device.

1.4 QUALITY ASSURANCE

A. Source Limitations: Obtain switches and circuit breakers from one source and by a single manufacturer.

B. Comply with NFPA 70 for components and installation.

C. Listing and Labeling: Provide switches and circuit breakers specified in this Section that are listed and labeled.

1. The Terms "Listed" and "Labeled": As defined in the National Electrical Code, Article 100.
2. Listing and Labeling Agency Qualifications: A "Nationally Recognized Testing Laboratory" (NRTL) as defined in OSHA Regulation 1910.7.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide switches and circuit breakers by one of the following:

1. Enclosed Disconnect Switches, Enclosed Molded Case Switches, and Enclosed Molded Case Circuit Breakers:

a. General Electric Co.; Electrical Distribution and Control Division.
b. Siemens Energy & Automation, Inc.
c. Square D Co.
d. Eaton Corp.; Cutler-Hammer Products.

2.2 ENCLOSURES

A. Enclosure: NEMA KS 1, Type 1, unless otherwise specified or required to meet environmental conditions of installed location.

1. Outdoor Locations: Type 3R.

2.3 ENCLOSED DISCONNECT SWITCHES

A. Enclosed, Nonfusible Switch: NEMA KS 1, Type HD Heavy Duty, with lockable handle.

B. Enclosed, Fusible Switch, 800 A and Smaller: NEMA KS 1, Type HD Heavy Duty, clips to accommodate specified fuses, enclosure consistent with environment where located, handle lockable with 2 padlocks, and interlocked with cover in CLOSED position.

C. Features and Accessories:

1. Lugs: Mechanical lugs and power-distribution connectors for number, size, and material of conductors indicated.

2.4 FUSES

A. Fuses shall be dual element time delay Bussman Low Peak Class RK-1 or approved equivalent.

PART 3 - EXECUTION

3.1 INSTALLATION

A. All disconnect switches shall be **fused type** unless otherwise indicated on the drawings.

B. Install switches and circuit breakers in locations as indicated, according to manufacturer's written instructions.

C. Install switches and circuit breakers level and plumb.

D. Install wiring between switches and circuit breakers, control, accessories, and indication devices.

E. Connect switches, circuit breakers, and components to wiring system and to ground as indicated and instructed by manufacturer.

1. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values.

3.2 IDENTIFICATION

A. Identify field-installed conductors, interconnecting wiring, and components; provide warning signs as specified in Division 26 Section "Basic Electrical Materials and Methods."

B. Switch and Circuit-Breaker Nameplates: Label each switch and circuit breaker with engraved metal or laminated-plastic nameplate mounted with corrosion-resistant screws.

3.3 FIELD QUALITY CONTROL

A. Testing: After installing switches and circuit breakers and after electrical circuitry has been energized, demonstrate product capability and compliance with requirements.

1. Procedures: Perform each visual and mechanical inspection and electrical test stated in NETA ATS, Section 7.5 for disconnect switches and Section 7.6 for molded-case circuit breakers. Certify compliance with test parameters.

B. Correct malfunctioning units on-site, where possible, and retest to demonstrate compliance; otherwise, remove and replace with new units and retest.

3.4 ADJUSTING

A. Set field-adjustable switches and circuit-breaker trip ranges as indicated.

3.5 CLEANING

A. After completing system installation, including outlet fittings and devices, inspect exposed finish. Remove burrs, dirt, and construction debris and repair damaged finish including chips, scratches, and abrasions.

END OF SECTION 262816

SECTION 263213 - PACKAGED ENGINE GENERATORS

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 packaged diesel-engine generator sets with the following features and accessories:

1. Battery charger.
2. Starting battery.
3. Sub-Base fuel tank.
4. Engine-generator set.
5. Muffler.
6. Outdoor enclosure with sound attenuation.
7. Remote annunciator.
8. Remote stop switch.
9. Transfer switch.

B. General description of unit:

1. Unit supports optional standby loads in the EOC space.

a. 60 kW Diesel engine generator, 208/120 V 3 phase, 4 wire output
b. Sub-base fuel tank with 24 hours of fuel supply at full load
c. FEMA/ICC500 Exterior weather protective housing with sound attenuation
d. 225/3 main circuit breaker
e. Transfer switches

1) 225 amp 4 pole, 208/120 V, NEMA 1

1.3 SUBMITTALS

A. For packaged engine generator and accessories, the manufacturer shall provide six (6) sets of printed literature describing the standard series of equipment specified, including performance data and environmental requirements.

1. Indicate fabrication details, dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
2. Shop Drawing Dimensioned outline plan and elevation drawings of engine generator set and other components specified.
3. Wiring Diagrams: Detail wiring for power and control connections and differentiate between factory-installed and field-installed wiring.
4. Transfer switches.

B. Field Test and Observation Reports: Indicate and interpret test results and inspection records relative to compliance with performance requirements.

C. Field test report of tests specified in Part 3.

D. Operations and Maintenance Manuals: For each packaged engine generator and accessories to include in maintenance manuals. The manufacturer shall supply three (3) complete sets of printed literature containing diagrams, part number lists, and description sufficient for the owners' personnel to operate the equipment and perform normal maintenance.

1. Include the following:

a. List of tools and replacement items recommended to be stored at the Project for ready access. Include part and drawing numbers, current unit prices, and source of supply.
b. Detail operating instructions for both normal and abnormal conditions.

E. Test Reports:

1. Report of factory test on units to be shipped for this Project, showing evidence of compliance with specified requirements.
2. Report of sound generation.
3. Report of exhaust emissions showing compliance with applicable regulations.
4. Field quality-control test reports.

F. Operation and Maintenance Data: For packaged engine generators 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. List of tools and replacement items recommended to be stored at the Project for ready access. Include part and drawing numbers, current unit prices, and source of supply.
2. Detail operating instructions for both normal and abnormal conditions.

G. Warranty: Special warranty specified in this Section.

1.4 QUALITY ASSURANCE

A. Manufacturer Qualifications: Maintain a service center capable of emergency maintenance and repairs at the Project with eight hours' maximum response time.

B. Source Limitations: Obtain packaged engine generator and auxiliary components specified in this Section through one source from a single manufacturer.

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.

D. Comply with NFPA 37.

E. Comply with NFPA 70.

F. Comply with NFPA 99.

G. Comply with NFPA 110 requirements for Level 1 emergency power supply system.

H. Engine Exhaust Emissions: Comply with applicable state and local government requirements.

I. Noise Emission: Comply with applicable state and local government requirements other for maximum noise level at adjacent property boundaries due to sound emitted by generator set including engine, engine exhaust, engine cooling-air intake and discharge, and other components of installation.

1.5 COORDINATION

A. Coordinate size and location of concrete bases.

B. Coordinate wire counts and connection locations with reviewed shop drawings.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver engine generator set and system components to their final locations in protective wrappings, containers, and other protection that will exclude dirt and moisture and prevent damage from construction operations. Remove protection only after equipment is safe from such hazards.

B. The supplier will be responsible for off-loading the generator onto concrete pad at the job site. Furnish all necessary rigging equipment and labor. Coordinate delivery time with owner and electrical contractor.

1.7 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of packaged engine generators and associated auxiliary components that fail in materials or workmanship within specified warranty period.

1. Warranty Period: Two years from date of Substantial Completion.

1.8 MAINTENANCE SERVICE

A. Initial Maintenance Service: Beginning at Substantial Completion, provide 12 months' full maintenance by skilled employees of manufacturer's designated service organization. Include quarterly exercising to check for proper starting, load transfer, and running under load. Include routine preventive maintenance as recommended by manufacturer and adjusting as required for proper operation. Include annual lube oil and filter replacement. Maintenance agreements shall include parts and supplies as used in manufacture and installation of original equipment.

1.9 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. Fuses: One for every 10 of each type and rating, but not less than one of each.
2. Indicator Lamps: Two for every six of each type used, but not less than two of each.
3. Filters: One set each of lubricating oil, fuel, and combustion-air filters.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Caterpillar; Engine Div.
2. Cummins Power Generation.
3. Kohler Power Systems.

2.2 ENGINE-GENERATOR SET

A. Packaged engine-generator set shall be a coordinated assembly of compatible components.

B. Power Output Ratings: Nominal ratings as indicated, with capacity as required to operate as a unit as evidenced by records of prototype testing.

C. Output Connections: Three phase, four wire.

D. Provide unit with suitable vibration isolators and mount on structural steel base.

2.3 GENERATOR-SET PERFORMANCE FOR SENSITIVE LOADS

A. Oversizing generator compared with the rated power output of the engine is permissible to meet specified performance.

1. Nameplate Data for Oversized Generator: Show ratings required by the Contract Documents rather than ratings that would normally be applied to generator size installed.

B. Steady-State Voltage Operational Bandwidth: 1 percent of rated output voltage from no load to full load.

C. Steady-State Voltage Modulation Frequency: Less than 1 Hz.

D. Transient Voltage Performance: Not more than 20 percent variation for 50 percent step-load increase or decrease. Voltage shall recover and remain within the steady-state operating band within 3 second.

E. Steady-State Frequency Operational Bandwidth: Plus or minus 0.25 percent of rated frequency from no load to full load.

F. Steady-State Frequency Stability: When system is operating at any constant load within the rated load, there shall be no random speed variations outside the steady-state operational band and no hunting or surging of speed.

G. Transient Frequency Performance: Less than 3-Hz variation for a 50 percent step-load increase or decrease. Frequency shall recover and remain within the steady-state operating band within three seconds.

H. Output Waveform: At no load, harmonic content measured line to neutral shall not exceed 2 percent total with no slot ripple. The telephone influence factor, determined according to NEMA MG 1, shall not exceed 50 percent.

I. Sustained Short-Circuit Current: For a 3-phase, bolted short circuit at system output terminals, the system shall supply a minimum of 300 percent of rated full-load current for not less than 10 seconds and then clear the fault automatically, without damage to winding insulation or other generator system components.

J. Excitation System: Performance shall be unaffected by voltage distortion caused by nonlinear load.

K. Start Time: Comply with NFPA 110, Type 10, system requirements.

2.4 SERVICE CONDITIONS

A. Environmental Conditions: Engine-generator system shall withstand the following environmental conditions without mechanical or electrical damage or degradation of performance capability:

1. Ambient Temperature: Minus 15 to plus 40 deg C.
2. Altitude: Lincoln, NE

2.5 ENGINE

A. Fuel: Fuel oil, Grade DF-2

B. Rated Engine Speed: 1800 rpm.

C. Maximum Piston Speed for Four-Cycle Engines: 2250 fpm (11.4 m/s).

D. Lubrication System: The following items are mounted on engine or skid:

1. Filter and Strainer: Rated to remove 90 percent of particles 5 micrometers and smaller while passing full flow.
2. Thermostatic Control Valve: Control flow in system to maintain optimum oil temperature. Unit shall be capable of full flow and is designed to be fail-safe.
3. Crankcase Drain: Arranged for complete gravity drainage to an easily removable container with no disassembly and without use of pumps, siphons, special tools, or appliances.

E. Engine Fuel System:

1. Main Fuel Pump: Mounted on engine. Pump ensures adequate primary fuel flow under starting and load conditions.

F. Coolant Jacket Heater: Electric-immersion type, factory installed in coolant jacket system. Comply with NFPA 110 requirements for Level 1 equipment for heater capacity.

2.6 GOVERNOR

A. Type: Adjustable isochronous, with speed sensing.

2.7 ENGINE COOLING SYSTEM

A. Description: Closed loop, liquid cooled, with radiator factory mounted on engine-generator-set mounting frame and integral engine-driven coolant pump.

B. Radiator: Rated for specified coolant.

C. Coolant: Solution of 50 percent ethylene-glycol-based antifreeze and 50 percent water, with anticorrosion additives as recommended by engine manufacturer.

D. Temperature Control: Self-contained, thermostatic-control valve modulates coolant flow automatically to maintain optimum constant coolant temperature as recommended by engine manufacturer.

E. Coolant Hose: Flexible assembly with inside surface of nonporous rubber and outer covering of aging-, ultraviolet-, and abrasion-resistant fabric.

1. Rating: 50-psig (345-kPa) maximum working pressure with coolant at 180 deg F (82 deg C), and noncollapsible under vacuum.
2. End Fittings: Flanges or steel pipe nipples with clamps to suit piping and equipment connections.

2.8 FUEL SUPPLY SYSTEM

A. Double wall Sub-Base-Mounted Fuel Oil Tank, 150 Gallon (24 hours): Factory-installed and -piped, listed and labeled fuel oil tank as part of the enclosure. Features include the following:

1. Tank level indicator.
2. Capacity: As specified under General Description of units.
3. Vandal-resistant fill cap.
4. Conduit stub-up area.
5. Low fuel alarm and leak detector contacts.
6. Mechanical gauge.
7. Drain, supply and return ports, and vents as required.
8. Tank shall be UL 142 listed and meet requirements of NFPA 37.

B. Fuel/water separator fuel filters and flexible fuel lines.

C. Heaters: Fuel tank heaters, thermostatically controlled, 2000 watts at 208 volt single phase or as sized by the manufacturer.

2.9 ENGINE EXHAUST SYSTEM

A. Muffler: Critical type, sized as recommended by engine manufacturer; sound level measured at a distance of 10 feet (3 m) from exhaust discharge shall be 85 dBA or less.

2.10 COMBUSTION-AIR INTAKE

A. Description: Heavy-duty, engine-mounted air cleaner with replaceable dry-filter element and "blocked filter" indicator.

2.11 STARTING SYSTEM

A. Description: 12 or 24-V electric, with negative ground and including the following items:

1. Components: Sized so they will not be damaged during a full engine-cranking cycle with ambient temperature at maximum specified in "Environmental Conditions" Paragraph in "Service Conditions" Article.
2. Cranking Motor: Heavy-duty unit that automatically engages and releases from engine flywheel without binding.
3. Cranking Cycle: As required by NFPA 110 for system level specified.
4. Battery: Adequate capacity within ambient temperature range specified in "Environmental Conditions" Paragraph in "Service Conditions" Article to provide specified cranking cycle at least three times without recharging.
5. Battery Cable: Size as recommended by engine manufacturer for cable length indicated. Include required interconnecting conductors and connection accessories.
6. Battery-Charging Alternator: Factory mounted on engine with solid-state voltage regulation and 35-A minimum continuous rating.
7. Battery Charger: Current-limiting, automatic-equalizing and float-charging type. Unit shall comply with UL 1236 and include the following features:

a. Operation: Equalizing-charging rate of 10 A shall be initiated automatically after battery has lost charge until an adjustable equalizing voltage is achieved at battery terminals. Unit shall then be automatically switched to a lower float-charging mode and shall continue to operate in that mode until battery is discharged again.
b. Automatic Temperature Compensation: Adjust float and equalize voltages for variations in ambient temperature from minus 40 deg C to plus 60 deg C to prevent overcharging at high temperatures and undercharging at low temperatures.
c. Automatic Voltage Regulation: Maintain constant output voltage regardless of input voltage variations up to plus or minus 10 percent.
d. Ammeter and Voltmeter: Flush mounted in door. Meters shall indicate charging rates.
e. Safety Functions: Sense abnormally low battery voltage and close contacts providing low battery voltage indication on control and monitoring panel. Sense high battery voltage and loss of ac input or dc output of battery charger. Either condition shall close contacts that provide a battery-charger malfunction indication at system control and monitoring panel.
f. Enclosure and Mounting: NEMA 250, Type 1, wall-mounted cabinet, within exterior generator housing, within transfer switch.

2.12 CONTROL AND MONITORING

A. Functional Description: When mode-selector switch on the control and monitoring panel is in the automatic position, remote-control contacts in one or more separate automatic transfer switches initiate starting and stopping of the generator set. When mode-selector switch is switched to the on position, the generator set starts. The off position of the same switch initiates generator-set shutdown. When generator set is running, specified system or equipment failures or derangements automatically shut down the generator set and initiate alarms. Operation of a remote emergency-stop switch also shuts down the generator set.

B. Configuration: Operating and safety indications, protective devices, basic system controls, and engine gages shall be grouped in a common control and monitoring panel mounted on the generator set. Mounting method shall isolate the control panel from generator-set vibration.

C. Indicating and protective devices and controls shall include those required by NFPA 110 for a Level 1 system, and the following:

D. Indicating and Protective Devices and Controls:

1. Unit equipped with Control Panel with the following features

a. Microprocessor-based control of engine and alternator functions
b. Digital fault codes
c. Analog or digital display panel
d. UL 508 listed; meets NFPA 110 for level 1 systems
e. Adjustable time delay start and stop

2. Selector Switches

a. Run-Off-Auto Switch
b. Emergency Stop Switch
c. Reset Switch
d. Menu Switch
e. Voltmeter/Ammeter phase selector switch with phase and scale indicating lamps
f. Panel lights switch, with 10 minute auto switch off

3. Display-AC Alternator Data

a. AC Voltage Line to Line
b. AC Voltage Line to Neutral
c. AC Current by Phase
d. AC Kilowatts
e. AC Kilowatt Hours
f. AC Power Factor

4. Display-Engine Data

a. Engine Oil Pressure
b. Engine Coolant Temperature
c. Engine Oil Temperature
d. Engine RPM
e. DC Battery Voltage
f. Engine Running Hours

5. Shutdown Functions (Failure)-Engine Shutdowns

a. Low Oil Pressure Fault
b. Low Coolant Level Fault
c. High Engine Temperature Fault
d. Overspeed Fault
e. Fail to Crank Fault
f. Overcrank Fault
g. Magnetic Pickup Failure
h. Emergency Stop Fault

6. Shutdown Functions (Failure)-AC Alternator Shutdowns

a. AC Undervoltage Fault
b. AC Overvoltage Fault
c. Underfrequency Fault
d. Alternator Over Current
e. Alternator Short Circuit Fault

7. Warning Functions (Pre-Alarm)

    a. Low Oil Pressure
    b. High Engine Temperature
    c. Oil Pressure Sender Failure
    d. Engine Temperature Sender Failure
    e. Alternator Over Current
    f. Low Engine Temperature
    g. Engine Overload, with load shed contacts
    h. Low Fuel Level
    i. Low Battery Voltage
    j. High Battery Voltage
    k. Weak Battery
    l. Generator main breaker open
    m. Up to 3 customer inputs

E. Supporting Items: Include sensors, transducers, terminals, relays, and other devices and include wiring required to support specified items. Locate sensors and other supporting items on engine or generator, unless otherwise indicated.

F. Connection to Data Link: Provide Modbus protocol network communications.

G. Remote Annunciator Panel – NFPA 110 Solid State: NFPA-110 requirements for remote annunciation shall be satisfied by a remote mounted solid state panel which includes a common red indicating light and silenceable alarm horn to annunciate all alarms and shutdowns provided by the generator set control panel when equipped with the NFPA-110 alarm module. This panel shall include a 12 light remote annunciator.

    a. Run (green)
    b. Overcrank shutdown (red)
    c. Overspeed shutdown (red)
    d. High coolant temperature shutdown (red)
    e. Low oil-pressure shutdown (red)
    f. High coolant temperature pre-warning (yellow)
    g. Low oil pressure pre-warning (yellow)
    h. Low coolant temperature (yellow)
    i. Generator set not in auto (flashing red)
    j. Low fuel supply (yellow)
    k. Two customer selected faults (red)

H. **Remote Emergency-Stop Switch** – Flush; wall mounted, unless otherwise indicated; and labeled. Push button shall be protected from accidental operation.

2.13 GENERATOR OVERCURRENT AND FAULT PROTECTION

A. Generator Circuit Breaker: Molded-case, thermal-magnetic type; 100 percent rated; complying with NEMA AB 1 and UL 489.

1. Tripping Characteristic: Designed specifically for generator protection.
2. Trip Rating: Matched to generator rating.
3. Shunt Trip: Battery voltage operated and connected to trip breaker when generator set is shut down by other protective devices.
4. Mounting: Adjacent to or integrated with control and monitoring panel.

2.14 GENERATOR, EXCITER, AND VOLTAGE REGULATOR

A. Comply with NEMA MG 1 and specified performance requirements.

B. Drive: Generator shaft shall be directly connected to engine shaft. Exciter shall be rotated integrally with generator rotor.

C. Electrical Insulation: Class H

D. Stator-Winding Leads: Brought out to terminal box to permit future reconnection for other voltages if required.

E. Construction shall prevent mechanical, electrical, and thermal damage due to vibration, overspeed up to 125 percent of rating, and heat during operation at 110 percent of rated capacity.

F. Excitation shall use no slip or collector rings, or brushes, and shall be arranged to sustain generator output under short-circuit conditions as specified.

G. Enclosure: Dripproof.

H. Votage Regulator: Solid-state type, separate from exciter, providing performance as specified.

1. Adjusting rheostat on control and monitoring panel shall provide plus or minus 5 percent adjustment of output-voltage operating band.

I. Strip Heater: Thermostatically controlled unit arranged to maintain stator windings above dew point.

J. Windings: Two-thirds or optimum pitch stator winding and fully linked amortisseur winding.

K. Subtransient Reactance: 12 percent, maximum.

L. PMG (Permanent Magnetic Generator) for increased motor starting ability and immunity from non-linear loads.

2.15 OUTDOOR GENERATOR-SET ENCLOSURE

A. Description: Vandal-resistant, sound attenuated, weather protective enclosure, wind resistant up to 250 MPH, ICC 500 / FEMA compliant. Multiple panels shall be lockable and provide adequate access to components requiring maintenance. Panels shall be removable by one person without tools. Instruments and control shall be mounted within enclosure.

B. Description: Prefabricated or preengineered enclosure with the following features:

1. 6” steel reinforced concrete walls and roof panel.
2. 8” waffle profile steel reinforced concerete floor.
3. FEMA 361 rated door hardware

C. Engine Cooling Airflow through Enclosure: Maintain temperature rise of system components within required limits when unit operates at 110 percent of rated load for 2 hours with ambient temperature at top of range specified in system service conditions.

D. Interior Lights with Switch: Factory-wired, vaporproof-type fixtures within housing; arranged to illuminate controls and accessible interior. Arrange for external electrical connection.

E. Convenience Outlets: Factory wired. Arrange for external electrical connection.

2.16 FINISHES

A. Indoor and Outdoor Enclosures and Components: Manufacturer's standard enamel over corrosion-resistant pretreatment and compatible standard primer.

2.17 TRANSFER SWITCHES

A. Ratings:

1. Transfer switch shall be UL listed per Standard 1008, CSA Certified, and rated for total system load. Transfer switch supplied shall be suitable for use on emergency and legally required standby systems in accordance with National Electrical Code and NFPA 99.
2. Transfer switch shall be 60 hertz. Main power switch contacts shall be rated for 600 volts AC minimum on transfer switches 40 through 1200 amperes.
3. Transfer switch shall be contactor type (NEMA Type A, IEC Type PC) and shall be rated to carry 100 percent of rated current continuously in the enclosure. Transfer switches using integral circuit breakers which require derating in enclosures do not meet this specification.
4. Transfer switch shall be rated for continuous operation in ambient temperatures of -40 degrees C (-40 degrees F) to +50 degrees C (+122 degrees F), relative humidity of up to 95% (non-condensing), and altitudes of up to 10,000 feet.
5. Transfer switch shall have minimum withstand and closing ratings (RMS symmetrical amperes) as required for the available fault currents shown on the drawings. These ratings shall be obtained without contact welding. These fault current ratings shall be verified by UL witnessed test on representative test samples and shall be the ratings listed in the UL listing or component recognition procedures for the transfer switch supplied.
6. Withstand and closing rating shall be suitable for 65,000 amperes available fault current when used with molded case circuit breakers.

B. Construction:

1. Transfer switch shall be double-throw construction, positively electrically and mechanically interlocked by a mechanical beam to prevent simultaneous closing (for break before make operation), and mechanically held in both normal and emergency positions. Transfer switches using electrical interlocking and make before break closed transition do not meet this specification.
2. Transfer switch shall not contain any integral overcurrent devices in the main power circuit, including molded case circuit breakers or fuses.
3. Manual operating handles and all control switches shall be accessible to authorized personnel only by opening the lockable door.
4. Transfer switch shall be equipped with direct acting linear operators for simple, reliable and fast acting transfer during automatic operation.
5. Switch shall have cover which allows visual determination of main contact position.
6. Main switch contacts shall be high-pressure silver alloy contacts to resist burning and pitting for long life operation. Switch shall have arc chutes of heat absorbing material and metal leaves for positive extinguishing of arcs. Arc chutes shall have insulating covers to prevent interphase flashover.
7. Transfer switches shall have one Form C, 10 Amp 250 Volt AC auxiliary switch on both normal and emergency sides, operated by the transfer switch. These switches shall be factory wired to an easy access terminal block and shall be used to monitor transfer switch position for controlling indicator lights or other peripheral equipment.

8. Complete AL-CU lugs, UL listed and CSA certified, shall be provided for normal, emergency, and load positions. Wiring bending space at normal, emergency, load, and neutral lugs inside the switch cabinets shall comply with NEC Article 373.
9. Transfer switch shall be mounted in separate UL listed, NEMA 1 **[3R]** cabinet with key-locking front door.

C. Automatic Controls:

1. Control shall be mounted inside of main lockable cabinet door, to allow for ease of service access. Control disconnect plugs shall be provided to de-energize control circuits to avoid shock hazard while making control adjustments. The solid-state voltage sensors and time delay modules shall be plug-in circuit boards with gold contacts for ease of service. The control shall be designed for a high level of immunity to power line surges and transients and tested to IEEE Standard 587-1980. The control shall have optically isolated logic inputs, high isolation transformers for AC inputs, and relays on all outputs.
2. Solid-state undervoltage sensors shall simultaneously monitor all phases of the normal source and all phases of the emergency source to provide adjustable range sensors for field adjustment for specific application needs. Pick-up setting shall be adjustable from minimum of 85% to maximum of 98% of nominal voltage. Dropout settings shall be adjustable from minimum of 75% to maximum of 98% of pick-up setting with fixed dropout time delay of 0.5 seconds. Voltage sensors shall be temperature compensated over the temperature range of -25 degrees F (-32 degrees C) to +175 degrees F (+79 degrees C). Voltage sensors shall allow for adjustment to sense partial loss of voltage on any phase of normal or emergency source, even where motor feedback voltages exist.
3. Controls shall signal the engine-generator set to start upon signal from normal source voltage sensors. Solid-state time delay start, adjustable from 0 to 15 seconds shall avoid nuisance start-ups on momentary voltage dips for momentary interruptions.
4. Switch shall transfer the load to the emergency power system after the generator set reaches proper voltage and frequency. Solid-state time delay transfer, adjustable from 2 to 120 second shall allow the engine-generator set to stabilize before application of load.
5. The transfer switch shall control the generator set to allow the engine-generator set to start and transfer load within 10 seconds after the normal source power failure. It shall be the responsibility of the supplier of the emergency power system that this requirement is met.
6. Switch shall retransfer the load to the normal source after normal power restoration. Solid-state time delay retransfer, adjustable from 0 to 30 minutes shall allow normal power to stabilize before retransfer and shall allow staggered retransfer of loads to multiple transfer switch systems.
7. Controls shall signal the engine-generator set to stop after load retransfer to normal source. Solid-state time delay stop, adjustable from 0 to 10 minutes shall maintain availability of emergency source in event that normal source fails shortly after retransfer and shall permit engine to run unloaded for cool down before shut down.
8. The operating power for transfer and retransfer shall be obtained from the source to which the load is being transferred. Controls shall provide an automatic retransfer of the load from emergency source to normal source if emergency source fails when normal source is available.
9. Controls shall provide built-in control mode status indicators, consisting of light emitting diodes to indicate functions the following:

    a. Source 1 OK
    b. Start Gen Set
    c. Source 2 OK
    d. Transfer Timing
    e. Transfer Complete
    f. Retransfer Timing
    g. Retransfer Complete
    h. Timing for Stop

10. These indicators shall allow the operator to determine that the controls are properly sequencing and shall assist in determining sequence of any malfunctions that might occur.
11. Start contacts for the engine control shall be gold type, dry contacts wired to easy access terminal block and compatible with the generator set control equipment furnished.

D. Front Panel Devices:

1. Provide devices mounted inside main cabinet door consisting of switch position indicator lamps (NORMAL and EMERGENCY), normal source available (green), emergency source available (red), and a selector switch to provide the following positions and functions:

   a. TEST - Simulated normal power loss to control unit for testing of generator set, including transfer of load. Controls shall provide for a system test without load transfer. Controls shall include provisions to automatically return the system to the normal power source if the generator set fails during any test or exercise period.
   b. NORMAL - This is a normal operating position and it restores the load to the normal source after test and after time delays.
   c. RETRANSFER - Momentary position to override retransfer time delay and cause immediate return to normal source after test or actual outage.

E. Accessory Items:

1. Digital exercise clock installed in the **largest** transfer switch. Provide with/without load tester switch.

F. Transfer switch shall be provided with the following additional equipment, all installed in the transfer switch enclosure:

1. Automatic adjustable low voltage sensors, all lines, normal side
2. Automatic adjustable low voltage sensors, all lines, emergency side
3. Automatic adjustable time delay on start, stop, transfer and retransfer
4. Manual operators
5. Program transition phase angle protection system or delayed neutral transfer position.
6. Auxiliary contacts, both normal and emergency
7. Volt, amp and frequency meters with phase selector switch, installed; meters are capable monitoring both the normal and emergency sources when CT’s are installed on the load side of the transfer switch
8. Phase rotation monitoring
9. Phase imbalance monitoring
10. Source available lights
11. Normal/emergency switch position lights

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas, equipment bases, and conditions, with Installer present, for compliance with requirements for installation and other conditions affecting packaged engine-generator performance.

B. Examine roughing-in of piping systems and electrical connections. Verify actual locations of connections before packaged engine-generator installation.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PERMITS

A. Provide all required fuel permits for the State of Nebraska, Lancaster County, and the City of Lincoln.

3.3 CONCRETE BASES

A. Coordinate size and location of concrete bases.

B. Provide helical pier foundation designed for 250 MPH wind load.

3.4 INSTALLATION

A. Conductors: All conductors connected to the generator shall be stranded. Use short sections of flexible metal conduit for attachment of conduit to generator or stub up conduits in designated conduit stub up area. Ductseal all underground conduits after conductor installation.

B. Comply with packaged engine-generator manufacturers' written installation and alignment instructions and with NFPA 110.

C. Install packaged engine generators level on concrete base.

D. Install packaged engine generator to provide access, without removing connections or accessories, for periodic maintenance.

E. Electrical Wiring: Install electrical devices furnished by equipment manufacturers but not specified to be factory mounted.

3.5 CONNECTIONS

A. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values.

3.6 IDENTIFICATION

A. Identify system components according to Basic Electrical Materials and Methods.

3.7 FLUID FILL

A. Electrical contractor shall provide initial fuel fill and refill system after testing is complete. Supplier shall provide and all other fluid fills.

3.8 FIELD QUALITY CONTROL

A. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust field-assembled components and equipment installation, including connections, and to assist in field testing. Report results in writing.

B. Perform the following field tests and inspections and prepare test reports:

1. Perform tests recommended by manufacturer.
2. NFPA 110 Acceptance Tests: Perform tests required by NFPA 110.
3. Battery Tests: Equalize charging of battery cells according to manufacturer's written instructions. Record individual cell voltages.

    a. Measure charging voltage and voltages between available battery terminals for full-charging and float-charging conditions. Check electrolyte level and specific gravity under both conditions.
    b. Test for contact integrity of all connectors. Perform an integrity load test and a capacity load test for the battery.
    c. Verify acceptance of charge for each element of the battery after discharge.
    d. Verify that measurements are within manufacturer's specifications.

4. Battery-Charger Tests: Verify specified rates of charge for both equalizing and float-charging conditions.
5. System Integrity Tests: Methodically verify proper installation, connection, and integrity of each element of engine-generator system before and during system operation. Check for air, exhaust, and fluid leaks.
6. Acceptance Load Testing:

    a. The genset supplier and the Electrical Contractor shall have joint responsibility for acceptance load testing of the emergency power generating system. All testing will be done at the convenience of the Owner and may be performed during non-business hours or on weekends. The Engineer shall be notified of the test a minimum of seven (7) days prior to testing. The genset supplier and the Electrical Contractor shall be responsible for providing as many tests as required to demonstrate proper system operation to the satisfaction of the Owner and Engineer.
    b. The system shall be complete and ready for load testing prior to test start-up.
    c. The test shall be performed through the use of resistive load banks. The load banks shall be connected to load side of the generator control panel breaker for testing. A minimum of 40 KW of load banks shall be provided.
    d. Block loading of the generation system shall be performed as follows:

Load	Duration
50%	1hours
75%	1 hours
100%	2 hours

    e. A recording meter shall be provided by the generator supplier to read and provide hard copy records of the following data:

        1) Transient responses including:

            a) Voltage dips
            b) Frequency dips
            c) Recovery time period

7. At the completion of the acceptance load test, a complete building load test in compliance with NFPA 110 shall be conducted.

a. Open transition testing: With the building load operating at normal, initiate a power failure by disconnecting the normal power supply to the facility. Monitor and record required test information as specified in NFPA 110 for voltage frequency and paralleling operation. Monitor battery charge rate at 5 minute intervals for the first 15 minutes and 15 minute intervals thereafter. Continue monitoring and recording load test for 2 hours noting any abnormal resultant effects on voltage, frequency and current from load changes. After the 2 hour running test, return normal power to the facility and record the time delays to retransfer and engine-generator shutdown. Wait for 5 minutes after shutdown and immediately initiate another normal power failure. Immediately upon reaching rated frequency, apply full rated nameplate kW (facility load with supplemental load bank if required) in one step. Record all test data as specified earlier, operate the engine-generator at nameplate kW for one hour noting any abnormal voltage, current or frequency changes. System supplier shall provide lube oil, 50% solution of ethylene glycol, initial fill of diesel fuel and refill of fuel after test.

b. Utility paralleling test (To be witnessed by engineer and power company): With the building load operating at normal, initiate the starting of the generator, and parallel with utility and export power to utility grid Monitor and record required test information as specified in NFPA 110 for voltage frequency and paralleling operation. Monitor battery charge rate at 5 minute intervals for the first 15 minutes and 15 minute intervals thereafter. Continue monitoring and recording load test for 2 hours noting any abnormal resultant effects on voltage, frequency and current from load changes. After the 2 hour running test, return normal power to the facility and record the time delays to retransfer and engine-generator shutdown. Record all test data as specified earlier, operate the engine-generator at nameplate kW for one hour noting any abnormal voltage, current or frequency changes. System supplier shall provide lube oil, 50% solution of ethylene glycol, initial fill of diesel fuel and refill of fuel after test.

8. Test reports shall be submitted to the Engineer and shall be included with the operations and maintenance manuals.

C. Coordinate tests with tests for transfer switches and run them concurrently.

D. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

E. Retest: Correct deficiencies identified by tests and observations and retest until specified requirements are met.

F. Report results of tests and inspections in writing. Record adjustable relay settings and measured insulation resistances, time delays, and other values and observations. Attach a label or tag to each tested component indicating satisfactory completion of tests.

3.9 STARTUP SERVICE

A. Engage a factory-authorized service representative to perform startup service.

B. Inspect field-assembled components and equipment installation, including piping and electrical connections. Report results in writing.

C. Complete installation and startup checks according to manufacturer's written instructions.

3.10 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain packaged engine generators.

1. Coordinate this training with that for transfer switches.
2. Train Owner's maintenance personnel on procedures and schedules for starting and stopping, troubleshooting, servicing, and maintaining equipment.
3. Review data in maintenance manuals.
4. Schedule training with Owner, through Engineer, with at least seven days' advance notice.
5. Instruction Period: After the test is completed, the supplier shall provide four (4), one (1) hour classes to the owner pertaining to general maintenance inspection and testing of the entire system.

END OF SECTION 263213

SECTION 264313 – SURGE PROTECTIVE DEVICES (SPD'S)

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes permanently installed, factory or field mounted, 1kV or less surge protective device (SPD) equipment.

1.3 DEFINITIONS

A. Type 1 SPD: Referred to as secondary surge arrestors prior to the 2008 NEC. These devices are designed for installation on the line side of the service entrance disconnect and must have integrated overcurrent protection.

B. Type 2 SPD: Referred to as hardwired transient voltage surge suppressors (TVSS) prior to the 2008 NEC. These devices are designed for installation at any location on the load side of the service disconnect. External overcurrent protection is allowed.

C. Type 4 SPD: SPD components intended to be part of a complete SPD.

D. VPR: Voltage protection rating.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product indicated. Include rated capacities, operating weights, electrical characteristics, furnished specialties, and accessories.

1.5 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For SPD devices to include in emergency, operation, and maintenance manuals.

1.6 QUALITY ASSURANCE

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a testing agency, and marked for intended location and application.

B. Comply with IEEE C62.41.2 and test devices according to IEEE C62.45.

C. Comply with UL 1283 2nd Edition.

D. Comply with UL 1449 3rd Edition.

E. Comply with NFPA 70, 2008 Edition.

1.7 PROJECT CONDITIONS

A. Service Conditions: Rate SPDs for continuous operation under the following conditions unless otherwise indicated:

1. Maximum Continuous Operating Voltage: Not less than 125 percent of nominal system operating voltage.
2. Operating Temperature: 30 to 120 deg F.
3. Humidity: 0 to 85 percent, noncondensing.
4. Altitude: Less than 20,000 feet above sea level.

1.8 COORDINATION

A. Coordinate location of field-mounted SPDs to allow adequate clearances for maintenance.

1.9 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of surge suppressors that fail in materials or workmanship within specified warranty period.

1. Warranty Period: Ten years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Designed for integration into selected switchgear/switchboard/panelboard manufacturer’s equipment.

1. Panel arrangement allowing maximum lead length to phase, neutral, and ground bus connection points of 8”.

B. Subject to compliance with requirements, provide product by one of the following:

1. Advanced Protection Technologies, Inc. (APT).
2. Cutler-Hammer; Eaton Business Unit.
3. GE Zenith.
4. Innovative Technology; Eaton Business Unit.
5. LEA International.
6. Liebert; Emerson Network Power Business Unit.
7. Siemens.
8. Surgelogic/Square D; Schneider Electric Business Unit.

C. SPDs for Non-Service Entrance Equipment Locations (Secondary Protection)

1. UL listed to UL 1449 3rd Edition
2. Type 1 (installed downstream of main breaker) or Type 2.
3. 20kA nominal discharge (In).
4. Short-circuit current rating (SCCR) complying with UL 1449, and matching or exceeding the connected equipment short-circuit rating and.
5. 7 modes of protection (L-N, L-G, N-G).
6. Peak surge current rating: 100kA per phase.
7. VPR: Not to exceed 700V for 208Y/120V systems, 1200V for 480Y/277V systems.
8. System voltage: match connected equipment.
9. EMI/RFI noise rejection filter: Noise attenuation of 50 dB from 10 kHz to 100 MHz using the MIL-STD-220A insertion loss test method.
10. LED indicator lights for power and protection status.
11. Audible alarm, with silencing switch, to indicate when protection has failed.
12. Form-C contacts rated at 5 A and 250-V ac, one normally open and one normally closed, for remote monitoring of protection status. Contacts shall reverse on failure of any surge diversion module or on opening of any current-limiting device. Coordinate with building power monitoring and control system.

2.2 ENCLOSURES

A. Indoor Enclosures: NEMA 250 Type 1

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install SPD devices for panelboards and auxiliary panels with conductors or buses between suppressor and points of attachment as short and straight as possible. Do not exceed manufacturer's recommended lead length. Do not bond neutral and ground.

1. Comply with manufacturer's written recommendation for conductor and circuit-breaker size for connecting SPD devices to distribution system.

B. Tests and Inspections:

1. Perform each visual and mechanical inspection and electrical test stated in NETA ATS, "Surge Arresters, Low-Voltage Surge Protection Devices" Section. Certify compliance with test parameters.
2. After installing SPD devices but before electrical circuitry has been energized, test for compliance with requirements.
3. Complete startup checks according to manufacturer's written instructions.
4. Coordinate with commissioning agent. Supply requested product documentation.

C. SPD device will be considered defective if it does not pass tests and inspections.

D. Prepare test and inspection reports.

3.2 STARTUP SERVICE

A. Do not energize or connect panelboards to their sources until SPDs are installed and connected.

B. Do not perform insulation resistance tests of the distribution wiring equipment with the SPD installed. Disconnect before conducting insulation resistance tests, and reconnect immediately after the testing is over.

3.3 DEMONSTRATION

A. Train Owner's maintenance personnel to maintain SPD devices.

END OF SECTION 264313

SECTION 265100 –LIGHTING AND LIGHTING CONTROL

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 lighting fixtures, lighting controls, lighting fixtures mounted on exterior building surfaces, exterior lighting, lamps, ballasts, emergency lighting units, emergency fluorescent power supply units, and accessories.

1.3 SUBMITTALS

A. Product Data: For each lighting fixture type, arranged in order of fixture designation. Include data on features, accessories, and the following:

1. Dimensions of fixtures.
2. Emergency lighting unit battery and charger.
3. Types of lamps.

B. Product Data: For each type of lighting control.

C. Maintenance Data: For lighting fixtures to include in maintenance manuals specified in Division 1.

1.4 QUALITY ASSURANCE

A. Fixtures, Controls**,** Emergency Lighting Units, Emergency Fluorescent Power Supply Units, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction.

B. Comply with NFPA 70.

C. NFPA 101 Compliance: Comply with visibility and luminance requirements for exit signs.

1.5 COORDINATION

A. Fixtures, Mounting Hardware, and Trim: Coordinate layout and installation of lighting fixtures with ceiling system and other construction.

1.6 WARRANTY

A. Ballast Warranty: 5-year replacement warranty. Include labor allowance required for ballast replacement in fixture on-site at no extra cost to the Owner within 1-year construction warranty.

Transfer remainder of the manufacturer's warranty including ballast manufacturer's labor stipend to owner after 1-year construction warranty.

B. Emergency Battery Warranty: 3-year pro-rated warranty.

C. LED Driver/ Light System Warranty: 5-year replacement warranty.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Products: Subject to compliance with requirements, provide one of the products indicated for each designation in the Lighting Fixture Schedules on the drawings.

B. Lighting Control Equipment: Subject to compliance with the requirements, provide lighting control equipment from one of the following manufacturers:

1. SensorSwitch nLight
2. Encelium

2.2 FIXTURES AND FIXTURE COMPONENTS, GENERAL

A. Metal Parts: Free from burrs, sharp corners, and edges.

B. Sheet Metal Components: Steel, unless otherwise indicated. Form and support to prevent warping and sagging.

C. Doors, Frames, and Other Internal Access: Smooth operating, free from light leakage under operating conditions, and arranged to permit relamping without use of tools. Arrange doors, frames, lenses, diffusers, and other pieces to prevent accidental falling during relamping and when secured in operating position.

D. Ballasts for Low-Temperature Environments: As follows:

1. Temperatures 0 Deg F (Minus 17 Deg C) and Above: Electronic or electromagnetic type rated for 0 deg F (minus 17 deg C) starting temperature.

E. General Requirements: Unless otherwise indicated, features include the following:

1. 0-10V Dimming
2. Total Harmonic Distortion Rating: Less than 20 percent.
3. Ambient temperature rating: -40° to +55° C
4. Power Factor (100% output): >0.95

F. Flickering: LED drivers shall conform to IEEE P1789 standards. Alternatively, manufacturers must demonstrate conformance with product literature and testing which demonstrates this performance. Submit % flicker in 1% increments for full range of dimming starting at 500 mA for full output reading. Systems that do not meet IEEE P1789 will not be considered.

2.3 EXIT SIGNS

A. General Requirements: Comply with UL 924 and the following:

1. Sign Colors and Lettering Size: Comply with authorities having jurisdiction.

B. Internally Lighted Signs: As follows:

1. Lamps for AC Operation: Light-emitting diodes, 70,000 hours minimum rated lamp life.

2.4 EMERGENCY LIGHTING UNITS

A. General Requirements: Self-contained units, wall or ceiling mounted. Comply with UL 924. Units include the following features:

1. Battery: Sealed, maintenance-free, lead-acid type with minimum 5-year nominal life and warranty.
2. Charger: Fully automatic, solid-state type with sealed transfer relay.
3. Operation: Relay automatically turns lamp on when supply circuit voltage drops to 80 percent of nominal voltage or below. Lamp automatically disconnects from battery when voltage approaches deep-discharge level. When normal voltage is restored, relay disconnects lamps, and battery is automatically recharged and floated on charger.

2.5 LED LIGHT MODULE

A. General Requirements: Unless otherwise indicated, features include the following:

1. L70 (70% light output) life rating: minimum 50,000 hours, as defined by IES LM80 and TM21
2. Minimum Color-Rendering Index: 80 CRI

2.6 LIGHTING CONTROL GATEWAY

A. Mounts to two gang recessed junction box.

B. Backlit LCD Screen with local control buttons. Integral time clock with remotely upgradeable firmware.

C. Provide 3 RJ-45 ports for connection to lighting control bridges via Cat 5. Provide with one integral ethernet port.

D. Sensor Switch, nGWY2.

2.7 LIGHTING CONTROL BRIDGE

A. Mounts to two gang junction box.

B. Provide with 8 RJ-45 ports for connection to lighting relay system devices via Cat 5.

C. Provide commissioning of system. Fill out cards and program zones to owner's schedule specifications.

D. Sensor Switch, nBRG 8.

2.8 LIGHTING CONTROL SYSTEM CABLING

A. Provide J-Hook style supports for Cat 5 cabling above accessible ceilings. Where exposed structure occurs run Cat 5 cabling concealed in conduit.

B. Provide plenum rated cat 5 cabling, pre-terminated for lengths shorter than 150 feet. Provide lengths necessary for installation, cables shall be as short as practical with a minimum 10' cable length.

2.9 LIGHTING CONTROL SYSTEM ENTRY STATIONS

A. Provide entry station that connects to lighting control relay system via Cat 5 with J-45 connectors.

B. Provide grey button station with stainless steel plate.

C. Sensor Switch Catalog Numbers:

1.	Lighting Control Network Entry Station:	nPODM(2P,4P)-GY
2.	Lighting Control Network Scene Entry Station:	nPODM2S(4S)-GY
3.	Lighting Control Network Dimming Entry Station:	nPODMD-GY

2.10 POWER PACKS

A. Connects to lighting control relay system via Cat 5 cabling with RJ-45 connectors.

B. Provide with an internal latching relay.

C. Sensor Switch Catalog Numbers:

1.	Lighting Control Network Relay/Power Pack	nPP16
2.	Lighting Control Network Secondary Relay Pack	nSP5
3.	Lighting Control Network Secondary Dimming/Relay Pack	nSP5 D
4.	Lighting Control Network UL924 Emergency Relay Pack	nSP5 D ER

2.11 OCCUPANCY SENSORS

A. Low Voltage Ceiling Sensors:

1. Passive Dual Technology: Infrared and microphonic sensors integrated into one housing.
2. Performance and Coverage: Passive Infrared (PIR) shall engage sensor and PIR or microphonic shall detect continued occupancy. 360 degree field of view. Minimum coverage of 20 foot radius at 9' mounting height, with sensor centered in coverage area. Provide accessory power packs and connect to power sensor.
3. Mounting: Sensor shall flush horizontal mount tight to ceiling surface. Sensors that protrude from ceiling or utilize drop-down mounting brackets shall not be acceptable.
4. Finish: White.
5. Stand Alone Load Rating: Provide accessory power packs with relay; connect to switch load. Relay in power packs shall be rated 20A for ballast loads.
6. Stand Alone: Sensor Switch CM PDT 10 or approved equivalent. Provide associated power packs with sensor power supply and load switching relay.
7. Relay System: Sensor Switch nCM PDT10.

B. Low Voltage Ceiling Photocell:

1. Passive Dual Technology: Infrared and microphonic sensors integrated into one housing.
2. Performance and Coverage: Passive Infrared (PIR) shall engage sensor and PIR or microphonic shall detect continued occupancy. 360 degree field of view. Minimum coverage of 20 foot radius at 9' mounting height, with sensor centered in coverage area. Provide accessory power packs and connect to power sensor.
3. Integral Daylight Dimming Photocell
4. Mounting: Sensor shall flush horizontal mount tight to ceiling surface. Sensors that protrude from ceiling or utilize drop-down mounting brackets shall not be acceptable.
5. Finish: White.
6. Relay System: Sensor Switch nCM PDT10 ADC.

C. Line Voltage Single Pole Wall Box Sensors:

1. Passive Dual Technology: Infrared and microphonic sensors integrated into one housing.
2. Performance and Coverage: Passive Infrared (PIR) shall engage sensor and PIR or microphonic shall detect continued occupancy. 180 degree field of view. Capable of sensing small motion up to 20' at 4' mounting height.
3. On Modes

    a. Automatic on - Sensor turns load on based on sensing occupancy of monitored area.
    b. Manual on - sensor requires pressing the pushbutton on sensor face to turn load on.
    c. Reduced turn on - sensor automatically turns load on with detection of large motion, automatically switches minor motion detection on after load is initially powered on.

4. Switch Off Modes

    a. Predictive off mode - occupant can turn lights off manually or lights automatically turn off after time out period. If lights are manually turned off, the sensor shall revert to automatic on after sensor sees no motion during time out period.
    b. Permanent off mode - pressing the switch turns the lights off, lights will not turn on until switch is pressed again.
    c. Switch disable - prevents user from manually turning lights off.

5. Mounting: Sensor shall mount in wall box with decorator style faceplate.
6. Load Rating: Switch integral in sensor housing

    a. Rated for 800 watt ballast or incandescent load at 120V
    b. Rated for 1200 watt ballast load at 277V
    c. Rated for ¼ horsepower motor load at 120V

7. Operation Mode Settings

    a. Storage areas - manual on / permanent off
    b. Private offices / work rooms - reduced turn on / predictive off

8. Sensor Switch WSD PDT or approved equivalent.

D. Line Voltage Two Pole Wall Box Sensors:

1. Passive Dual Technology: Infrared and microphonic sensors integrated into one housing.
2. Performance and Coverage: Passive Infrared (PIR) shall engage sensor and PIR or microphonic shall detect continued occupancy. 180 degree field of view. Capable of sensing small motion up to 20' at 4' mounting height.

3. On Modes

    a. Automatic on - Sensor turns load on based on sensing occupancy of monitored area.
    b. Manual on - sensor requires pressing the pushbutton on sensor face to turn load on.
    c. Reduced turn on - sensor automatically turns load on with detection of large motion, automatically switches minor motion detection on after load is initially powered on.

4. Switch Off Modes

    a. Predictive off mode - occupant can turn lights off manually or lights automatically turn off after time out period. If lights are manually turned off, the sensor shall revert to automatic on after sensor sees no motion during time out period.
    b. Permanent off mode - pressing the switch turns the lights off, lights will not turn on until switch is pressed again.
    c. Switch disable - prevents user from manually turning lights off.

5. Mounting: Sensor shall mount in wall box with decorator style faceplate.
6. Load Rating: Switches integral in sensor housing, shall be capable of independent operation

    a. Rated for 800 watt ballast or incandescent load at 120V
    b. Rated for 1200 watt ballast load at 277V
    c. Rated for ¼ horsepower motor load at 120V

7. Operation Mode Settings

    a. Private offices / work rooms / conference rooms

        1) Pole 1 - reduced turn on / predictive off
        2) Pole 2 - manual on / permanent off

8. Sensor Switch WSD PDT 2P or approved equivalent.

E. Low Voltage Wide View Corner Sensors:

1. Passive Dual Technology: Infrared and microphonic sensors integrated into one housing.
2. Performance and Coverage: Passive Infrared (PIR) shall engage sensor and PIR or microphonic shall detect continued occupancy. 120 degree field of view. Minimum coverage of 40' minor motion detection at 8' mounting height, with sensor at center of field of view. Provide accessory power packs and connect to power sensor.
3. Mounting: Sensor shall flush horizontal mount tight to ceiling surface. Sensors that protrude from ceiling or utilize drop-down mounting brackets shall not be acceptable.
4. Finish: White.
5. Load Rating: Provide accessory power packs with relay; connect to switch load. Relay in power packs shall be rated 20A for ballast loads.
6. Stand Along: Sensor Switch WV PDT 16 or approved equivalent. Provide associated power packs with sensor power supply and load switching relay.
7. Relay System: Sensor Switch nWV PDT 16.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Fixtures: Set level, plumb, and square with ceiling and walls, and secure according to manufacturer's written instructions and approved submittal materials. Install lamps in each fixture.

B. Occupancy Sensors: Provide required power packs with sensor power supply and load switching relay. Connect power packs per manufacturer's instructions. Adjust settings of occupancy sensors, tailor to configuration and use of room served.

C. Support for Fixtures in or on Grid-Type Suspended Ceilings: Use grid for support.

1. Install a minimum of four ceiling support system rods or wires for each fixture. Locate not more than 6 inches (150 mm) from fixture corners.
2. Support Clips: Fasten to fixtures and to ceiling grid members at or near each fixture corner.
3. Fixtures of Sizes Less Than Ceiling Grid: Arrange as indicated on reflected ceiling plans or center in acoustical panel, and support fixtures independently with at least two 3/4-inch (20-mm) metal channels spanning and secured to ceiling tees.

D. Suspended Fixture Support: As follows:

1. Pendants and Rods: Where longer than 48 inches (1200 mm), brace to limit swinging.
2. Continuous Rows: Suspend from cable installed according to fixture manufacturer's written instructions and details on Drawings.

3.2 CONNECTIONS

A. Ground equipment.

1. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values.

3.3 FIELD QUALITY CONTROL

A. Inspect each installed fixture for damage. Replace damaged fixtures and components.

B. Provide instruments to make and record test results.

C. Tests: As follows:

1. Verify normal operation of each fixture after installation.
2. Emergency Lighting: Interrupt electrical supply to demonstrate proper operation.
3. Verify normal transfer to battery source and retransfer to normal.

Verify normal operation of each lighting control.

D. Malfunctioning Fixtures and Components: Replace or repair, then retest. Repeat procedure until units operate properly.

3.4 CLEANING AND ADJUSTING

A. Clean fixtures internally and externally after installation. Use methods and materials recommended by manufacturer.

B. Adjust aimable fixtures to provide required light intensities.

3.5 SYSTEM PROGRAMMING AND SEQUENCE OF OPERATION

A. Head End Software

1. Install software on computer furnished by Owner.

B. Program spaces per sequence of operation below. Design light level shall be used to set high end trim as well as daylight harvesting photocell setpoints. Assist commissioning agent in system testing and verification.

C. Building Time Schedule:

1. Business Hours: 6am until 6pm
2. After Hours: 11pm until 6am

D. Typical Enclosed Office

1. Design Light Level: 40fc
2. Time Out Periods:

a. Business Hours: 15 minutes
b. After Hours: 5 minutes

3. Wall switch occupancy sensor or Entry Station 3D:

a. Button 1: On/Off
b. Button 2: All lights up
c. Button 3: All lights down

4. Room Function Description:

a. User presses on button lights illuminate to 30fc. Up allows user to adjust light level up to a maximum of 40fc. Down allows user to lower lights to minimum. Pressing on/off a second time turns lights off. If no movement is sensed for time out period lights turn off. Sensor shall operate as a vacancy sensor.

E. Typical Storage Room

1. Room Function Description:

a. Lights shall illuminate upon detection of occupancy. If no movement is detected for 5 minutes the lights shall turn off.

F. Typical Corridor

1. Design Light Level: 20fc
2. Time Out Periods:

a. Business Hours: 15 minutes
b. After Hours: 5 minutes

3. Room Function Description:

a. During school hours lights shall not turn off, lights shall dim to minimum after time out period. All other hours lights shall illuminate upon detection of occupancy. If no movement is detected for time out period the lights shall turn off.

G. Typical Public Restroom

1. Design Light Level: 20fc
2. Time Out Periods:

a. Business Hours: 15 minutes
b. After Hours: 5 minutes

3. Room Function Description:

a. During school hours lights shall not turn off, lights shall dim to minimum after time out period. All other hours lights shall illuminate upon detection of occupancy. If no movement is detected for time out period the lights shall turn off.

H. Typical Small Restroom (Single Fixture)

1. Design Light Level: 20fc
2. Room Function Description:

a. Lights shall illuminate upon detection of occupancy by wall switch occupancy sensor. If no movement is detected for 10 minutes the lights shall turn off.

I. Typical Conference Room and Emergency Operations Center

1. Design Light Level: 40fc
2. Time Out Periods:

a. Business Hours: 15 minutes
b. After Hours: 5 minutes

3. Entry Station 4SD:

a. Button 1: 100% - Turns lights to 40fc at work plane
b. Button 2: 50% - Turns lights to 20fc at work plane

c. Button 3: A/V - Turns row of lights closest to marker board off Turns all other lights to 5fc
d. Button 4: Off - Turns all lights off
e. Button 5: 75% - Turns lights to 30fc at work plane
f. Button 6: 25% - Turns lights to 10fc at work plane
g. Button 7: Up - Uniformly raises all lights. Maximum of 40fc
h. Button 8: Down - Uniformly lowers all lights.

4. Room Function Description:

a. Sensor shall function as a vacancy sensor. Vacancy sensor shall turn off all lights after timeout period.

3.6 ADJUSTING

A. Occupancy Adjustments: When requested within twelve (12) months from date of Substantial Completion, provide on-site assistance in adjusting sensors to suit actual occupied conditions. Provide up to two (2) visits to Project during other-than-normal occupancy hours for this purpose.

1. For occupancy and motion sensors, verify operation at outer limits of detector range. Set time delay to suit Owner's operations.
2. For daylighting controls, adjust set points and deadband controls to suit Owner's operations.

3.7 DEMONSTRATION

A. Train Owner's maintenance personnel to adjust, operate, and maintain lighting control devices.

B. Six (6) months after project completion provide one (1) two (2) hour owner re-training session.

END OF SECTION 265100

SECTION 268100 – FIRE ALARM (EXISTING)

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 fire alarm systems with control panel, manual stations, detectors, signal equipment, controls, and devices.

B. This Section includes fire alarm systems for the following:

1. Renovation and extension of existing fire alarm systems.

1.3 DEFINITIONS

A. FACP: Fire alarm control panel.

B. LED: Light-emitting diode.

C. Definitions in NFPA 72 apply to fire alarm terms used in this Section.

1.4 SYSTEM DESCRIPTION

A. General: Noncoded, analog-addressable system; automatic sensitivity control of certain smoke detectors; and multiplexed signal transmission dedicated to fire alarm service only.

1. Interface with existing fire alarm system.

1.5 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Shop Drawings:

1. Drawings: Prepare project specific information, drawn accurately to scale. Do not base Shop Drawings on reproductions of the Contract Documents or standard printed media.
2. Wiring Diagrams: Detail wiring and differentiate between manufacturer-installed and field-installed wiring. Include diagrams for equipment and for system with all terminals and interconnections identified.

C. Operating Instructions: For mounting at the FACP.

D. Submissions to Authorities Having Jurisdiction: Submit to authorities having jurisdiction. Include copies of annotated Contract Drawings as needed to depict component locations to facilitate review. Resubmit if required to make clarifications or revisions to obtain approval. On receipt of comments from authorities having jurisdiction, submit them to Engineer for review.

E. Certificate of Completion: Comply with NFPA 72.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: An experienced installer who is an authorized representative of the FACP manufacturer for both installation and maintenance of units required for this Project.

B. Manufacturer Qualifications: A firm experienced in manufacturing systems similar to those indicated for this Project and with a record of successful in-service performance.

C. Source Limitations: Obtain fire alarm system components through one source from a single manufacturer.

D. Compliance with Local Requirements: Comply with applicable building code, local ordinances and regulations, and requirements of authorities having jurisdiction.

E. Comply with NFPA 72.

1.7 SEQUENCING AND SCHEDULING

A. Existing Fire Alarm Equipment: Maintain fully operation until new equipment has been tested and accepted. As new equipment is installed, label it "NOT IN SERVICE" until it is accepted. Remove labels from new equipment when put into service and label existing fire alarm equipment "NOT IN SERVICE" until removed from the building.

B. Equipment Removal: After acceptance of the new fire alarm system, remove existing disconnected fire alarm equipment.

1. Package operational fire alarm and detection equipment that has been removed and deliver to Owner.
2. Remove from site and legally dispose of unless designated otherwise.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Match Existing – Simplex 4100 Series Control panel

2.2 FUNCTIONAL DESCRIPTION OF SYSTEM

A. Noncoded, analog-addressable system; automatic sensitivity control of certain smoke detectors; and multiplexed signal transmission dedicated to fire alarm service only.

1. Interface with existing fire alarm system.

2.3 PERFORMANCE REQUIREMENTS

A. Comply with NFPA 72.

B. Fire alarm signal initiation shall be by one or more of the following devices:

1. Manual stations.
2. Heat detectors.
3. Smoke detectors.
4. Verified automatic alarm operation of smoke detectors.
5. Automatic sprinkler system water flow.
6. Fire extinguishing system operation.

C. Supervisory signal initiation shall be by one or more of the following devices or actions:

1. Operation of a fire-protection system valve tamper.

D. System trouble signal initiation shall be by one or more of the following devices or actions:

1. Open circuits, shorts and grounds of wiring for initiating device, signaling line, and notification-appliance circuits.
2. Opening, tampering, or removal of alarm-initiating and supervisory signal-initiating devices.

E. System Operation

1. All existing system operations, alerts, and notifications shall be maintained and extended to new addition.

2.4 MANUAL PULL STATIONS

A. Description: Fabricated of metal or plastic, and finished in red or brushed aluminum with molded operating instructions of contrasting color.

1. Single-action mechanism initiates an alarm. With integral addressable module, arranged to communicate manual-station status (normal, alarm, or trouble) to the FACP.
2. Station Reset: Key or wrench operated.

2.5 SMOKE DETECTORS

A. General Description:

1. UL 268 listed, operating at 24-V dc, nominal.
2. Integral Addressable Module: Arranged to communicate detector status (normal, alarm, or trouble) to the FACP.
3. Plug-in Arrangement: Detector and associated electronic components shall be mounted in a plug-in module that connects to a fixed base. Provide terminals in the fixed base for connection of building wiring.
4. Self-Restoring: Detectors do not require resetting or readjustment after actuation to restore them to normal operation.
5. Integral Visual-Indicating Light: LED type.

B. Photoelectric Smoke Detectors:

1. Detector style: Low Profile.
2. Sensor: LED or infrared light source with matching silicon-cell receiver.
3. Detector Sensitivity: Between 2.5 and 3.5 percent/foot smoke obscuration when tested according to UL 268A.

C. Duct Smoke Detectors:

1. Photoelectric Smoke Detectors:

a. Sensor: LED or infrared light source with matching silicon-cell receiver.
b. Detector Sensitivity: Between 2.5 and 3.5 percent/foot smoke obscuration when tested according to UL 268A.

2. UL 268A listed, operating at 24-V dc, nominal.
3. Integral Addressable Module: Arranged to communicate detector status (normal, alarm, or trouble) to the FACP.
4. Plug-in Arrangement: Detector and associated electronic components shall be mounted in a plug-in module that connects to a fixed base. The fixed base shall be designed for mounting directly to the air duct. Provide terminals in the fixed base for connection to building wiring.
5. Self-Restoring: Detectors shall not require resetting or readjustment after actuation to restore them to normal operation.
6. Integral Visual-Indicating Light: LED type. Provide remote status and alarm indicator and test station for each duct detector.
7. Each sensor shall have multiple levels of detection sensitivity.
8. Sampling Tubes: Design and dimensions as recommended by manufacturer for the specific duct size, air velocity, and installation conditions where applied.
9. Relay Fan Shutdown: Rated to interrupt fan motor-control circuit.

2.6 OTHER DETECTORS

A. Heat Detector, Combination Type: Actuated by either a fixed temperature of 135 deg F or rate of rise of temperature that exceeds 15 deg F per minute, unless otherwise indicated.

1. Mounting: Low profile plug-in base, interchangeable with smoke detector bases.
2. Integral Addressable Module: Arranged to communicate detector status (normal, alarm, or trouble) to the FACP.

2.7 NOTIFICATION APPLIANCES

A. Description: Equip for mounting as indicated and have screw terminals for system connections.

1. Combination Devices: Factory-integrated audible and visible devices in a single-mounting assembly.
2. All alarm devices shall be semi-flush mounted unless otherwise indicated.

B. Horns: Electric-vibrating-polarized type, 24-V dc; with provision for housing the operating mechanism behind a grille. Horns produce a sound-pressure level of 90 dB, measured 10 feet from the horn.

C. Visible Alarm Devices: Synchronized Xenon strobe lights listed under UL 1971 with clear or nominal white polycarbonate lens. Mount lens on an aluminum faceplate. The word "FIRE" is engraved in minimum 1-inch- high letters on the lens.

1. Rated Light Output: Per NFPA.

D. Voice/Tone Speakers:

1. UL 1480 listed.
2. Low-Range Units: Rated 1 to 2 W.
3. Mounting: Flush, semirecessed,
4. Matching Transformers: Tap range matched to the acoustical environment of the speaker location.

E. Provide alterations to existing Control Panel for intended modifications.

2.8 ADDRESSABLE INTERFACE DEVICE

A. Description: Microelectronic monitor module listed for use in providing a system address for listed alarm-initiating devices for wired applications with normally open contacts.

2.9 WIRE

A. NFPA 70, Types FPL, FPLR, or FPLP, as recommended by manufacturer.

B. Non-Power-Limited Circuits: Solid-copper conductors with 600-V rated, 75 deg C, color-coded insulation.

PART 3 - EXECUTION

3.1 EQUIPMENT INSTALLATION

A. Manual Pull Stations: Mount semi-flush in recessed back boxes.

B. Water-Flow Detectors and Valve Supervisory Switches: Connect for each sprinkler valve station required to be supervised.

C. Ceiling Mounted Fire Alarm Devices in Accessible Ceilings: Use flexible metal conduit whip from EMT conduit to ceiling tile to facilitate device relocation in the future and allow device to mount flush to ceiling tile.

D. Ceiling-Mounted Smoke Detectors: Not less than 4 inches from a sidewall to the near edge.

E. Wall-Mounted Smoke Detectors: At least 4 inches, but not more than 12 inches, below the ceiling.

F. Smoke Detectors near Air Registers: Install no closer than 60 inches.

G. Audible Alarm-Indicating Devices: Install not less than 6 inches below the ceiling. Install on flush-mounted back boxes with the device-operating mechanism concealed behind a grille. Combine audible and visible alarms at the same location into a single unit.

3.2 WIRING INSTALLATION

A. Wiring within Enclosures: Separate power-limited and non-power-limited conductors as recommended by the manufacturer. Install conductors parallel with or at right angles to sides and back of the enclosure. Bundle, lace, and train conductors to terminal points with no excess. Connect conductors that are terminated, spliced, or interrupted in any enclosure associated with the fire alarm system to terminal blocks. Mark each terminal according to the system's wiring diagrams. Make all connections with approved crimp-on terminal spade lugs, pressure-type terminal blocks, or plug connectors.

B. Cable Taps: Use numbered terminal strips in junction, pull and outlet boxes, cabinets, or equipment enclosures where circuit connections are made.

C. Color-Coding: Color-code fire alarm conductors differently from the normal building power wiring. Use one color-code for alarm circuit wiring and a different color-code for supervisory circuits. Color-code audible alarm-indicating circuits differently from alarm-initiating circuits. Use different colors for visible alarm-indicating devices. Paint fire alarm system junction boxes and covers red.

D. Install in conduit.

3.3 IDENTIFICATION

A. Identify system components, wiring, cabling, and terminals according to Division 26 Section "Basic Electrical Materials and Methods."

B. Install instructions frame in a location visible from the FACP.

C. Paint power-supply breaker red and lock. Label "FIRE ALARM."

3.4 FIELD QUALITY CONTROL

A. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect field-assembled components and connections and to supervise pretesting, testing, and adjustment of the system. Report results in writing.

B. Final Test Notice: Provide a minimum of 10 days' notice in writing when the system is ready for final acceptance testing.

C. Minimum System Tests: Test the system according to procedures outlined in NFPA 72. Minimum required tests are as follows:

1. Verify the absence of unwanted voltages between circuit conductors and ground.
2. Test all conductors for short circuits using an insulation-testing device.
3. With each circuit pair, short circuit at the far end of the circuit and measure the circuit resistance with an ohmmeter. Record the circuit resistance of each circuit on record drawings.
4. Verify that the control unit is in the normal condition as detailed in the manufacturer's operation and maintenance manual.
5. Test initiating and indicating circuits for proper signal transmission under open circuit conditions. One connection each should be opened at not less than 10 percent of initiating and indicating devices. Observe proper signal transmission according to class of wiring used.

6. Test each initiating and indicating device for alarm operation and proper response at the control unit. Test smoke detectors with actual products of combustion.
7. Test the system for all specified functions according to the approved operation and maintenance manual. Systematically initiate specified functional performance items at each station, including making all possible alarm and monitoring initiations and using all communications options. For each item, observe related performance at all devices required to be affected by the item under all system sequences. Observe indicating lights, displays, signal tones.
8. Test Both Primary and Secondary Power: Verify by test that the secondary power system is capable of operating the system for the period and in the manner specified.

D. Retesting: Correct deficiencies indicated by tests and completely retest work affected by such deficiencies. Verify by the system test that the total system meets Specifications and complies with applicable standards.

3.5 CLEANING AND ADJUSTING

A. Cleaning: Remove paint splatters and other spots, dirt, and debris. Touch up scratches and marred finish to match original finish. Clean unit internally using methods and materials recommended by manufacturer.

3.6 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel as specified below:

1. Train Owner's maintenance personnel on procedures and schedules for starting and stopping, troubleshooting, servicing, adjusting, and maintaining equipment and schedules. Provide a minimum of 4 hours' training.
2. Schedule training with Owner with at least seven days' advance notice.

3.7 ON-SITE ASSISTANCE

A. Occupancy Adjustments: When requested within one year of date of Substantial Completion, provide on-site assistance in adjusting sound levels, controls, and sensitivities to suit actual occupied conditions. Provide up to two requested visits to Project site for this purpose.

END OF SECTION 268100

SECTION 271500 – COMMUNICATION CABLING SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions apply to this Section.

1.2 SUMMARY

A. Section Includes: Equipment, materials, labor, and services to provide telephone, data, and video distribution system including, but not limited to:

1. Communication Pathways
2. Equipment racks, cabinets, and cable management
3. Backboards
4. Structured cable solution
5. Fiber Optic cabling
6. Coaxial cable solution
7. Cabling system identification and administration
8. Communications grounding and bonding
9. System testing certification

B. Provide all equipment, materials, labor, and services, not specifically mentioned or shown, which may be necessary to complete or perfect all parts of the installation. Ensure that they are in compliance with requirements stated or reasonably inferred by the contract documents.

1.3 DEFINITIONS

A. BICSI: Building Industry Consulting Service International

B. EF: Entrance Facility

C. EMI: Electromagnetic interference

D. ER: Equipment Room

E. IDC: Insulation displacement connector

F. LAN: Local area network

G. TBB: Telecommunications Bonding Backbone

H. TR: Telecommunications Room

I. TGB: Telecommunications Grounding Bar

J. TMGB: Telecommunications Main Grounding Bar

K. UTP: Unshielded twisted pair

1.4 WARRANTY

A. Unless otherwise specified, unconditionally guarantee in writing the materials, equipment, and workmanship for a period of not less than twenty five (25) years from date of acceptance by the owner. The owner shall deem acceptance as beneficial use. Warranty shall be written through the connectivity manufacturer.

B. Transfer manufacturer's warranties to the owner in addition to the General System Guarantee. Submit these warranties on each item in list form with shop drawings. Detail specific parts within equipment that are subject to separate conditional warranty. Warranty proprietary equipment and systems involved in this contract during the guarantee period.

1.5 SUBMITTALS

A. Product Data: Include data on features, ratings, and performance for each component specified.

B. Warranty documents for equipment.

C. Qualification Data: For installer/ technician, installation supervisor, and field inspector.

D. Operation and Maintenance Data:

1. Provide three (3) copies of operations and maintenance manuals. As a minimum, manuals should include:

a. Complete schematics of each system component
b. Troubleshooting procedures
c. Factory-authorized support information
d. Test results
e. Record Drawings
f. Cable Administration Drawings

1.6 QUALITY ASSURANCE

A. Installer Qualifications: Contractor shall have at least 5 years experience in the field. Contractor shall be a certified partner of the structured cable system manufacturer. Each installer/technician, installation supervisor, and field inspector shall be a certified installer of the structured cable system manufacturer. The contractor shall provide at least five references for projects of similar scope and specifications.

B. 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.

C. Grounding: Comply with ANSI-J-STD-607-A/B.

D. Comply with all applicable ANSI/TIA/EIA 568-C and BICSI standards / guidelines for telecommunications cabling, pathways, performance testing, and administration.

1.7 COORDINATION

A. Coordinate work of this section with Owner's Representative:

1. Meet with Owner's Representatives to exchange information and agree on details of equipment arrangements and installation interfaces.
2. Record agreements reached in meetings and distribute record to other participants.
3. Adjust arrangements and locations of distribution frames, patch panels, and cross connects in equipment rooms, wiring closets, and racks to accommodate and optimize arrangement and space requirements of LAN equipment.

PART 2 - PRODUCTS

2.1 PATHWAYS

A. Telecommunications Pathways and Spaces: Comply with most current version of TIA/EIA-569.

B. Ladder Cable Management Tray (Communications Rooms)

1. Manufacturers: Equipment listed in this specification shall be the standard product of Chatsworth Products Inc. whose catalog and model numbers are used to identify the type and quality of design, materials used, and features required.

a. Equal equipment as manufactured by Systimax or Hubbell Premise Wiring may be considered as acceptable.

2. Ladder Cable Management Tray:

a. Nominal Dimensions: Rung spacing shall not exceed 12”.
b. Sizes and Layout: Widths and layouts indicated on drawings, 1 ½” high stringers.

3. Material: Welded steel, painted finish

a. Straight Section: CPI series 10250-X**
b. Corner Bend: CPI series 10822-X**
c. Corner Bracket (15”): CPI part no. 11959-X15
d. Wall Angle Support Kit: CPI series 11421-7**
e. Triangular Support Bracket: CPI series 11746-7**
f. 6” Radius Drop Outs: CPI part no. 12100-X06
g. Runway Dividers: 13392-7**
h. End closing kit: CPI series 11700-7**
i. Splice Kits: CPI series 11301/2-001

4. Support system: Provide additional support devices as required per manufacturer’s recommendations. Supports shall consist of threaded rods with associated fittings and/or wall brackets. Wall brackets shall be factory assemblies by cable tray manufacturer.
5. Grounding: Provide grounding lugs for attachment of ground conductor to tray.
6. Horizontal transition pieces (90s, 45s, etc.) shall be factory manufactured assemblies and shall not be cut and bent from straight runs.

C. Non-Continuous Cable Support:

a. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the work include, but are not limited to, the following:

1) Erico/Caddy
2) Cooper/B-line
3) Panduit Corp.
4) Arlington Industries

b. J-Hooks or straps: 4" size (or larger), rated for Category cables being supported, with wire spring cable retaining clips or slots for Velcro cable ties.
c. Loop Cable Supports: 2" minimum diameter. Arlington Industries TL series LOOP supports.
d. Distribution Rings: Wall Mounted 6" D-rings suitable for Category cables being supported.

2.2 EQUIPMENT RACKS, CABINETS, CABLE MANAGEMENT

A. Subject to compliance with requirements, additional manufacturers offering products that may be incorporated into the work include, but are not limited to, the following:

1. Panduit
2. Chatsworth/CPI
3. Middle Atlantic

B. Equipment Enclosures/Racks

1. See plan details and schedules.

C. Cable Management

1. See plan details and schedules.

2.3 BACKBOARDS

A. Backboards: Provide A/C grade plywood, ¾” by 48” by 96", painted with 3 coats of white fire resistant paint on all six sides. Mount plywood “A” side out. Coordinate work with General Contractor.

2.4 STRUCTURED CABLE SOLUTION

A. Manufacturers:

1. Subject to compliance with requirements, available manufacturers offering products/solutions that may be incorporated into the work include the following:

a. Commscope/Uniprise Cable
b. Panduit/General Cable
c. Hubbell/Hitachi Cable
d. Legrand/Superior Essex

B. UTP Cable

1. All UTP cable shall be considered “data” cable. This solution shall provide connectivity for current analog telephone switching systems as well as provide future capability for VoIP telephone systems.
2. Data Cable Description: Category 6/Class E Channel Specifications to 250 MHz, 100-ohm, 4-pair UTP, covered with a blue thermoplastic jacket. All cabling shall be plenum rated.

    a. Comply with IEEE 802.3 1000BASE-T.
    b. Comply with TIA-854-A 1000BASE-TX.
    c. Comply with TIA/EIA-568-B.2.

C. UTP Cable Hardware

1. General Requirements: Comply with TIA/EIA-568-C.2, IDC type, with modules designed for punch-down caps or tools. Cables shall be terminated with connecting hardware of same category or higher.
2. Jacks and Jack Assemblies:

    a. Modular, matching cable category specifications, color to match faceplate color, eight-position modular receptacle units with integral IDC-type terminals. Comply with TIA/EIA-568-C.1.

3. Copper Patch Cords:

    a. Patch cords shall be contractor furnished, owner-installed unless otherwise noted.
    b. Factory-made, four-pair, stranded cables, matching horizontal cable category for rating.
    c. Quantities: Equal to total number of data outlets = 33% 5 foot', 133% 7 foot, 34% 10 foot (e.g., 100 data outlets = 33 five foot, 133 seven foot, 34 ten foot)
    d. Color: half - blue, half – white
    e. Provide bend-relief-compliant boots and color-coded icons to ensure performance. Patch cords shall have latch guards to protect against snagging.

4. Workstation Outlets: Two-port or four-port connector assemblies mounted in single gang faceplate, unless otherwise noted.

    a. Faceplate:

        1) Faceplate shall have integrated recessed label field with clear plastic window.
        2) Coordinate color of faceplate and faceplate material with adjacent electrical wiring devices at all locations. Refer to “Wiring Devices” specification section.

    b. Use blanking insert(s) for any unused port(s).

D. Distribution (backbone) Cabling

1. Multi-Pair Copper Riser Cable.

    a. Description: Category 5 Solid copper, 24 AWG, 100 Ω balanced twisted-pair (UTP) backbone cable, in pair quantities as indicated on the drawings, with mechanical and transmission performance specifications that meet or exceed ANSI/TIA/EIA-568-C.2

2. Cross Connects Cables/Wire:

    a. Cross connects shall be contractor furnished, owner-installed unless otherwise noted.

3. Multi-Pair Copper Riser Hardware

    a. General Requirements for Multi-pair UTP Cable Termination Hardware: Comply with TIA/EIA-568-c.2, IDC type, with modules designed for punch-down caps or tools. Cables shall be terminated with connecting hardware of same category or higher.
    b. Voice Connecting Blocks:

        1) Wall-Mount Connecting Blocks: Category 5e rated, 100 Pair, 110-style IDC.

            a) Number of connections per field: Match number of connections required for rack-mounted patch panels, plus blank positions adequate to suit 20 percent expansion criteria.
            b) Use industry standard C-5 connectors.

        2) Number of terminals per field: Two for each pair cable plus blank positions adequate to suit 20 % expansion criteria.

4. Optical Fiber Cable.

    a. Description: Single-mode 8.3-10/125-micron, strand count as indicated on drawings, nonconductive, loose buffer, gel-filled optical fiber cable. All fiber cable shall be plenum rated.

        1) Optical fiber shall be installed in Innerduct.
        2) Comply with ICEA S-83-596 for mechanical properties.
        3) Comply with TIA/EIA-568-C.3 for performance specifications.
        4) All optical fiber cable shall be Listed and labeled by an NRTL acceptable to authorities having jurisdiction as complying with UL 444, UL 1651, and NFPA 70.

    b. Jacket:

        1) Jacket Color: Yellow for 8.3-10/125-micron cable, Aqua for 50/125-micron cable, and Orange for 62.5/125-micron cable.
        2) Cable cordage jacket, fiber, unit, and group color shall be according to TIA/EIA-598-B.
        3) Imprinted with fiber count, fiber type, and aggregate length at regular intervals not to exceed 40 inches.

5. Optical Fiber Cable Hardware.

    a. Rack mounted optical fiber termination panel.

        1) See schedules.

    b. Number of connectors per field: One for each fiber assigned to field, plus spares and blank positions adequate to suit specified 20 percent expansion criteria.
    c. Optical fiber cable connecting hardware:

1) Comply with Optical Fiber Connector Intermateability Standards (FOCIS) specifications of TIA/EIA-604-2, TIA/EIA-604-3-A, and TIA/EIA-604-12. Comply with TIA/EIA-568-C.3.
2) **Confirm** style connectors to be used. Insertion loss not more than 0.75 dB.

6. Optical Fiber Patch Cords:

a. Patch cords shall be contractor furnished, owner-installed unless otherwise noted.
b. Factory-made, dual fiber cables matching rating of fiber backbone.
c. Quantity: Equal to the total number of fiber strands at each cross connect.
d. Lengths: 20% shall be 4 foot, 80% shall be 7 foot.

E. Coaxial Cable

1. Cable Characteristics: Broadband type, recommended by cable manufacturer specifically for broadband data transmission applications. Coaxial cable and accessories shall have 75-ohm nominal impedance with a return loss of 20 dB maximum from 7 to 1000 MHz. All coaxial cable shall be plenum rated.
2. All coax cable shall be NFPA and UL compliance listed and labeled by an NRTL acceptable to authorities having jurisdiction as complying with UL 1655 and with NFPA 70 "Radio and Television Equipment" and "Community Antenna Television and Radio Distribution" Articles.

a. RG-6/U: NFPA 70, Type CATV or CM.

1) No. 18 AWG, solid, copper-covered steel conductor; gas-injected, foam-PE insulation.
2) Double shielded with 100 percent aluminum-foil shield and 60 percent aluminum braid.
3) Suitable for indoor installations.
4) Jacket color: White

b. RG-11/U: NFPA 70, Type CATV

1) No. 14 AWG, solid, copper-covered steel conductor.
2) Gas-injected, foam-PE insulation.
3) Double shielded with 100 percent aluminum polyester tape and 60 percent aluminum braid.
4) Jacket color: White

3. Coaxial Patch Cables

1) Patch cable shall have male F-connectors on both ends and shall be of the same cable type as the horizontal coaxial cabling.
2) Quantities: One for each TV outlet indicated on drawings.
3) Length: 3 foot.

4. Coaxial Distribution (Backbone) Cable

a. Cable Characteristics: Broadband type, recommended by cable manufacturer specifically for broadband data transmission applications. Coaxial cable and accessories shall have 75-ohm nominal impedance with a return loss of 20 dB maximum from 7 to 1000 MHz. All coaxial riser cable shall be plenum rated.
b. RG-11/U: NFPA 70, Type CATV

1) No. 14 AWG, solid, copper-covered steel conductor.
2) Gas-injected, foam-PE insulation.
3) Double shielded with 100 percent aluminum polyester tape and 60 percent aluminum braid.

5. Coaxial Cable Distribution Hardware

a. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the work include:

1) Blonder-Tongue
2) Channel Vision
3) ICM Corp.

b. Coaxial-Cable Connectors: ICM Corp, F-Conn DB Series, 75 Ohm, F-type or approved equal.
c. Splitters, taps, filters, and amplifiers as required to provide a minimum of 6dB at each antenna outlet.

2.5 CABLING SYSTEM IDENTIFICATION AND ADMINISTRATION

A. Comply with TIA/EIA-606-A and UL 969 for labeling materials, including label stocks, laminating adhesives, and inks used by label printers.

PART 3 - EXECUTION

3.1 COORDINATION

A. Coordinate work in this section with owner's telephone switch provider, workstation and LAN equipment provider, and local exchange carrier.

1. Meet jointly with representatives of above organizations, engineering firm and owners to exchange information and agree on details of equipment arrangements and installation of system interfaces prior to start of installation.
2. Coordinate locations of distribution frames, patch panels, and cross connects in ERs and TRs to accommodate and optimize arrangement and space requirements of telephone, LAN, demarcation, and miscellaneous equipment

B. Coordinate work of this section with other trades. Coordinate installation of racks, enclosures, and other equipment to avoid overhead sprinkler piping or similar obstructions over communications equipment.

3.2 WIRING METHODS

A. Comply with TIA/EIA-568-C.

B. Only Main conduit sleeves are indicated on drawings. Additional sleeves will be required. Communications contractor shall provide additional sleeves through walls / areas as required to protect cabling at all locations.

C. Provide bushings at both ends of all raceways / sleeves prior to installing cable.

D. Install cables in raceways and cable trays except within consoles, cabinets, desks, and counters and except above accessible ceiling spaces where unenclosed wiring method may be used.

E. Conceal conductors and cables in accessible ceilings, walls, and floors where possible.

F. Install cables parallel to structural members.

G. Wiring within Enclosures: Bundle, lace, and train cables to terminal points with no excess and without exceeding manufacturer's limitations on bending radii. Provide and use lacing bars and distribution spools.

H. Install all ladder tray in telecommunications rooms. Provide all components and accessories included for a complete installation including splices, end closing kits, grounding and bonding, etc.

I. Provide vertically mounted ladder tray for vertical cable pathways in TRs or ERs. Mount according to manufacturers specifications, sized appropriately.

J. Secure and support cables at intervals not exceeding 30 inches and not more than 6 inches from cabinets, boxes, fittings, outlets, racks, frames, and terminals.

K. Bundle, lace, and train conductors to terminal points without exceeding manufacturer's limitations on bending radii. Install lacing bars and distribution spools.

L. Installation of Cable Routed Exposed under Raised Floors:

1. Install cabling after the flooring system has been installed in raised floor areas.
2. Suspend UTP cable not in a wireways or pathway a minimum of 2 inches above structural floor by cable supports not more than every other floor support.
3. Install cables parallel to floor structure.

M. Separation from EMI Sources:

1. Comply with TIA/EIA-569-A for separating unshielded copper voice and data communication cable from potential EMI sources, including electrical power lines and equipment.
2. Separation between open communications cables or cables in nonmetallic raceways and unshielded power conductors and electrical equipment shall be as follows:

    a. Electrical Equipment Rating Less Than 2 kVA: A minimum of 5 inches
    b. Electrical Equipment Rating between 2 and 5 kVA: A minimum of 12 inches
    c. Electrical Equipment Rating More Than 5 kVA: A minimum of 24 inches.

3. Separation between communications cables in grounded metallic raceways and unshielded power lines or electrical equipment shall be as follows:

    a. Electrical Equipment Rating Less Than 2 kVA: A minimum of 2-1/2 inches.
    b. Electrical Equipment Rating between 2 and 5 kVA: A minimum of 6 inches.
    c. Electrical Equipment Rating More Than 5 kVA: A minimum of 12 inches.

4. Separation between communications cables in grounded metallic raceways and power lines and electrical equipment located in grounded metallic conduits or enclosures shall be as follows:

a. Electrical Equipment Rating Less Than 2 kVA: No requirement.
b. Electrical Equipment Rating between 2 and 5 kVA: A minimum of 3 inches.
c. Electrical Equipment Rating More Than 5 kVA: A minimum of 6 inches.

5. Separation between Communications Cables and Electrical Motors and Transformers, 5 kVA or HP and Larger: A minimum of 48 inches.
6. Separation between Communications Cables and Fluorescent Fixtures: A minimum of 5 inches.
7. Separation from communication, speaker-microphone, line-level, speaker-level, and power wiring: A minimum of 4 inches.

N. Open-Cable Installation:

1. Communications cables shall be installed in cable tray where cable tray is available. Secure cable within cable tray system a minimum of every 15 feet. Within telecommunications closets, secure cables to ladder system 12" on center. All securing of cables shall be with removable Velcro type fasteners.
2. J-hooks or adjustable cable supports (slings) shall be used in any ceiling space where cable tray is not specified. Maximum distance between supports shall be 5'. J-hooks shall be fastened to permanent building elements (i.e., steel, walls, etc.).
3. Where j-hooks are fastened using support wires, the support wires shall be independent from the other building support wires and shall be secured at both ends. Cables and raceways shall not be supported by ceiling grids.
4. Install cabling with horizontal and vertical cable guides in telecommunications spaces with terminating hardware and interconnection equipment.
5. Suspend UTP cable not in a raceway or cable tray a minimum of 8 inches above ceilings by cable
6. Penetrations through floor and fire-rated walls shall utilize intermediate metallic conduit (IMC) or galvanized rigid conduit (GRC) sleeves and shall be firestopped after installation and testing, utilizing a firestopping assembly approved for that application.
7. Cable shall not be run through structural members or in contact with pipes, ducts, building structure, or other potentially damaging items.

O. Horizontal Cabling

1. Bridged taps or splices shall not be permitted in the horizontal cabling.
2. The maximum allowable horizontal cable length is 295 feet (90 m).
3. The maximum combined cross-connect cable length is 33 feet (10 m).

4. Terminate conductors; no cable shall contain un-terminated elements. Make terminations only at indicated outlets, terminals, cross-connects, and patch panels.
5. In the communications equipment room, provide a 10 foot service loop for each cable.
6. At the workstation outlet, provide a 3 foot service loop for each cable. Bundle cable above accessible ceiling location with Velcro straps.

P. Optical Fiber Cable Installation:

1. Comply with TIA/EIA-568-C.

Q. Coaxial Cable Installation:

1. Provide all coaxial cable infrastructure. Install splitters at each telecommunications closet with one coaxial cable homerun from each TV location outlet back to serving telecommunications closet.
2. All station location and/or television outlets exceeding 150' shall be RG11.

a. Provide RG11 to RG6 pigtail adapter within 12" of outlet location for connection to F-connector.

3.3 COMMUNICATIONS GROUNDING

A. Grounding shall conform to ANSI/TIA-607-A - Commercial Building Grounding and Bonding Requirements for Telecommunications, ANSI/TIA-607-B - Generic Telecommunications Bonding and Grounding for Customer Premises, National Electrical Code®, ANSI/NECA/BICSI-568 and manufacturer's grounding requirements as minimum.

B. Bond and ground all CATV equipment including but not limited to: splitters, taps, amplifiers, and entrances.

C. Bond and ground equipment racks, housings, messenger cables, ground bars, and communication raceways.

3.4 FIRESTOPPING

A. Comply with TIA/EIA-569-A; Annex A, "Firestopping."

B. Use firestop devices for all wall, floor, and roof penetrations.

C. Penetrations through floor and fire-rated walls shall utilize intermediate metallic conduit (IMC) or galvanized rigid conduit (GRC) sleeves and shall be firestopped after installation and testing, utilizing a firestopping assembly approved for that application.

D. Selected systems shall not be less than the hourly time delay ratings indicated in the Contract Documents for each respective fire-rated floor, wall, or other partition of building construction. Firestop for each type of communications penetration shall conform to requirements of an independent testing laboratory design drawing or manufacturer's approved modification when used in conjunction with details shown on the Drawings.

E. Perform all necessary coordination with trades constructing floors, walls, or other partitions of building construction with respect to size and shape of each opening to be constructed and device or system approved for use in each instance.

3.5 IDENTIFICATION

A. Identify system components, wiring, and cabling complying with TIA/EIA-606-A. Comply with requirements for identification specified in Division 26 Section "Identification for Electrical Systems."

1. Administration Class: 4
2. Color-code cross-connect fields. Apply colors to voice and data service covers and labels.

B. Comply with requirements in "Interior Painting" for painting backboards. For fire-resistant plywood, do not paint over manufacturer's label.

C. Cabling Administration Drawings: Show building floor plans with cabling administration-point labeling. Identify labeling convention and show labels for telecommunications closets, backbone pathways and cables, entrance pathways and cables, terminal hardware and

positions, horizontal cables, work areas and workstation terminal positions. Follow convention of TIA/EIA-606-A. Furnish electronic record of all drawings, in software and format selected by Owner. Also furnish printed drawing no smaller than 36” by 24”and laminated for each TR. At completion, drawing shall reflect as-built conditions.

D. Cable and Wire Identification:

1. Comply with TIA/EIA standards.
2. Cable Labels: Self-adhesive vinyl or vinyl-cloth wraparound tape markers, machine printed with alphanumeric cable designations.
3. Label each cable within 4 inches of each termination and tap, where it is accessible in a cabinet or junction or outlet box, and elsewhere as indicated.
4. Label each terminal strip and screw terminal in each cabinet, rack, or panel.

    a. Individually number wiring conductors connected to terminal strips, and identify each cable or wiring group being extended from a panel or cabinet to a building-mounted device shall be identified with name and number of particular device as shown.
    b. Label each unit and field within distribution racks and frames.

5. Identification within Connector Fields in ER and TRs: Label each connector and each discrete unit of cable-terminating and connecting hardware. Where similar jacks and plugs are used for both voice and data communication cabling, use a different color for jacks and plugs of each service.

3.6 SOURCE QUALITY CONTROL

A. Factory test UTP and optical fiber cables on reels according to TIA/EIA-568-C.

B. Factory test UTP cables according to TIA/EIA-568-C.

C. Factory test multimode optical fiber cables according to TIA/EIA-526-14-A and TIA/EIA-568-C. See Division 01 Section "Quality Requirements" for retesting and re-inspecting requirements and Division 01 Section "Execution" for requirements for correcting the Work.

3.7 FIELD QUALITY CONTROL

A. Perform tests and inspections. Test each signal path for end-to-end performance from each end of all pairs installed.

B. General Performance: Horizontal cabling system shall comply with transmission standards in TIA/EIA-568-C, when tested according to test procedures of this standard.

C. Tests and Inspections:

1. Visually inspect UTP and or optical fiber cable jacket materials for NRTL certification markings. Inspect cabling terminations in communications equipment rooms for compliance with color-coding for pin assignments, and inspect cabling connections for compliance with TIA/EIA-568-B/C.
2. Visually confirm marking of outlets, cover plates, outlet/connectors, and patch panels.
3. Visually inspect cable placement, cable termination, grounding and bonding, equipment and patch cords, and labeling of all components.

4. Test UTP backbone copper cabling for DC loop resistance, shorts, opens, intermittent faults, and polarity between conductors. Test operation of shorting bars in connection blocks. Test cables after termination but not cross-connection.

    a. Test instruments shall meet or exceed applicable requirements in TIA/EIA-568-C. Perform tests with a tester that complies with performance requirements in "Test Instruments (Normative)" Annex, complying with measurement accuracy specified in "Measurement Accuracy (Informative)" Annex. Use only test cords and adapters that are qualified by test equipment manufacturer for channel or link test configuration.

5. Correct non-passing cables including removing excess cabling from cables that test over specified distance limits. Retest to demonstrate compliance.
6. Optical Fiber Cable Tests:

    a. Test instruments shall meet or exceed applicable requirements in TIA/EIA-568-C.3. Use only test cords and adapters that are qualified by test equipment manufacturer for channel or link test configuration.
    b. Link End-to-End Attenuation Tests:

        1) Horizontal and multimode backbone link measurements: Test at 850 or 1300 nm in 1 direction according to TIA/EIA-526-14-A, Method B, One Reference Jumper.
        2) Attenuation test results for backbone links shall be less than 2.0 dB. Attenuation test results shall be less than that calculated according to equation in TIA/EIA-568-C.3.

7. UTP Performance Tests:

    a. Test for each outlet. Perform the following tests according to TIA/EIA-568-C.1 and TIA/EIA-568-C.2:

        1) Wire map.
        2) Length (physical vs. electrical, and length requirements).
        3) Insertion loss.
        4) Near-end crosstalk (NEXT) loss.
        5) Power sum near-end crosstalk (PSNEXT) loss.
        6) Equal-level far-end crosstalk (ELFEXT).
        7) Power sum equal-level far-end crosstalk (PSELFEXT).
        8) Return loss.
        9) Propagation delay.
        10) Delay skew.

8. Optical Fiber Cable Performance Tests: Perform optical fiber end-to-end link tests according to TIA/EIA-568-C.

3.8 CLEANING

A. After completing system installation including outlet fittings and devices, inspect exposed finish. Remove burrs, dirt, and construction debris and repair damaged finishes including chips, scratches, and abrasions.

3.9 RECORD DRAWINGS

A. Maintain current documents at the construction site. Submit with Operations and Maintenance Manuals.

B. Record drawings shall include all information required for shop drawings and in addition shall indicate the following:

1. Identification of each cable outlet uniquely identified.
2. Routing of cables from communications closets to jacks.
3. Revisions to construction documents (addenda and field changes).

C. Provide warranty certificate for voice data system.

END OF SECTION 271500

SECTION 274134 - AUDIO VISUAL SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Work of this section shall be by Electronic Contracting Inc., Contact: Matt Thorne, (402)

B. This Section includes audio visual systems indicated on the construction drawings including but not limited to:

1. Relocation of existing A/V Equipment and cabling from current EOC location.
2. Installation of new cabling as required to accommodate relocated equipment.

1.3 SUBMITTALS

A. Product Data: For each type of product indicated. Include operating characteristics, furnished specialties, and accessories.

B. Shop Drawings:

1. Wiring Diagrams: For power, signal, and control wiring.

C. Field quality-control test reports.

D. Operation and Maintenance Data: For security system to include in emergency, operation, and maintenance manuals. In addition to items specified in Division 01 Section "Operation and Maintenance Data" include the following:

1. Hard copies of manufacturer's specification sheets, operating specifications, design guides, user's guides for software and hardware, and PDF files on CD-ROM of the hard-copy submittal.
2. System installation and setup guides, with data forms to plan and record options and setup decisions.

E. Warranty documents for equipment.

F. As-Built Drawings upon completion of project.

1.4 QUALITY ASSURANCE

A. Installer Qualifications: An employer of workers trained and approved by manufacturer.

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, "National Electrical Code."

D. Compliance with Local Requirements: Comply with applicable building code, local ordinances and regulations, and requirements of authorities having jurisdiction.

1.5 WARRANTY

A. Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of audio/visual systems and equipment that fail in materials or workmanship within specified warranty period.

1. Warranty Period: One year from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PATHWAYS

A. General Requirements: Comply with TIA/EIA-569-A/B.

B. Types of pathways:

1. Non-Continuous Cable Support:

a. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the work include, but are not limited to, the following:

1) Erico/Caddy
2) Cooper/B-line
3) Panduit Corp.

b. NRTL labeled for support of UTP cabling, designed to prevent degradation of cable performance and pinch points that could damage cable.
c. J-hooks and or adjustable cable supports (also called slings) shall be used.

2.2 MANUFACTURERS / PRODUCTS

A. Refer to plans for acceptable manufacturers and product data.

B. All cabling shall be plenum rated unless otherwise indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine pathway elements intended for cables. Check raceways, cable trays, and other elements for compliance with space allocations, installation tolerances, hazards to cable installation, and other conditions affecting installation.

3.2 SYSTEM SETUP

A. Obtain detailed Project planning forms from manufacturer of audio/visual control systems.

1. Program room controllers in accordance with owner needs. Room control shall include integration with lighting, shades, screens, and projectors as applicable.
2. Program A/V control systems (Crestron) to operate rooms as multiple inputs / multiple outputs as required.
3. Program touch screens to operate room controllers. Coordinate templates with owner and Engineer prior to final programming.
4. Interface room controllers with lighting control system in all rooms as applicable.

3.3 CABLING

A. Wiring Method: Install cables in raceways and cable trays except within consoles, cabinets, desks, and counters, and except in accessible ceiling spaces and in gypsum board partitions where unenclosed wiring method may be used. Conceal raceway and cables except in unfinished spaces.

B. General Cable Installation Requirements:

1. Terminate conductors; no cable shall contain unterminated elements. Make terminations only at outlets and terminals.
2. Splices, Taps, and Terminations: Arrange on numbered terminal strips in junction, pull, and outlet boxes; terminal cabinets; and equipment enclosures. Cables may not be spliced.
3. Secure and support cables at intervals not exceeding 48 inches and not more than 6 inches from cabinets, boxes, fittings, outlets, racks, frames, and terminals.
4. Bundle, lace, and train conductors to terminal points without exceeding manufacturer's limitations on bending radii. Install lacing bars and distribution spools.
5. Do not install bruised, kinked, scored, deformed, or abraded cable. Do not splice cable between termination, tap, or junction points. Remove and discard cable if damaged during installation and replace it with new cable.

3.4 GROUNDING

A. Comply with Division 26 Section "Grounding and Bonding for Electrical Systems."

B. Comply with IEEE 1100, "Power and Grounding Sensitive Electronic Equipment."

C. Ground cable shields, drain conductors, and equipment to eliminate shock hazard and to minimize ground loops, common-mode returns, noise pickup, cross talk, and other impairments.

D. Bond shields and drain conductors to ground at only one point in each circuit.

3.5 IDENTIFICATION

A. In addition to requirements in this Article, comply with applicable requirements in Division 26 Section "Identification for Electrical Systems" and with TIA/EIA-606.

B. Label each terminal strip and screw terminal in each cabinet, rack, or panel.

1. All wiring conductors connected to terminal strips shall be individually numbered, and each cable or wiring group being extended from a panel or cabinet to a building-mounted device shall be identified with the name and number of the particular device as shown.
2. Each wire connected to building-mounted devices is not required to be numbered at the device if the color of the wire is consistent with the associated wire connected and numbered within the panel or cabinet.

C. At completion, cable and asset management software shall reflect as-built conditions.

3.6 SYSTEM SOFTWARE

A. Develop, install, and test software and databases for the complete and proper operation of systems involved. Install software on owner-designated workstations. Assign software license to Owner.

3.7 FIRESTOPPING

A. Comply with TIA/EIA-569-A; Annex A, "Firestopping."

B. Select appropriate type or types of through penetration firestop devices or systems appropriate for each type of communications penetration and base each selection on criteria specified herein.

1. Use firestop devices for all wall, floor, and roof penetrations.
2. Putty or caulk is only to be used on small penetrations.

C. Selected systems shall not be less than the hourly time delay ratings indicated in the Contract Documents for each respective fire-rated floor, wall, or other partition of building construction. Firestop for each type of communications penetration shall conform to requirements of an independent testing laboratory design drawing or manufacturer's approved modification when used in conjunction with details shown on the Drawings.

D. Perform all necessary coordination with trades constructing floors, walls, or other partitions of building construction with respect to size and shape of each opening to be constructed and device or system approved for use in each instance.

3.8 FIELD QUALITY CONTROL

A. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust field-assembled components and equipment installation, including connections.

B. Testing Agency: Engage a qualified testing and inspecting agency to perform field tests and inspections and prepare test reports:

C. Remove and replace malfunctioning devices and circuits and retest as specified above.

3.9 STARTUP SERVICE

A. Engage a factory-authorized service representative to supervise and assist with startup service. Complete installation and startup checks.

3.10 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain audio visual systems.

1. Conduct a minimum of four hours' training as specified in instructions to Owner's employees in Division 01 Section "Demonstration and Training"

END OF SECTION 274134

SECTION 281300 - ACCESS CONTROL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Work of this section shall be by Inteconnex, contact: Casey Weggen (319) 533-4198

B. This Section includes a security access system consisting of a Central Station, one or more networked workstation computers, operating system and application software, and field-installed Controllers connected by a high-speed electronic data transmission network. The security access system shall have the following:

1. Access Control:

a. Regulating access through doors
b. Surge and tamper protection.
c. Credential cards and readers.
d. Request to exit push-button switches.
e. Request to exit motion sensors
f. Door contacts
g. Credential creation and credential holder database and management.
h. Monitoring of field-installed devices.
i. Reporting.

C. Related Sections include the following:

1. Division 08 Section “Door Hardware” for access control and door hardware device information.

1.3 DEFINITIONS

A. Central Station: A PC with software designated as the main controlling PC of the security access system. Where this term is presented with initial capital letters, this definition applies.

B. Controller: An intelligent peripheral control unit that uses a computer for controlling its operation. Where this term is presented with an initial capital letter, this definition applies.

C. CPU: Central processing unit.

D. Credential: Data assigned to an entity and used to identify that entity.

E. Workstation: A PC with software that is configured for specific limited security system functions.

1.4 SYSTEM DESCRIPTION

A. System shall consist of a PC-based Central Station and field-installed Controllers, connected by a high-speed electronic data transmission network.

1. System Software: Based on central-station operating system, and application software. Software shall have the following capabilities:

a. Graphical user interface to show pull-down menus and a menu tree format that complies with interface guidelines of Microsoft Windows operating system.
b. System license shall be for the entire system and shall include capability for future additions that are within the indicated system size limits specified in this Section.
c. System shall have open architecture that allows importing and exporting of data and interfacing with other systems that are compatible with Microsoft Windows operating system.
d. Password-protected operator login and access.

1.5 PERFORMANCE REQUIREMENTS

A. Security access system shall use a single database for access-control and credential-creation functions.

B. Distributed Processing: System shall be a fully distributed processing system so that information, including time, date, valid codes, access levels, and similar data, is downloaded to Controllers so that each Controller makes access-control decisions for that Location. If communications to Central Station are lost, all Controllers shall automatically buffer event transactions until communications are restored, at which time buffered events shall be uploaded to the Central Station.

C. Number of Controlled Doors: Support at least 128 separate access control doors using a single PC with combinations of direct-connect, dial-up, or TCP/IP LAN connections to each Location.

1. Each Location shall have its own database and history in the Central Station. Locations may be combined to share a common database.

D. System Network Requirements:

1. Interconnect system components and provide automatic communication of status changes, commands, field-initiated interrupts, and other communications required for proper system operation.
2. Communication shall not require operator initiation or response, and shall return to normal after partial or total network interruption such as power loss or transient upset.
3. System shall automatically annunciate communication failures to the operator and identify the communication link that has experienced a partial or total failure.
4. Communications Controller may be used as an interface between the Central Station display systems and the field device network. Communications Controller shall provide functions required to attain the specified network communications performance.

E. Central Station shall provide operator interface, interaction, display, control, and dynamic and real-time monitoring. Central Station shall control system networks to interconnect all system components, including workstations and field-installed Controllers.

F. Field equipment shall include Controllers, sensors, and controls.

G. Data Line Supervision: System shall initiate an alarm in response to opening, closing, shorting, or grounding of data transmission lines.

H. Door Hardware Interface: Coordinate with Division 08 Sections that specify door hardware required to be monitored or controlled by the security access system. The Controllers in this Section shall have electrical characteristics that match the signal and power requirements of door hardware. Integrate door hardware specified in Division 08 Sections to function with the controls and PC-based software and hardware in this Section.

1.6 SUBMITTALS

A. Product Data: For each type of product indicated. Include operating characteristics, furnished specialties, and accessories.

B. Shop Drawings:

1. System components including devices and cabling.
2. Wiring Diagrams: For power, signal, and control wiring.

C. Operation and Maintenance Data: For security system to include in emergency, operation, and maintenance manuals. In addition to items specified in Division 01 Section "Operation and Maintenance Data" include the following:

1. Software documentation.
2. Hard copies of manufacturer's specification sheets, operating specifications, design guides, user's guides for software and hardware, and PDF files on CD-ROM of the hard-copy submittal.
3. System installation and setup guides, with data forms to plan and record options and setup decisions.

D. As-Built Drawings upon completion of project.

E. Test results

F. Warranty Information

1.7 QUALITY ASSURANCE

A. Installer Qualifications: An employer of workers trained and approved by manufacturer.

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, "National Electrical Code."

D. Compliance with Local Requirements: Comply with applicable building code, local ordinances and regulations, and requirements of authorities having jurisdiction.

1.8 WARRANTY

A. Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of cameras, equipment related to camera operation, and control-station equipment that fail in materials or workmanship within specified warranty period.

1. Warranty Period: One year from date of Substantial Completion.

1.9 SYSTEM DESCRIPTION

A. The access Control System shall consist of the following:

1. TCP/IP network interface capability
2. Door Controllers
3. Proximity Card Readers
4. Door position switches
5. Request-to-exit sensors
6. Interface to Door locking devices (electric strikes, electronic lock sets, etc.)
7. Security cards

1.10 PERFORMANCE REQUIREMENTS

A. Security access system shall use a single database for access-control and credential-creation functions.

B. Distributed Processing: System shall be a fully distributed processing system so that information, including time, date, valid codes, access levels, and similar data, is downloaded to Controllers so that each Controller makes access-control decisions for that Location. If communications to Central Station are lost, all Controllers shall automatically buffer event transactions until communications are restored, at which time buffered events shall be uploaded to the Central Station.

C. System Network Requirements:

1. Interconnect system components and provide automatic communication of status changes, commands, field-initiated interrupts, and other communications required for proper system operation.
2. Communication shall not require operator initiation or response, and shall return to normal after partial or total network interruption such as power loss or transient upset.
3. System shall automatically annunciate communication failures to the operator and identify the communication link that has experienced a partial or total failure.
4. Communications Controller may be used as an interface between the Central Station display systems and the field device network. Communications Controller shall provide functions required to attain the specified network communications performance.

D. Central Station shall provide operator interface, interaction, display, control, and dynamic and real-time monitoring. Central Station shall control system networks to interconnect all system components, including workstations and field-installed Controllers.

E. Field equipment shall include open architecture Controllers, sensors, and controls.

F. System Response to Alarms: Field device network shall provide a system end-to-end response time of 1 second or less for every device connected to the system. Alarms shall be annunciated

at the Central Station. Alarm and status changes shall be displayed after receipt of data by the Central Station. All graphics shall be displayed, including graphics-generated map displays, on the console monitor at the security console.

G. Data Line Supervision: System shall initiate an alarm in response to opening, closing, shorting, or grounding of data transmission lines.

H. Door Hardware Interface: Coordinate with Division 08 Sections that specify door hardware required to be monitored or controlled by the security access system. The Controllers in this Section shall have electrical characteristics that match the signal and power requirements of door hardware. Integrate door hardware specified in Division 08 Sections to function with the door controllers and power supplies furnished and installed as part of this section.

1. Scope of work distribution is as follows:

    a. Division 8 to prepare doors and mount all access control hardware furnished with division 8 equipment.
    b. Security contractor to install all division 28 hardware as required.
    c. Security contractor to test all door hardware and coordinate troubleshooting with Division 8 as required.

1.11 SYSTEM OPERATION

A. The system shall be able to perform the following tasks:

1. Control access to various doors equipped with a card reader.
2. Ensure more secure control with the anti-passback control function.
3. Monitor all defined alarm points as well as all doors controlled by card readers based on programmed schedules.
4. Access the system using the main and secondary menus (to which access is limited by a password) to make additions and required changes to various data files so that they can be updated by the user without the manufacturer's assistance.
5. Enable the entry of access code data for every card or group of cards.
6. Display all alarms on the screen in text or graphic mode and simultaneously trigger a buzzer requiring an acknowledgement on the keypad to stop the alarm.
7. Each event shall print on a log printer. For security reasons, each event shall be incremented with a print number.
8. Generate reports and view them on the screen, output them to a printer, or send them to an email address
9. Supervise specific points such as door contacts, volumetric detectors, and mechanical points, high and low temperature sensors, or any other equipment necessary for good building management based on programmed schedules.
10. Save the database manually or automatically following a schedule.
11. Perform the following operations from all workstations:

    a. Lock or unlock one door or a group of doors;
    b. Activate or deactivate a relay or a group of relays;
    c. Activate or deactivate a point or a group of points;
    d. Program or modify one card or a group of cards;
    e. Validate or invalidate one card or a group of cards;
    f. Change time and date;
    g. Demand the system state in text or graphic mode;
    h. Query, create and/or modify data on:

1) Access levels
2) Schedules and holidays
3) Access card
4) Instructions
5) Reports and log
6) Doors
7) Supervision points and relays
8) Operator levels
9) Graphics

PART 2 - PRODUCTS

2.1 PATHWAYS

A. General Requirements: Comply with TIA/EIA-569-A/B.

B. Types of pathways:

1. Non-Continuous Cable Support:

a. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the work include, but are not limited to, the following:

1) Erico/Caddy
2) Cooper/B-line
3) Panduit Corp.

b. NRTL labeled for support of UTP cabling, designed to prevent degradation of cable performance and pinch points that could damage cable.
c. Lacing bars, spools, and D-rings should only be used in the EFs, TRs and ERs.
d. J-hooks and or adjustable cable supports (also called slings) shall be used in any ceiling space

2.2 MANUFACTURERS

A. Equipment furnished under this section shall be the standard product of Identiv whose catalog and model numbers are used to indicate the type and quality of design, material type, and required features.

2.3 SOFTWARE

A. System Software: PC-based software furnished with the following features:

1. Identiv Velocity Security management System Software – Enterprise Edition (as required)

2.4 CONTROLLERS

A. Controllers: Local entry-control functions including one- and two-way communications with access-control devices such as card readers, keypads, biometric personal identity verification

devices, door strikes, magnetic latches, gate and door operators, and exit push-buttons. Additional features as follows:

1. Capable of controlling up to 2 doors
2. Integrated network communication
3. Configurable relay outputs
4. Supports up to 4000 users
5. 30 day memory protection battery
6. Hirsch Identiv: MX-2

2.5 CARD READER / KEYPAD COMBINATION DEVICE

A. Power: Card reader shall be powered from its associated Controller, including its standby power source.

1. Combination keypad/card reader
2. Supports all major credentials and proximity
3. Identiv TS Scramblepad: DS47L-SSP-TS
4. Provide with Hirsch MB2SL surface mounting pad with MBX extension ring

2.6 REQUEST-TO-EXIT MOTION SENSORS

A. Directional zone detection motion sensor.

1. Passive infrared sensing technology
2. Red/Green LED indicator light
3. Backplate mounting or mounted to standard electrical box (see drawings)
4. Bosch DS160

2.7 DOOR CONTACTS

A. 3/4" round, flush mounted in door frame.

1. General Electric GC-1078CW-M

2.8 CREDENTIAL CARDS

A. Credential cards are existing

2.9 POWER SUPPLIES

A. Power supplies will be furnished by division 08 contractor, installed by 281300 contractor.

2.10 CABLES

A. All access control cabling shall be plenum rated. Provide cable size/quantity configurations for each device as required to perform functions specified.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine pathway elements intended for cables. Check raceways, cable trays, and other elements for compliance with space allocations, installation tolerances, hazards to cable installation, and other conditions affecting installation.

B. Examine roughing-in for LAN and control cable conduit systems to PCs, Controllers, card readers, and other cable-connected devices to verify actual locations of conduit and back boxes before device installation.

3.2 SYSTEM SETUP

A. Obtain detailed Project planning forms from manufacturer of access-control system.

1. Record setup data for control station and workstations.
2. For each Location, record setup of Controller features and access requirements.
3. Propose start and stop times for time zones and holidays, and match up access levels for doors.
4. Set up groups, facility codes, linking, and list inputs and outputs for each Controller.
5. Assign action message names and compose messages.
6. Set up alarms.
7. Prepare and install alarm graphic maps.
8. Discuss badge layout options; design badges.
9. Complete system diagnostics and operation verification.
10. Prepare a specific plan for system testing, startup, and demonstration.
11. Develop acceptance test concept and, on approval, develop specifics of the test.

3.3 CABLING

A. Wiring Method: Install cables in raceways except within consoles, cabinets, desks, and counters, and except in accessible ceiling spaces and in gypsum board partitions where unenclosed wiring method may be used. Conceal raceway and cables except in unfinished spaces.

B. General Cable Installation Requirements:

1. Terminate conductors; no cable shall contain unterminated elements. Make terminations only at outlets and terminals.
2. Splices, Taps, and Terminations: Arrange on numbered terminal strips in junction, pull, and outlet boxes; terminal cabinets; and equipment enclosures. Cables may not be spliced.
3. Secure and support cables at intervals not exceeding 48 inches and not more than 6 inches from cabinets, boxes, fittings, outlets, racks, frames, and terminals.
4. Bundle, lace, and train conductors to terminal points without exceeding manufacturer's limitations on bending radii. Install lacing bars and distribution spools.
5. Do not install bruised, kinked, scored, deformed, or abraded cable. Do not splice cable between termination, tap, or junction points. Remove and discard cable if damaged during installation and replace it with new cable.

3.4 GROUNDING

A. Comply with Division 26 Section "Grounding and Bonding for Electrical Systems."

B. Comply with IEEE 1100, "Power and Grounding Sensitive Electronic Equipment."

C. Ground cable shields, drain conductors, and equipment to eliminate shock hazard and to minimize ground loops, common-mode returns, noise pickup, cross talk, and other impairments.

D. Bond shields and drain conductors to ground at only one point in each circuit.

3.5 INSTALLATION

A. Install access control devices including card readers, request-to-exit devices, and other pertinent equipment.

B. Install door controllers, power supplies, and other equipment in designated rooms. Provide enclosures for equipment. Connect 120V power to power supplies as required.

3.6 IDENTIFICATION

A. In addition to requirements in this Article, comply with applicable requirements in Division 26 Section "Identification for Electrical Systems" and with TIA/EIA-606.

B. Label each terminal strip and screw terminal in each cabinet, rack, or panel.

1. All wiring conductors connected to terminal strips shall be individually numbered, and each cable or wiring group being extended from a panel or cabinet to a building-mounted device shall be identified with the name and number of the particular device as shown.
2. Each wire connected to building-mounted devices is not required to be numbered at the device if the color of the wire is consistent with the associated wire connected and numbered within the panel or cabinet.

C. At completion, cable and asset management software shall reflect as-built conditions.

3.7 SYSTEM SOFTWARE

A. Develop, install, and test software and databases for the complete and proper operation of systems involved. Install software on owner-designated workstations. Assign software license to Owner.

3.8 FIRESTOPPING

A. Comply with TIA/EIA-569-A; Annex A, "Firestopping."

B. Select appropriate type or types of through penetration firestop devices or systems appropriate for each type of communications penetration and base each selection on criteria specified herein.

1. Use firestop devices for all wall, floor, and roof penetrations.
2. Putty or caulk is only to be used on small penetrations.

C. Selected systems shall not be less than the hourly time delay ratings indicated in the Contract Documents for each respective fire-rated floor, wall, or other partition of building construction. Firestop for each type of communications penetration shall conform to requirements of an independent testing laboratory design drawing or manufacturer's approved modification when used in conjunction with details shown on the Drawings.

D. Perform all necessary coordination with trades constructing floors, walls, or other partitions of building construction with respect to size and shape of each opening to be constructed and device or system approved for use in each instance.

3.9 FIELD QUALITY CONTROL

A. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust field-assembled components and equipment installation, including connections.

B. Testing Agency: Engage a qualified testing and inspecting agency to perform field tests and inspections and prepare test reports:

C. Perform the following field tests and inspections and prepare test reports:

1. LAN Cable Procedures: Inspect for physical damage and test each conductor signal path for continuity and shorts. Use Class 2, bidirectional, Category 5 tester. Test for faulty connectors, splices, and terminations. Test according to TIA/EIA-568-1, "Commercial Building Telecommunications Cabling Standards - Part 1 General Requirements." Link performance for UTP cables must comply with minimum criteria in TIA/EIA-568-B.
2. Test each circuit and component of each system. Tests shall include, but are not limited to, measurements of power supply output under maximum load, signal loop resistance, and leakage to ground where applicable. System components with battery backup shall be operated on battery power for a period of not less than 10 percent of the calculated battery operating time. Provide special equipment and software if testing requires special or dedicated equipment.
3. Operational Test: After installation of cables and connectors, demonstrate product capability and compliance with requirements. Test each signal path for end-to-end performance from each end of all pairs installed. Remove temporary connections when tests have been satisfactorily completed.

D. Remove and replace malfunctioning devices and circuits and retest as specified above.

3.10 STARTUP SERVICE

A. Engage a factory-authorized service representative to supervise and assist with startup service. Complete installation and startup checks.

1. Enroll and prepare badges and access cards for Owner's operators, management, and security personnel.

3.11 PROTECTION

A. Maintain strict security during the installation of equipment and software. Rooms housing the control station, and workstations that have been powered up shall be locked and secured, with an activated burglar alarm and access-control system reporting to a Central Station complying

with UL 1610, "Central-Station Burglar-Alarm Units," during periods when a qualified operator in the employ of Contractor is not present.

3.12 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain video surveillance equipment.

1. Train Owner's maintenance personnel on procedures and schedules for troubleshooting, servicing, and maintaining equipment.
2. Demonstrate methods of determining optimum alignment and adjustment of components and settings for system controls.
3. Review equipment list and data in maintenance manuals. Refer to Division 01 Section "Operation and Maintenance Data"
4. Conduct a minimum of 2 hours' training as specified in instructions to Owner's employees in Division 01 Section "Demonstration and Training"

END OF SECTION 281300

Existing Facility Images

Master Keynote List

DRAWING KEYNOTE SYSTEM DESCRIPTION:

A KEYNOTING SYSTEM IS USED ON THE DRAWINGS FOR MATERIAL REFERENCING AND NOTATION. REFER TO THE KEYNOTE LEGEND ON EACH SHEET FOR ADDITIONAL DESCRIPTIVE INFORMATION ASSOCIATED TO THE PARTICULAR KEYNOTE IDENTIFICATION USED IN THE DETAILS LOCATED ON THAT PARTICULAR SHEET.

EACH KEYNOTE IDENTIFIER CONSISTS OF A 6-DIGIT NUMBER FOLLOWED BY A PERIOD AND AN ALPHANUMERIC SUFFIX. THE 6-DIGIT NUMBER CORRESPONDS TO A SPECIFIC SPECIFICATION SECTION IN THE PROJECT MANUAL WHERE ADDITIONAL INFORMATION REGARDING THE PRODUCT REQUIREMENTS CAN BE FOUND. THE ALPHANUMERIC SUFFIX ADDED TO THE 6-DIGIT NUMBER HELPS TO PROVIDE ADDITIONAL, UNIQUE IDENTIFICATION FOR PRODUCTS NOTED IN THE DRAWING BUT DOES NOT SPECIFICALLY CORRESPOND TO ANY REFERENCE LETTER USED WITHIN THE ASSOCIATED SPECIFICATIONS

THE ORGANIZATION OF THE KEYNOTING SYSTEM ON THE DRAWINGS, ALONG WITH THE KEYNOTE REFERENCE NUMBERS ASSOCIATED TO THE SPECIFICATION SECTION NUMBERING SYSTEM, SHALL NOT CONTROL THE CONTRACTOR IN THEIR DIVISION OF WORK SCOPES AMONG THE VARIOUS SUB-CONTRACTORS, OR IN ESTABLISHING THE EXTENT OF WORK TO BE PERFORMED BY ANY SPECIFIC TRADE

KEYNOTE MASTER LEGEND

033000.A	CONCRETE FOOTING – REFER TO STRUCTURAL
033000.A2	EXISTING CONCRETE FOOTING
033000.B	4" THICK CONCRETE SLAB ON GRADE – REFER TO STRUCTURAL
033000.B2	5" THICK EXISTING CONCRETE SLAB ON GRADE
033000.B3	5" THICK CONCRETE SLAB ON GRADE INFILL
033000.B4	6 1/2" THICK EXISTING COMPOSITE CONCRETE SLAB WITH 10"x8" REINFORCED CONCRETE CURB
033000.C	VAPOR RETARDER BELOW 4" GRANULAR FILL – TIE NEW VAPOR RETARDER INTO EXISTING AS RECOMMENDED BY MANUFACTURER
033000.C2	EXISTING VAPOR RETARDER BELOW GRANULAR FILL
033000.D	4" CONCRETE TOPPING SLAB – REFER TO STRUCTURAL
033000.E	ISOLATION JOINT FILLER STRIP
033000.F	1'-0" WIDE CONCRETE SITE WALL – REFER TO STRUCTURAL FOR REINFORCING REQUIREMENTS
034100.A	PRECAST STRUCTURAL CONCRETE (HOLLOWCORE) – REFER TO STRUCTURAL
034500.A	EXISTING ARCHITECTURAL PRECAST SILL
034500.B	EXISTING ARCHITECTURAL PRECAST LINTEL
034500.C	EXISTING ARCHITECTURAL PRECAST WALL PANEL
042000.A	COMPRESSIBLE FILLER
042000.B	EXISTING 10" CONCRETE MASONRY UNIT SHEAR WALL
042000.B2	EXISTING 8" CONCRETE MASONRY UNIT WALL
042000.B3	EXISTING 6" CONCRETE MASONRY UNIT WALL
042000.B4	EXISTING 4" CONCRETE MASONRY UNIT WALL
042000.C	10" CONCRETE MASONRY UNIT
042000.C2	10" CONCRETE MASONRY UNIT BOND BEAM
042000.D	8" CONCRETE MASONRY UNIT
042000.D2	8" CONCRETE MASONRY UNIT BOND BEAM
042000.D3	8" CONCRETE MASONRY UNIT LINTEL – REFER TO STRUCTURAL FOR REQUIREMENTS
042000.E	EXISTING ECONOMY BRICK
042000.F	EXISTING MASONRY THROUGH-WALL FLASHING ASSEMBLY
042000.G	6" CONCRETE MASONRY UNIT
042000.H	4" CONCRETE MASONRY UNIT
042000.J	MASONRY GROUT – GROUT CAVITY SOLID
042000.K	MASONRY SOAP UNIT
051200.A	EXISTING STEEL BEAM
051200.A2	STEEL LINTEL BEAM WITH CONTINOUS STEEL PLATE – REFER TO STRUCTURAL
051200.B	EXISTING STEEL COLUMN
052100.A	EXISTING STEEL ROOF JOIST – CUT AND MODIFY JOIST AS INDICATED IN STRUCTURAL DRAWINGS
053100.A	EXISTING COMPOSITE METAL DECK
053100.B	EXISTING STEEL ROOF DECK
054000.A	EXISTING 8" (18GA) STEEL STUD ASSEMBLY AT 24" O.C.
054000.B	EXISTING 5/8" GLASS MAT GYPSUM SHEATHING WITH ASPHALT SATURATED ORGANIC FELT AIR-INFILTRATION BARRIER
055000.A	STEEL CHANNEL WITH CAP PLATE AS SHOWN IN STRUCTURAL DRAWINGS FOR SUPPORT OF EXISTING STEEL JOIST OFF EXISTING CMU WALL
055000.B	EXISTING STEEL EDGE ANGLE FOR SUPPORT OF ROOF EDGE BLOCKING – ORIGINAL ARCHITECTURAL DRAWINGS INDICATE THIS ANGLE AND REFER BACK TO STRUCTURAL DRAWINGS FOR SIZING. STRUCTURAL DRAWINGS DO NOT IDENTIFY THIS ANGLE SO IT IS UNCLEAR IF IT WAS INSTALLED OR NOT.
055000.C	3/8" THICK GALVANIZED STEEL PLATE ASSEMBLY – ASSEMBLY INTENDED TO SLIDE INTO MASONRY OPENING AND ANCHOR TO STEEL ANGLES MOUNTED AT THE INTERIOR FACE OF CMU AT THE HEAD AND SILL OF OPENING. FIELD VERIFY OPENING – GALVANIZED ASSEMBLY TO BE PAINTED
055000.D	STEEL ANGLE – REFER TO STRUCTURAL – FEMA MECHANICAL LOUVER TO ANCHOR TO ANGLE. COORDINATE ANCHORING REQUIREMENTS WITH LOUVER MANUFACTURER
061053.A	PROVIDE BLOCKING AS NECESSARY TO BUILD UP EDGE OF ROOF ASSEMBLY FOR TIE-IN TO EXISTING BLOCKING AND COUNTERFLASHING ASSEMBLY SCHEDULED TO REMAIN
061053.A2	PROVIDE BLOCKING IN WALL AS REQUIRED FOR MOUNTING OF OWNER PROVIDED TELEVISION MOUNT
061053.A3	PROVIDE BLOCKING IN WALL AS REQUIRED FOR MOUNTING OF OWNER PROVIDED VISUAL DISPLAY BOARD – COORDINATE EXTENT OF BLOCKING WITH OWNER PRIOR TO INSTALLATION OF GWB – REFER TO SHEET A900 FOR ANTICIPATED CONFIGURATION AND EXTENT OF VISUAL DISPLAY BOARDS FOR COORDINATION OF BLOCKING REQUIREMENTS AND ITEMS INTENDED TO BE INSTALLED BY THE CONTRACTOR
061053.A4	PROVIDE BLOCKING IN WALL AS REQUIRED FOR MOUNTING OF OWNER PROVIDED FIXED PROJECTION SCREEN – COORDINATE EXTENT OF BLOCKING WITH OWNER PRIOR TO INSTALLATION OF GWB – REFER TO SHEET A900
061053.B	EXISTING CONTINUOUS WOOD BLOCKING TO REMAIN – CONFIGURATION OF BLOCKING SHOWN IN DETAIL MATCHES CONFIGURATION SHOWN IN ORIGINAL CONSTRUCTION DOCUMENTS. WE BELIEVE IT IS LIKELY THAT THE ORIENTATION OF THE INSTALLED BLOCKING WAS ROTATED FROM WHAT IS SHOWN IN THE DETAIL
061053.B2	EXISTING CONTINUOUS WOOD BLOCKING ALONG FACE OF PRECAST WALL PANELS TO REMAIN
062023.A	CLOTHES ROD AND BRACKET
062023.B	1x PAINTED SHELF CLEAT
062023.C	ADJUSTABLE SHELVING – PROVIDE 8'-0" LONG SURFACE MOUNTED ADJUSTABLE SHELVING STANDARDS AT 24" O.C. WITH BOTTOM MOUNTED AT 2'-0" AFF FOR SUPPORT OF 24" DEEP WOOD SHELVING – PROVIDE (6) ROWS OF SHELVING WITH ASSOCIATED SUPPORT BRACKETS – SHELVING TO BE FABRICATED FROM 5/8" THICK MDF WITH A 1x2 POPLAR EDGE AT FACE AND ENDS – PAINT SHELVING – PROVIDE SOLID BLOCKING IN WALL AS REQUIRED FOR PROPER ANCHORAGE OF SHELVING STANDARDS
064116.A	PLASTIC-LAMINATE-CLAD BASE CABINET – 24" DEEP – PROVIDE ADJUSTABLE SHELVING WHERE GRAPHICALLY INDICATED
064116.A2	PLASTIC-LAMINATE-CLAD SINK BASE CABINET – 24" DEEP
064116.B	PLASTIC-LAMINATE-CLAD UPPER CABINET – 14" DEEP – PROVIDE ADJUSTABLE SHELVING WHERE GRAPHICALLY INDICATED
064116.C	1 1/2" THICK PLASTIC-LAMINATE-CLAD COUNTER SUPPORT WITH 2" DIA. PASS-THRU CUT-OUT
072100.A2	1 1/2" EXTRUDED POLYSTYRENE INSULATION – EXTEND FROM FINISHED FLOOR TO TOP OF EXISTING FOOTING
072100.A3	1 1/2" EXTRUDED POLYSTYRENE INSULATION – ANCHOR TO EXISTING CMU WALL TO SERVE AS A POUR STOP FOR DOWNTURNED EDGE OF NEW TOPPING SLAB
072100.A4	1 1/2" EXTRUDED POLYSTYRENE INSULATION – EXTEND 2'-0" INTO CAVITY AROUND ALL SIDES OF OPENING
072100.A5	2" EXTRUDED POLYSTYRENE INSULATION
072100.B	EXISTING 2" CAVITY WALL INSULATION
072100.C	UNFACED BATT INSULATION (R-19)
072100.C2	EXISTING UNFACED BATT INSULATION (R-30)
072100.D	EXISTING POLYETHYLENE VAPOR RETARDER
074113.16.A	EXISTING STANDING SEAM METAL ROOF ASSEMBLY
074213.19.A	EXISTING INSULATED METAL WALL PANEL ASSEMBLY
075216.A	APP MODIFIED BITUMINOUS MEMBRANE ROOFING SYSTEM
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075216.C	POLYISOCYANURATE BOARD INSULATION – 5 1/2" THICK BASE LAYER APPLIED IN A MINIMUM OF (2) OFFSET LAYERS
075216.C2	POLYISOCYANURATE TAPERED BOARD INSULATION – PROVIDE TYPICAL 1/4-INCH PER FOOT SLOPE
075216.C3	CRICKET
075216.C4	POLYISOCYANURATE BOARD INSULATION – 3 1/2" THICK BASE LAYER APPLIED IN (2) OFFSET LAYERS
075216.D	1/4" THICK COVER BOARD
075216.E	VAPOR BARRIER
075216.F	CANT STRIP
075216.G	ROOF EXPANSION JOINT ASSEMBLY – PROVIDE MANUFACTURER'S STANDARD DETAIL AS NECESSARY TO COMPLY WITH REQUIREMENTS OF WARRANTED ASSEMBLY. PROVIDE BLOCKING, INSULATION RETAINER, INSULATION, WATERPROOFING CLOSURE MEMBRANE, SHEET METAL CAP AND ALL OTHER ACCESSORIES REQUIRED FOR A COMPLETE ASSEMBLY
075216.G2	EXISTING ROOF EXPANSION JOINT ASSEMBLY – NEW ROOF ASSEMBLY TO TIE INTO EXISTING EXPANSION JOINT ASSEMBLY

KEYNOTE MASTER LEGEND

076200.A	EXISTING 0.050" PRE-FINISHED ALUMINUM FASCIA WITH CONTINUOUS 0.040" ALUMINUM CLEAT – REMOVE AND REPLACE WITH NEW FLASHING ASSEMBLY THAT MATCHES COLOR AND PROFILE OF EXISTING ASSEMBLY
076200.A2	EXISTING 0.050" PRE-FINISHED FASCIA AND TRIM ASSEMBLY
076200.B	EXISTING 0.032" PRE-FINISHED ALUMINUM COUNTERFLASHING - PROTECT AND RETAIN
076200.C	EXISTING PRE-FINISHED 0.050" ALUMINUM GUTTER ASSEMBLY
078100.A	REPAIR AND OR RESTORE EXISTING APPLIED FIREPROOFING ASSEMBLY AS REQUIRED TO RETAIN EXISTING PROTECTION. EXISTING PRIMARY STRUCTURE IS RATED FOR 2-HOURS AND EXISTING ROOF ASSEMBLY IS RATED FOR 1-HOUR
079200.A	SEALANT WITH BACKER ROD – REFER TO SPECIFICATIONS FOR SEALANT SCHEDULE
079200.B	SEALANT – REFER TO SPECIFICATIONS FOR SEALANT SCHEDULE
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081113.B2	INSULATED HOLLOW METAL DOOR
081113.B3	EXISTING HOLLOW METAL DOOR (RELOCATED)
081113.C	THRESHOLD
081416.A	SOLID CORE WOOD VENEER DOOR – FLUSH SLAB
084113.A	EXISTING THERMALLY BROKEN ALUMINUM STOREFRONT ASSEMBLY
084113.B	NON-THERMALLY BROKEN ALUMINUM STOREFRONT ASSEMBLY
084113.C	4 1/2" x 4 1/2" VERTICAL MULLION
084113.D	ALUMINUM DOOR
088000.A	(IG-1) – 1" INSULATED SPANDREL GLAZING
088000.A2	EXISTING INSULATED GLAZING TO REMAIN – GLAZING ASSEMBLY AT MAIN ENTRY TO BE REMOVED AND REINSTALLED AS NECESSARY FOR OBTAINING CONSTRUCTION ACCESS INTO BUILDING
088000.B	(MG-1) - 1/4" CLEAR FLOAT GLASS – PROVIDE FULLY TEMPERED AT LOCATIONS IDENTIFIED AND WHERE REQUIRED BY CODE
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092216.B	3 5/8" METAL STUDS
092216.C	6" METAL STUDS
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Lancaster County
Emergency Management Agency Renovation

1200 Radcliff Street
Lincoln, NE 68512

Bidding Documents

November 3, 2017
Lancaster County Bid #17-282

Vicinity Map

Professional Seals

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N:\CURRENT PROJECTS\17004 Lancaster County Emergency Management Relocation Study\Drawing Files\1_Revit Model\17004_Architectural_Central_2019.rvt

CONCRETE - CAST IN PLACE

CONCRETE - PRECAST

GYPSUM WALLBOARD

INSULATION - PERIMETER

INSULATION - RIGID

INSULATION - SPRAY FOAM

MASONRY - BRICK

MASONRY - CMU

MASONRY - GROUT FILL

MASONRY - MORTAR NET

EARTH

GRANULAR FILL

WOOD FIBER DECKING

WOOD - FINISH

J1 PATTERNS

NO SCALE — TYPICAL ARCHITECTURAL HATCH PATTERNS

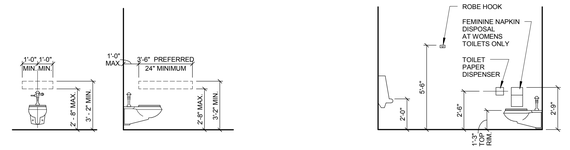
J4 ABBREVATIONS

NO SCALE — TYPICAL ARCHITECTURAL ABBREVIATIONS

ABBREVIATIONS	
@	AT
A/E	ARCHITECT / ENGINEER
ABV	ABOVE
AD	AREA DRAIN
ADDL	ADDITIONAL
ADJ	ADJUSTABLE
ADJC	ADJACENT
AFF	ABOVE FINISHED FLOOR
AFG	ABOVE FINISHED GRADE
AFS	ABOVE FINISHED SLAB
AHJ	AUTHORITY HAVING JURISDICTION
AHU	AIR HANDLING UNIT
AL	ALUMINUM
ALT	ALTERNATE
AMT	AMOUNT
ANOD	ANODIZED
AP	ACCESS PANEL
APC	ACOUSTICAL PANEL CEILING
ARCH	ARCHITECT (URAL)
ASC	ABOVE SUSPENDED CEILING
ASPH	ASPHALT
AV	AUDIO VISUAL
AWC	ACOUSTICAL WALL COVERING
AWP	ACOUSTICAL WALL PANEL
B&B	BALLED AND BURLAPPED
BAL	BALANCE
BB	BULLETIN BOARD
BC	BOTTOM OF CURB
BD	BOARD
BF	BOTH FACES
BFF	BELOW FINISHED FLOOR
BJT	BED JOINT
BLDG	BUILDING
BLK	BLOCK
BLKG	BLOCKING
BLKHD	BULKHEAD
BM	BEAM
BO	BOTTOM OF
BOC	BACK OF CURB
BOW	BOTTOM OF WALL
BP	BASE PLATE
BRG	BEARING
BRK	BRICK
BRK LDG	BRICK LEDGE
BRKT	BRACKET
BS	BOTH SIDES
BSMT	BASEMENT
BTM	BOTTOM
BUR	BUILT UP ROOF
BW	BOTH WAYS
CACMU	COLOR ADDED CMU
CAPT	CAPITAL
CJ	CONTROL OR CONTRACTION JOINT
CL	CLOSET
CLG	CEILING
CMT	CERAMIC MOSAIC TILE
CMU	CONCRETE MASONRY UNIT
COL	COLUMN
CONC	CONCRETE
COND	CONDITION
CONT	CONTINUOUS
CPT	CARPET
CRNR	CORNER
CSK	COUNTERSINK
CT	CERAMIC TILE
CW	CURTAIN WALL

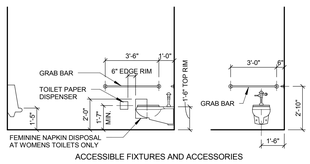
ABBREVIATIONS	
DBL	DOUBLE
DF	DRINKING FOUNTAIN
DIA	DIAMETER
DISP	DISPOSAL
DPR	DISPENSER
DRF	DECORATIVE RESINOUS FLOORING
DRWRS	DRAWERS
DS	DOWNSPOUT
DTL	DETAIL
DW	DISHWASHER
DWG	DRAWING
EA	EACH
EJ	EXPANSION JOINT
EL	ELEVATION
ELEC	ELECTRIC
ELEV	ELEVATOR
EQ	EQUAL
EW	EACH WAY
EWC	ELECTRIC WATER COOLER
EXP STR	EXPOSED STRUCTURE
EXTG	EXISTING
F.V.	FIELD VERIFY
FD	FLOOR DRAIN
FIN	FINISHED
FLR	FLOOR
FND	FOUNDATION
FT	FULLY TEMPERED GLASS
FT-AE	FT ACID ETCHED GLASS
FT-TINT	FT TINTED GLASS
GCMU	GLAZED CONCRETE MASONRY UNIT
GMU	GLAZED MASONRY UNIT
GWB	GYPSUM WALLBOARD OR GYPSUM BOARD
H	HEIGHT
HC	HOLLOW CORE
HDBD	HARDBOARD
HM	HOLLOW METAL
HORIZ	HORIZONTAL
IG	INSULATING GLASS
IG-LE	INSULATING GLASS - LOW 'E'
INSUL	INSULATION
JAN	JANITOR
JNT	JOINT
L	LENGTH
LAV	LAVATORY
LSF	LINOLEUM SHEET FLOORING
M.O.	MASONRY OPENING
MAX	MAXIMUM
MECH	MECHANICAL
MEZZ	MEZZANINE
MFR	MANUFACTURER
MIN	MINIMUM
MTL	METAL
N.I.C.	NOT IN CONTRACT
NTS	NOT TO SCALE
O.C.	ON CENTER
O.D.	OUTSIDE DIAMETER
OHD	OVERHEAD DOOR
OPNG	OPENING
OPP HAND	OPPOSITE HAND
ORD	OVERFLOW ROOF DRAIN
PLAM	PLASTIC LAMINATE
PLAS	PLASTER
PLYWD	PLYWOOD
PNT	PAINT

ABBREVIATIONS	
QT	QUARRY TILE
R	RADIUS
R.O.	ROUGH OPENING
RAF	RESILIENT ATHLETIC FLOORING
RD	ROOF DRAIN
REF	REFERENCE
REFR	REFRIGERATOR
REQ'D	REQUIRED
REST	RESTROOM
RM	ROOM
RSF	RUBBER SHEET FLOORING
RWB	THERMOSET VULCANIZED RUBBER WALL BASE
SC	SEALED CONCRETE
SECT	SECTION
SF	STOREFRONT
SHLV	SHELVING
SHT	SHEET
SIM	SIMILAR
SJ	SOFT JOINT
SLC	SOLID CORE
SRD	SECONDARY ROOF DRAIN
STL	STEEL
STN	STAIN
STOR	STORAGE
STRUCT	STRUCTURE
SV	SHEET VINYL
T.B.L.	TOP OF BRICK LEDGE
T.O.	TOP OF
T.O.W.	TOP OF WALL
THK	THICK
TP	TOILET PARTITIONS
TPR	THERMOPLASTIC RUBBER WALL BASE
TYP.	TYPICAL
U.N.O.	UNLESS NOTED OTHERWISE
VCT	VINYL COMPOSITION TILE
VERT	VERTICAL
VSF	VINYL SHEET FLOORING
VT	VINYL TILE
VWB	VINYL WALL BASE
VWC	VINYL WALL COVERING
W	WIDTH
W/	WITH
W/O	WITHOUT
WC	WATER CLOSET
WD	WOOD
WDW	WINDOW
WWF	WELDED WIRE FABRIC

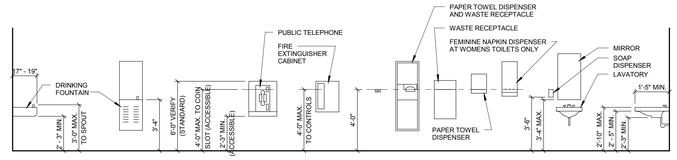


GRAB BAR REINFORCEMENT LOCATION AT WATER CLOSETS

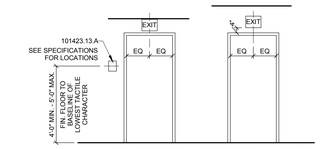
STANDARD FIXTURES AND ACCESSORIES



ACCESSIBLE FIXTURES AND ACCESSORIES



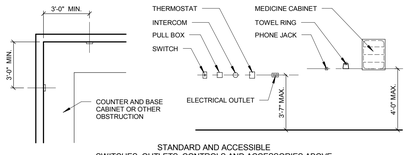
STANDARD AND ACCESSIBLE FIXTURES AND ACCESSORIES



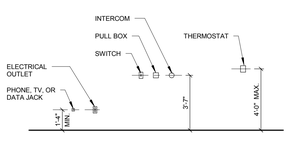
ROOM DESIGNATION AND EXIT SIGNS

ELECTRICAL SWITCHES, OUTLETS, CONTROLS AND ACCESSORIES ON WALLS OVER OBSTRUCTIONS MUST BE A MINIMUM OF 36" FROM CORNER, UNLESS OTHERWISE REQUIRED BY OTHER APPLICABLE CODES.

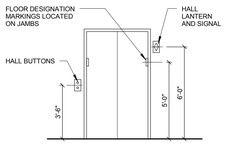
CONTACT ARCHITECT FOR ACCEPTABLE LOCATIONS OF ELECTRICAL SWITCHES , OUTLETS, AND CONTROLS ABOVE COUNTERTOPS AND OTHER OBSTRUCTIONS WHICH ARE GREATER THAN 25" IN DEPTH



STANDARD AND ACCESSIBLE SWITCHES, OUTLETS, CONTROLS AND ACCESSORIES ABOVE COUNTERTOPS AND OTHER OBSTRUCTIONS LESS THAN 25" IN DEPTH



STANDARD AND ACCESSIBLE SWITCHES, OUTLETS, AND CONTROLS



PUBLIC ELEVATOR ELEVATION

J8 MOUNTING HEIGHT GUIDELINES

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

NORTH ARROW

BUILDING SECTION
A1 — SECTION IDENTIFICATION NUMBER
A100 — SHEET NUMBER WHERE SECTION IS DRAWN

WALL SECTION
A1 — SECTION IDENTIFICATION NUMBER
A100 — SHEET NUMBER WHERE SECTION IS DRAWN

ELEVATION
A1 — ELEVATION IDENTIFICATION NUMBER
A100 — SHEET NUMBER WHERE ELEVATION IS DRAWN

DETAIL
A1 — DETAIL IDENTIFICATION NUMBER
A100 — SHEET NUMBER WHERE DETAIL IS DRAWN

A — WINDOW TYPE

1.0 — WALL TYPE

1 — REVISION NUMBER (CLOUD AROUND REVISION)

100'-0" — CONTROL POINT

T.O. MASONRY EL: 110'-8" — VERTICAL CONTROL DIMENSION

3.0 — COLUMN REFERENCE

CONTROL JOINT

103 — DOOR NUMBER

OFFICE 100 — ROOM IDENTIFICATION (ROOM NAME / ROOM NUMBER)

NOTE 1 — SPECIAL NOTE

033000.A — KEYNOTE

MATCH LINE
SHADED PORTION IS SIDE CONSIDERED

1268 — NEW OR FINISHED CONTOURS

1268 — EXISTING CONTOURS

EL. 72.2 — NEW SPOT ELEVATION

TC EL. 72.2 — TOP OF CURB

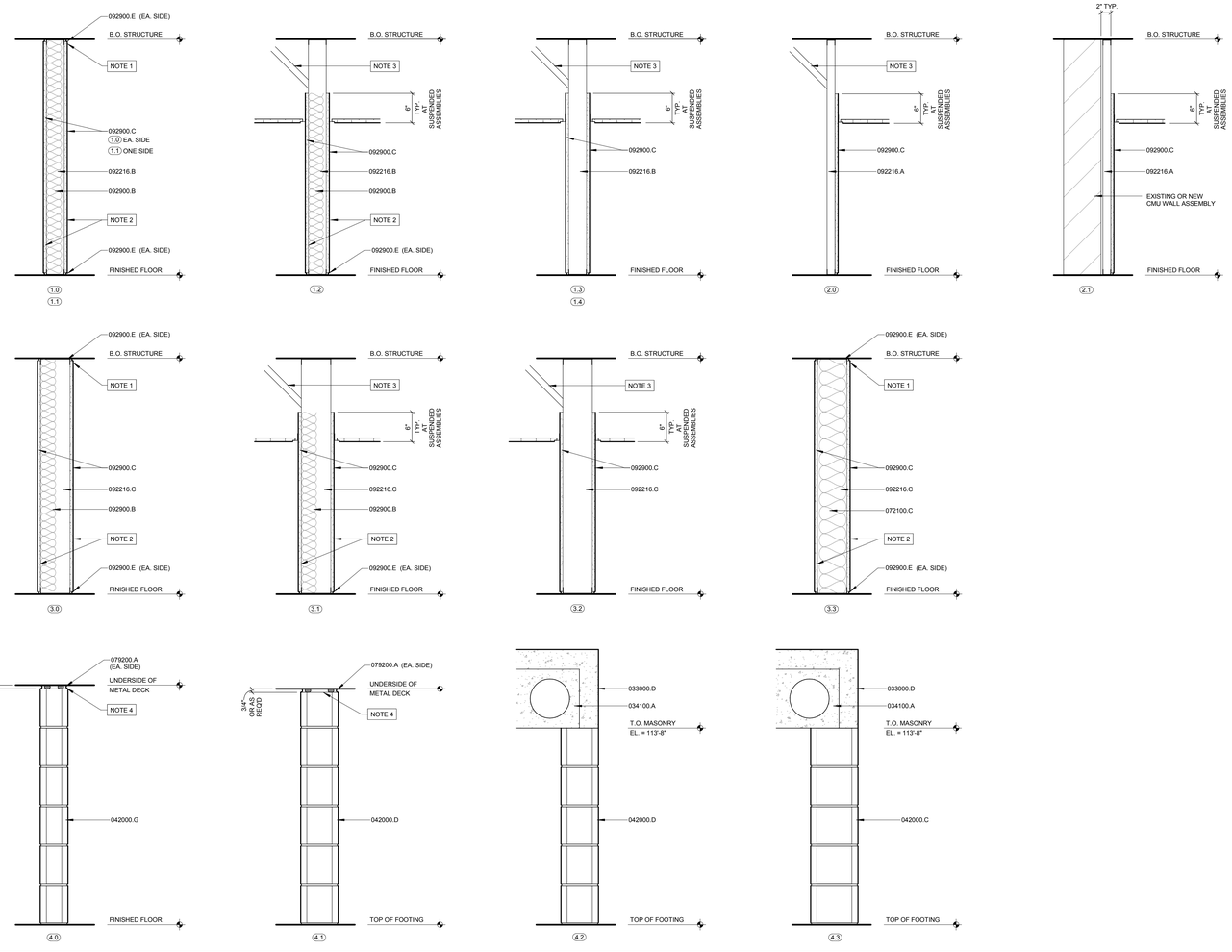
TP EL. 72.2 — TOP OF PAVEMENT

A1 SYMBOLS

NO SCALE — TYPICAL ARCHITECTURAL SYMBOLS

A4 WALL TYPES

SCALE: 1" = 1'-0"



KEYNOTE LEGEND

033000.D	4" CONCRETE TOPPING SLAB – REFER TO STRUCTURAL
034100.A	PRECAST STRUCTURAL CONCRETE (HOLLOWCORE) – REFER TO STRUCTURAL
042000.C	10" CONCRETE MASONRY UNIT
042000.D	8" CONCRETE MASONRY UNIT
042000.G	6" CONCRETE MASONRY UNIT
072100.C	UNFACED BATT INSULATION (R-19)
079200.A	SEALANT WITH BACKER ROD – REFER TO SPECIFICATIONS FOR SEALANT SCHEDULE
092216.A	1 5/8" METAL STUDS
092216.B	3 5/8" METAL STUDS
092216.C	6" METAL STUDS
092900.B	3" SOUND ATTENUATION BLANKETS
092900.C	5/8" TYPE 'X' GYPSUM WALLBOARD – REFER TO SPECIFICATIONS AND WALL TYPES FOR FURTHER DIRECTION REGARDING SPECIFIC LOCATION OF VARIOUS TYPES AND FINISH OF WALLBOARD
092900.E	ACOUSTICAL JOINT SEALANT
101423.13.A	WALL MOUNTED ROOM IDENTIFICATION SIGN

SHEET G100 SHEET SPECIFIC NOTES

NOTE 1 — CUT GWB TO CONFORM TO PROFILE OF UNDERSIDE OF STRUCTURE

NOTE 2 — PROVIDE PERIMETER AND LEAF CAULKING AT PARTITION WITH NON-HARDENING ACOUSTICALLY RATED SEALANT. SEALANT TO BE APPLIED WITH POWER TOOLS TO ENSURE BEAD PENETRATION FOR THE FULL DEPTH OF GWB

NOTE 3 — BRACE WALL AS REQUIRED TO RETAIN DEFLECTION CRITERIA OF L/360

NOTE 4 — CUT TOP OF CMU TO CONFORM TO UNDERSIDE OF METAL DECK. REFER TO STRUCTURAL DRAWINGS FOR TYPICAL REQUIREMENTS OF RETAINAGE AND SECUREMENT FOR TOP OF WALL

GENERAL NOTES

1 NOTES APPLY TO ALL TRADES AND DRAWINGS

2 ALL DIMENSIONS ARE REFERENCED FROM FACE OF FRAMING STUD, FACE OF MASONRY, FACE OF CAST-IN-PLACE CONCRETE OR FACE OF PRECAST UNLESS NOTED OTHERWISE.

3 WHERE REMOVAL OF ITEMS LEAVES A HOLE OR DAMAGED SURFACE THAT WILL BE EXPOSED IN FINISHED WORK, PATCH AND REPAIR DAMAGE TO MATCH ADJACENT FINISHED SURFACE.

4 COORDINATE WORK OF ALL OTHER TRADES WITH YOUR TRADE PRIOR TO STARTING ANY CONSTRUCTION.

5 FIELD VERIFY EXISTING CONDITIONS AND DIMENSIONS PRIOR TO COMMENCEMENT OF ANY NEW CONSTRUCTION. NOTIFY ARCHITECT IMMEDIATELY OF ANY DISCREPANCIES.

6 GENERAL CONTRACTOR SHALL BE RESPONSIBLE FOR THE COORDINATION OF THE WORK OF ALL TRADES.

7 CONSULT ARCHITECT / STRUCTURAL ENGINEER FOR ANY AND ALL LOCATIONS WHERE UNFORSEEN OR UNUSUAL STRUCTURAL CONDITIONS EXIST.

8 DO NOT SCALE DIMENSIONS FROM THESE DRAWINGS. VERIFY ALL DIMENSIONS AND REPORT ANY DISCREPANCIES TO THE ARCHITECT IMMEDIATELY.

9 PROVIDE BLOCKING IN WALLS FOR ALL BASE AND WALL CABINETS, TELEVISIONS, WALL HUNG EQUIPMENT, BATH ACCESSORIES AND WALL APPLIED DOOR HARDWARE.

10 PLUMBING / ELECTRICAL TRADES SHALL COORDINATE THEIR WORK WITH FOUNDATIONS AS REQUIRED IN MECHANICAL / ELECTRICAL SPECIFICATIONS AND NOTES. PENETRATIONS / SLEEVES SHALL BE COORDINATED WITH ARCHITECT AND STRUCTURAL ENGINEER.

REVISIONS:

DESIGN ARCHITECT: David E. Ouse
PROJECT ARCHITECT: Project Author
DRAWN BY: Author
CHECKED BY: Checker
November 3, 2017

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Lancaster County
Emergency Management Relocation / Renovation

Drawing Standards and Wall Types

COUNTY BID #
SHA PROJECT #

G100

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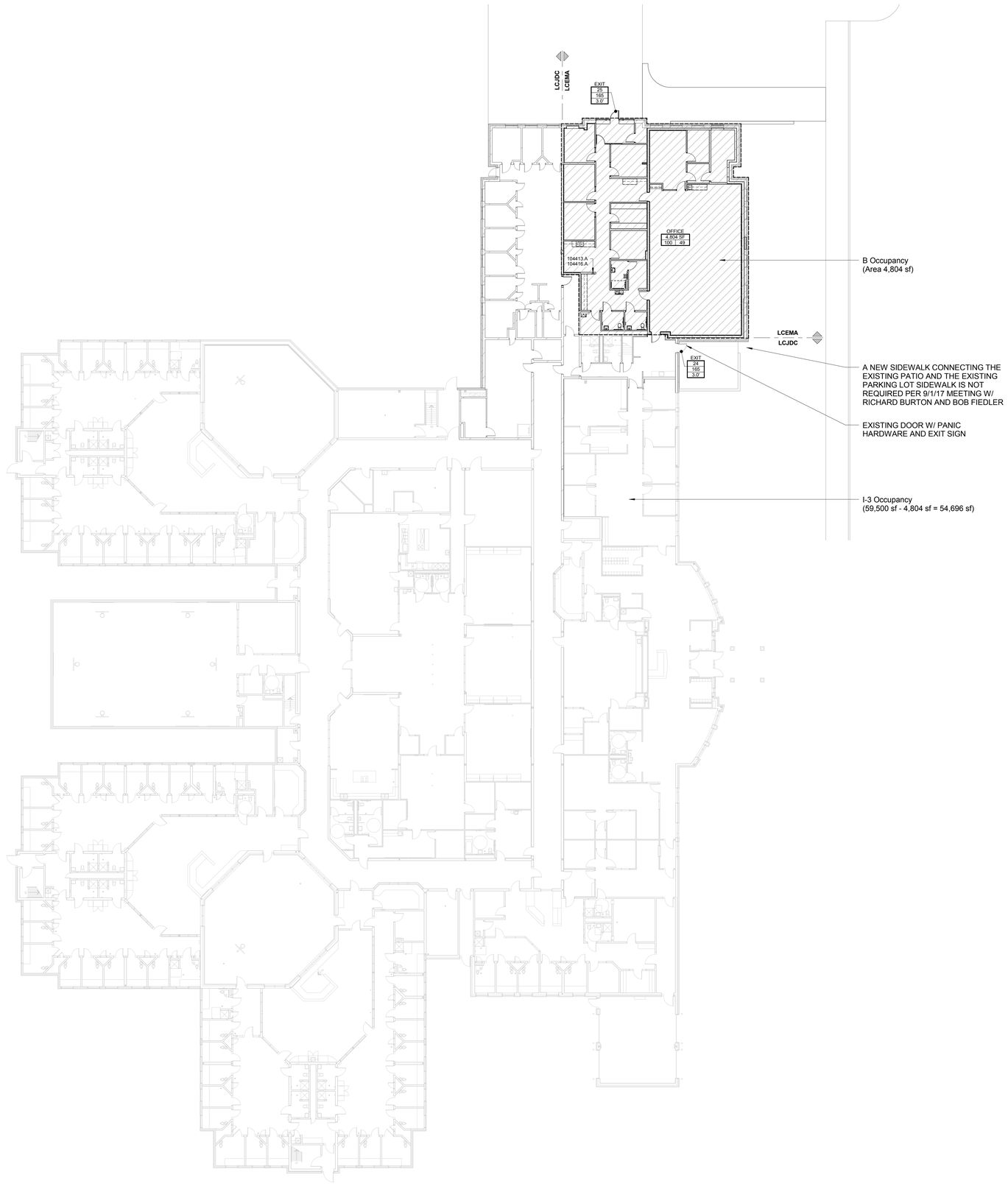


A1 LIFE SAFETY PLAN

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

International Building Code - 2012
NFPA 101 Life Safety Code - 2000

Non-Structural Building Code Information

Use and Occupancy Classification – Chapter 3

Use Description	Classification
Existing Youth Services Center	I-3
New Lancaster County EMA	B

General Building Heights and Areas – Chapter 5

Section 504 – Height:

Per Table 503 and Section 504.2 (Automatic Sprinkler Increase), the maximum building height is 3 stories and 85 feet tall based on the following occupancies:

Occupancy Classification(s)	I-3	I-3
	1997 UBC	2012 IBC
Construction Type*:	II-FR	II-A
Allowable Height in Feet (Table 503)**:	160 ft.	65 ft.
Fire Sprinkler Increase (504.2):	0 ft.	20 ft.
Maximum Height in Feet:	160 ft.	85 ft.
Allowable Stories (Table 503):	2 Stories	2 Stories
Fire Sprinkler Increase (504.2):	1 Story	1 Story
Total Allowable Stories:	3 Stories	3 Stories
Actual Building Height***:	15'-4"	15'-10"
Actual Stories:	1	1

*The original Construction Type was II-FR under the 1997 UBC. Per email correspondence with Richard Burton on 3/31/17, the 2012 IBC equivalent Construction Type would be II-A.
**Building heights and areas are based on the I-3 Occupancy Classification (most restrictive).
***The original documents listed the height as 15'-4", but the actual height of the roof edge is approximately 15'-10".

Section 506 – Area Modifications:

Per Table 503, Section 506.1 and Section 503.3, the allowable area per floor is 68,663 sf per floor with a total allowable area of 137,326 sf based on the following calculations:

Occupancy Classification(s):	I-3	I-3
	1997 UBC	2012 IBC
Construction Type:	II-FR	II-A
Tabular Allowable Area (Table 503):	15,100	15,000 sf
FRONTAGE INCREASE per Section 506.2		
Perimeter which fronts open space 'F':	N/A	1,454 ft.
Perimeter of entire building 'P':	N/A	1,757 ft.
Minimum width of open space 'W':	N/A	30 ft.
Frontage Increase Percentage (Equation):	N/A	57.75 %
AUTO SPRINKLER INCREASE per Section 506.3		
Multiplying Factor:	N/A	300%
Allowable Area Per Floor per Section 506.1	**N/A**	**68,663 sf**
Allowable Area TOTAL per Section 503.3	**181,200 sf**	**137,326 sf**

The project's actual area (SF) per floor is:
First Floor 54,696 (I-3)
First Floor 4,804 (B)

Total project area is 59,500 SF - Gross.

Types of Construction – Chapter 6

Fire Resistance Rating Requirements (Table 601):

Construction Type	Type II-FR	Type II-A
Structural Frame	2	1
Exterior Bearing Walls	4	1
Interior Bearing Walls	2	1
Exterior Non-Bearing Walls	4	0
Interior Non-Bearing Walls	N/A	0
Floor Construction	2	1
Roof Construction	1	1

Fire Resistance Exterior Walls (Table 602)

No rating for exterior walls with Fire Separation Distance > 30 ft.

Special Construction Type Req'mnts None

Fire and Smoke Protection Features – Chapter 7

Section 704 Fire-Resistance Rating of Structural Members:

The existing roof assembly is 1 HR rated and the existing existing steel roof joists are 2 HR rated. During construction, the existing Sprayed Fire-Resistive Materials (SFRM) is likely to be damaged. The Contractor is required to repair or restore the SFRM as required to maintain rating.

International Building Code - 2012
NFPA 101 Life Safety Code - 2000

Non-Structural Building Code Information

Fire Protection Systems – Chapter 9

903 – Automatic Sprinkler Systems: An automatic sprinkler system Type 13 is provided throughout the entire building.

IFC 906 – Portable Fire Extinguishers: Not generally required. Required at elevator equipment room/kitchen/special hazard - see 906.12-6.

Means of Egress – Chapter 10

1004 – Occupant Load: Occupant loads for the building are as follows:

ACTIVITY	GROUP DIVISION (CHAPTER 3)	AREA	SQ. FT / OCCUPANT (1004.1.1)	NUMBER OF OCCUPANTS
Office	B	4,804 sf (gross)	100	49
New LCEMA				

1005 – Egress Width: Egress Widths are summarized as follows:

Stair Egress Width Factor = N/A
Horizontal Egress Width Factor = 0.2*

*Egress width values are per NFPA 101, as they are more restrictive than the IBC allows.

First Floor:
Total Occupants: 49
Occupant Load Through Stairs (each): N/A
Stair Egress Width: N/A inches
Total Horizontal Egress Width Required: 10 inches
Occupant Load Through Horz. Exits 49
Req'd No. of Exits: 1

Special Exiting Requirements:

1014.3 - Common Path of Egress Travel 100 ft. in B Occupancy with fire sprinkler system. NFPA 101 has same limits.

1017.1 - Corridors in B Occupancy structures do not require fire rating with fire sprinkler system.

1017.3 - Dead end distance 50 ft. in B Occupancy with fire sprinkler system. NFPA 101 has same limits.

1019 - 1 exit is required if occupant load is < 50.

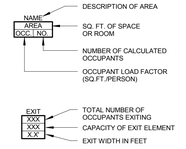
A13 CODE REVIEW SUMMARY

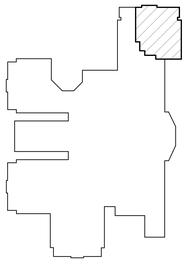
SCALE: 12" = 1'-0"

KEYNOTE LEGEND

104413.A SEMI-RECESSED FIRE EXTINGUISHER CABINET
104416.A PORTABLE FIRE EXTINGUISHER FOR INSTALLATION IN FIRE PROTECTION CABINET

LIFE SAFETY SYMBOL LEGEND





PROJECT KEY PLAN

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November 3, 2017

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Lancaster County
Emergency Management Relocation / Renovation

Code Summary and Life Safety Plan

COUNTY BID #
SHA PROJECT #

LS100

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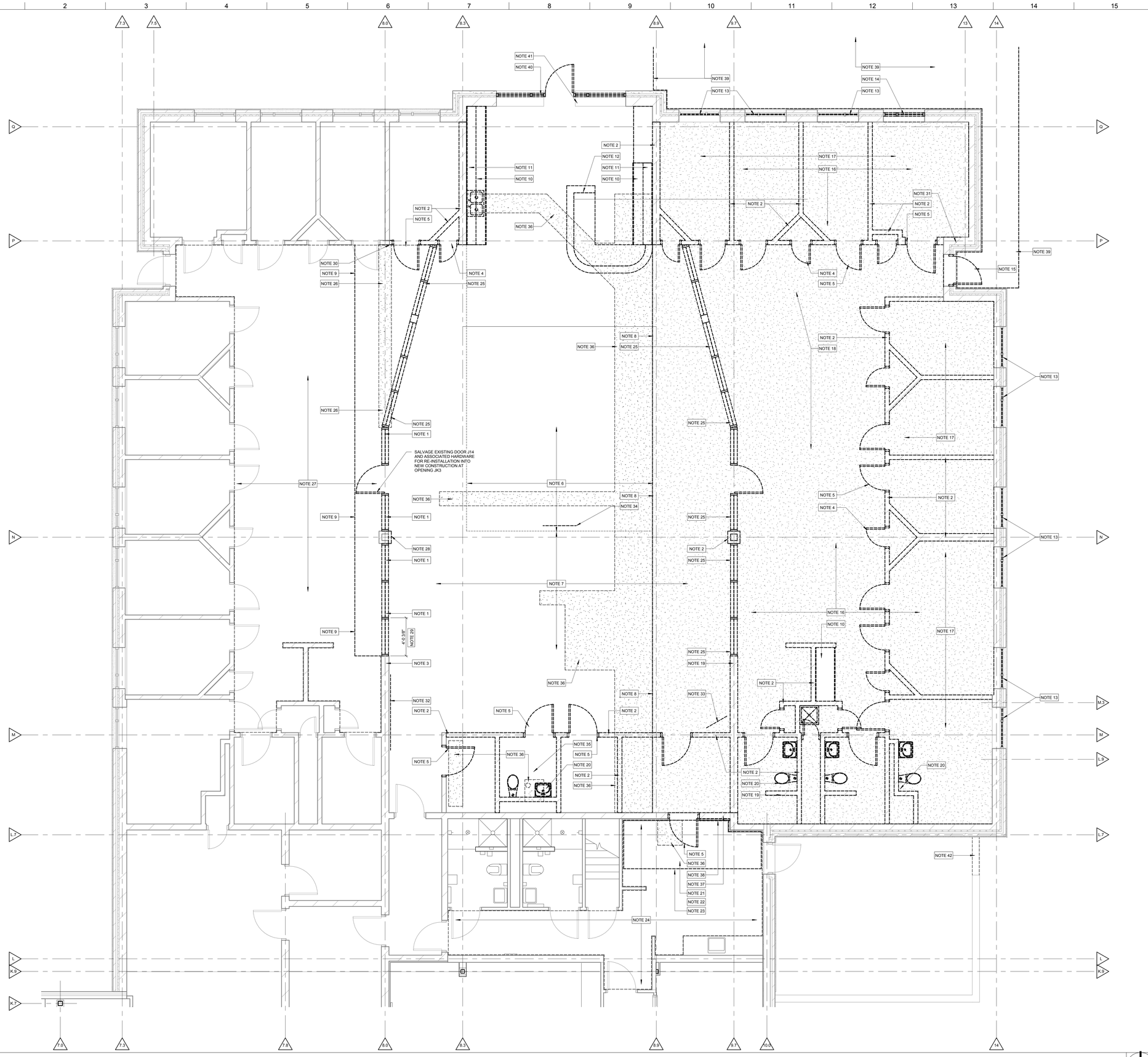

GENERAL DEMOLITION NOTES

1. THE EXISTING INFORMATION SHOWN ON THE DRAWINGS IS AS EXACT AS COULD BE SECURED INSOFAR AS BUILDING CONSTRUCTION AND EXISTING CONDITIONS ARE CONCERNED. EXTREME ACCURACY IS NOT GUARANTEED. THE DRAWINGS AND SPECIFICATIONS ARE INTENDED FOR THE ASSISTANCE OF THE CONTRACTOR IN ACHIEVING THE END RESULTS. MANY OF THE DIMENSIONS AND CONDITIONS NOTED ON THE DRAWINGS ARE BASED ON INFORMATION OBTAINED FROM THE ORIGINAL DRAWINGS AND MAY OR MAY NOT BE CORRECT. EXACT LOCATIONS, MEASUREMENTS, DISTANCES, LEVELS, ETC. WILL BE GOVERNED BY CONDITIONS AT THE JOB SITE. THE CONTRACTOR SHALL FIELD VERIFY ALL EXISTING CONDITIONS AND DIMENSIONS WHICH AFFECT WORK TO BE PERFORMED AS PART OF THIS PROJECT PRIOR TO ANY NEW CONSTRUCTION OR MATERIAL FABRICATION. ALL DIMENSIONS MUST BE FIELD VERIFIED AND SHOWN ON THE SHOP DRAWINGS OR ON A SEPARATE SUBMITTAL SO ADJUSTMENTS TO DETAILS CAN BE CONSIDERED. THE CONTRACTOR WILL BE RESPONSIBLE FOR ALL CONSTRUCTION CHANGES WHICH ARE A RESULT OF EXISTING JOB SITE CONDITIONS, AND WHICH ARE NOT ACCURATELY DOCUMENTED FOR THE OWNER IMMEDIATELY AFTER THE CONTRACTOR'S FIELD VERIFICATION EFFORTS.
2. SEE FLOOR PLANS FOR NEW CONSTRUCTION. COORDINATE ALL DEMOLITION WORK WITH ALL NEW CONSTRUCTION INDICATED.
3. ALL BOLD, DASHED LINES INDICATE EXISTING CONSTRUCTION TO BE REMOVED UNLESS NOTED OTHERWISE.
4. THESE PLANS INDICATE MAJOR ITEMS OF DEMOLITION IN THE PROJECT AND ARE NOT INTENDED TO INDICATE ALL DEMOLITION REQUIRED TO COMPLETE THE WORK. ADDITIONAL DEMOLITION MAY BE REQUIRED OF THE CONTRACTOR IN ORDER TO COMPLETE NEW CONSTRUCTION.
5. CONTRACTOR IS TO PROVIDE OPENINGS IN WALLS AS REQUIRED BY ANY NEW DUCTWORK, CONDUIT OR OTHER UTILITIES. REFER TO MECHANICAL AND ELECTRICAL PLANS FOR SIZE AND LOCATION OF POTENTIAL OPENINGS NOT SPECIFICIALLY INDICATED AS PART OF THE DEMOLITION DRAWINGS.
6. CONTRACTOR SHALL FILL ALL OPENINGS IN EXISTING FLOOR SLABS, WALLS AND CEILINGS LEFT BY THE REMOVAL OF EXISTING DUCTWORK, CONDUIT AND OTHER UTILITIES. FILL HOLES SO AS TO MATCH THE EXISTING ADJACENT CONSTRUCTION MATERIALS AND FINISHES. CONTRACTOR TO FIELD VERIFY THE SIZE, NUMBER AND LOCATION OF THESE OPENINGS.
7. REFER TO MECHANICAL, ELECTRICAL, STRUCTURAL AND CIVIL SHEETS FOR ADDITIONAL DEMOLITION SCOPE RELATING TO THOSE SPECIFIC TRADES.
8. REPAIR OR REPLACE ANY EXISTING CONSTRUCTION AND FINISHES SCHEDULED TO REMAIN WHICH ARE DAMAGED DURING DEMOLITION OPERATIONS. DAMAGED CONSTRUCTION AND FINISHES SCHEDULED TO REMAIN SHALL BE REPAIRED OR REPLACED TO MATCH EXISTING ADJACENT CONSTRUCTION.
9. UNLESS NOTED OTHERWISE, WHERE EXISTING FIXTURES, ASSEMBLIES OR EQUIPMENT ARE REMOVED, REMOVE AND CAP ASSOCIATED SERVICES IN A CONCEALED LOCATION AND AS REQUIRED FOR NEW WORK. REMOVE (OR REMOVE AND SALVAGE) ASSOCIATED CARRIERS AND MOUNTING DEVICES AS REQUIRED FOR REINSTALLATION OR NEW WORK. REFER TO AND COORDINATE WITH MECHANICAL AND ELECTRICAL.
10. SAW CUTTING OF CONCRETE BEYOND THE DIMENSIONS OF THE PLANNED OPENING IS PROHIBITED.
11. DEMOLITION DRAWINGS ONLY INDICATE PRIMARY DEMOLITION WORK. ALL ADDITIONAL INCIDENTAL DEMOLITION REQUIRED TO COMPLETE WORK IS TO BE INCLUDED AS PART OF THE OVERALL DEMOLITION EFFORT WITH NO ADDITIONAL COSTS BEING ASSESSED TO THE OWNER.
12. REPAIR AND PREPARE ALL EXISTING SURFACES ADJACENT TO DEMOLITION ITEMS AS REQUIRED TO RECEIVE NEW FINISHES.
13. THE OWNER RETAINS THE FIRST RIGHT OF SALVAGE FOR ALL ASSEMBLIES AND EQUIPMENT. IF OWNER DECLINES, THE CONTRACTOR SHALL REMOVE ITEMS FROM THE PREMISES AND DISPOSE OF PROPRLY. VERIFY OWNER'S INTENT PRIOR TO REMOVAL OR DEMOLITION.
14. REMOVE AND SALVAGE MOUNTED ITEMS AS REQUIRED BY THE WORK. REINSTALL UNLESS DIRECTED OTHERWISE BY OWNER.
15. COORDINATE RELOCATION AND STORAGE OF ANY EXISTING FURNISHINGS & EQUIPMENT (SHOWN AND NOT SHOWN) WITH OWNER PRIOR TO COMMENCEMENT OF DEMOLITION ACTIVITIES
16. MASONRY DEMOLITION SHALL ACCOMMODATE MATCHING EXISTING BOND PATTERNS.
17. ALL EXISTING MOVEABLE FURNISHINGS WILL BE REMOVED BY THE OWNER AS NEEDED FOR CONTRACTOR TO COMPLETE THE WORK. CONTRACTOR TO COORDINATE WITH OWNER. SCHEDULE FOR REMOVAL AND REINSTALLATION.
18. COMPLETELY REMOVE ALL EXISTING WALLS, WALL BASE, DOORS, FRAMES, BORROW LITES, MILLWORK, FLOORING AND CEILING ASSEMBLIES IN THE DESIGNATED AREA OF NEW CONSTRUCTION.

SHEET AD100 SHEET SPECIFIC NOTES

NOTE 1 REMOVE EXISTING HM BORROW LIGHT ASSEMBLY IN ITS ENTIRETY ALONG WITH EXISTING METAL STUD AND GWB FRAMING ABOVE HM BORROW LITE. EXISTING CMU STEM WALL TO REMAIN IN PLACE.
NOTE 2 REMOVE EXISTING CMU WALL ASSEMBLY IN ITS ENTIRETY
NOTE 3 EXISTING CMU SHEAR WALL TO REMAIN IN PLACE.
NOTE 4 REMOVE EXISTING ACCESS DOOR AND FRAME IN ITS ENTIRETY
NOTE 5 REMOVE EXISTING DOOR AND FRAME IN ITS ENTIRETY
NOTE 6 REMOVE EXISTING RUBBER FLOORING IN ITS ENTIRETY. PREP FLOOR AS REQUIRED FOR INSTALLATION OF NEW SCHEDULED FLOORING MATERIAL.
NOTE 7 REMOVE EXISTING BROADLOOM CARPETING IN ITS ENTIRETY. PREP FLOOR AS REQUIRED FOR INSTALL OF NEW SCHEDULED FLOORING MATERIAL.
NOTE 8 REMOVE EXISTING 5" CONCRETE FLOOR SLAB, 3" GRANULAR BASE AND VAPOR BARRIER IN THEIR ENTIRETY FROM THIS POINT EAST. IN THIS SAME AREA, REMOVE AN ADDITIONAL 8" OF EXISTING SUBGRADE AS NECESSARY FOR INSTALLATION OF NEW DEPRESSED FLOOR ASSEMBLY INDICATED.
NOTE 9 REMOVE PORTION OF EXISTING SUSPENDED CEILING ASSEMBLY AS REQUIRED FOR INSTALLATION OF NEW WALL ASSEMBLIES. SALVAGE EXISTING TILES AND GRID AS NEEDED FOR RECONFIGURATION AND REINSTALLATION BACK INTO EXISTING ASSEMBLY.
NOTE 10 REMOVE EXISTING BASE CABINETS, COUNTERS AND UPPER CABINETS AND ASSOCIATED ACCESSORIES IN THEIR ENTIRETY.
NOTE 11 REMOVE EXISTING GWB SOFFIT IN ITS ENTIRETY.
NOTE 12 REMOVE EXISTING BUILT-IN WORKSTATION IN ITS ENTIRETY.
NOTE 13 REMOVE EXISTING INSULATED GLAZING UNITS AND REPLACE W/ INSULATED SPANDREL AS SPECIFIED.
NOTE 14 REMOVE EXISTING STOREFRONT FRAMING ASSEMBLY IN ITS ENTIRETY AND REPLACE WITH NEW HURRICANE RATED MECHANICAL LOUVER AS SPECIFIED.
NOTE 15 REMOVE EXISTING HM DOOR AND FRAME ASSEMBLY IN ITS ENTIRETY AND REPLACE WITH NEW HURRICANE RATED MECHANICAL LOUVER AS SPECIFIED.
NOTE 16 REMOVE EXISTING BROADLOOM CARPETING IN ITS ENTIRETY.
NOTE 17 REMOVE EXISTING GWB CEILING ASSEMBLY IN ITS ENTIRETY.
NOTE 18 REMOVE EXISTING SUSPENDED APC CEILING ASSEMBLY IN ITS ENTIRETY.
NOTE 19 REMOVE EXISTING CMU SHEAR WALL IN ITS ENTIRETY. COORDINATE REMOVAL WITH STRUCTURAL REQUIREMENTS.
NOTE 20 REMOVE EXISTING PLUMBING FIXTURES IN THEIR ENTIRETY. CAP ALL PLUMBING LINES. COORDINATE WITH MECHANICAL DEMOLITION REQUIREMENTS.
NOTE 21 REMOVE AND SALVAGE PORTION OF EXISTING CEILING GRID, CEILING PADS, LIGHT FIXTURES, MECHANICAL DIFFUSERS AND OTHER CEILING DEVICES AS REQUIRED TO PROVIDE ACCESS TO EXISTING STRUCTURE FOR REQUIRED STRUCTURAL MODIFICATIONS TO ACCOMMODATE NEW CONSTRUCTION. CONTRACTOR WILL BE REQUIRED TO REINSTALL SALVAGED MATERIAL BACK INTO EXISTING SPACE.
NOTE 22 PROTECT EXISTING FLOORING DURING PERIODS WHERE CONSTRUCTION ACTIVITIES WILL OCCUR IN THIS AREA.
NOTE 23 PROVIDE TEMPORARY PARTITION WALL AS REQUIRED TO SEPARATE DEMOLITION CONSTRUCTION FROM EXISTING FINISHED AREA. CONTRACTOR TO COORDINATE WORK IN THIS AREA WITH THE DIRECTOR OF THE YOUTH SERVICES CENTER.
NOTE 24 REMOVE EXISTING RUBBER SHEET FLOORING AND EXISTING RUBBER WALL BASE IN ITS ENTIRETY. PREPARE EXISTING SUBSTRATE AS REQUIRED FOR INSTALLATION OF NEW RUBBER SHEET FLOORING
NOTE 25 REMOVE EXISTING HM BORROW LIGHT ASSEMBLY IN ITS ENTIRETY ALONG WITH EXISTING CMU STEM WALL BELOW AND EXISTING GWB AND METAL STUD FRAMING ABOVE. REMOVE CMU DOWN TO TOP OF EXISTING FOOTING BELOW. FOOTING MAY REMAIN IN PLACE.
NOTE 26 SAW CUT EXISTING CMU FLOOR ASSEMBLY AS NEEDED FOR INSTALLATION OF NEW FOOTING ASSOCIATED WITH NEW CMU WALL ASSEMBLY. PATCH CONCRETE FLOOR TO MATCH ADJACENT.
NOTE 27 REMOVE EXITG. BROADLOOM CARPETING AND EXISTING RUBBER WALL BASE IN ITS ENTIRETY. PROVIDE CLEAN TRANSITION AT ADJACENT FLOORING SCHEDULED TO REMAIN. PREP FLOOR AS REQUIRED FOR INSTALLATION OF NEW SCHEDULED FLOORING MATERIAL.
NOTE 28 REMOVE PORTION OF EXISTING CMU WALL ASSEMBLY. RETAIN NORTH, WEST AND SOUTH EDGES.
NOTE 29 REMOVE EXISTING CMU STEM WALL TO A POINT AT LEAST 4" BELOW FINISHED FLOOR.
NOTE 30 SAW CUT EXISTING CMU WALL IN LINE WITH EAST FACE OF EXISTING INTERIOR WALL.
NOTE 31 EXISTING STEEL ROOF BEAM EXTENDS OVER TOP OF EXTERIOR CMU WALL ASSEMBLY UP TO GRID INTERSECTION 13/P. PROVIDE SUPPORT FOR EXISTING BRICK VENEER AND OR SALVAGE VENEER AS NECESSARY FOR RE-INSTALLATION TO MATCH ADJACENT EXISTING CONDITIONS.
NOTE 32 REMOVE AND SALVAGE EXISTING MARKERBOARD ASSEMBLY. TURN OVER TO YOUTH SERVICES CENTER.
NOTE 33 REMOVE AND SALVAGE EXISTING TV AND AV EQUIPMENT WITH ASSOCIATED MOUNTING BRACKETS. TURN OVER TO YOUTH SERVICES.
NOTE 34 REMOVE AND SALVAGE EXISTING WALL MOUNTED BACKBOARD & FRAME. TURN OVER TO YOUTH SERVICES.
NOTE 35 REMOVE EXISTING TILE FLOOR COVERING. PREP FLOOR AS REQUIRED TO RECEIVE NEW FLOOR COVERINGS.
NOTE 36 REMOVE AND REPLACE EXISTING SLAB ON GRADE AS REQUIRED TO MODIFY EXISTING UNDERGROUND PLUMING AS SHOWN ON SHEET MD200.
NOTE 37 CUT NEW OPENING IN WALL FOR INSTALLATION OF NEW FEMA RATED DOOR ASSEMBLY. REFER TO STRUCTURAL DRAWINGS FOR NEW LINTEL AT EXISTING CMU WALL. REMOVE TO INSIDE CORNER.
NOTE 38 REMOVE AND RELOCATE EXISTING WALL MOUNTED PHONE AND VISUAL DISPLAY UNIT.
NOTE 39 REFER TO A1/A200 FOR SITE DEMOLITION INFORMATION
NOTE 40 REMOVE AND REINSTALL EXISTING CURTAINWALL ASSEMBLY IN ITS ENTIRETY AS NEEDED FOR CONSTRUCTION EQUIPMENT ACCESS IN AND OUT OF FACILITY DURING CONSTRUCTION OPERATIONS.
NOTE 41 REMOVE AND REPLACE EXISTING CMU WALL BELOW CURTAINWALL AS REQUIRED FOR CONSTRUCTION EQUIPMENT ACCESS.
NOTE 42 REMOVE EXISTING PARTIAL HEIGHT BRICK SITE WALL. SALVAGE BRICK UNITS FOR REPAIRS INDICATED IN NEW CONSTRUCTION.

A1 DEMOLITION PLAN
SCALE: 1/4" = 1'-0"

DESIGN ARCHITECT: David E. Ouse
PROJECT ARCHITECT: Dustin Sinclair
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ISSUED: November 3, 2017

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Lancaster County
Emergency Management Relocation / Renovation

Demolition Plan

COUNTY BID #
SHA PROJECT #

AD100

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KEYNOTE LEGEND

033000.F	1'-0" WIDE CONCRETE SITE WALL – REFER TO STRUCTURAL FOR REINFORCING REQUIREMENTS
061053.A2	PROVIDE BLOCKING IN WALL AS REQUIRED FOR MOUNTING OF OWNER PROVIDED TELEVISION MOUNT
061053.A3	PROVIDE BLOCKING IN WALL AS REQUIRED FOR MOUNTING OF OWNER PROVIDED VISUAL DISPLAY BOARD – COORDINATE EXTENT OF BLOCKING WITH OWNER PRIOR TO INSTALLATION OF GWB – REFER TO SHEET A900 FOR ANTICIPATED CONFIGURATION AND EXTENT OF VISUAL DISPLAY BOARDS FOR COORDINATION OF BLOCKING REQUIREMENTS AND ITEMS INTENDED TO BE INSTALLED BY THE CONTRACTOR
061053.A4	PROVIDE BLOCKING IN WALL AS REQUIRED FOR MOUNTING OF OWNER PROVIDED FIXED PROJECTION SCREEN – COORDINATE EXTENT OF BLOCKING WITH OWNER PRIOR TO INSTALLATION OF GWB – REFER TO SHEET A900
062023.C	ADJUSTABLE SHELVING – PROVIDE 8'-0" LONG SURFACE MOUNTED ADJUSTABLE SHELVING STANDARDS AT 24" O.C. WITH BOTTOM MOUNTED AT 2'-0" AFF FOR SUPPORT OF 24" DEEP WOOD SHELVING – PROVIDE (6) ROWS OF SHELVING WITH ASSOCIATED SUPPORT BRACKETS – SHELVING TO BE FABRICATED FROM 5/8" THICK MDF WITH A 1x2 POPLAR EDGE AT FACE AND ENDS – PAINT SHELVING – PROVIDE SOLID BLOCKING IN WALL AS REQUIRED FOR PROPER ANCHORAGE OF SHELVING STANDARDS
081113.C	THRESHOLD
088000.A	(IG-1) – 1" INSULATED SPANDREL GLAZING
102800.A	TOILET TISSUE DISPENSER – TYPICAL AT ALL TOILETS
102800.B	GRAB BAR – 42" LENGTH
102800.B2	GRAB BAR – 36" LENGTH
102800.C	FRAMELESS MIRROR – 18x36
102800.D	SOAP DISPENSER – PROVIDED AND INSTALLED BY OWNER
102800.E	WALL MOUNTED PAPER TOWEL DISPENSER
102800.F	WASTE RECEPTACLE – PROVIDED AND INSTALLED BY OWNER
102800.G	SHOWER CURTAIN ROD AND CURTAIN
102800.H	TOWEL BAR – 24" LENGTH
102800.J	ROBE HOOK
102800.K	FOLD-UP SHOWER SEAT
102800.L	MOP AND BROOM HOLDER RACK
123661.A	1/2" THICK SOLID SURFACE WINDOW SILL WITH 3/8" OVERHANG FROM FACE OF WALL TYPICAL – RADIUS EXPOSED EDGE (SS-1)
224000.A	BOTTLE FILLING STATION – REFER TO MECHANICAL
224000.B	MOP SERVICE BASIN – REFER TO MECHANICAL
224000.C	FLOOR DRAIN – REFER TO MECHANICAL
260500.A	IN-FLOOR ELECTRICAL DEVICE

SHEET A100 SHEET SPECIFIC NOTES

NOTE 1 CMU INFILL REQUIRED WHERE EXISTING STRUCTURAL STEEL ROOF BEAM HAS BEEN REMOVED. INFILL 8" CMU UP TO ELEVATION 115'-4" TO MATCH ADJACENT EXISTING CONDITIONS.

NOTE 3 PROVIDE ONE GRIMMET IN COUNTERTOP AT EACH KNEE SPACE (THREE TOTAL)

NOTE 4 CONTRACTOR SHALL PROVIDE AND INSTALL WOOD BLOCKING IN WALL AS REQUIRED FOR WALL MOUNTED TELEVISION. REFER TO SHEET A900 FOR TELEVISION INFORMATION. REFER TO ELECTRICAL FOR MOUNTING HEIGHTS

NOTE 5 ADA-COMPLIANT SHOWER ENCLOSURE WITH THREE GRAB BARS AND SHOWER CURTAIN ROD - REFER TO MECHANICAL. VERIFY FRAMING DIMENSIONS WITH SHOWER ENCLOSURE

NOTE 6 DASHED LINES REPRESENT ADA DOOR CLEAR FLOOR AREA (60" L x 48" W)

NOTE 7 DASHED LINES REPRESENT ADA DOOR CLEAR FLOOR AREA (48" L x 36" W)

NOTE 8 DASHED LINES REPRESENT ADA SHOWER COMPARTMENT CLEAR FLOOR AREA (60" L x 30" W)

NOTE 9 WIDTH OF THRESHOLD AS REQUIRED TO COVER INSULATION BELOW AND OVERLAP CONCRETE SLAB AT MECHANICAL 119

NOTE 10 CONTROL POINT FOR LAYOUT OF RAISED FLOOR ASSEMBLY

NOTE 11 REINSTALL SALVAGED CURTAINWALL FRAMING ASSEMBLY BACK INTO EXISTING OPENING.

NOTE 12 RECONSTRUCT NEW PARTIAL HEIGHT, FULLY GROUTED CMU AND REINSTALL SALVAGED PRECAST VENEER AT SAME LOCATION WHERE REMOVED FOR ACCESS TO CONSTRUCTION OPERATIONS.

NOTE 13 PATCH EXISTING BRICK VENEER WHERE PARTIAL HEIGHT WALL WAS REMOVED DURING DEMOLITION WITH SALVAGED BRICK FROM DEMOLISHED WALL ASSEMBLY. TOOTH BRICK INTO EXISTING COURSING

NOTE 14 EDGE OF MECHANICAL ROOM SLAB TO ALIGN WITH INSIDE FACE OF NEW CMU WALL.

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Floor Plan

COUNTY BID # 17-282
SHA PROJECT # 17004

A100

PROJECT KEY PLAN

A1 FLOOR PLAN
SCALE: 1/4" = 1'-0"

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075216.B
NO WORK IS SCHEDULED FOR THIS AREA
EXISTING ROOF ASSEMBLY TO REMAIN AS IS

075216.B
NO WORK IS SCHEDULED FOR THIS AREA
EXISTING ROOF ASSEMBLY TO REMAIN AS IS

NOTE 8

3" / 12"

3" / 12"

STRUCTURE

FD

RD

KEYNOTE LEGEND

075216.A	APP MODIFIED BITUMINOUS MEMBRANE ROOFING SYSTEM
075216.B	EXISTING APP MODIFIED BITUMINOUS MEMBRANE ROOFING SYSTEM – PROTECT EXISTING ROOFING ASSEMBLY AS REQUIRED TO MAINTAIN EXISTING ROOFING WARRANTY
075216.C	POLYISOCYANURATE BOARD INSULATION – 5 1/2" THICK BASE LAYER APPLIED IN A MINIMUM OF (2) OFFSET LAYERS
075216.C2	POLYISOCYANURATE TAPERED BOARD INSULATION – PROVIDE TYPICAL 1/4-INCH PER FOOT SLOPE
075216.C3	CRICKET
075216.C4	POLYISOCYANURATE BOARD INSULATION – 3 1/2" THICK BASE LAYER APPLIED IN (2) OFFSET LAYERS
075216.D	1/4" THICK COVER BOARD
075216.G	ROOF EXPANSION JOINT ASSEMBLY – PROVIDE MANUFACTURER'S STANDARD DETAIL AS NECESSARY TO COMPLY WITH REQUIREMENTS OF WARRANTED ASSEMBLY. PROVIDE BLOCKING, INSULATION RETAINER, INSULATION, WATERPROOFING CLOSURE MEMBRANE, SHEET METAL CAP AND ALL OTHER ACCESSORIES REQUIRED FOR A COMPLETE ASSEMBLY

SHEET A101 SHEET SPECIFIC NOTES

NOTE 1 DESIGN INTENT IS TO RETAIN EXISTING PERIMETER ROOF EDGE BLOCKING AND PRE-FINISHED ALUMINUM FASCIA. NEW ROOFING ASSEMBLY TO BE BROUGHT UP TO ALIGN WITH THE TOP OF EXISTING ROOF EDGE BLOCKING.

NOTE 2 DASHED LINE IDENTIFIES APPROXIMATE LOCATION OF INSIDE FACE OF EXISTING EXTERIOR CMU WALL - SCHEDULED TO REMAIN.

NOTE 3 DASHED LINE REPRESENTS APPROXIMATE LOCATION OF EXTERIOR PRECAST WALL PANEL AT CLERESTORY WALL.

NOTE 4 DASHED LINES INDICATE APPROXIMATE LOCATION OF EXISTING STEEL BAR JOISTS.

NOTE 5 EXISTING STEEL BAR JOISTS ARE TO BE SHORED AND MODIFIED AS INDICATED IN STRUCTURAL DETAILS. DESIGN INTENT IS TO RETAIN EXISTING ELEVATIONS OF SLOPED JOISTS AND ASSOCIATED METAL DECKING.

NOTE 6 ROOFING MANUFACTURER'S TYPICAL DETAILS WOULD INDICATE NEED FOR A ROOF EXPANSION JOINT AT LOCATION WHERE ROOF SUBSTRATE CHANGES FROM METAL DECK TO CONCRETE DECK. EXISTING METAL DECK STRUCTURE SLOPES TOWARD THE NORTH AND INSTALLATION OF A ROOF EXPANSION JOINT BETWEEN THE EXISTING/MODIFIED METAL DECK ASSEMBLY AND NEW PRECAST/CONCRETE TOPPING ASSEMBLY WILL REQUIRE THE ADDITION OF A ROOF DRAIN IN THIS AREA. TO FACILITATE DRAINAGE OF THIS ASSEMBLY BETWEEN THE ROOF EXPANSION JOINTS AT GRIDS L AND L.7, TAPERED INSULATION WILL BE NECESSARY FOR SLOPE BACK TOWARD DRAIN.

NOTE 7 HEAVY DASHED LINE REPRESENTS LOCATION OF EXISTING STEEL ROOF JOIST SCHEDULED TO BE MODIFIED AS SHOWN ON STRUCTURAL DRAWINGS.

NOTE 8 REMOVE EXISTING SEALANT AT PRECAST CONCRETE PANELS (BELOW ROOF OVERHANG) AND REPLACE WITH NEW SEALANT. PREPARE EXISTING PRECAST CONCRETE SURFACE AS REQUIRED FOR INSTALLATION OF NEW SEALANT (TYP. ALL LOCATIONS OF ALL FACADES)

NOTE 9 COMMUNICATIONS TOWER. REFER TO ELECTRICAL DRAWINGS FOR SPECIFIED TOWER TO BE PROVIDED AND INSTALLED BY ELECTRICAL SUB-CONTRACTOR. REFER TO STRUCTURAL DRAWINGS FOR GALAVINIZED STEEL SUPPORT ASSEMBLY TO BE IN PLACE FOR MOUNTING OF TOWER TO ROOF STRUCTURE. BASE OF TOWER TO BE APPROXIMATELY 2'-0" ABOVE TOPPING SLAB OF ROOF ASSEMBLY. PROVIDE FLASHING AT ROOF PENETRATIONS IN COMPLIANCE WITH ROOFING MANUFACTUER'S WARRANTY.

ROOF LEGEND

INDICATES DIRECTION OF TAPERED INSULATION SLOPE

INDICATES DIRECTION OF STRUCTURAL SLOPE. SLOPE UTILIZED IN LIEU OF TAPERED INSULATION FOR DRAINAGE PURPOSES.

RD INDICATES LOCATION OF ROOF DRAIN - REFER TO MECHANICAL DRAWINGS FOR ADDITIONAL INFORMATION.

+ 2 1/4" INDICATES THICKNESS OF ROOF INSULATION ABOVE TOP OF ROOF DECK MATERIAL.

(115'-0") INDICATES ELEVATION AT BASE OF ROOF INSULATION ASSEMBLY

BOPC INDICATES ELEVATION FOR BOTTOM OF PRECAST

REVISIONS

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PROJECT ARCHITECT: Daniel Clark
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ISSUED: November 3, 2017

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Lancaster County
Emergency Management Relocation / Renovation

Roof Plan

COUNTY BID #
SHA PROJECT #

A101

A1 ROOF PLAN
SCALE: 1/4" = 1'-0"

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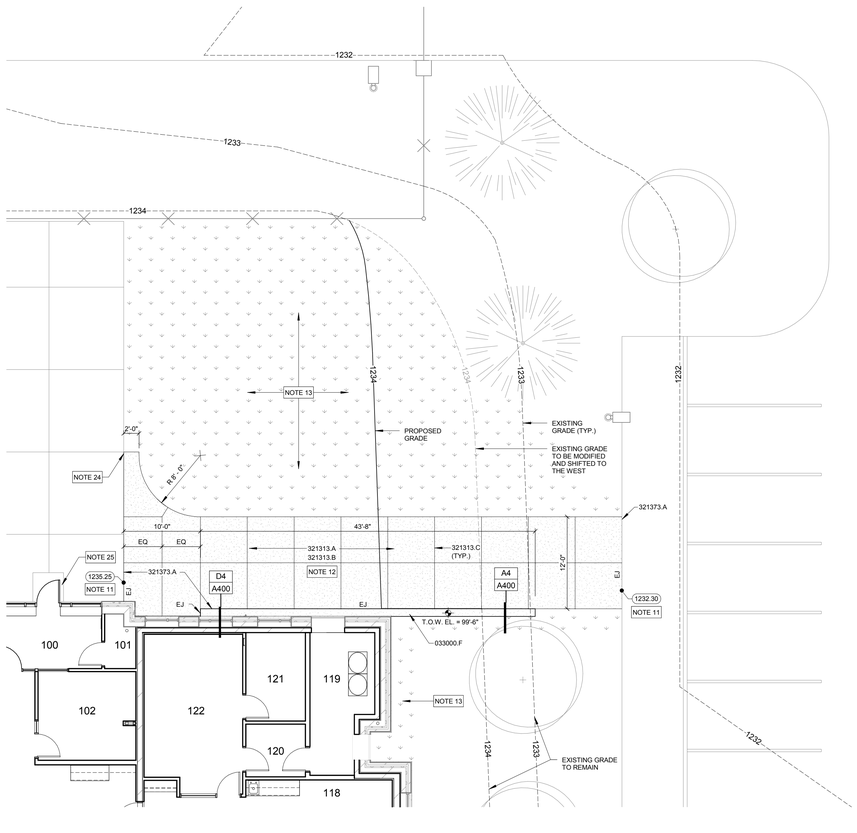
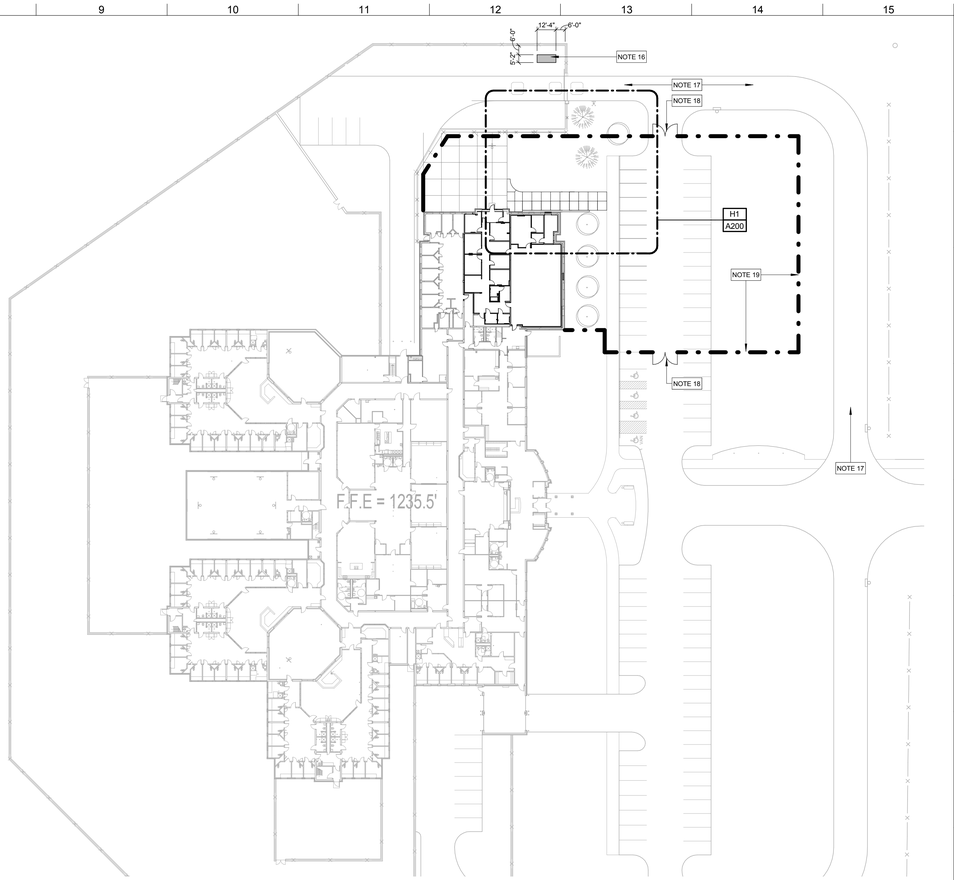


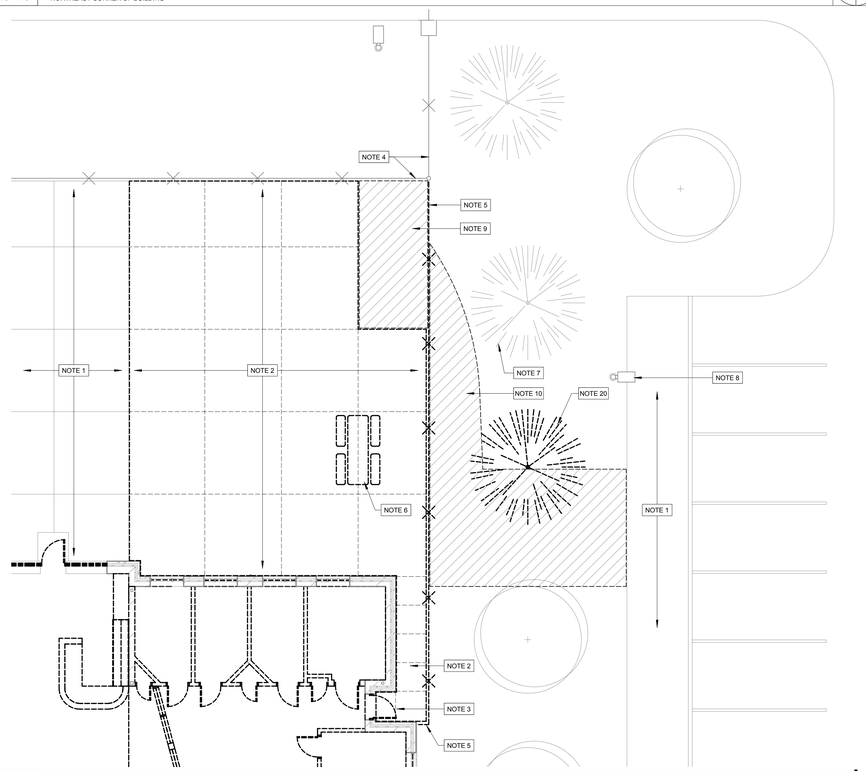
H1 SITE CONSTRUCTION PLAN

SCALE: 1/8" = 1'-0" NORTHEAST CORNER OF BUILDING



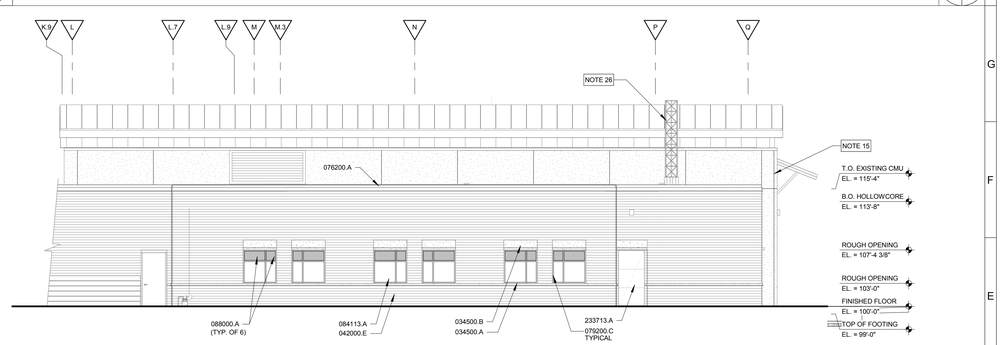
H8 SITE PLAN

SCALE: 1" = 40'-0"



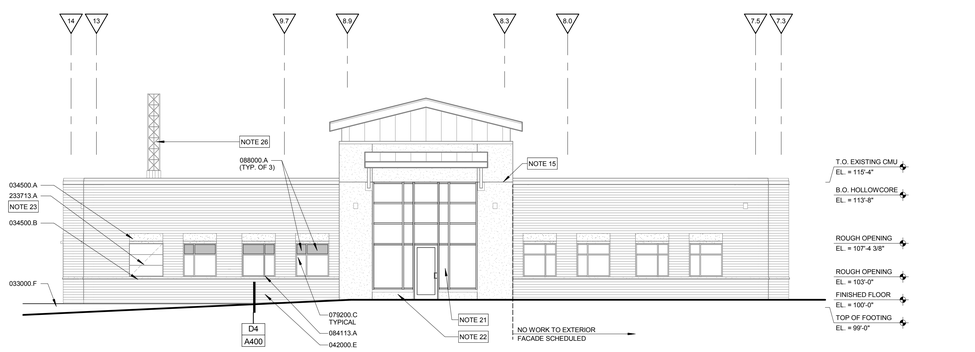
A1 SITE DEMOLITION PLAN

SCALE: 1/8" = 1'-0" NORTHEAST CORNER OF BUILDING



D8 EXTERIOR ELEVATION

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



A8 EXTERIOR ELEVATION

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

KEYNOTE LEGEND

033000.F	1'-0" WIDE CONCRETE SITE WALL – REFER TO STRUCTURAL FOR REINFORCING REQUIREMENTS
034500.A	EXISTING ARCHITECTURAL PRECAST SILL
034500.B	EXISTING ARCHITECTURAL PRECAST LINTEL
042000.E	EXISTING ECONOMY BRICK
076200.A	EXISTING 0.050" PRE-FINISHED ALUMINUM FASCIA WITH CONTINUOUS 0.040" ALUMINUM CLEAT – REMOVE AND REPLACE WITH NEW FLASHING ASSEMBLY THAT MATCHES COLOR AND PROFILE OF EXISTING ASSEMBLY
079200.C	REMOVE AND REPLACE EXISTING BACKER ROD AND SEALANT AROUND ENTIRE WINDOW ASSEMBLY – REFER TO SPECIFICATIONS FOR SEALANT SCHEDULE
084113.A	EXISTING THERMALLY BROKEN ALUMINUM STOREFRONT ASSEMBLY
088000.A	(IG-1) – 1" INSULATED SPANDREL GLAZING
233713.A	FEMA RATED MECHANICAL LOUVER – REFER TO MECHANICAL – COORDINATE SIZE OF LOUVER WITH ROUGH OPENING. COORDINATE LOUVER ATTACHMENT WITH STRUCTURAL ANGLE
321313.A	5" CONCRETE PAVING WITH 6x6 WWF – W1.4 x W1.4 AT CENTER OF CONCRETE
321313.B	GRANULAR SUBBASE
321313.C	CONTROL JOINT – 1/4" W x 1/3 DEPTH OF SLAB
321373.A	ELASTOMERIC PAVING SEALANT WITH BACKER ROD AND BOND BREAK

SHEET A200 SHEET SPECIFIC NOTES

NOTE 1 EXISTING CONCRETE SIDEWALK TO REMAIN

NOTE 2 REMOVE EXISTING CONCRETE SIDEWALK TO CONTROL JOINT AS SHOWN. PREPARE GRADE AS REQUIRED FOR INSTALLATION OF NEW CONCRETE SIDEWALK OR TURF GRASS

NOTE 3 REMOVE EXISTING CONCRETE STOOP IN ITS ENTIRETY

NOTE 4 EXISTING CHAIN LINK FENCE TO REMAIN

NOTE 5 REMOVE EXISTING 12'-0" HIGH CHAIN LINK FENCE, CONCRETE FOOTINGS AND CONCRETE MOWSTRIP IN ITS ENTIRETY. SALVAGE AND TURN OVER FENCE TO OWNER. PLANT NEW TURF GRASS AS REQ'D TO MATCH EXISTING ADJACENT TURF GRASS

NOTE 6 REMOVE EXISTING PICNIC TABLE, SALVAGE AND TURN OVER TO OWNER

NOTE 7 EXISTING TREE TO REMAIN (TYPICAL). PROTECT TREE THROUGHOUT DURATION OF CONSTRUCTION.

NOTE 8 EXISTING POLE-MOUNTED STREET LIGHT TO REMAIN (TYP.)

NOTE 9 REMOVE EXISTING PLANTING BED AND PREPARE GRADE AS REQUIRED FOR INSTALLATION OF NEW TURF GRASS

NOTE 10 REMOVE EXISTING TURF GRASS AS REQUIRED FOR INSTALLATION OF NEW CONCRETE PAVING OR TURF GRASS

NOTE 11 APPROXIMATE ELEVATION OF EXISTING CONCRETE SIDEWALK (FV). MATCH ELEVATION

NOTE 12 RUNNING SLOPE OF SIDEWALK NOT TO EXCEED 1:20. CROSS SLOPE OF SIDEWALK NOT TO EXCEED 1:48

NOTE 13 NEW TURF GRASS TO MATCH EXISTING ADJACENT TURF GRASS

NOTE 15 REMOVE EXISTING SEALANT AT PRECAST CONCRETE PANELS AND REPLACE WITH NEW SEALANT. PREPARE EXISTING PRECAST CONCRETE SURFACE AS REQUIRED FOR INSTALLATION OF NEW SEALANT (TYP. ALL LOCATIONS OF ALL FACADES)

NOTE 16 NEW FEMA RATED GENERATOR - REFER TO ELECTRICAL DRAWINGS FOR ADDITIONAL INFORMATION

NOTE 17 SERVICE DRIVE TO REMAIN OPEN AND ACCESSIBLE FOR DELIVERY OPERATIONS ASSOCIATED WITH THE YOUTH SERVICES CENTER. CONTRACTOR MAY STILL USE DRIVE FOR CIRCULATION PURPOSES BUT MUST BE SURE TO COORDINATE WITH YOUTH SERVICES DIRECTOR.

NOTE 18 CONSTRUCTION GATE

NOTE 19 GENERAL BOUNDARY OF CONSTRUCTION LIMITS. CONTRACTOR TO PROVIDE FENCING AS NECESSARY TO ENCLOSE PERIMETER OF CONSTRUCTION LIMITS.

NOTE 20 REMOVE EXISTING TREE AND REPLANT AT A LOCATION ON THE SOUTH EDGE OF PROPERTY AS DIRECTED BY YOUTH SERVICES CENTER. PREPARE GRADE AS REQUIRED FOR INSTALLATION OF NEW TURF GRASS

NOTE 21 REINSTALL SALVAGED EXISTING CURTAIN WALL ASSEMBLY IN ITS ENTIRETY.

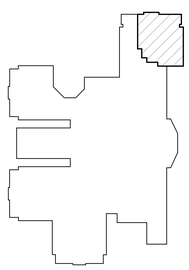
NOTE 22 REINSTALL SALVAGED EXISTING PRECAST SILL PANEL IN ITS ENTIRETY.

NOTE 23 COORDINATE SIZE OF NEW LOUVER WITH SIZE OF EXISTING MASONRY OPENING

NOTE 24 COORDINATE EDGE OF NEW SLAB WITH EXISTING PAVEMENT JOINT.

NOTE 25 EXISTING STRUCTURAL STOOP.

NOTE 26 COMMUNICATIONS TOWER. REFER TO ELECTRICAL DRAWINGS FOR SPECIFIED TOWER TO BE PROVIDED AND INSTALLED BY ELECTRICAL SUB-CONTRACTOR. REFER TO STRUCTURAL DRAWINGS FOR GALAVINZED STEEL SUPPORT ASSEMBLY TO BE IN PLACE FOR MOUNTING OF TOWER TO ROOF STRUCTURE.



PROJECT KEY PLAN

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Exterior Elevations and Site Plans

COUNTY BID #
SHA PROJECT #

A200

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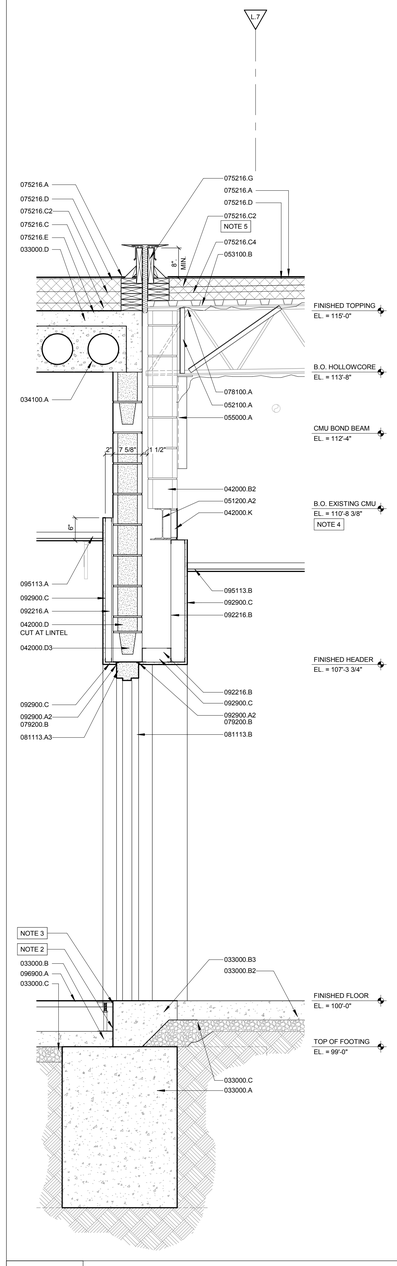

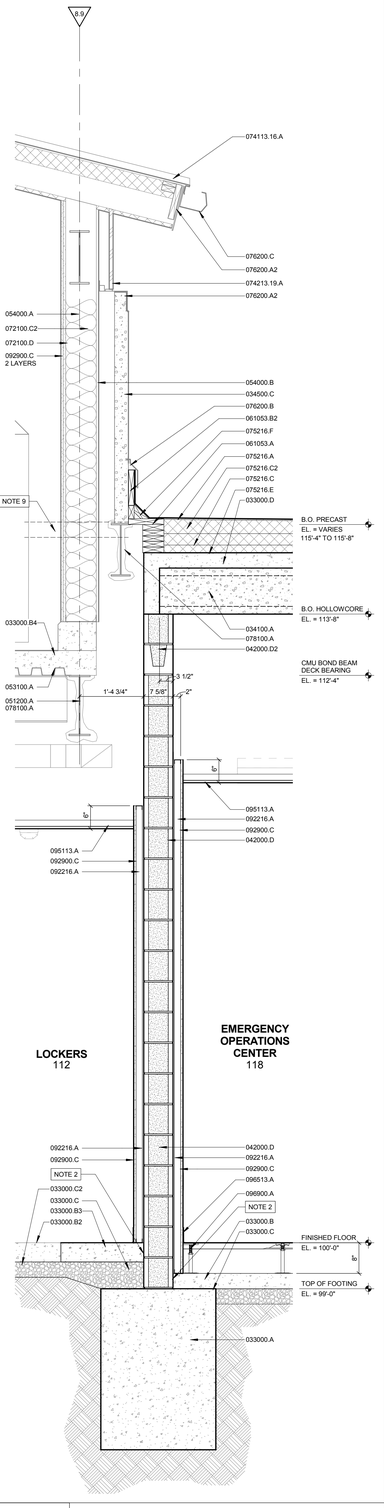

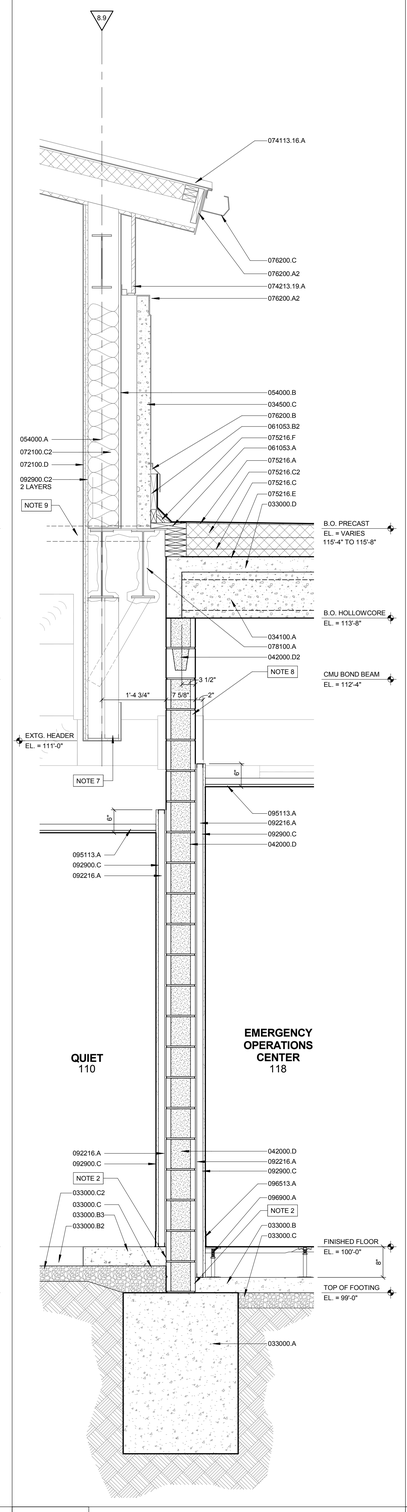

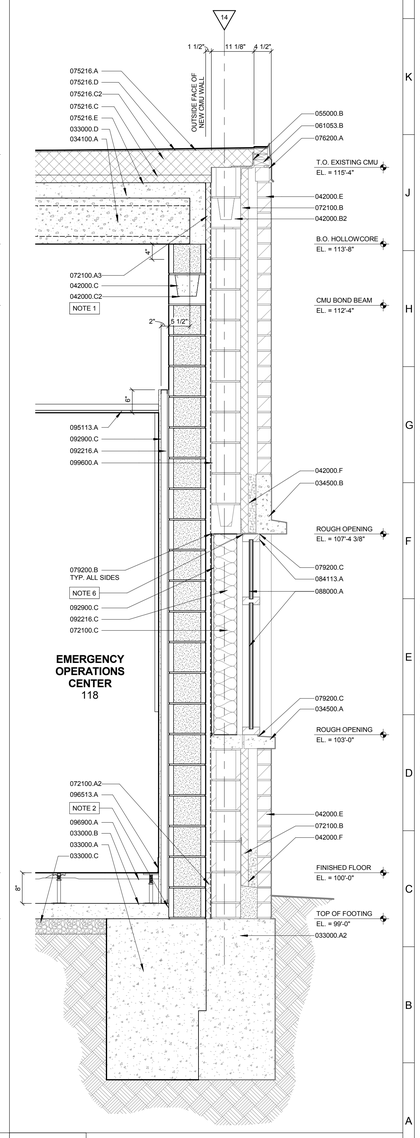

KEYNOTE LEGEND

033000.A	CONCRETE FOOTING – REFER TO STRUCTURAL
033000.A2	EXISTING CONCRETE FOOTING
033000.B	4" THICK CONCRETE SLAB ON GRADE – REFER TO STRUCTURAL
033000.B2	5" THICK EXISTING CONCRETE SLAB ON GRADE
033000.B3	5" THICK CONCRETE SLAB ON GRADE INFILL
033000.B4	6 1/2" THICK EXISTING COMPOSITE CONCRETE SLAB WITH 10"x8" REINFORCED CONCRETE CURB
033000.C	VAPOR RETARDER BELOW 4" GRANULAR FILL – TIE NEW VAPOR RETARDER INTO EXISTING AS RECOMMENDED BY MANUFACTURER
033000.C2	EXISTING VAPOR RETARDER BELOW GRANULAR FILL
033000.D	4" CONCRETE TOPPING SLAB – REFER TO STRUCTURAL
034100.A	PRECAST STRUCTURAL CONCRETE (HOLLOWCORE) – REFER TO STRUCTURAL
034500.A	EXISTING ARCHITECTURAL PRECAST SILL
034500.B	EXISTING ARCHITECTURAL PRECAST LINTEL
034500.C	EXISTING ARCHITECTURAL PRECAST WALL PANEL
042000.B2	EXISTING 8" CONCRETE MASONRY UNIT WALL
042000.C	10" CONCRETE MASONRY UNIT
042000.C2	10" CONCRETE MASONRY UNIT BOND BEAM
042000.D	8" CONCRETE MASONRY UNIT
042000.D2	8" CONCRETE MASONRY UNIT BOND BEAM
042000.D3	8" CONCRETE MASONRY UNIT LINTEL – REFER TO STRUCTURAL FOR REQUIREMENTS
042000.E	EXISTING ECONOMY BRICK
042000.F	EXISTING MASONRY THROUGH-WALL FLASHING ASSEMBLY
042000.K	MASONRY SOAP UNIT
051200.A	EXISTING STEEL BEAM
051200.A2	STEEL LINTEL BEAM WITH CONTINOUS STEEL PLATE – REFER TO STRUCTURAL
052100.A	EXISITNG STEEL ROOF JOIST – CUT AND MODIFY JOIST AS INDICATED IN STRUCTURAL DRAWINGS
053100.A	EXISTING COMPOSITE METAL DECK
053100.B	EXISTING STEEL ROOF DECK
054000.A	EXISTING 8" (18GA) STEEL STUD ASSEMBLY AT 24" O.C.
054000.B	EXISTING 5/8" GLASS MAT GYPSUM SHEATHING WITH ASPHALT SATURATED ORGANIC FELT AIR-INFILTRATION BARRIER
055000.A	STEEL CHANNEL WITH CAP PLATE AS SHOWN IN STRUCTURAL DRAWINGS FOR SUPPORT OF EXISTING STEEL JOIST OFF EXISITNG CMU WALL
055000.B	EXISTING STEEL EDGE ANGLE FOR SUPPORT OF ROOF EDGE BLOCKING – ORIGINAL ARCHITECTURAL DRAWINGS INDICATE THIS ANGLE AND REFER BACK TO STRUCTURAL DRAWINGS FOR SIZING. STRUCTURAL DRAWINGS DO NOT IDENTIFY THIS ANGLE SO IT IS UNCLEAR IF IT WAS INSTALLED OR NOT.
061053.A	PROVIDE BLOCKING AS NECESSARY TO BUILD UP EDGE OF ROOF ASSEMBLY FOR TIE-IN TO EXISTING BLOCKING AND COUNTERFLASHING ASSEMBLY SCHEDULED TO REMAIN
061053.B	EXISTING CONTINUOUS WOOD BLOCKING TO REMAIN – CONFIGURATION OF BLOCKING SHOWN IN DETAIL MATCHES CONFIGURATION SHOWN IN ORIGINAL CONSTRUCTION DOCUMENTS. WE BELIEVE IT IS LIKELY THAT THE ORIENTATION OF THE INSTALLED BLOCKING WAS ROTATED FROM WHAT IS SHOWN IN THE DETAIL
061053.B2	EXISTING CONTINUOUS WOOD BLOCKING ALONG FACE OF PRECAST WALL PANELS TO REMAIN
072100.A2	1 1/2" EXTRUDED POLYSTYRENE INSULATION – EXTEND FROM FINISHED FLOOR TO TOP OF EXISTING FOOTING
072100.A3	1 1/2" EXTRUDED POLYSTYRENE INSULATION – ANCHOR TO EXISTING CMU WALL TO SERVE AS A POUR STOP FOR DOWNTURNED EDGE OF NEW TOPPING SLAB
072100.B	EXISTING 2" CAVITY WALL INSULATION
072100.C	UNFACED BATT INSULATION (R-19)
072100.C2	EXISTING UNFACED BATT INSULATION (R-30)
072100.D	EXISTING POLYETHYLENE VAPOR RETARDER
074113.16.A	EXISTING STANDING SEAM METAL ROOF ASSEMBLY
074213.19.A	EXISTING INSULATED METAL WALL PANEL ASSEMBLY
075216.A	APP MODIFIED BITUMINOUS MEMBRANE ROOFING SYSTEM
075216.C	POLYISOCYANURATE BOARD INSULATION – 5 1/2" THICK BASE LAYER APPLIED IN A MINIMUM OF (2) OFFSET LAYERS
075216.C2	POLYISOCYANURATE TAPERED BOARD INSULATION – PROVIDE TYPICAL 1/4-INCH PER FOOT SLOPE
075216.C4	POLYISOCYANURATE BOARD INSULATION – 3 1/2" THICK BASE LAYER APPLIED IN (2) OFFSET LAYERS
075216.D	1/4" THICK COVER BOARD
075216.E	VAPOR BARRIER
075216.F	CANT STRIP
075216.G	ROOF EXPANSION JOINT ASSEMBLY – PROVIDE MANUFACTURER'S STANDARD DETAIL AS NECESSARY TO COMPLY WITH REQUIREMENTS OF WARRANTED ASSEMBLY. PROVIDE BLOCKING, INSULATION RETAINER, INSULATION, WATERPROOFING CLOSURE MEMBRANE, SHEET METAL CAP AND ALL OTHER ACCESSORIES REQUIRED FOR A COMPLETE ASSEMBLY
076200.A	EXISTING 0.050" PRE-FINISHED ALUMINUM FASCIA WITH CONTINUOUS 0.040" ALUMINUM CLEAT – REMOVE AND REPLACE WITH NEW FLASHING ASSEMBLY THAT MATCHES COLOR AND PROFILE OF EXISTING ASSEMBLY
076200.A2	EXISTING 0.050" PRE-FINISHED FASCIA AND TRIM ASSEMBLY
076200.B	EXISTING 0.032" PRE-FINISHED ALUMINUM COUNTERFLASHING - PROTECT AND RETAIN
076200.C	EXISTING PRE-FINISHED 0.050" ALUMINUM GUTTER ASSEMBLY
078100.A	REPAIR AND OR RESTORE EXISTING APPLIED FIREPROOFING ASSEMBLY AS REQUIRED TO RETAIN EXISTING PROTECTION. EXISTING PRIMARY STRUCTURE IS RATED FOR 2-HOURS AND EXISTING ROOF ASSEMBLY IS RATED FOR 1-HOUR
079200.B	SEALANT – REFER TO SPECIFICATIONS FOR SEALANT SCHEDULE
079200.C	REMOVE AND REPLACE EXISITNG BACKER ROD AND SEALANT AROUND ENTIRE WINDOW ASSEMBLY – REFER TO SPECIFICATIONS FOR SEALANT SCHEDULE
081113.A3	HOLLOW METAL FRAME – FEMA RATED ASSEMBLY
081113.B	HOLLOW METAL DOOR – FEMA RATED ASSEMBLY
084113.A	EXISTING THERMALLY BROKEN ALUMINUM STOREFRONT ASSEMBLY
088000.A	(IG-1) – 1" INSULATED SPANDREL GLAZING
092216.A	1 5/8" METAL STUDS
092216.B	3 5/8" METAL STUDS
092216.C	6" METAL STUDS
092900.A2	METAL TRIM
092900.C	5/8" TYPE 'X' GYPSUM WALLBOARD – REFER TO SPECIFICATIONS AND WALL TYPES FOR FURTHER DIRECTION REGARDING SPECIFIC LOCATION OF VARIOUS TYPES AND FINISH OF WALLBOARD
092900.C2	EXISTING 5/8" GWB
095113.A	(APC-1) - ACOUSTICAL PANEL CEILING SYSTEM
095113.B	(APC-2) - ACOUSTICAL PANEL CEILING SYSTEM – SUSPENSION ASSEMBLY AND CEILING PADS TO MATCH EXISTING, ADJACENT ASSEMBLY
096513.A	(TRB-1) - THERMOPLASTIC RUBBER WALL BASE
096900.A	ACCESS FLOOR ASSEMBLY
099600.A	VAPOR BARRIER

SHEET A300 SHEET SPECIFIC NOTES

NOTE 1 NEW INTERIOR CMU ASSEMBLY ALONG GRID 14 BETWEEN GRIDS P AND M.3 IS TO BE 10" CMU. ALL OTHER PERIMETER CMU WALLS AT THE STORM ENCLOSURE ARE TO BE 8" CMU.

NOTE 2 WRAP UNDERSLAB VAPOR BARRIER UP FACE OF WALL AS RECOMMENDED BY MANUFACTURER AND TO ALSO SERVE AS A BOND BREAK FOR SLAB EDGE.

NOTE 3 FORMED EDGE OF DOWNTURNED SLAB TO ALIGN WITH INSIDE FACE OF NEW CMU WALL.

NOTE 4 REMOVE EXISTING CMU BELOW THIS POINT AT LOCATION SHOWN ON DEMOLITION PLANS.

NOTE 5 PROVIDE TAPERED INSULATION AS NECESSARY TO TIE IN INSULATION AT EXISTING SLOPED STRUCTURE ASSEMBLY WITH NEW FLAT STRUCTURE TO THE NORTH.

NOTE 6 REMOVE EXISTING SEALANT AND BACKER ROD AT INSIDE PERIMETER OF EXISTING STOREFRONT FRAMING AND REPLACE WITH NEW SEALANT AND BACKER ROD.

NOTE 7 CUT AND MODIFY EXISTING GWB HEADER AS NECESSARY FOR ROUTING OF NEW MECHANICAL DUCTWORK.

NOTE 8 COORDINATE BOND BEAM AND LINTEL REQUIREMENTS OF OPENINGS REQUIRED FOR MECHANICAL PENETRATIONS WITH STRUCTURAL.

NOTE 9 TOP OF STEEL (BOTTOM OF PRECAST WALL PANEL) VARIES ALONG ELEVATION. DASHED LINES REPRESENT HIGH AND LOW POINTS OF ELEVATION.

A4	WALL SECTION	A7	WALL SECTION
SCALE: 3/4" = 1'-0"	SOUTH STORM SHELTER WALL AT EXISTING BREAK ROOM CONNECTION	SCALE: 3/4" = 1'-0"	WEST STORM SHELTER WALL AT MECHANICAL MEZZANINE
A10	WALL SECTION	A13	WALL SECTION
SCALE: 3/4" = 1'-0"	WEST STORM SHELTER WALL AT EAST EDGE OF EXISTING CLERESTORY	SCALE: 3/4" = 1'-0"	TYPICAL STORM SHELTER WALL AT EXISTING EXTERIOR WALL ASSEMBLY

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David E. Ouse

PROJECT ARCHITECT:
Dustin Gaede

DRAWN BY:
DEO

ISSUED:
November 3, 2017

REVISIONS:

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Wall Sections

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A300

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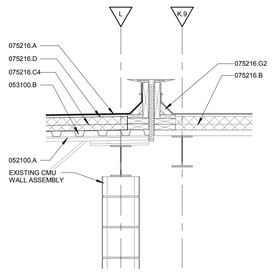
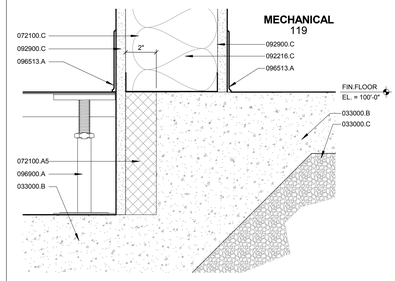


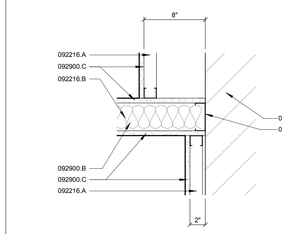
N1 ROOF EXPANSION JOINT

SCALE: 3/4" = 1'-0" EXISTING ROOF EXPANSION JOINT ASSEMBLY



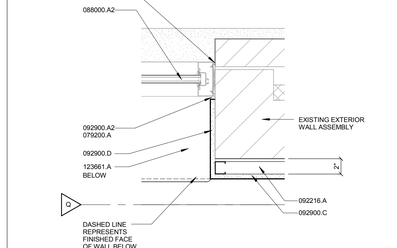
N4 SECTION DETAIL

SCALE: 3" = 1'-0" CONCRETE CURB AT MECHANICAL 119



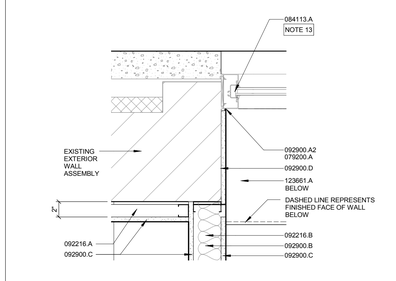
N7 PLAN DETAIL

SCALE: 1 1/2" = 1'-0" QUIET ROOM WALL TERMINATION AT REINFORCED CMU STORM SHELTER WALL



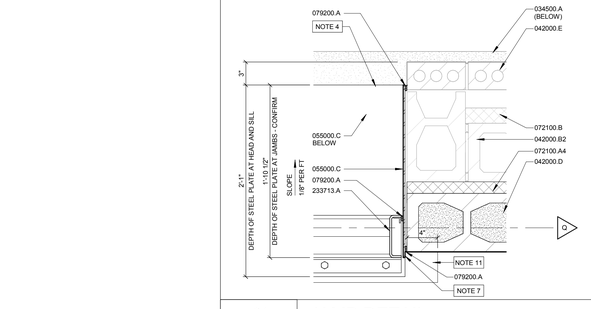
N10 JAMB DETAIL

SCALE: 1 1/2" = 1'-0" JAMB DETAIL AT EXISTING STOREFRONT - CONFERENCE 103



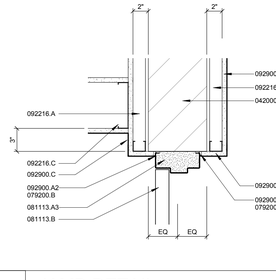
N13 PLAN DETAIL

SCALE: 1 1/2" = 1'-0" JAMB DETAIL AT EXISTING STOREFRONT - VESTIBULE 100 - WALL FRAMING CONTROL POINT



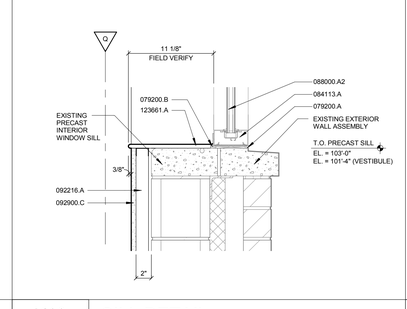
K4 JAMB DETAIL

SCALE: 1 1/2" = 1'-0" MECHANICAL LOUVER JAMB



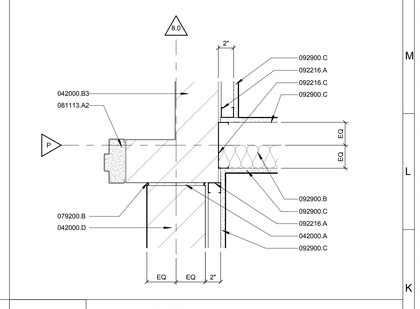
K7 JAMB DETAIL

SCALE: 1 1/2" = 1'-0" JAMB DETAIL AT DOOR 118.2



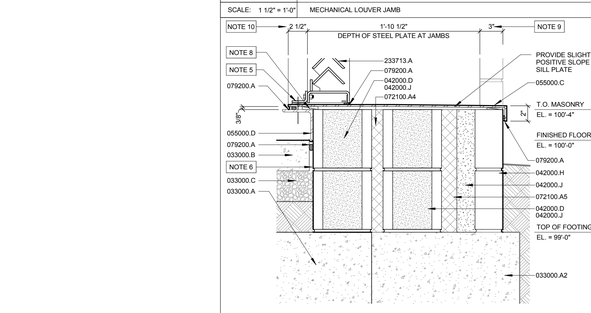
K10 SILL DETAIL

SCALE: 1 1/2" = 1'-0" WINDOW SILL DETAIL AT EXISTING STOREFRONT - CONFERENCE 103 AND VESTIBULE 100



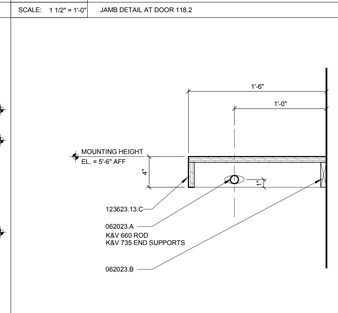
K13 PLAN DETAIL

SCALE: 1 1/2" = 1'-0" NEW CONSTRUCTION AT SW CORNER OF CONFERENCE 103 - INTERIOR CONTROL POINT



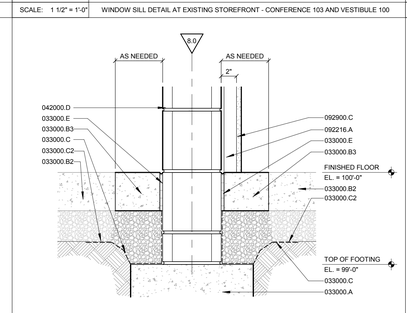
K4 JAMB DETAIL

SCALE: 1 1/2" = 1'-0" MECHANICAL LOUVER JAMB



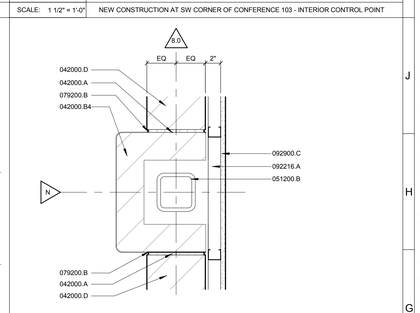
K7 PLAN DETAIL

SCALE: 1" = 1'-0" NEW DOOR OPENING INTO EXISTING BREAK ROOM FROM STORM SHELTER



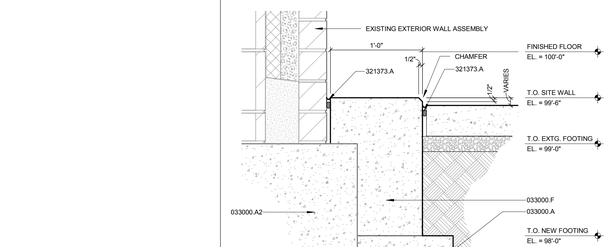
K10 SILL DETAIL

SCALE: 1 1/2" = 1'-0" WINDOW SILL DETAIL AT EXISTING STOREFRONT - CONFERENCE 103 AND VESTIBULE 100



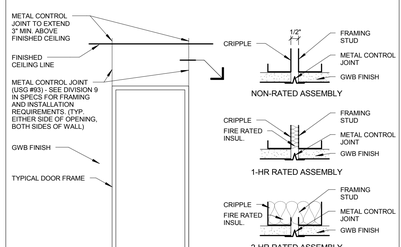
K13 PLAN DETAIL

SCALE: 1 1/2" = 1'-0" NEW CONSTRUCTION AT SW CORNER OF CONFERENCE 103 - INTERIOR CONTROL POINT



G4 SECTION DETAIL

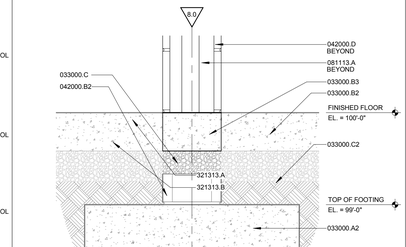
SCALE: 1 1/2" = 1'-0" MECHANICAL LOUVER SILL AT MECHANICAL 119 EXISTING REMOVED EXTERIOR DOOR



TYPICAL GWB CONTROL JOINT DETAIL AT HEAD OF DOOR OPENING

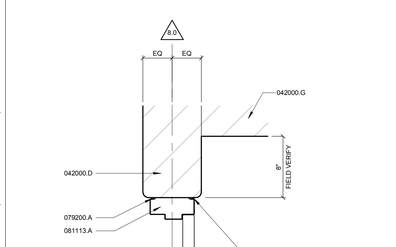
G7 COAT ROD AND SHELF

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



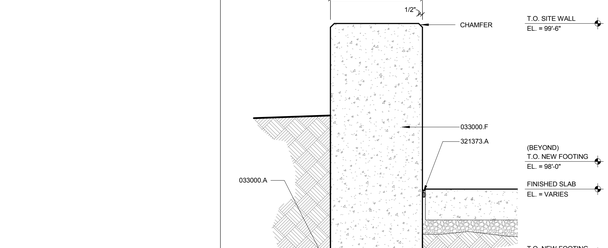
G10 SECTION DETAIL

SCALE: 1 1/2" = 1'-0" TYPICAL BASE OF NEW INTERIOR CMU WALL



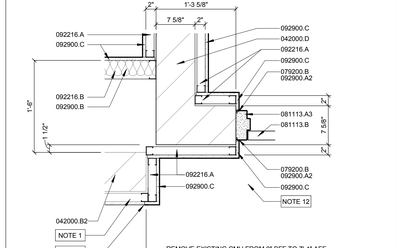
G13 PLAN DETAIL

SCALE: 1 1/2" = 1'-0" NEW WALL CONSTRUCTION AT EXISTING CMU COLUMN WRAP



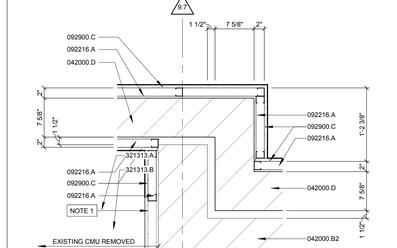
D4 SECTION DETAIL

SCALE: 1 1/2" = 1'-0" SITE WALL DETAIL ALONG NORTH FACE OF EXISTING BUILDING



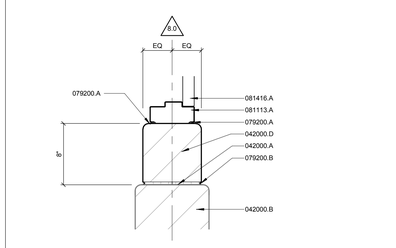
D7 GWB CONTROL JOINT DETAILS

SCALE: 3" = 1'-0" TYPICAL GWB CONTROL JOINTS



D10 SECTION DETAIL

SCALE: 1 1/2" = 1'-0" SLAB INFILL AT NEW DOOR OPENING IN EXISTING CMU WALL - DOOR JK3



D13 PLAN DETAIL

SCALE: 1 1/2" = 1'-0" HM JAMB AT DOOR JK3 - CONTROL DETAIL FOR PLACEMENT OF NEW FRAMED WALLS

A4 SECTION DETAIL

SCALE: 1 1/2" = 1'-0" SITE WALL DETAIL ALONG NORTH FACE OF EXISTING BUILDING

A7 PLAN DETAIL

SCALE: 1" = 1'-0" DETAIL AT SOUTH WALL OF STORM SHELTER - CONNECTION TO EXISTING BREAK ROOM

A10 PLAN DETAIL

SCALE: 1" = 1'-0"

A13 JAMB DETAIL

SCALE: 1 1/2" = 1'-0" HM JAMB AT DOOR JK3 - CONNECTION TO EXISTING CMU SHEAR WALL

KEYNOTE LEGEND

033000.A	CONCRETE FOOTING – REFER TO STRUCTURAL
033000.A2	EXISTING CONCRETE FOOTING
033000.B	4" THICK CONCRETE SLAB ON GRADE – REFER TO STRUCTURAL
033000.B2	5" THICK EXISTING CONCRETE SLAB ON GRADE
033000.B3	5" THICK CONCRETE SLAB ON GRADE INFILL
033000.C	VAPOR RETARDER BELOW 4" GRANULAR FILL – TIE NEW VAPOR RETARDER INTO EXISTING AS RECOMMENDED BY MANUFACTURER
033000.C2	EXISTING VAPOR RETARDER BELOW GRANULAR FILL
033000.E	ISOLATION JOINT FILLER STRIP
033000.F	1'-0" WIDE CONCRETE SITE WALL – REFER TO STRUCTURAL FOR REINFORCING REQUIREMENTS
034500.A	EXISTING ARCHITECTURAL PRECAST SILL
042000.A	COMPRESSIBLE FILLER
042000.B	EXISTING 10" CONCRETE MASONRY UNIT SHEAR WALL
042000.B2	EXISTING 8" CONCRETE MASONRY UNIT WALL
042000.B3	EXISTING 6" CONCRETE MASONRY UNIT WALL
042000.B4	EXISTING 4" CONCRETE MASONRY UNIT WALL
042000.D	8" CONCRETE MASONRY UNIT
042000.E	EXISTING ECONOMY BRICK
042000.G	6" CONCRETE MASONRY UNIT
042000.H	4" CONCRETE MASONRY UNIT
042000.J	MASONRY GROUT – GROUT CAVITY SOLID
051200.B	EXISTING STEEL COLUMN
052100.A	EXISTING STEEL ROOF JOIST – CUT AND MODIFY JOIST AS INDICATED IN STRUCTURAL DRAWINGS
053100.B	EXISTING STEEL ROOF DECK
055000.C	3/8" THICK GALVANIZED STEEL PLATE ASSEMBLY – ASSEMBLY INTENDED TO SLIDE INTO MASONRY OPENING AND ANCHOR TO STEEL ANGLES MOUNTED AT THE INTERIOR FACE OF CMU AT THE HEAD AND SILL OF OPENING. FIELD VERIFY OPENING – GALVANIZED ASSEMBLY TO BE PAINTED
055000.D	STEEL ANGLE – REFER TO STRUCTURAL – FEMA MECHANICAL LOUVER TO ANCHOR TO ANGLE. COORDINATE ANCHORING REQUIREMENTS WITH LOUVER MANUFACTURER
062023.A	CLOTHES ROD AND BRACKET
062023.B	1x PAINTED SHELF CLEAT
072100.A4	1 1/2" EXTRUDED POLYSTYRENE INSULATION – EXTEND 2'-0" INTO CAVITY AROUND ALL SIDES OF OPENING
072100.A5	2" EXTRUDED POLYSTYRENE INSULATION
072100.B	EXISTING 2" CAVITY WALL INSULATION
072100.C	UNFACED BATT INSULATION (R-19)
075216.A	APP MODIFIED BITUMINOUS MEMBRANE ROOFING SYSTEM
075216.B	EXISTING APP MODIFIED BITUMINOUS MEMBRANE ROOFING SYSTEM – PROTECT EXISTING ROOFING ASSEMBLY AS REQUIRED TO MAINTAIN EXISTING ROOFING WARRANTY
075216.C4	POLYISOCYANURATE BOARD INSULATION – 3 1/2" THICK BASE LAYER APPLIED IN (2) OFFSET LAYERS
075216.D	1/4" THICK COVER BOARD
075216.G2	EXISTING ROOF EXPANSION JOINT ASSEMBLY – NEW ROOF ASSEMBLY TO TIE INTO EXISTING EXPANSION JOINT ASSEMBLY
079200.A	SEALANT WITH BACKER ROD – REFER TO SPECIFICATIONS FOR SEALANT SCHEDULE
079200.B	SEALANT – REFER TO SPECIFICATIONS FOR SEALANT SCHEDULE
081113.A	HOLLOW METAL FRAME
081113.A2	EXISTING HOLLOW METAL FRAME
081113.A3	HOLLOW METAL FRAME – FEMA RATED ASSEMBLY
081113.B	HOLLOW METAL DOOR – FEMA RATED ASSEMBLY
081416.A	SOLID CORE WOOD VENEER DOOR – FLUSH SLAB
084113.A	EXISTING THERMALLY BROKEN ALUMINUM STOREFRONT ASSEMBLY
088000.A2	EXISTING INSULATED GLAZING TO REMAIN – GLAZING ASSEMBLY AT MAIN ENTRY TO BE REMOVED AND REINSTALLED AS NECESSARY FOR OBTAINING CONSTRUCTION ACCESS INTO BUILDING
092216.A	1 5/8" METAL STUDS
092216.B	3 5/8" METAL STUDS
092216.C	6" METAL STUDS
092216.D	ISOLATION STRIP
092900.A2	METAL TRIM
092900.B	3" SOUND ATTENUATION BLANKETS
092900.C	5/8" TYPE 'X' GYPSUM WALLBOARD – REFER TO SPECIFICATIONS AND WALL TYPES FOR FURTHER DIRECTION REGARDING SPECIFIC LOCATION OF VARIOUS TYPES AND FINISH OF WALLBOARD
092900.D	DIRECT GLUE GYPSUM WALLBOARD TO EXISTING CMU
096513.A	(TRB-1) - THERMOPLASTIC RUBBER WALL BASE
096900.A	ACCESS FLOOR ASSEMBLY
123623.13.C	3/4" THICK PLASTIC-LAMINATE-CLAD SHELF AND FASCIA
123661.A	1/2" THICK SOLID SURFACE WINDOW SILL WITH 3/8" OVERHANG FROM FACE OF WALL TYPICAL – RADIUS EXPOSED EDGE (SS-1)
233713.A	FEMA RATED MECHANICAL LOUVER – REFER TO MECHANICAL – COORDINATE SIZE OF LOUVER WITH ROUGH OPENING. COORDINATE LOUVER ATTACHMENT WITH STRUCTURAL ANGLE
321313.A	5" CONCRETE PAVING WITH 6x6 WWF – W1.4 x W1.4 AT CENTER OF CONCRETE
321313.B	GRANULAR SUBBASE
321373.A	ELASTOMERIC PAVING SEALANT WITH BACKER ROD AND BOND BREAK

SHEET A400 SHEET SPECIFIC NOTES

NOTE 1 EXISTING METAL STUD AND GWB FINISH ASSEMBLY

NOTE 2 AT EXISTING WALL, AN EXISTING FRP PANEL IS ADHERED TO THE GWB UP TO THE JAMB OF THE EXISTING HM FRAME ON THE LOWER 4'-0" OF THE WALL. FRP TO REMAIN. NEW STUD AND GWB INFILL AT JAMB TO BE TAPED INTO EXISTING GWB ABOVE FRP PANEL.

NOTE 4 CONFIRM OUTSIDE EDGE OF PLATE AT SILL EXTENDS OVER VERTICAL LIP OF PRECAST SILL BELOW.

NOTE 5 COORDINATE ANCHORING OF MECHANICAL LOUVER ASSEMBLY THROUGH GALVANIZED PLATE (055000.C) INTO STEEL ANGLE WITH LOUVER MANUFACTURER.

NOTE 6 WRAP UNDERSLAB VAPOR BARRIER UP FACE OF WALL AS RECOMMENDED BY MANUFACTURER AND TO ALSO SERVE AS A BOND BREAK FOR SLAB EDGE.

NOTE 7 EDGE OF STEEL PLATE ASSEMBLY TO ALIGN WITH INSIDE FACE OF MECHANICAL LOUVER - COORDINATE WITH LOUVER MANUFACTURER AND INSTALLER.

NOTE 8 SHIM BOTTOM OF PLATE ASSEMBLY AS NECESSARY TO ACCOMMODATE SLOPE BUILT INTO PLATE ASSEMBLY. TOP OF MOUNTING ANGLE TO BE FLUSH WITH TOP OF CMU.

NOTE 9 OUTSIDE EDGE OF PLATE ASSEMBLY AT JAMB AND HEAD CONDITION AT THE INTAKE LOUVER IS TO BE HELD BACK FROM FACE OF BRICK VENEER 3". SILL CONDITION IS TO EXTEND PAST FACE OF VENEER AND TURN DOWN AS SHOWN IN DETAIL. DETAIL K4/A400 IS A REASONABLE REPRESENTATION OF JAMB CONDITION.

NOTE 10 ADDED DEPTH OF STEEL PLATE AT SILL AND HEAD CONDITIONS.

NOTE 11 SILL MOUNTING ANGLE BELOW

NOTE 12 INFILL CONCRETE INTO EXISTING SLAB ON GRADE WHERE EXISTING CMU WALL ASSEMBLY WAS REMOVED FOR INSTALLATION OF NEW OPENING.

NOTE 13 REMOVE AND REINSTALL EXISTING CURTAINWALL ASSEMBLY IN ITS ENTIRETY AS NEEDED FOR CONSTRUCTION EQUIPMENT ACCESS IN AND OUT OF FACILITY DURING CONSTRUCTION OPERATIONS.

REVISIONS:			

DESIGN ARCHITECT: David E. Ouade
PROJECT ARCHITECT: Daniel J. Sinclair
DRAWN BY: DEO
ISSUED: November 3, 2017

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Plan and Section Details

COUNTY BID #
SHA PROJECT #

A400

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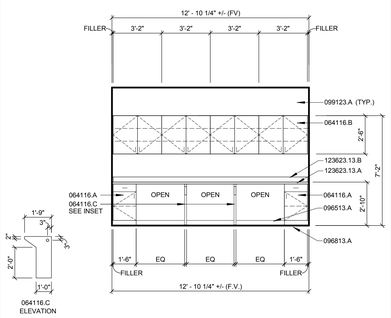
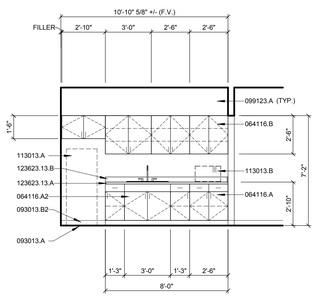
N:\CURRENT PROJECTS\17004 Lancaster County Emergency Management Relocation Study\Drawing Files\1_Revit Model\17004_Architectural_Central_2019.rvt



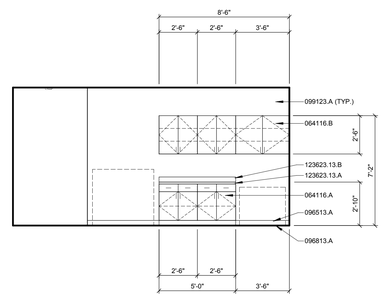
M1 INTERIOR ELEVATION

SCALE: 1/4" = 1'-0" — WORKROOM 113 - WEST ELEVATION



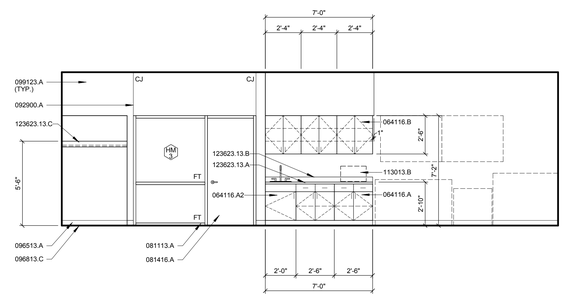
M4 INTERIOR ELEVATION

SCALE: 1/4" = 1'-0" — BREAK ROOM 109 - NORTH ELEVATION



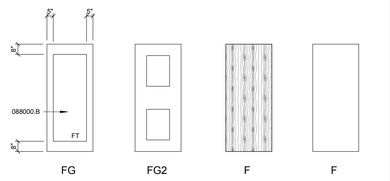
M7 INTERIOR ELEVATION

SCALE: 1/4" = 1'-0" — COPY 106 - NORTH ELEVATION



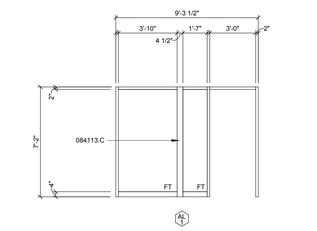
M11 INTERIOR ELEVATION

SCALE: 1/4" = 1'-0" — EMERGENCY OPERATIONS CENTER 118 - NORTH ELEVATION



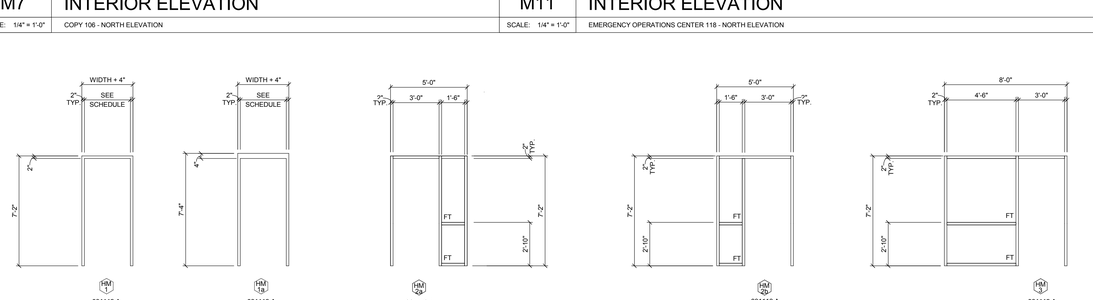
J1 DOOR TYPES

SCALE: 1/4" = 1'-0" — TYPICAL PROJECT DOOR TYPES



J4 ALUMINUM FRAME TYPES

SCALE: 1/4" = 1'-0" — ALUMINUM STOREFRONT FRAME TYPES



J7 HOLLOW METAL FRAME TYPES

SCALE: 1/4" = 1'-0" — FULLY WELDED STEEL FRAMES

KEYNOTE LEGEND

064116.A	PLASTIC-LAMINATE-CLAD BASE CABINET – 24" DEEP – PROVIDE ADJUSTABLE SHELVING WHERE GRAPHICALLY INDICATED
064116.A2	PLASTIC-LAMINATE-CLAD SINK BASE CABINET – 24" DEEP
064116.B	PLASTIC-LAMINATE-CLAD UPPER CABINET – 14" DEEP – PROVIDE ADJUSTABLE SHELVING WHERE GRAPHICALLY INDICATED
064116.C	1 1/2" THICK PLASTIC-LAMINATE-CLAD COUNTER SUPPORT WITH 2" DIA. PASS-THRU CUT-OUT
081113.A	HOLLOW METAL FRAME
081113.B	HOLLOW METAL DOOR – FEMA RATED ASSEMBLY
081113.B2	INSULATED HOLLOW METAL DOOR
081113.B3	EXISTING HOLLOW METAL DOOR (RELOCATED)
081416.A	SOLID CORE WOOD VENEER DOOR – FLUSH SLAB
084113.B	NON-THERMALLY BROKEN ALUMINUM STOREFRONT ASSEMBLY
084113.C	4 1/2" x 4 1/2" VERTICAL MULLION
084113.D	ALUMINUM DOOR
088000.B	(MG-1) - 1/4" CLEAR FLOAT GLASS – PROVIDE FULLY TEMPERED AT LOCATIONS IDENTIFIED AND WHERE REQUIRED BY CODE
092900.A	METAL CONTROL JOINT – IDENTIFIED IN DRAWINGS WITH A 'CJ' ON CEILING PLANS AND ELEVATIONS – IDENTIFIED WITH TRIANGLE IN FLOOR PLANS
093013.A	(PT-1) - 18"x18" PORCELAIN TILE FOR USE AT WALL AND FLOOR
093013.B2	(PT-1BB) – 4"x12" PORCELAIN BULLNOSE BASE
096513.A	(TRB-1) - THERMOPLASTIC RUBBER WALL BASE
096813.A	FIELD CARPET (CPT-1)
096813.C	FIELD CARPET W/ POSITILE BUTTONS (CPT-3)
099123.A	PAINT
113013.A	UPRIGHT REFRIGERATOR – PROVIDED AND INSTALLED BY OWNER
113013.B	COUNTERTOP MICROWAVE – PROVIDED AND INSTALLED BY OWNER
123623.13.A	1 1/2" THICK PLASTIC-LAMINATE-CLAD COUNTER
123623.13.B	1/2" THICK PLASTIC-LAMINATE-CLAD BACKSPLASH – 4" TALL
123623.13.C	3/4" THICK PLASTIC-LAMINATE-CLAD SHELF AND FASCIA

ROOM FINISH SCHEDULE NOTES

1 EXISTING AND SALVAGED/REINSTALLED APC SYSTEM. REFER TO DEMOLITION PLAN AND REFLECTED CEILING PLAN FOR ADDITIONAL INFORMATION
2 PROVIDE AND INSTALL NEW RUBBER SHEET FLOORING AT BREAK L8 TO MATCH EXISTING RUBBER SHEET FLOORING

DOOR SCHEDULE NOTES

1 EXISTING DOOR AND FRAME PREPPED TO RECEIVE NEW HARDWARE AS SCHEDULED
2 FEMA-RATED DOOR AND FRAME ASSEMBLY, COMPLIANT WITH ICC 500-2014
3 EXISTING CURTAINWALL FRAME ASSEMBLY TO BE REMOVED AND REINSTALLED AS NEEDED TO PROVIDE ACCESS FOR CONSTRUCTION ACTIVITIES.
4 INSULATED HM DOOR
5 EXISTING EXTERIOR ALUMINUM DOOR ASSEMBLY. HARDWARE CONFIGURATION SHOULD ALREADY BE SET UP FOR EGRESS REQUIREMENTS.
6 CONTRACTOR TO FIELD VERIFY DIMENSIONS OF EXISTING DOOR (J14) SCHEDULED TO BE SALVAGED AND RE-INSTALLED IN THIS OPENING AND COORDINATE ROUGH OPENING AND NEW HM FRAME SIZE ACCORDINGLY.
7 RE-PAINT EXISTING DOOR TO MATCH OTHER EXISTING FRAMES IN DAYROOM J14.
8 NEW HM FRAME TO BE PAINTED TO MATCH OTHER EXISTING HM DOORS AND FRAMES FOUND IN DAYROOM J14.
9 NEW HM FRAME AND DOOR TO BE PAINTED TO MATCH OTHER EXISTING HM FRAMES IN BREAK ROOM L8 ON BREAK ROOM SIDE OF FRAME. COLOR OF FRAME AND DOOR ON THE EMERGENCY OPERATIONS ROOM SIDE OF OPENING TO BE PAINTED PNT-2.
10 DOOR HARDWARE TO HAVE A HOLD-OPEN FUNCTION AS PART OF THE CLOSER.
11 DOOR TO HAVE ACCESS CONTROL COMPONENTS. COORDINATE FRAME PREP WITH SPECIFIED HARDWARE. COORDINATE WITH ELECTRICAL.
12 DOOR TO HAVE ACCOMMODATIONS MADE FOR MONITORING BY YOUTH SERVICES CENTER BY MEANS OF A DOOR POSITION SWITCH OR SIMILAR.

DOOR SCHEDULE

Door No.	Door Size	F.R.	DOOR Elev.	DOOR Matl	DOOR Fin.	FRAME Type	FRAME Matl	FRAME Fin.	Hdwr. Set	NOTES	Door No.
100.1	3'-0" x 7'-0" (EXISTING)		FG	AL	AL	EXISTING	AL	AL	1.0	1, 3, 11	100.1
100.2	3'-0" x 7'-0"		FG	AL	AL	AL-1	AL	AL	3.0		100.2
101.1	3'-0" x 7'-0"		F	WD	STN	HM-1	HM	PNT	9.0		101.1
102.1	3'-0" x 7'-0"		F	WD	STN	HM-2b	HM	PNT	11.0		102.1
103.1	3'-0" x 7'-0"		F	WD	STN	HM-2a	HM	PNT	13.0		103.1
104.1	3'-0" x 7'-0"		F	WD	STN	HM-2a	HM	PNT	11.0		104.1
107.1	3'-0" x 7'-0"		F	WD	STN	HM-2b	HM	PNT	11.0		107.1
108.1	3'-0" x 7'-0"		F	WD	STN	HM-1	HM	PNT	10.0		108.1
110.1	3'-0" x 7'-0"		F	WD	STN	HM-1	HM	PNT	12.0		110.1
111.1	3'-0" x 7'-0"		F	WD	STN	HM-1	HM	PNT	15.0		111.1
115.1	3'-0" x 7'-0"		F	WD	STN	HM-1	HM	PNT	9.0		115.1
116.1	3'-0" x 7'-0"		F	WD	STN	HM-1	HM	PNT	16.0		116.1
117.1	3'-0" x 7'-0"		F	WD	STN	HM-1	HM	PNT	16.0		117.1
118.1	3'-0" x 7'-0"		F	HM	PNT	HM-1a	HM	PNT	5.0	2, 10	118.1
118.2	3'-0" x 7'-0"		F	HM	PNT	HM-1a	HM	PNT	5.0	2, 10	118.2
118.3	3'-0" x 7'-0"		F	HM	PNT	HM-1a	HM	PNT	6.0	2, 9, 12	118.3
119.1	3'-0" x 7'-0"		F	HM	PNT	HM-1	HM	PNT	2.0	4	119.1
120.1	3'-0" x 7'-0"		F	WD	STN	HM-1	HM	PNT	9.0		120.1
121.1	3'-0" x 7'-0"		F	WD	STN	HM-1	HM	PNT	4.0		121.1
122.1	3'-0" x 7'-0"		F	WD	STN	HM-3	HM	PNT	14.0		122.1
JK3	3'-0" x 7'-0" (EXISTING RELOCATED)		FG2	HM	PNT	HM-1	HM	PNT	8.0	6, 7, 8	JK3
L8a	3'-0" x 7'-0" (EXISTING)		FG	AL	AL	EXISTING	AL	AL	7.0	5	L8a

E1 DOOR SCHEDULE

NO SCALE — REFER TO SHEET LEGEND FOR DOOR SCHEDULE NOTES

ROOM FINISH SCHEDULE

No.	Name	Floor Finish	Base	North Wall Material	North Wall Finish	East Wall Material	East Wall Finish	South Wall Material	South Wall Finish	West Wall Material	West Wall Finish	Ceiling Material	Ceiling Finish	NOTES	No.
100	VESTIBULE	CPT-2	TRB-1	GWB	PNT-1	GWB	PNT-1	GWB	PNT-1	GWB	PNT-1	GWB	PNT-1		100
101	STORAGE	CPT-1	TRB-1	EXTG CMU	PNT-1	GWB	PNT-1	GWB	PNT-1	GWB	PNT-1	GWB	PNT-1		101
102	OFFICE	CPT-1	TRB-1	GWB	PNT-1	GWB	PNT-1	GWB	PNT-1	GWB	PNT-1	APC-1			102
103	CONFERENCE	CPT-1	TRB-1	GWB	PNT-1	GWB	PNT-1	GWB	PNT-1	GWB	PNT-1	APC-1			103
104	OFFICE	CPT-1	TRB-1	GWB	PNT-1	GWB	PNT-1	GWB	PNT-1	GWB	PNT-1	APC-1			104
105	CORRIDOR	CPT-1	TRB-1	GWB	PNT-1	GWB	PNT-1	GWB	PNT-1	GWB	PNT-1	APC-1			105
106	COPY	CPT-1	TRB-1	GWB	PNT-1	GWB	PNT-1	GWB	PNT-1	-	-	APC-1			106
107	OFFICE	CPT-1	TRB-1	GWB	PNT-1	GWB	PNT-1	GWB	PNT-1	GWB	PNT-1	APC-1			107
108	STORAGE	CPT-1	TRB-1	GWB	PNT-1	GWB	PNT-1	GWB	PNT-1	GWB	PNT-1	APC-1			108
109	BREAK	PT-1	PT-1BB	GWB	PNT-1	GWB	PNT-1	GWB	PNT-1	GWB	PNT-1	APC-1			109
110	QUIET	CPT-1	TRB-1	GWB	PNT-1	GWB	PNT-1	GWB	PNT-1	GWB	PNT-1	APC-1			110
111	SHOWER	PT-1	PT-1CB	GWB	PNT-1	GWB	PNT-1	GWB	PNT-1	GWB	PNT-1	GWB	PNT-1		111
112	LOCKERS	CPT-1	TRB-1	GWB	PNT-1	GWB	PNT-1	GWB	PNT-1	GWB	PNT-1	APC-1			112
113	WORKROOM	CPT-1	TRB-1	GWB	PNT-1	-	-	GWB	PNT-1	GWB	PNT-1	APC-1			113
114	CORRIDOR	CPT-1	TRB-1	GWB	PNT-1	GWB	PNT-1	GWB	PNT-1	-	-	APC-1			114
115	CUSTODIAL	VCT-1	TRB-1	GWB	PNT-1	GWB	PNT-1	EXTG CMU	PNT-1	EXTG & NEW CMU	PNT-1	-	-		115
116	MEN	PT-1	PT-1CB	GWB	PNT-1	GWB	PNT-1	GWB	PT-1	GWB	PNT-1	GWB	PNT-1		116
117	WOMEN	PT-1	PT-1CB	GWB	PNT-1	GWB	PNT-1	GWB	PT-1	GWB	PNT-1	GWB	PNT-1		117
118	EMERGENCY OPERATIONS CENTER	CPT-3	TRB-1	GWB	PNT-1	GWB	PNT-1	GWB	PNT-1	GWB	PNT-1	APC-1			118
119	MECHANICAL	SEALED CONC.	TRB-1	CMU	PNT-1	CMU	PNT-1	GWB	PNT-1	GWB	PNT-1	HOLLOWCORE			119
120	ELECTRICAL	PLAM	TRB-1	GWB	PNT-1	GWB	PNT-1	GWB	PNT-1	GWB	PNT-1	HOLLOWCORE			120
121	DATA	PLAM	TRB-1	CMU	PNT-1	GWB	PNT-1	GWB	PNT-1	GWB	PNT-1	HOLLOWCORE			121
122	CONFERENCE	CPT-3	TRB-1	GWB	PNT-1	GWB	PNT-1	GWB	PNT-1	GWB	PNT-1	APC-1			122
J14	DAYROOM	CPT-1	TRB-1	EXTG CMU	-	EXTG & NEW CMU	PNT	EXTG CMU	-	EXTG CMU	-	EXTG APC *(1)	-	1	J14
JK3	CORRIDOR	CPT-1	TRB-1	CMU	PNT-1	EXTG & NEW CMU	PNT-1	EXTG CMU	PNT-1	EXTG & NEW CMU	PNT-1	APC-1			JK3
L8	BREAK	RSF *(2)	TRB-1	EXTG & NEW GWB	PNT-1	EXTG GWB	-	EXTG GWB	-	EXTG GWB	-	EXTG APC *(1)		1, 2	L8
M1	MECHANICAL	EXTG CONC.	-	EXTG CMU	-	EXTG CMU	-	EXTG CMU	-	EXTG CMU	-	-	-		M1
M22	COMM.	EXTG CONC.	-	EXTG CMU	-	EXTG CMU	-	EXTG CMU	-	EXTG CMU	-	-	-		M22

E7 ROOM FINISH SCHEDULE

NO SCALE — REFER TO SHEET LEGEND FOR ROOM FINISH SCHEDULE NOTES

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PROJECT ARCHITECT: David E. Ouse
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Interior Elevations, Frame Type and Schedules

COUNTY BID #
SHA PROJECT #

A600

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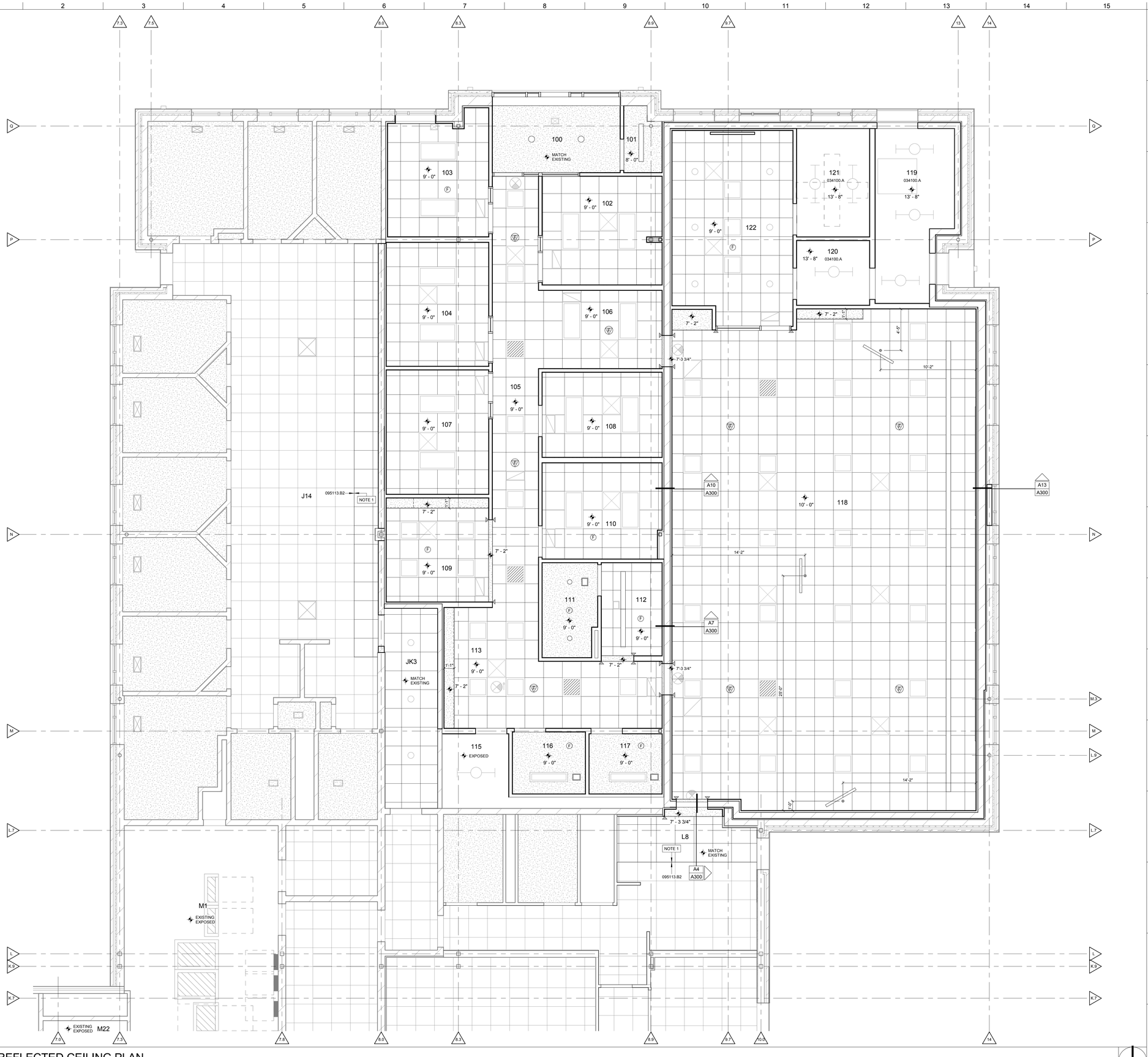
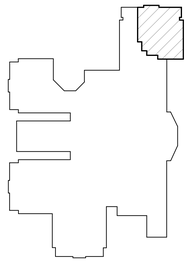


A1 REFLECTED CEILING PLAN

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



PROJECT KEY PLAN

N:\CURRENT PROJECTS\17004 Lancaster County Emergency Management Relocation Study\Drawing Files\1_Revit Model\17004_Architectural_Central_2015.rvt

KEYNOTE LEGEND

034100.A	PRECAST STRUCTURAL CONCRETE (HOLLOWCORE) – REFER TO STRUCTURAL
095113.B2	EXISTING ACOUSTICAL PANEL CEILING SYSTEM

SHEET A700 SHEET SPECIFIC NOTES

NOTE 1 REINSTALL SALVAGED APC SYSTEM TO MATCH EXISTING CONFIGURATION

REFLECTED CEILING PLAN LEGEND

- GYPSUM WALLBOARD CEILING/SOFFIT/BULKHEAD - PAINT FINISH
- APC CEILING
- METAL CONTROL JOINT
- CAN LIGHT OR PENDANT LIGHT - REFER TO ELECTRICAL
- 2X4 LIGHT - REFER TO ELECTRICAL
- 2X2 LIGHT - REFER TO ELECTRICAL
- 1X4 LIGHT - REFER TO ELECTRICAL
- STRIP LIGHT - REFER TO ELECTRICAL
- SUPPLY DIFFUSER - REFER TO MECHANICAL
- LINEAR SUPPLY DIFFUSER - REFER TO MECHANICAL
- RETURN DIFFUSER - REFER TO MECHANICAL
- EXHAUST GRILLE - REFER TO MECHANICAL
- EXIT LIGHT - REFER TO ELECTRICAL

REVISIONS:

DESIGN ARCHITECT: David E. Quade
PROJECT ARCHITECT: David E. Quade
DRAWN BY: XXX
ISSUED: November 3, 2017

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Reflected Ceiling Plan

COUNTY BID #
SHA PROJECT #

A700

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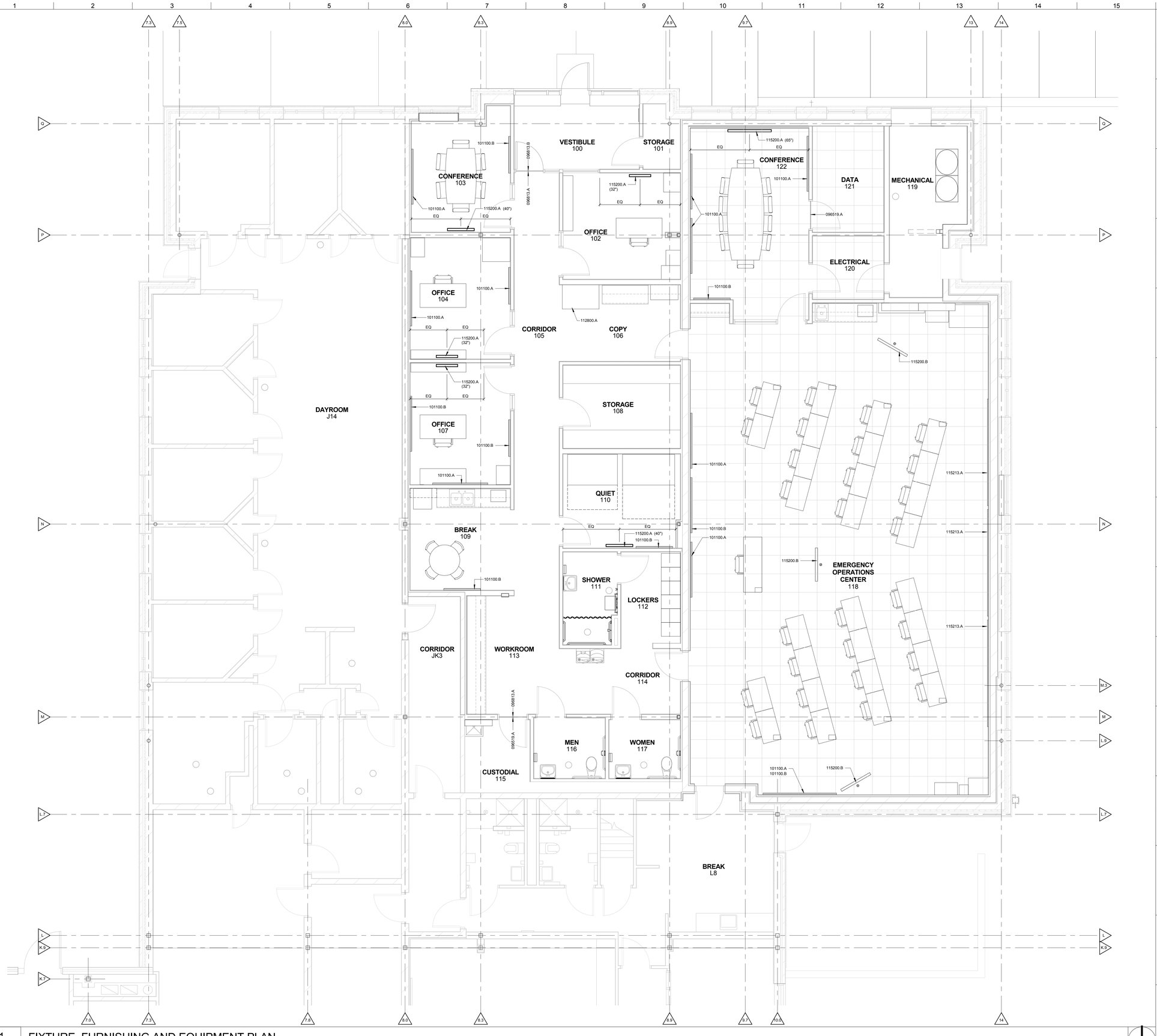
N:\CURRENT PROJECTS\17004 Lancaster County Emergency Management Relocation Study\Drawing Files\1. Revit Model\17004_Architectural_Central_2019.rvt



KEYNOTE LEGEND

096519.A	(VCT-1) - VINYL COMPOSITION FLOOR TILE
096813.A	FIELD CARPET (CPT-1)
096813.B	WALK OFF CARPET (CPT-2)
101100.A	MARKERBOARD – PROVIDED BY OWNER, INSTALLED BY CONTRACTOR
101100.B	TACKBOARD – PROVIDED BY OWNER, INSTALLED BY CONTRACTOR
112800.A	BIZ HUB – PROVIDED AND INSTALLED BY OWNER
115200.A	EXISTING WALL MOUNTED TELEVISION WITH MOUNTING BRACKET PROVIDED BY OWNER AND INSTALLED BY CONTRACTOR
115200.B	EXISTING CEILING MOUNTED TELEVISION WITH MOUNTING BRACKET PROVIDED BY OWNER AND INSTALLED BY CONTRACTOR
115213.A	WALL MOUNTED PROJECTION SCREEN PROVIDED AND INSTALLED BY CONTRACTOR

REVISIONS:

DESIGN ARCHITECT: David E. Ouse
PROJECT ARCHITECT: Project Author
DRAWN BY: Author
ISSUED: November 3, 2017

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Fixture, Furnishing and Equipment Plan

COUNTY BID #
SHA PROJECT #

A900

PROJECT KEY PLAN

A1 FIXTURE, FURNISHING AND EQUIPMENT PLAN

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

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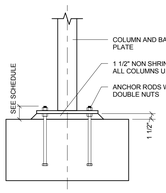
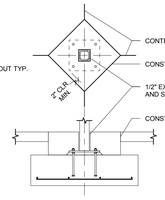
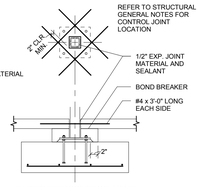


TYPICAL ANCHOR BOLT DETAIL



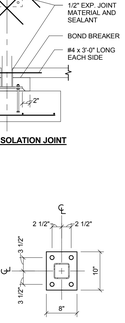
TYPICAL COLUMN ISOLATION JOINT



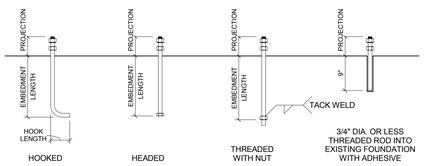
ALTERNATE ISOLATION JOINT

ANCHOR ROD EMBEDMENT SCHEDULE				
DIA.	HOOKED ROD		HEADED ROD	
	HOOKED LENGTH (MIN.)	EMBEDMENT LENGTH (MIN.)	EMBEDMENT LENGTH (MIN.)	PROJECTION (MIN.)
1/2"	2"	6"	6"	4"
3/4"	3"	9"	9"	4"
1"	DO NOT USE HOOKED RODS		12"	6"
1 1/4"	DO NOT USE HOOKED RODS		15"	6"
1 1/2"	DO NOT USE HOOKED RODS		22"	6"

ANCHOR RODS SHALL CONFORM TO ASTM F1554, GRADE 36
INCREASE LENGTHS 4" FOR ANCHOR RODS IN PIERS AND WALLS.



BP-1 HSS 4x4
PL 3/4x8x10 3/4" DIA. A.B.

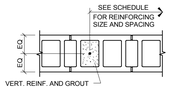


K1 COLUMN SCHEDULE AND DETAILS

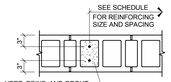
SCALE: 3/4" = 1'-0"

MARK	TYPE	SIZE	VERTICAL REINFORCING	BOND COURSE REINFORCING	
				CMU SIZE	REINF. SIZE
A	1	8"	#5 AT 8" O.C.	4"	1 - #3
B	1	10"	#5 AT 8" O.C.	6"	1 - #4
C	-	-	-	8" AND 10"	2 - #4
				12" AND 16"	2 - #5

NOTES:
1. PROVIDE HORIZONTAL JOINT REINFORCING AT 1'-4" O.C. TYP. U.N.O. SEE GENERAL STRUCTURAL NOTES FOR DESCRIPTION.
2. SEE GENERAL STRUCTURAL NOTES AND DESIGN DATA FOR GROUT MIX DESIGN AND GROUT LIFT REQUIREMENTS.
3. REFER TO TYPICAL CMU WALL REINFORCING DETAILS.



TYPE 1



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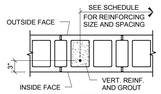
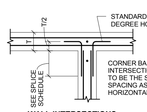


TYPE 3

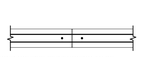
NOTES:
1. SEE SECTIONS OR CMU REINFORCING SCHEDULE FOR REINFORCING SIZE AND SPACING.
2. PROVIDE REINFORCING FROM FOUNDATION TO TOP OF WALL AT VERTICAL WALL REINFORCING DETAILS.
3. PROVIDE A CONTINUOUS BOND COURSE AT TOP OF OR WITHIN 3 COURSES OF THE TOP OF ALL CMU WALLS AND PARTITIONS.
4. LOCATE CMU CONTROL JOINTS AT 24'-0" O.C. MAX. IN WALLS 16'-0" OR GREATER IN HEIGHT AT 20'-0" O.C. MAX. IN WALLS LESS THAN 16'-0" IN HEIGHT.
5. PROVIDE A CONTINUOUS BOND COURSE AT ALL JOIST BEARING ELEVATIONS.
6. LOCATE CMU CONTROL JOINTS AT BRICK EXPANSION JOINTS EXCEPT WHEN BRICK EXPANSION JOINTS ARE WITHIN 4'-0" OF A CORNER.
7. SEE ARCH. DRAWINGS FOR LOCATION OF BRICK EXPANSION JOINTS.

CMU REINFORCING NOTES



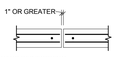
WALL INTERSECTIONS

CORNERS



BOND COURSE REINFORCING TO BE CONTINUOUS THROUGH CONTROL JOINTS

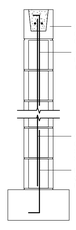
CONTROL JOINTS

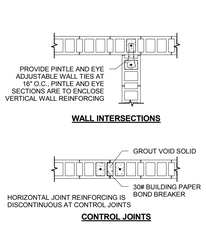


STOP REINFORCING AT BUILDING EXPANSION JOINTS

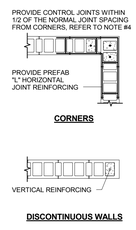
EXPANSION JOINTS

BOND COURSE REINFORCING DETAILS



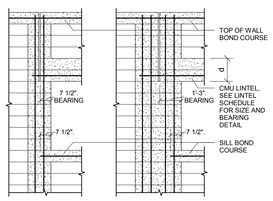


WALL INTERSECTIONS **CONTROL JOINTS**



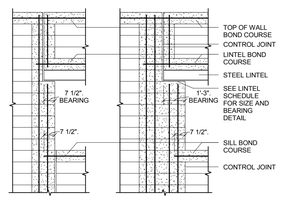
CORNERS **DISCONTINUOUS WALLS**

VERTICAL REINFORCING DETAILS



7 1/2" LINTEL BEARING **1'-3" LINTEL BEARING**

REINFORCING DETAILS AT OPENINGS WITH CMU LINTELS



7 1/2" LINTEL BEARING **1'-3" LINTEL BEARING**

REINFORCING DETAILS AT OPENINGS WITH STEEL AND PRECAST LINTELS

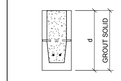
PROVIDE A CONTROL JOINT AT ONE JAMB MIN. AT OPENINGS LESS THAN 6'-0" IN WIDTH.

PROVIDE A CONTROL JOINT AT BOTH JAMBS AT OPENINGS 6'-0" AND GREATER IN WIDTH.

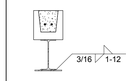
A1 TYPICAL CMU REINFORCING DETAILS

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

MARK	BEARING	TYPE	DESCRIPTION	EXTEND PLATE FULL LENGTH OF LINTEL	COMMENTS
L-1	7 1/2"	1	8" CMU REINFORCED WITH 2 - #5	-	d = 8"
L-2	7 1/2"	2	W8x10 WITH PL 1/4" x 7"	YES	
MECH. OPENINGS	7 1/2"	LINTELS ARE REQUIRED ABOVE ALL MECHANICAL OPENINGS GREATER THAN 1'-4" IN WIDTH COORDINATE OPENING SIZE AND LOCATION WITH THE MECHANICAL CONTRACTOR.			



TYPE 1



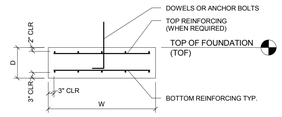
TYPE 2

NOTE:
1. ALL OPENINGS IN MASONRY WALLS SHALL HAVE LINTELS WHETHER SHOWN OR NOT, ADAPT LINTEL DETAILS SHOWN. ALL EXTERIOR STEEL LINTELS SHALL HAVE THE EXPOSED SURFACES AND VENEER BEARING SURFACES GALVANIZED.

M6 LINTEL SCHEDULE

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

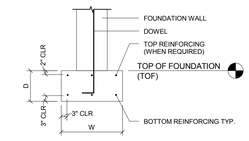
MARK	WIDTH	LENGTH	DEPTH	REINFORCING
F-1	4' - 0"	4' - 0"	3' - 6"	6 - #5 CONTINUOUS AT TOP AND BOTTOM



J6 SPREAD FOOTING SCHEDULE

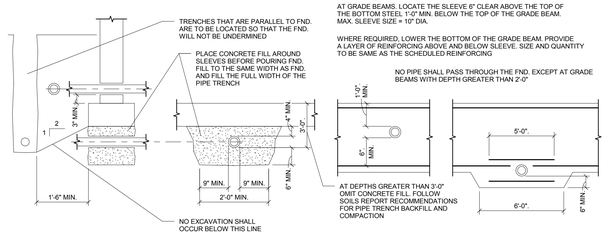
SCALE: 3/4" = 1'-0"

MARK	WIDTH	DEPTH	REINFORCING
CF-1	1' - 6"	3' - 6"	2 - #5 CONTINUOUS AT TOP AND BOTTOM
CF-2	2' - 0"	3' - 6"	3 - #5 CONTINUOUS AT TOP AND BOTTOM
CF-3	2' - 6"	3' - 6"	3 - #5 CONTINUOUS AT TOP AND BOTTOM
CF-4	1' - 4"	1' - 0"	2 - #5 CONTINUOUS AT TOP AND BOTTOM
CF-5	1' - 8"	1' - 0"	2 - #5 CONTINUOUS AT TOP AND BOTTOM
CF-6	1' - 8"	3' - 0"	3 - #5 CONTINUOUS AT TOP AND BOTTOM
CF-7	1' - 1 1/2"	3' - 0"	2 - #5 CONTINUOUS AT TOP AND BOTTOM



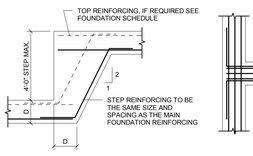
F6 CONTINUOUS FOOTING SCHEDULE

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

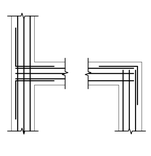


DETAIL FOR PIPES AND TRENCHES LOCATED AT FOOTINGS AND GRADE BEAMS

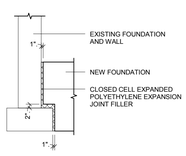
NOTES:
1. SEE GENERAL STRUCTURAL NOTES FOR SPLICE LENGTHS AND CLEAR COVER REQUIREMENTS.
2. CORNER AND INTERSECTION BARS ARE TO BE THE SAME SIZE AND SPACING AS THE MAIN HORIZONTAL REINFORCING.
3. CORNER AND INTERSECTION BARS TO HAVE STANDARD 90 DEGREE HOOK.



TYPICAL FOUNDATION STEP



STANDARD FOUNDATION REINFORCING DETAILS



FOUNDATION ADJACENT TO EXISTING STRUCTURES

A6 TYPICAL FOUNDATION DETAILS

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

GENERAL STRUCTURAL NOTES

1. GENERAL CONTRACTOR'S RESPONSIBILITIES SHALL INCLUDE BUT ARE NOT LIMITED TO:
   a. DETERMINING CONSTRUCTION PROCEDURE AND SEQUENCE.
   b. PROVIDING SHORING, SHEETING, TEMPORARY BRACING, GUYS OR TIEDOWNS WHICH MIGHT BE NECESSARY TO INSURE THE SAFETY OF THE BUILDING AND ITS COMPONENT PARTS DURING CONSTRUCTION.
   c. COORDINATE THE LOCATION OF LOADS, OPENINGS, AND STRUCTURE RELATED TO MECHANICAL EQUIPMENT.
      "MECHANICAL LOADS, OPENINGS AND STRUCTURE RELATED TO MECHANICAL REQUIREMENTS SHOWN ARE FOR BIDDING PURPOSES ONLY.
      "LOADS OR OPENINGS GREATER THAN THOSE SHOWN ON STRUCTURAL OR MECHANICAL DRAWINGS SHALL BE BROUGHT TO THE ATTENTION OF THE ENGINEER OF RECORD BEFORE PROCEEDING WITH WORK.
   d. VERIFYING AND COORDINATING DIMENSIONS AND ELEVATIONS SHOWN ON THE CONTRACT DOCUMENTS. IF DISCREPANCIES OCCUR, THE CONTRACTOR SHALL NOTIFY THE ARCHITECT BEFORE PROCEEDING WITH THE WORK.
   e. TAKE PROPER PRECAUTIONS TO PROTECT SHALLOW FOOTINGS FROM FROST DURING COLD WEATHER CONSTRUCTION. REFER TO GEOTECHNICAL REPORT FOR MINIMUM FOOTING DEPTHS REQUIRED FOR FROST PROTECTION.
2. IF CONFLICTING INFORMATION IS PRESENT IN THE CONSTRUCTION DOCUMENTS, THE STRICTEST PROVISIONS SHALL GOVERN.
3. UNLESS NOTED OTHERWISE, REQUIREMENTS GIVEN FOR ONE OR MORE LOCATIONS SHALL APPLY AT OTHER LOCATIONS AT WHICH CONDITIONS ARE SIMILAR.

REINFORCED CONCRETE

1. REFER TO DESIGN DATA FOR FURTHER INFORMATION.
2. CONFORM TO ACI (AMERICAN CONCRETE INSTITUTE) STANDARDS AND RECOMMENDATIONS AS OUTLINED IN FIELD REFERENCE MANUAL, SP-15 PROVIDE AT LEAST ON COPY OF THE ACI FIELD REFERENCE MANUAL, SP-15, IN THE FIELD OFFICE AT ALL TIMES.
3. PROVIDE CONTROL JOINTS IN SLAB ON GRADE AS FOLLOWS:
   8" THICK SLABS 24'-0" MAX. SPACING ON ANY SIDE
   6" THICK SLABS 18'-0" MAX. SPACING ON ANY SIDE
   5" THICK SLABS 15'-0" MAX. SPACING ON ANY SIDE
   4" THICK SLABS 12'-0" MAX. SPACING ON ANY SIDE
   THE SECTIONS BOUNDED BY CONTROL OR CONSTRUCTION JOINTS SHALL BE APPROXIMATELY SQUARE, WITH THE LENGTH TO WIDTH RATIO LESS THAN 1 1/2 TO 1.
4. PROVIDE DOWELS IN FOOTINGS TO MATCH SIZE AND SPACING OF VERTICAL WALL AND PIER REINFORCING.
5. PROVIDE REINFORCING AT LOCATIONS AS SHOWN IN CIP CONCRETE STANDARD REINFORCING DETAILS.
6. UNLESS NOTED OTHERWISE, ALL REINFORCING BAR SPLICES SHALL BE IN ACCORDANCE WITH THE TABLE SHOWN BELOW:

BAR SIZE	SPLICE LENGTH (IN INCHES) NON TOP BAR	TOP BAR
#3	14	18
#4	19	24
#5	23	30
#6	30	40
#7	41	54
#8	55	71
#9	69	90
#10	88	114
#11	108	140

TOP BARS ARE HORIZONTAL REINFORCEMENT PLACED SO THAT MORE THAN 12" OF FRESH CONCRETE IS CAST IN THE MEMBER BELOW THE REINFORCEMENT.

7. THE FOLLOWING MINIMUM CONCRETE COVER SHALL BE PROVIDED FOR REINFORCEMENT:

	MIN. COVER IN INCHES
CONCRETE CAST AGAINST AND PERMANENTLY EXPOSED TO EARTH	3
CONCRETE EXPOSED TO EARTH OR WEATHER: #6 THROUGH #18 BARS	2
#5 BAR AND SMALLER	1 1/2
CONCRETE NOT EXPOSED TO WEATHER OR IN CONTACT WITH GROUND: SLABS AND JOIST: #11 BAR AND SMALLER	3/4
WALLS	1 1/2
BEAMS, COLUMN: PRIMARY REINFORCEMENT, TIES, STIRRUPS AND SPIRALS	1 1/2

8. IF CAST-IN-PLACE WALLS ARE SHOWN ON THE DRAWINGS BUT THE REINFORCING IS NOT INDICATED, PROVIDE THE FOLLOWING STEEL IN CONCRETE WALLS.

THICKNESS	VERTICAL BARS	HORIZONTAL BARS
6"	#4 AT 18" O.C.	#4 AT 16" O.C.
8"	#4 AT 18" O.C.	#4 AT 12" O.C.
10"	#4 AT 16" O.C.	#4 AT 10" O.C.
12"	#4 AT 18" O.C.	#4 AT 16" O.C.

CENTER REINFORCING IN WALLS 10" AND SMALLER UNLESS NOTED OTHERWISE.
PROVIDE REINFORCING IN EACH FACE FOR WALLS GREATER THAN 10".

9. PROVIDE 2 - #5 BARS AROUND ALL RECTANGULAR OPENINGS IN CAST-IN-PLACE WALLS. BARS SHALL EXTEND NO LESS THAN 24" BEYOND THE OPENING.

MASONRY

1. REFER TO DESIGN DATA FOR FURTHER INFORMATION.
2. UNLESS NOTED OTHERWISE, ALL REINFORCING BAR SPLICES SHALL BE:

BAR SIZE -	#3	#4	#5	#6	#7
LAP LENGTH -	16"	24"	32"	40"	48"

3. ALL MASONRY WALLS SHALL HAVE HORIZONTAL MASONRY JOINT REINFORCEMENT AT 16" ON CENTER. THE MINIMUM LAP LENGTH SHALL BE 6" UNLESS NOTED OTHERWISE.
4. WHEN A WALL CONSISTS OF A WYTHE OF CONCRETE MASONRY BLOCKS AND A WYTHE OF BRICK VENEER, PROVIDE LADDER TYPE HORIZONTAL JOINT REINFORCING WITH ADJUSTABLE WALL TIE EYE SECTIONS AT 24" ON CENTER. RECTANGULAR ADJUSTABLE WALL TIE PINTLE SECTIONS ARE FITTED INTO THE EYE SECTIONS TO COMPLETE THE ASSEMBLY.
5. COMPLY WITH THE REQUIREMENTS OF ACI 530.1 SECTION 3.2F FOR CLEAN OUTS AND SECTION 3.5 GROUT PLACEMENT.
6. ALL OPENINGS IN CMU WALLS SHALL BE REINFORCED AS SHOWN IN THE STANDARD CMU REINFORCING DETAILS.
7. GROUT CORES SOLID ONE FULL COURSE ABOVE AND BELOW ALL BOLTS AND EXPANSION JOINTS.
8. GROUT ALL CORES SOLID BELOW GRADE AT EXTERIOR WALLS.
9. WHERE HOLLOW MASONRY UNITS ARE USED ABOVE HOLLOW MASONRY UNITS OF A DIFFERENT WIDTH, PROVIDE A CONTINUOUS COURSE OF SOLID GROUTED MASONRY AT LEAST 8" HIGH BELOW THE TRANSITION.
10. ALL OPENINGS IN CMU WALLS SHALL HAVE LINTELS WHETHER SHOWN OR NOT. ADAPT LINTEL DETAILS SHOWN. ALL STEEL EXTERIOR LINTELS SHALL HAVE THE EXPOSED SURFACES AND VENEER BEARING SURFACES GALVANIZED.

STRUCTURAL STEEL

1. REFER TO DESIGN DATA FOR FURTHER INFORMATION.
2. FIELD CUTTING OR OTHER FIELD MODIFICATIONS TO STRUCTURAL STEEL SHALL NOT BE MADE WITHOUT PRIOR APPROVAL FROM THE ENGINEER OF RECORD.
3. SIZES OF FILLET WELDS NOT SHOWN SHALL CONFORM TO MINIMUM SIZES AS SPECIFIED BY AISC "SPECIFICATIONS FOR STRUCTURAL STEEL BUILDINGS".
4. PROVIDE TWO COATS OF ASPHALTIC PAINT ON ALL STRUCTURAL STEEL SHAPES EXPOSED TO THE SOIL OR BELOW TOP OF SLAB ON GRADE.

DESIGN DATA

GOVERNING CODE: _____ 2012 INTERNATIONAL BUILDING CODE

SOILS REPORT:

A SOILS INVESTIGATION WAS PERFORMED BY:
TERRACON, PROJECT NUMBER 05995612
THE CONTRACTOR SHALL COMPLY WITH THE RECOMMENDATIONS OF THE REPORT.

THE CONTRACTOR SHALL NOTIFY THE GEOTECHNICAL ENGINEER AFTER EXCAVATION TO DETERMINE IF THE CONDITIONS COMPLY WITH THE SOILS REPORT.

EXCAVATIONS SHALL BE TESTED BY AN APPROVED TESTING LABORATORY PRIOR TO PLACING CONCRETE.

ALLOWABLE NET SOIL BEARING PRESSURE _____ 2500 PSF

DESIGN LOADS:

BUILDING CATEGORY _____ III

LIVE LOADS

ROOF
GROUND SNOW (Pg) 30 PSF
FLAT ROOF SNOW (Pf) 25 PSF
SNOW EXPOSURE (Ce) 1.0
THERMAL FACTOR (Ct) 1.0
RAIN ON SNOW ASCE 7 SECTION 7.10
UNBALANCED SNOW LOADS ASCE 7 SECTION 7.6
MECHANICAL UNITS SEE FRAMING PLAN

WIND LOADS
SPEED 115 M.P.H.
EXPOSURE C
NET UPLIFT FOR STEEL JOIST SYSTEMS 15 PSF

SEISMIC LOADS
SITE CLASSIFICATION - D
SEISMIC DESIGN CATEGORY - B
Ss = 0.134
S1 = 0.049

MATERIALS:

CONCRETE

28 DAY CONCRETE STRENGTHS (MINIMUM):
FOOTINGS 4000 PSI
SLAB ON GRADE 3000 PSI
C.I.P. 4000 PSI
SUPPORTED FLOORS AND STOOPS 4000 PSI
REINFORCING BARS ASTM A615 GRADE 60
WELDED BARS AND ANCHORS ASTM A706 GRADE 60
WELDED WIRE FABRIC (WWF)
SLABS ON GRADE < 6" THICK 6x6-W1.4xW1.4 WWF

MASONRY

CMU GRADE N, NORMAL WEIGHT
f'm 2000 PSF
REINFORCING BARS ASTM A615 GRADE 60
HORIZONTAL JOINT REINFORCING 9 GAGE LADDER TYPE GALVANIZING
INTERIOR WALLS ASTM A641 CLASS 1
EXTERIOR WALLS ASTM A153 CLASS B-2
MASONRY GROUT 6 1/2 SACK, READY MIX SAND-GRAVEL CONCRETE WITH A SLUMP OF 6 TO 10 "
MORTAR
CMU TYPE S
BRICK TYPE N

STRUCTURAL STEEL

W SHAPES ASTM A992
ROLLED SHAPES AND PLATES ASTM A36
TUBES ASTM A500 GRADE B
PIPES ASTM A53 TYPE E OR S
BOLTS (UNLESS NOTED OTHERWISE) ASTM A325
ANCHOR RODS ASTM F1554, GRADE 36
EXPANSION BOLTS HILTI KWIK BOLT 3 OR APPROVED EQUIVALENT
ADHESIVE ANCHORS HILTI HIT HY 150 MAX OR APPROVED EQUIVALENT
SCREW ANCHORS HILTI HUS-H OR SIMPSON TITEN HD
SLEEVE ANCHORS HILTI HLC OR APPROVED EQUIVALENT
FASTENERS IN CONTACT WITH TREATED WOOD 304 OR 316 STAINLESS STEEL OR HOT DIP GALVANIZED OR APPROVED EQUIVALENT

SPECIAL INSPECTION

SPECIAL INSPECTION SHALL BE PERFORMED AS REQUIRED BY LOCAL BUILDING OFFICIAL, ACCORDING TO CHAPTER 17 OF IBC, AND AS DIRECTED BELOW:

STEEL CONSTRUCTION
TABLE 1704.3
ALL EXCEPTIONS APPLY

CONCRETE CONSTRUCTION
TABLE 1704.4
EXCEPTIONS 1,2,3 AND 5 APPLY

MASONRY CONSTRUCTION
TABLE 1704.5.1 (SPECIAL INSPECTION REQUIRED)

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ISSUED: November 3, 2017

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Lancaster County
Emergency Management Relocation / Renovation

STRUCTURAL GENERAL NOTES AND DESIGN DATA

COUNTY BID # 17-282
SHA PROJECT # 17004

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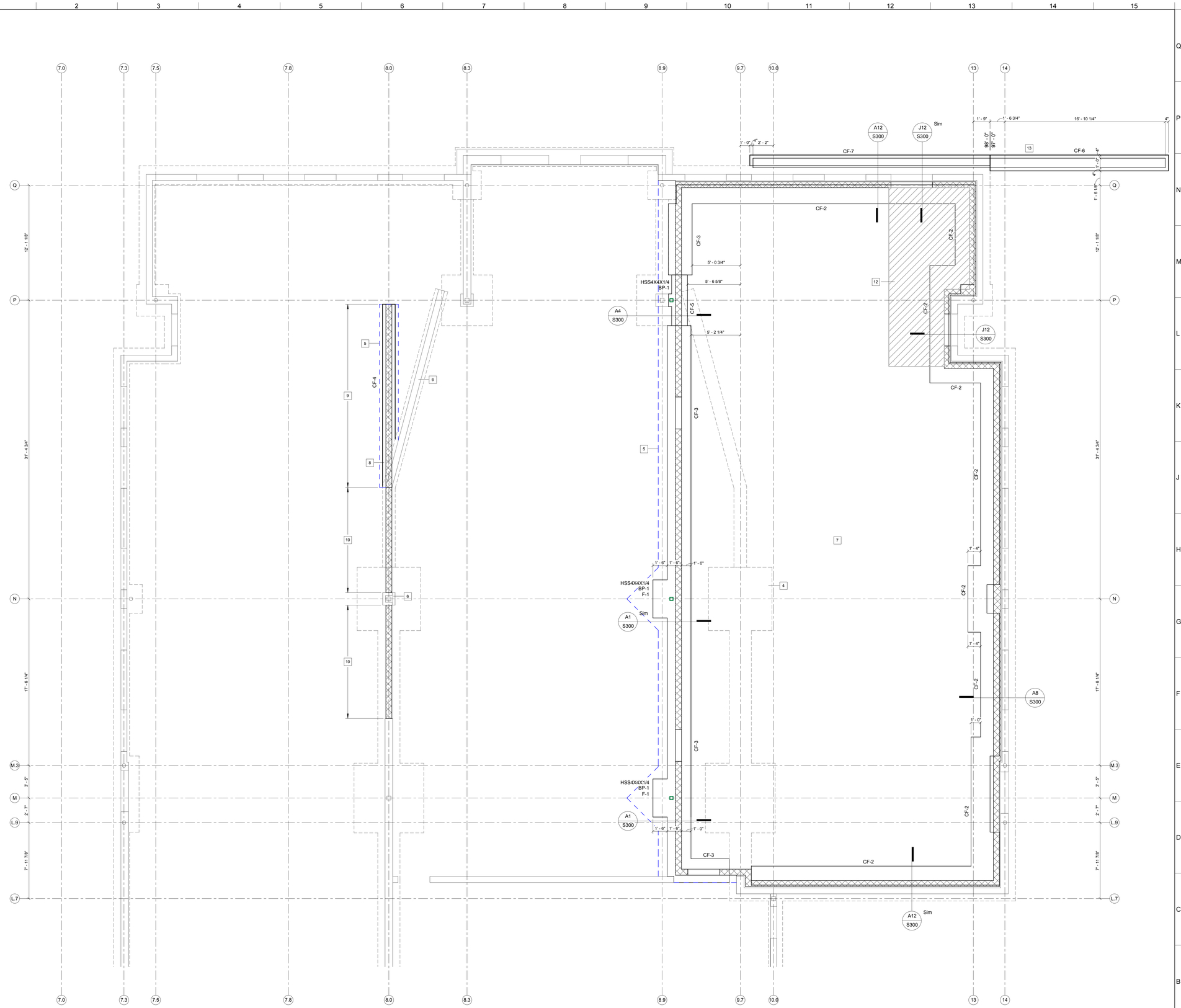

A1 FOOTING / FOUNDATION PLAN

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

SHEET NOTES:

X GENERAL SHEET NOTE

X REFER TO PLAN FOR NOTE LOCATION

1. ALL FOOTING ELEVATIONS GIVEN ARE TO TOP OF FOOTING.
2. TOP OF FOOTING ELEVATION = 99'-0", TYP., U.N.O.
3. FINISH FLOOR EL = 100'-0 TYP., U.N.O. SEE ARCHITECTURAL DRAWINGS FOR LOCATIONS AND EXTENTS OF RECESSED AND SLOPED SLABS.
4. INDICATES EXISTING FOOTING TO REMAIN., TYP., U.N.O.
5. DASHED LINE INDICATES EXTENTS OF EXISTING CONCRETE SLAB TO BE REMOVED FOR INSTALLATION OF NEW CONCRETE FOOTINGS. INSTALL NEW 5" CONCRETE SLAB ON COMPACTED FILL TO NEW CMU WALL. MATCH ADJACENT FLOOR ELEVATION.
6. INFILL FLOOR WITH 5" CONCRETE SLAB ON COMPACTED FILL. PROVIDE VAPOR BARRIER, SEE SPECIFICATIONS FOR LOCATION BELOW SLAB. REFER TO SOILS REPORT FOR SLAB SUBGRADE REQUIREMENTS. MATCH ADJACENT FLOOR ELEVATION.
7. 4" CONCRETE SLAB ON COMPACTED FILL, REINFORCED WITH 6x6-W1.4xW1.4 WWF, CENTER IN SLAB TYP., PROVIDE VAPOR BARRIER, SEE SPECIFICATIONS FOR LOCATION BELOW SLAB. REFER TO SOILS REPORT FOR SLAB SUBGRADE REQUIREMENTS, TYP., U.N.O. TOP OF SLAB = 99'-4"
8. ADHESIVE ANCHOR (6" MIN. EMBED) TOP AND BOTTOM BARS OF NEW FOOTING INTO EXISTING FOOTING.
9. NEW 8" CMU INFILL. SEE ARCHITECTURAL FOR HEIGHT OF WALL.
10. NEW 8" CMU INFILL ON TOP OF EXISTING CMU WALL. SEE ARCHITECTURAL FOR HEIGHT OF WALL.
11. C-1 COLUMN
    BP-1 BASE PLATE
    F-1 FOOTING MARK
    99'-0" TOP OF FOOTING
12. 4" CONCRETE SLAB ON COMPACTED FILL, REINFORCED WITH 6x6-W1.4xW1.4 WWF, CENTER IN SLAB TYP., PROVIDE VAPOR BARRIER, SEE SPECIFICATIONS FOR LOCATION BELOW SLAB. REFER TO SOILS REPORT FOR SLAB SUBGRADE REQUIREMENTS, TYP., U.N.O. TOP OF SLAB = 100'-0"
13. 12" CONCRETE WALL, REINFORCED WITH #4 BARS AT 12" O.C. EACH WAY, EACH FACE. TOP OF SLAB = 99'-6

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FOOTING/FOUNDATION PLAN

COUNTY BID # 17-282

SHA PROJECT # 17004

S200

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SHEET NOTES:

X. GENERAL SHEET NOTE

X | REFER TO PLAN FOR NOTE LOCATION

1. REFER TO ARCHITECTURAL AND MECHANICAL DRAWINGS FOR LOCATION AND SIZE OF ROOF PENETRATIONS.
2 | 12" HOLLOWCORE WITH 4" CONCRETE COMPOSITE TOPPING AND REINFORCING WITH 4 FC 4 MESH.
3 | ANTENNA SUPPORT FRAME. COORDINATE ANTENNA TOWER MODEL, BASE PLATE KIT, LOCATION, ELEVATION, AND ATTACHMENT REQUIREMENTS WITH ANTENNA SUPPLIER.

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Lancaster County

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ROOF FRAMING PLAN

COUNTY PROJ # 17-282
SHA PROJECT # 17004

S201

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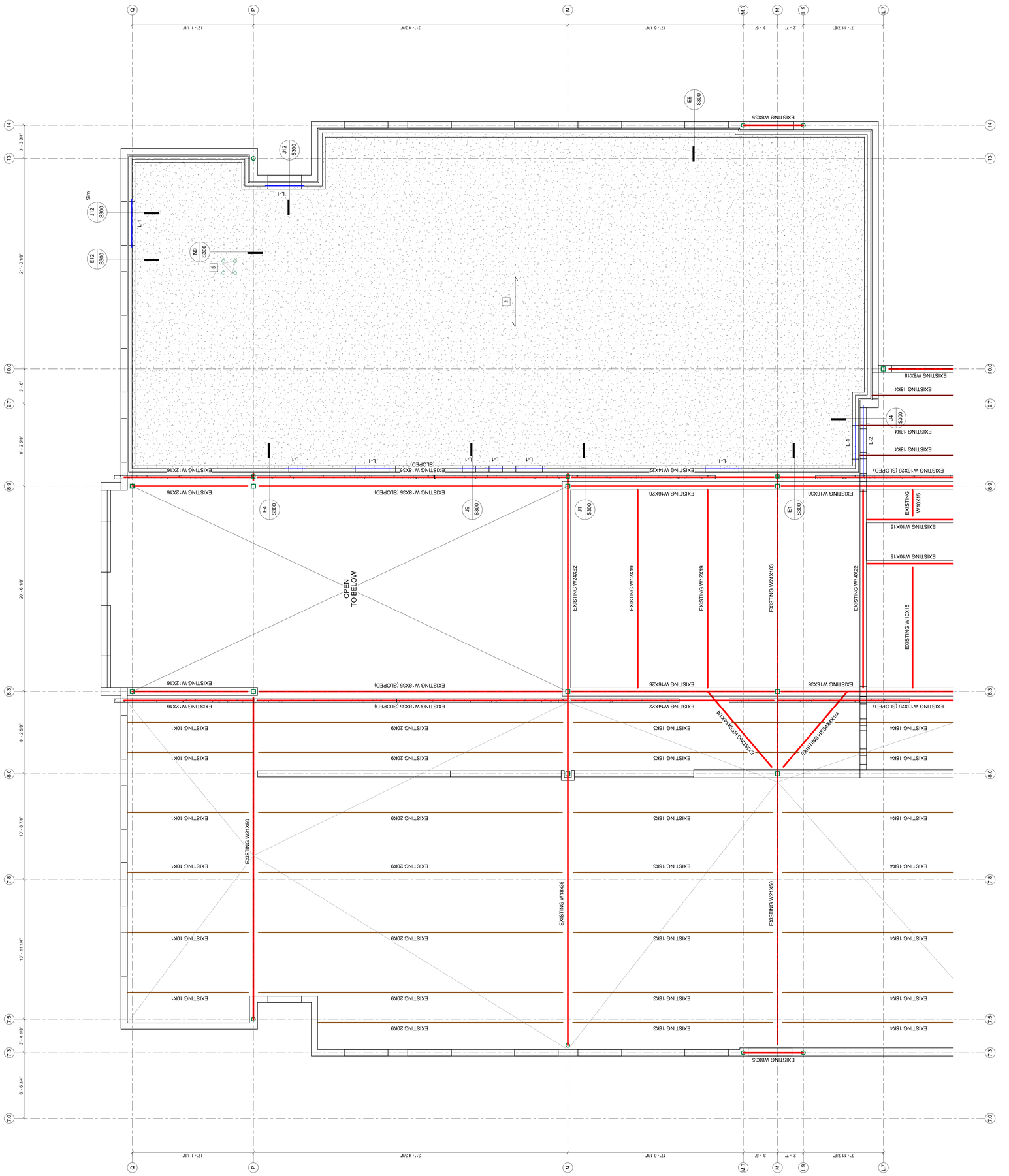

A1 ROOF FRAMING PLAN

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

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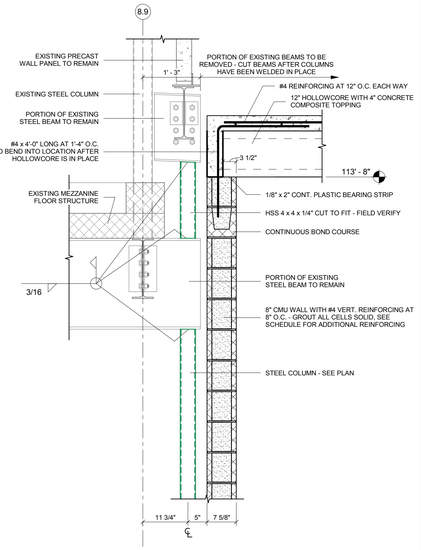
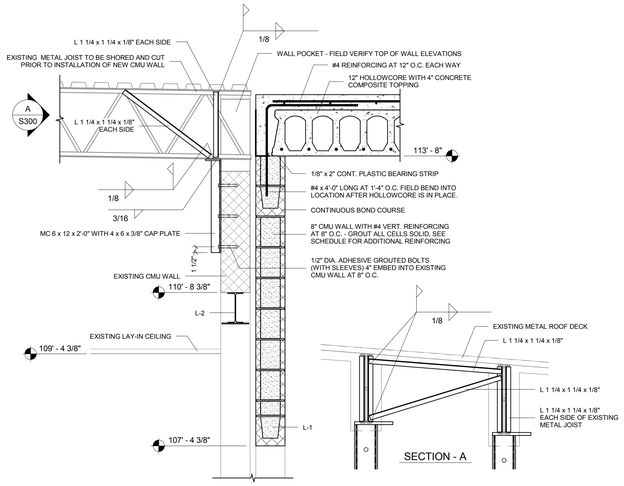


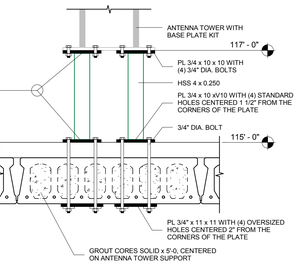
J1 EXISTING BEAM CONNECTION

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



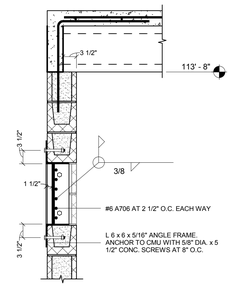
J4 12" HOLLOWCORE AT 8" CMU WALL

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



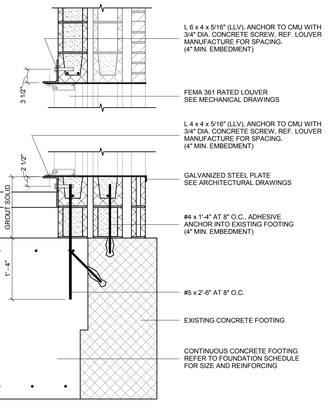
N9 ANTENNA SUPPORT DETAIL

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



J9 PENETRATION REINFORCING

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



J12 LOUVER ATTACHEMENT AT SILL / HEAD

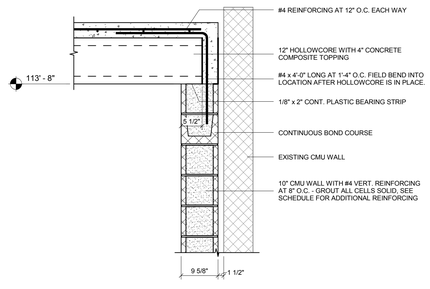
SCALE: 3/4" = 1'-0"

E1 EXISTING BEAM CONNECTION

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

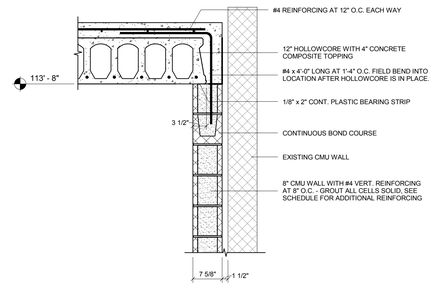
E4 EXISTING BEAM CONNECTION

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



E8 12" HOLLOWCORE AT 10" CMU WALL

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



E12 12" HOLLOWCORE AT 8" CMU WALL

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

A1 CONCRETE FOOTING AT 8" CMU WALL

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

A4 CONCRETE FOOTING AT 8" CMU WALL

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

A8 CONCRETE FOOTING AT 10" CMU WALL

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

A12 CONCRETE FOOTING AT 8" CMU WALL

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

REVISIONS:	
DESIGN ARCHITECT:	
PROJECT ARCHITECT:	
DRAWN BY:	
ISSUED:	November 3, 2017

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Lancaster County
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STRUCTURAL DETAILS

COUNTY BID #	17-282
SHA PROJECT #	17004

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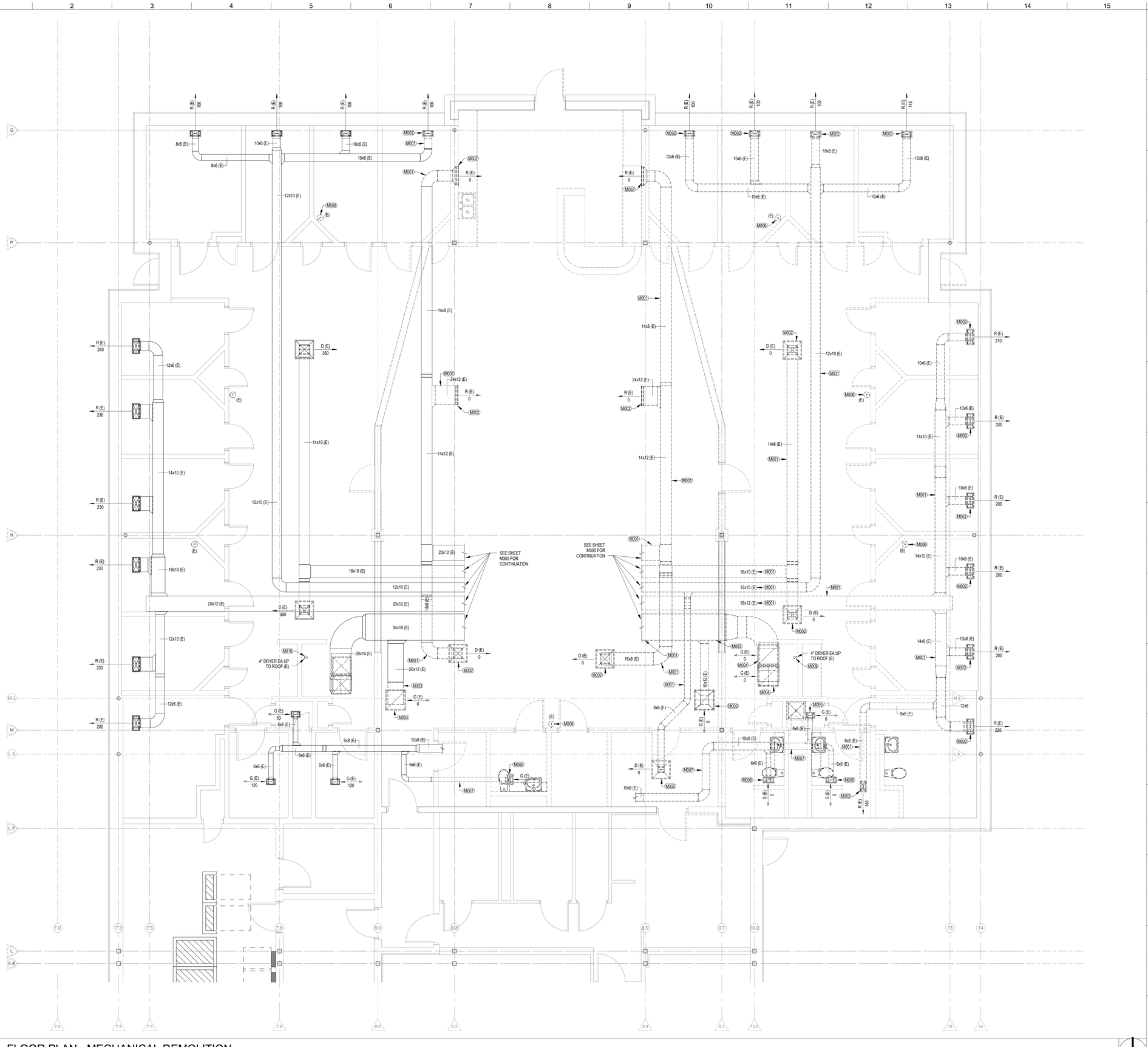


1 FLOOR PLAN - MECHANICAL DEMOLITION

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

DEMOLITON GENERAL NOTES

1. ALL ITEMS SHOWN LIGHT OR INDICATED ON PLAN AS (E) ARE EXISTING. ALL ITEMS SHOWN DASHED ARE TO DEMOLISHED. NOT ALL MECHANCIAL ITEMS ARE SHOWN.

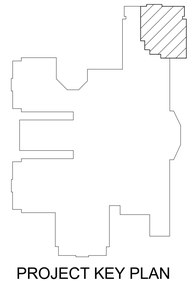
2. FIELD VERIFY EXACT LOCATION OF ALL MECHANICAL EQUIPMENT AND DUCTWORK. EQUIPMENT AND DUCTWORK DISCOVERED ON SITE TO BE REMOVED BUT NOT INDICATED ON PLANS IS TO BE IDENTIFIED BY CONTRACTOR AND REMOVED AS DIRECTED BY THE ENGINEER.

3. THE BUILDING MANAGER RESERVES THE FIRST RIGHT OF SALVAGE OF ANY ITEMS REMOVED. CONTRACTOR SHALL REMOVE ALL UNWANTED MATERIALS FROM THE SITE. BUILDING DUMPSTER OR OTHER TRASH RECEPTACLES ARE NOT TO BE UTILIZED.

4. HOLES CUT IN WALLS, FLOOR, AND CEILINGS TO PERMIT THE REMOVAL / INSTALLATION OF EQUIPMENT, DUCTWORK, ETC. SHALL BE CAREFULLY MADE AND RESTRICTED TO THE SMALLEST PRACTICAL SIZE. PATCHE ALL HOLES NOT REQUIRED FOR NEW WORK TO MATCH EXISTING. COORDINATE ALL CUTTING AND PATCHING WITH GENERAL CONTRACTOR. SEE ARCHITECTURAL PLANS.

KEYNOTES

M001	REMOVE EXISTING SUPPLY AIR DUCT MAIN TO POINT INDICATED ON DRAWING.
M002	REMOVE EXISTING SUPPLY AIR DIFFUSER/REGISTER AND DUCTWORK COMPLETE.
M003	REMOVE EXISTING RETURN AIR DUCT TO POINT INDICATED ON DRAWING.
M004	REMOVE EXISTING RETURN AIR GRILLE AND DUCTWORK COMPLETE.
M005	REMOVE EXISTING EXHAUST AIR DUCT AND REGISTER TO POINT INDICATED ON DRAWING.
M006	REMOVE AND RETAIN EXISTING THERMOSTAT. SEE SHEET M100 FOR RELOCATION.
M007	REMOVE EXISTING EXHAUST AIR DUCT MAIN TO POINT INDICATED ON DRAWING.
M008	REMOVE AND RETAIN EXISTING THERMOSTAT. SEE SHEET M100 FOR RELOCATION. SEE ARCHITECTURAL REQUIREMENT FOR WALL PATCHING REQUIREMENTS. PROVIDE STAINLESS STEEL COVERPLATE FOR PATCHING HOLE IN WALL.
M009	REMOVE EXISTING DRYER VENT AND ROOF CAP COMPLETE.
M010	REMOVE EXISTING DRYER VENT AND CAP DUCTWORK AT ROOF.



PROJECT KEY PLAN

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REVISIONS:

DESIGN ARCHITECT: David E. Quade
PROJECT ARCHITECT: David E. Quade
DRAWN BY: AMP
ISSUED: November 3, 2017

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FLOOR PLAN - MECHANICAL DEMOLITION

COUNTY BID # 17-282
SHA PROJECT # 17004

MD100

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DEMOLITION GENERAL NOTES

1. ALL ITEMS SHOWN LIGHT OR INDICATED ON PLAN AS (E) ARE EXISTING. ALL ITEMS SHOWN DASHED ARE TO DEMOLISHED. NOT ALL MECHANCIAL ITEMS ARE SHOWN.

2. FIELD VERIFY EXACT LOCATION OF ALL MECHANICAL EQUIPMENT AND PIPING. EQUIPMENT AND PIPING DISCOVERED ON SITE TO BE REMOVED BUT NOT INDICATED ON PLANS IS TO BE IDENTIFIED BY CONTRACTOR AND REMOVED AS DIRECTED BY THE ENGINEER.

3. THE BUILDING MANAGER RESERVES THE FIRST RIGHT OF SALVAGE OF ANY ITEMS REMOVED. CONTRACTOR SHALL REMOVE ALL UNWANTED MATERIALS FROM THE SITE. BUILDING DUMPSTER OR OTHER TRASH RECEPTACLES ARE NOT TO BE UTILIZED.

4. HOLES CUT IN WALLS, FLOOR, AND CEILINGS TO PERMIT THE REMOVAL / INSTALLATION OF EQUIPMENT, PIPING, ETC. SHALL BE CAREFULLY MADE AND RESTRICTED TO THE SMALLEST PRACTICAL SIZE. PATCHE ALL HOLES NOT REQUIRED FOR NEW WORK TO MATCH EXISTING. COORDINATE ALL CUTTING AND PATCHING WITH GENERAL CONTRACTOR. SEE ARCHITECTURAL PLANS.

KEYNOTES

M014	REMOVE EXISTING SINK, CW, HW, W, AND V COMPLETE.
M015	REMOVE EXISTING SANITARY WASTE PIPING COMPLETE. DO NOT ALLOW DEAD LEGS OF SANITARY WASTE PIPING. COORDINATE ALL FLOOR REMOVAL AND PATCHING REQUIREMENTS WITH ARCHITECTURAL DRAWINGS, SHEET AD100.
M016	REMOVE EXISTING WASHING MACHINE BOX, CW, HW, W, AND V COMPLETE.
M017	REMOVE EXISTING MOP SINK, CW, HW, W, AND V COMPLETE.
M018	REMOVE EXISTING WATER CLOSET, CW, W, AND V COMPLETE.
M019	REMOVE EXISTING LAVATORY, CW, HW, W, AND V COMPLETE.
M021	REMOVE EXISTING FLOOR DRAIN, W, AND V COMPLETE.
M022	REMOVE EXISTING SHOWER, DRAIN, CW, HW, W, AND V COMPLETE.
M023	REMOVE EXISTING V PIPING AND VTR.
M024	REMOVE EXISTING ABOVE GROUND STORM PIPING COMPLETE.
M025	REMOVE EXISITNG ROOF DRAIN COMPLETE.
M026	REMOVE EXISTING BELOW GROUND STORM PIPING COMPLETE. COORDINATE ALL FLOOR REMOVAL AND PATCHING REQUIREMENTS WITH ARCHITECTURAL DRAWINGS, SHEET AD100.
M027	CAP SANITARY WASTE PIPING AT MAIN.
M028	REMOVE EXISTING CW, HW, HWC, FIRE PROTECTION, G, W, AND STORM PIPING AT POINT INDICATED ON DRAWING. SEE SHEET M200 FOR NEW WORK.
M029	REMOVE EXISTING GAS PIPING MAIN TO POINT INDICATED ON DRAWING. SEE SHEET M200 FOR NEW WORK.
M030	CW, HW, HWC, FIRE, SANITARY, G, AND STORM PIPING ARE LOCATED PER EXISTING DRAWINGS. FIELD VERIFY EXACT SIZES AND LOCATION PRIOR TO WORK. FIELD VERIFY SLOPE AND DIRECTION OF FLOW FOR SANITARY WASTE AND STORM PIPING PRIOR TO WORK.
M031	REMOVE EXISTING CW PIPING MAIN COMPLETE.
M032	REMOVE EXISTING HW PIPING MAIN COMPLETE.
M033	REMOVE EXISTING HWC PIPING MAIN COMPLETE.
M034	REMOVE EXISITNG FIRE PROTECTION PIPING MAIN COMPLETE.
M035	REMOVE EXISTING CW PIPING TO WALL HYDRANT. CAP PIPING AT WALL HYDRANT.
M318	CONNECT NEW FIRE PROTECTION PIPING TO EXISITNG FIRE PROTECTION PIPING. FIELD VERIFY EXISTING SIZE AND LOCATION OF EXISTING PIPING PRIOR TO WORK.

PROJECT KEY PLAN

1 FLOOR PLAN - PLUMBING DEMOLITION

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

REVISIONS:

DESIGN ARCHITECT: David E. Ouade
PROJECT ARCHITECT: Dwight Sinclair
DRAWN BY: AMP
CHECKED: Author
DATE: November 3, 2017

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Emergency Management Relocation / Renovation

FLOOR PLAN - PLUMBING DEMOLITION

COUNTY BID # 17-282
SHA PROJECT # 17004

MD200

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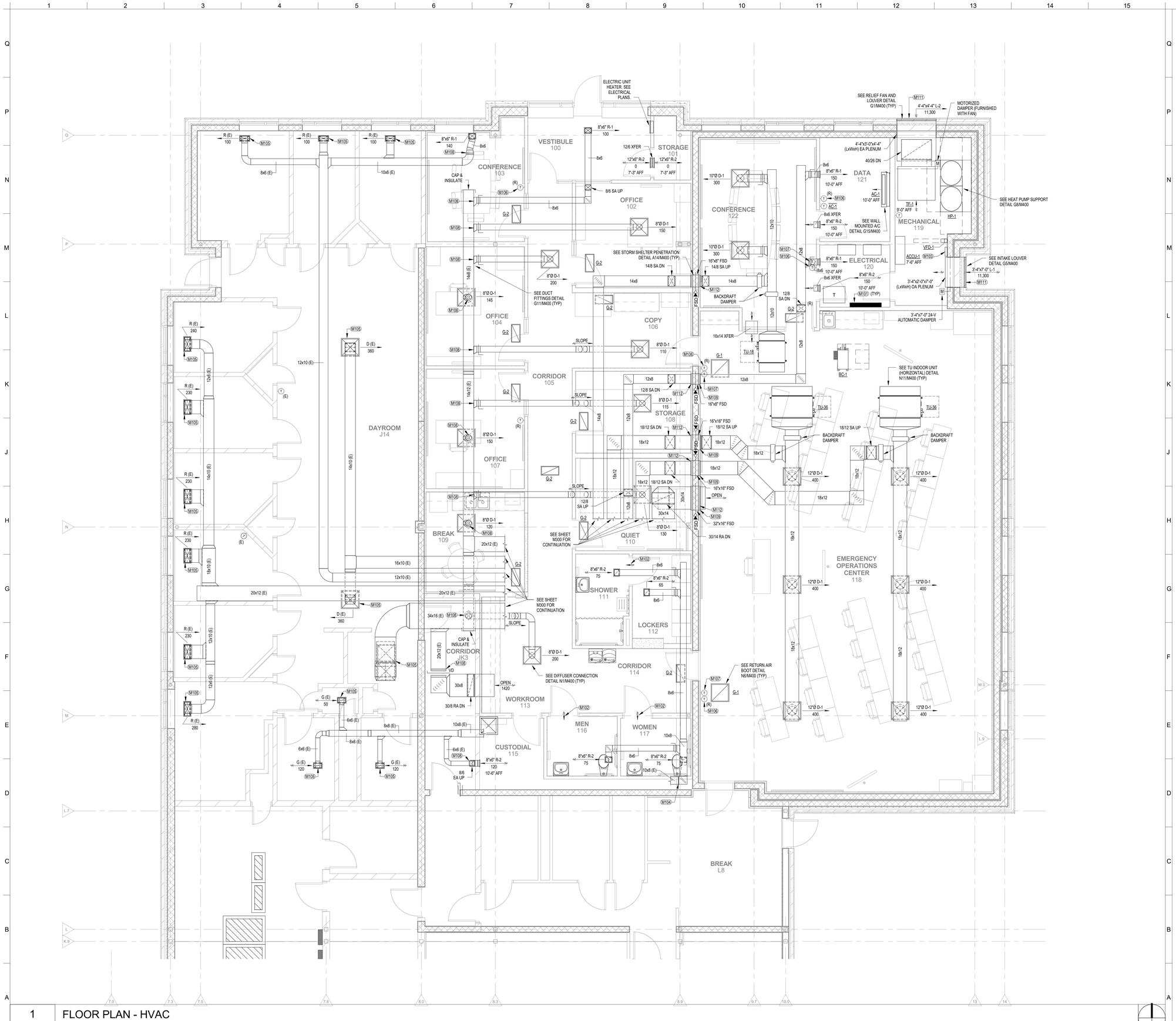
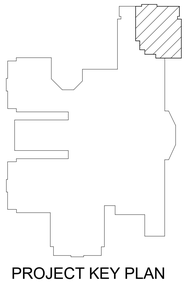


1 FLOOR PLAN - HVAC

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



PROJECT KEY PLAN

GENERAL NOTES

1. DO NOT ROUTE DUCTWORK OR PIPING ABOVE ELECTRICAL PANELS. MAINTAIN ALL CODE REQUIRED CLEARANCES.

2. ALL ITEMS LIGHT OR INDICATED ON PLAN AS (E) ARE EXISTING. ALL ITEMS INDICATED ON PLAN AS (R) ARE TO BE RELOCATED. ALL ITEMS SHOWN DARK ARE NEW. NOT ALL MECHANICAL ITEMS ARE SHOWN.

3. FIELD VERIFY ALL EXISTING CONDITIONS PRIOR TO NEW WORK. MECHANICAL CONTRACTOR SHALL BE RESPONSIBLE FOR ADJUSTING DUCTWORK AS NECESSARY TO AVOID CONFLICTS WITH STRUCTURE AND WITH ALL OTHER TRADES.

4. FIRE CAULK ALL DUCTWORK/PIPING PENETRATIONS THROUGH FIRE/SMOKE RATED WALLS AND ASSEMBLIES. CAULK AROUND ALL DUCTWORK PENETRATIONS THROUGH FULL HEIGHT SOUND WALLS. REFER TO ARCHITECTURAL DRAWINGS FOR WALL CONSTRUCTION.

5. SPACE ABOVE CEILINGS IS LIMITED. COORDINATE DUCT AND PIPE ROUTING WITH ALL OTHER TRADES. OFFSET AND EXTEND DUCTWORK AND PIPING AS REQUIRED TO AVOID CONFLICTS.

6. COORDINATE ALL DUCT, DIFFUSERS, REGISTERS AND GRILLES WITH STRUCTURE AND ALL OTHER TRADES.

7. CONTRACTOR TO PROVIDE ALL LOW VOLTAGE AND LINE VOLTAGE CONTROL WIRING REQUIRED FOR COMPLETE OPERATION OF ALL MECHANICAL EQUIPMENT.

KEYNOTES

M101 DO NOT ROUTE DUCTWORK ABOVE ELECTRICAL PANELS. MAINTAIN ALL CODE REQUIRED CLEARANCES.

M102 RETURN AIR THROUGH DOOR UNDERCUT. UNDERCUT MUST BE MINIMUM 1" ABOVE TOP OF FLOOR COVERING.

M103 MITSUBISHI AE-200A CENTRAL CONTROLLER. COORDINATE WITH DATA AND CONTROLS CONTRACTOR.

M104 CONNECT NEW 10/8 EA DUCTWORK TO EXISTING 10/8 EA DUCTWORK. FIELD VERIFY LOCATION OF EXISTING EA DUCTWORK PRIOR TO WORK.

M105 BALANCE EXISTING DIFFUSER/REGISTER/GRILLE TO CFM INDICATED ON DRAWING.

M106 RELOCATED EXISTING THERMOSTAT.

M107 STANDALONE MITSUBISHI THERMOSTAT.

M108 CONNECT NEW DUCTWORK TO EXISTING DUCTWORK. FIELD VERIFY LOCATION OF EXISTING DUCTWORK PRIOR TO WORK.

M109 COORDINATE ALL WALL PATCHING REQUIRMENTS WITH ARCHITECTURAL DRAWINGS. KEEP HOLES IN HARDEND WALL AS MINIMAL AS POSSIBLE.

M111 CONTRACTOR TO FIELD VERIFY THE ACTUAL SIZE OF ROUGH OPENINGS PRIOR TO ORDERING LOUVER. SEE ARCHITECTURAL AND STRUCTURAL DRAWINGS FOR LOUVER PLACEMENT AND INSTALLATION.

M112 TRANSITION DUCTWORK TO FIRE/SMOKE DAMPER. SEE STRUCTURAL DRAWINGS FOR EXACT PENETRATION LOCATIONS, HOLE DIMENSIONS, AND ELEVATIONS PRIOR TO ORDERING FIRE/SMOKE DAMPERS AND START OF NEW WORK.

REVISIONS:

DESIGN ARCHITECT: David E. Quade
PROJECT ARCHITECT: David E. Quade
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ISSUED: November 3, 2017

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FLOOR PLAN - HVAC

COUNTY BID # 17-282
SHA PROJECT # 17004

M100

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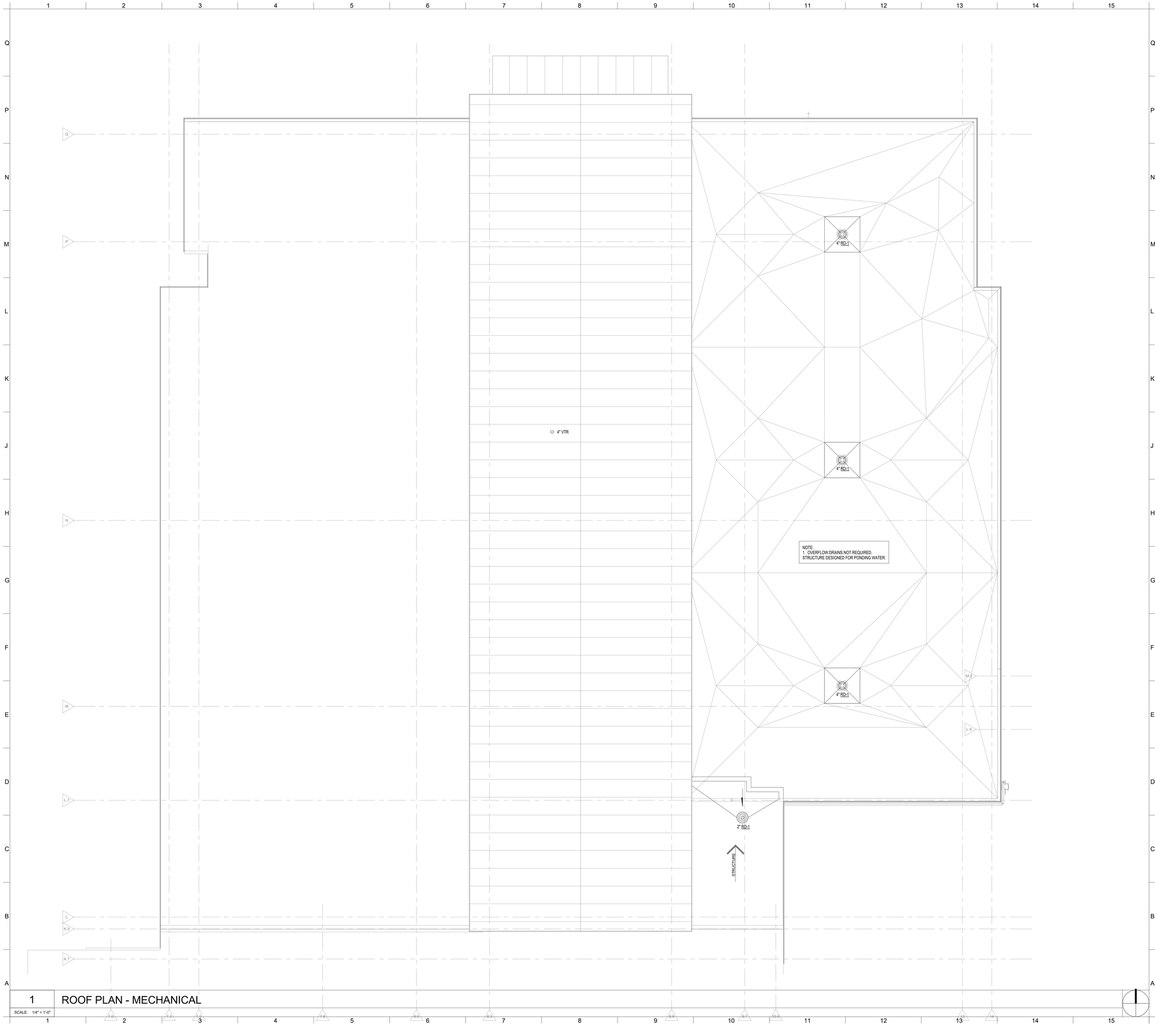
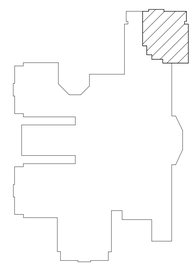


1 ROOF PLAN - MECHANICAL

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

GENERAL NOTES

1. SEAL ALL ROOF PENETRATIONS WATER TIGHT. COORDINATE ALL PENETRATIONS WITH GENERAL CONTRACTOR AND ROOFING CONTRACTOR.
2. ALL OUTDOOR AIR INTAKES SHALL BE LOCATED AT LEAST 10 FEET FROM EXHAUST OUTLETS, COMBUSTION AIR STACKS, AND PLUMBING VENTS.
3. MAINTAIN ACCESSIBLE PATHS TO ROOF HATCH.



PROJECT KEY PLAN

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REVISIONS:

DESIGN ARCHITECT: David E. Quade
PROJECT ARCHITECT: David E. Quade
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ROOF PLAN - MECHANICAL

COUNTY BID # 17-282
SHA PROJECT # 17004

M101

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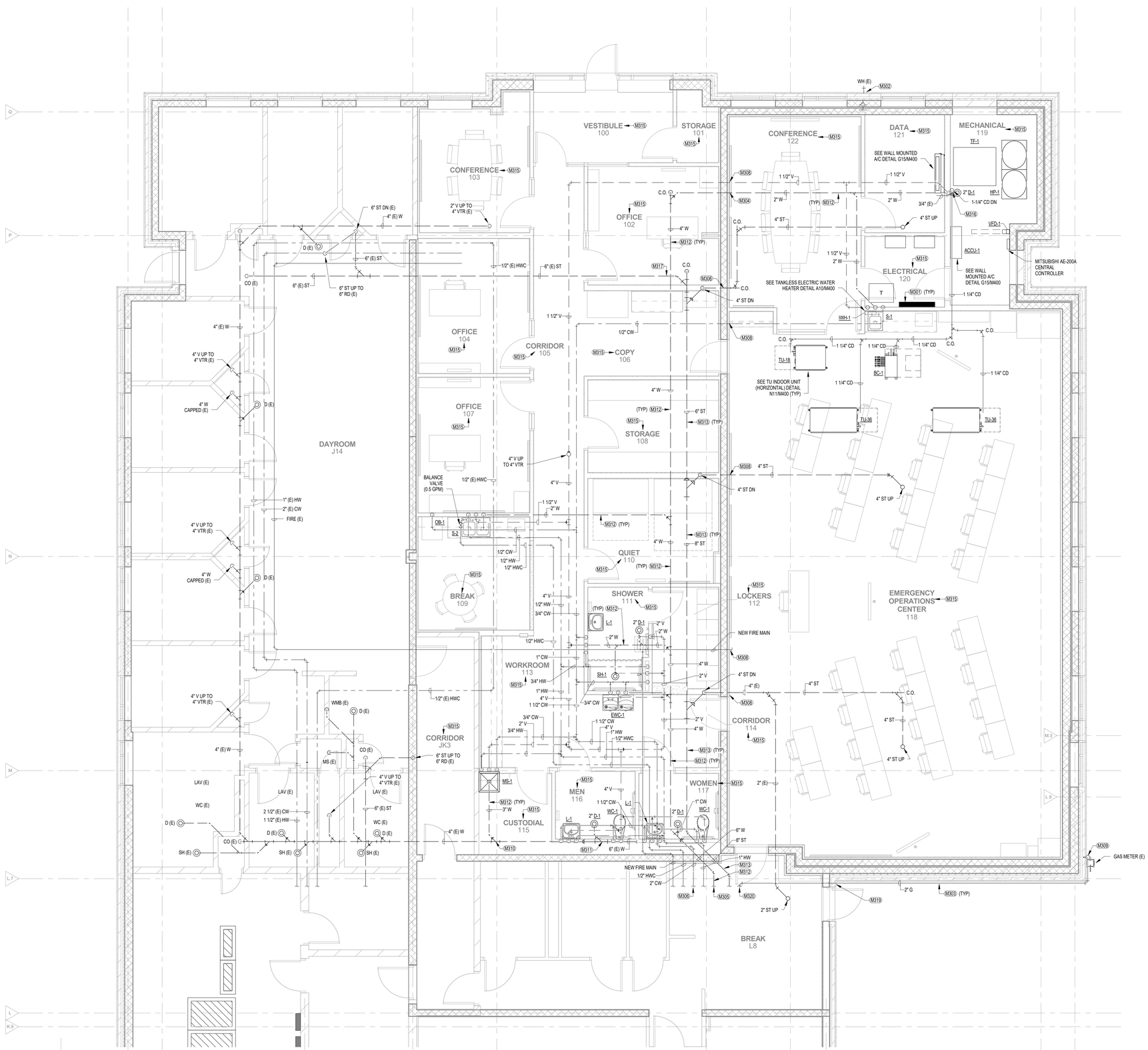

GENERAL NOTES

1. DO NOT ROUTE PIPING ABOVE ELECTRICAL PANELS. MAINTAIN ALL CODE REQUIRED CLEARANCES.

2. ALL ITEMS SHOWN LIGHT OR INDICATED ON PLAN AS (E) ARE EXISTING. ALL ITEMS INDICATED ON PLAN AS (R) ARE TO BE RELOCATED. ALL ITEMS SHOWN DARK ARE NEW. NOT ALL MECHANICAL ITEMS ARE SHOWN.

3. SPACE ABOVE CEILINGS ARE LIMITED. COORDINATE PIPE ROUTING WITH ALL OTHER TRADES. PROVIDE ALL ADDITIONAL OFFSETS AND TRANSITIONS AS REQUIRED TO COMPLETE INSTALLATION.

4. INSTALL ALL ISOLATION VALVES AND BALANCING VALVES IN ACCESSIBLE LOCATIONS.

5. ALL PIPING SHOWN FOR CLARITY. ROUTE WASTE, VENT, WATER, AND FIRE PROTECTION PIPING CONCEALED IN CHASES, IN WALLS, OR ABOVE CEILINGS AS REQUIRED.

6. COORDINATE ALL BELOW GRADE PIPING WITH STRUCTURAL FOOTINGS. SLEEVE PIPING AS REQUIRED. SEE STRUCTURAL DRAWINGS. COORDINATE WITH GENERAL CONTRACTOR.

7. SEE WASTE AND VENT RISER DIAGRAMS A1/M400 FOR WASTE AND VENT PIPE SIZES.

8. SEE PLUMBING FIXTURE SCHEDULE ON SHEET M501 FOR PLUMBING FIXTURE CONNECTION REQUIREMENTS.

9. ALL CD RUNOUT TO VRF TERMINAL UNITS TO BE 1-1/4" UNLESS OTHERWISE NOTED.

10. PROVIDE REFRIGERANT PIPING FOR VRF SYSTEM AS REQUIRED PER MANUFACTURER'S RECOMMENDATIONS. COORDINATE EXACT PIPE ROUTING WITH ALL OTHER TRADES. PROVIDE REFRIGERANT PIPING AND ALL REFRIGERANT SPECIALITIES REQUIRED PER MANUFACTURER'S RECOMMENDATIONS FOR A COMPLETE OPERATIONAL SYSTEM. SEE VRF MECHANICAL SCHEMATIC ON SHEET M600 FOR QUANTITIES AND SIZES OF REFRIGERATN PIPING.

FIRE SPRINKLER GENERAL NOTES

1. THE EXISTING BUILDING IS PROTECTED BY A WET PIPE NFPA 13 FIRE SPRINKLER SYSTEM. CONTRACTOR SHALL VERIFY EXISTING CONDITIONS INCLUDING PIPE SIZES AND LOCATIONS, SPRINKLER HEAD LOCATIONS, FLOW SWITCHES, ZONE VALVES, AVAILABLE PRESSURE, ETC. CONTRACTOR SHALL PROVIDE ALL EQUIPMENT AND MATERIALS NECESSARY TO MODIFY SYSTEM TO MEET REQUIREMENTS OF NFPA 13 AND THE AUTHORITY HAVING JURISDICTION.

2. INSTALL NEW PIPING AND SPRINKLER HEADS IN AREAS OF REMODEL SUCH TO PROVIDE A FIRE SPRINKLER SYSTEM THAT MEETS THE REQUIREMENTS OF NFPA 13 AND THE AUTHORITY HAVING JURISDICTION.

3. CONNECT NEW FIRE SPRINKLER PIPING TO THE EXISTING SPRINKLER PIPING. RELOCATE EXISTING SPRINKLER PIPING AND HEADS AS REQUIRED BY NEW WALLS, CEILINGS, LIGHTS, DUCTWORK, ETC.

4. NEW PIPING SHALL MEET THE REQUIREMENTS OF NFPA 13.

5. COORDINATE LOCATION OF ALL SPRINKLER HEADS AND PIPING WITH ALL OTHER TRADES. IF CONFLICTS DO OCCUR SUCH THAT LIGHTS, DUCTWORK, OR CEILING SYSTEMS CANNOT BE INSTALLED DUE TO SPRINKLER PIPING INTERFERENCE, THE PIPING SHALL BE RELCATED AT NO ADDITIONAL COST TO THE PROJECT.

6. SEE SPECIFICATION SECTIONS 210100 & 211000.

KEYNOTES

M301 DO NOT ROUTE PIPING ABOVE ELECTRICAL PANELS. MAINTAIN ALL CODE REQUIRED CLEARANCES.

M302 CAP CW PIPING AND ABANDON EXISTING WALL HYDRANT.

M303 SUPPORT GAS PIPING FROM WALL.

M304 3" PIPING SLEEVE THROUGH FOOTING FOR SANITARY WASTE. SEE STRUCTURAL DETAILS ON SHEET S100.

M305 CW, HW, HWC, FIRE, SANITARY, G, AND STORM PIPING ARE LOCATED PER EXISTING DRAWINGS. FIELD VERIFY EXACT SIZES AND LOCATION PRIOR TO WORK. FIELD VERIFY SLOPE AND DIRECTION OF FLOW FOR SANITARY WASTE AND STORM PIPING PRIOR TO WORK.

M306 CONNECT NEW 1/2" HWC PIPING TO EXISTING 1/2" HWC PIPING. CONNECT NEW 2" CW PIPING TO EXISTING 2-1/2" CW PIPING. CONNECT NEW 1" HW PIPING TO EXISTING 1-1/4" HW PIPING. CONNECT NEW 6" W PIPING TO EXISTING 6" W PIPING. CONNECT NEW 8" STORM PIPING TO EXISTING STORM PIPING. CONNECT NEW FIRE PROTECTION PIPING TO EXISTING FIRE PROTECTION PIPING.

M308 COORDINATE ALL WALL PATCHING REQUIRMENTS WITH ARCHITECTURAL DRAWINGS. KEEP HOLES IN HARDEND WALL AS MINIMAL AS POSSIBLE.

M309 CONNECT NEW 2" GAS PIPING TO EXISTING 2" GAS PIPING. FIELD VERIFY EXACT SIZE AND LOCATION OF EXISTING GAS PIPING.

M310 CONNECT NEW 3" W PIPING TO EXISTING 4" W PIPING. FIELD VERIFY EXISTING SIZE, SLOPE, AND LOCATION OF EXISTING PIPING PRIOR TO WORK.

M311 CONNECT NEW 2" W PIPING TO EXISTING 6" W PIPING. FIELD VERIFY EXISTING SIZE, SLOPE, AND LOCATION OF EXISTING PIPING PRIOR TO WORK.

M312 SAWCUT FLOOR TO ALLOW FOR INSTALLATION OF NEW SANITARY WASTE PIPING. KEEP CUTS IN FLOOR AS MINIMAL AS POSSIBLE. COORDINATE ALL FLOOR REMOVAL AND PATCHING REQUIREMENTS WITH ARCHITECTURAL DRAWINGS, AD100.

M313 SAWCUT FLOOR TO ALLOW FOR INSTALLATION OF NEW STORM WASTE PIPING. KEEP CUTS IN FLOOR AS MINIMAL AS POSSIBLE. COORDINATE ALL FLOOR REMOVAL AND PATCHING REQUIREMENTS WITH ARCHITECTURAL DRAWINGS, AD100.

M315 PROVIDE ALL NEW FIRE PROTECTION PIPING AND HEAD LAYOUT PER NFPA 13 IN THESE AREAS.

M316 ROUTE 1-1/4" CD TO FLOOR DRAIN.

M317 CONNECT NEW 6" STORM PIPING TO EXISTING 6" STORM PIPING. FIELD VERIFY EXISTING SIZE, SLOPE, AND LOCATION OF EXISTING PIPING PRIOR TO WORK.

M319 CUT OPENING IN WALL FOR NEW PIPING AND SEAL WEATHERTIGHT.

M320 CONNECT NEW GAS PIPING TO EXISTING GAS PIPING. FIELD VERIFY EXACT LOCATION OF GAS PIPING PRIOR TO WORK.

1 FLOOR PLAN - MECHANICAL PIPING & PLUMBING

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

PROJECT KEY PLAN

REVISIONS:

DESIGN ARCHITECT: David E. Dubbe
PROJECT ARCHITECT: Daniel J. Kuhn
DRAWN BY: AMP
ISSUED: November 3, 2017

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FLOOR PLAN - MECHANICAL PIPING & PLUMBING

COUNTY BID # 17-282
SHA PROJECT # 17004

M200

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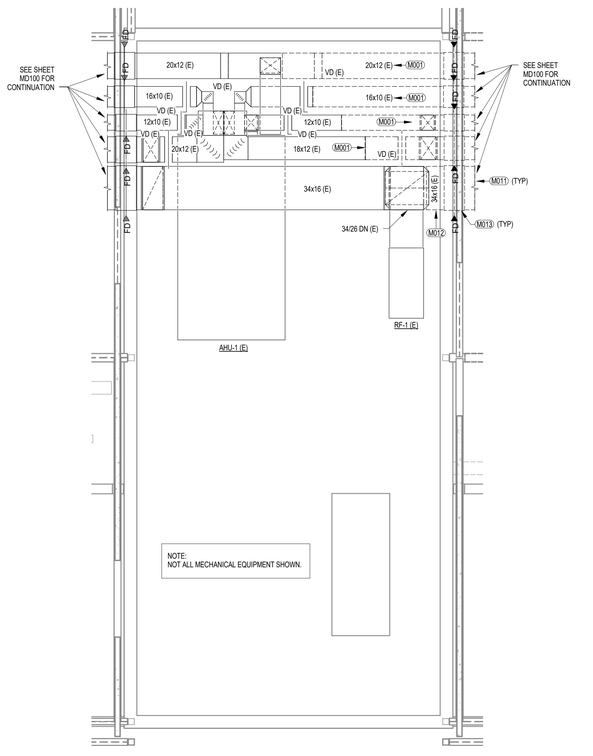
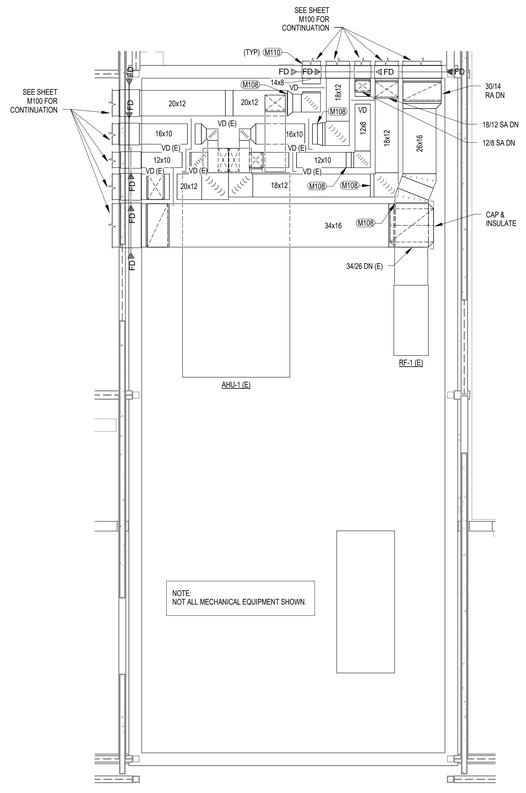


1 ENLARGED PENTHOUSE PLAN - MECHANICAL DEMOLITION

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



2 ENLARGED PENTHOUSE PLAN - MECHANICAL

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

DEMOLITON GENERAL NOTES

1. ALL ITEMS SHOWN LIGHT OR INDICATED ON PLAN AS (E) ARE EXISTING. ALL ITEMS SHOWN DASHED ARE TO DEMOLISHED. NOT ALL MECHANCIAL ITEMS ARE SHOWN.

2. FIELD VERIFY EXACT LOCATION OF ALL MECHANICAL EQUIPMENT AND DUCTWORK. EQUIPMENT AND DUCTWORK DISCOVERED ON SITE TO BE REMOVED BUT NOT INDICATED ON PLANS IS TO BE IDENTIFIED BY CONTRACTOR AND REMOVED AS DIRECTED BY THE ENGINEER.

3. THE BUILDING MANAGER RESERVES THE FIRST RIGHT OF SALVAGE OF ANY ITEMS REMOVED CONTRACTOR SHALL REMOVE ALL UNWANTED MATERIALS FROM THE SITE. BUILDING DUMPSTER OR OTHER TRASH RECEPTACLES ARE NOT TO BE UTILIZED.

4. HOLES CUT IN WALLS, FLOOR, AND CEILINGS TO PERMIT THE REMOVAL / INSTALLATION OF EQUIPMENT, DUCTWORK, ETC. SHALL BE CAREFULLY MADE AND RESTRICTED TO THE SMALLEST PRACTICAL SIZE. PATCHE ALL HOLES NOT REQUIRED FOR NEW WORK TO MATCH EXISTING. COORDINATE ALL CUTTING AND PATCHING WITH GENERAL CONTRACTOR. SEE ARCHITECTURAL PLANS.

GENERAL NOTES

1. DO NOT ROUTE DUCTWORK OR PIPING ABOVE ELECTRICAL PANELS. MAINTAIN ALL CODE REQUIRED CLEARANCES.

2. ALL ITEMS LIGHT OR INDICATED ON PLAN AS (E) ARE EXISTING. ALL ITEMS INDICATED ON PLAN AS (R) ARE TO BE RELOCATED. ALL ITEMS SHOWN DARK ARE NEW. NOT ALL MECHANICAL ITEMS ARE SHOWN.

3. FIELD VERIFY ALL EXISTING CONDITIONS PRIOR TO NEW WORK. MECHANICAL CONTRACTOR SHALL BE RESPONSIBLE FOR ADJUSTING DUCTWORK AS NECESSARY TO AVOID CONFLICTS WITH STRUCTURE AND WITH ALL OTHER TRADES.

4. FIRE CAULK ALL DUCTWORK/PIPING PENETRATIONS THROUGH FIRE/SMOKE RATED WALLS AND ASSEMBLIES. CAULK AROUND ALL DUCTWORK PENETRATIONS THROUGH FULL HEIGHT SOUND WALLS. REFER TO ARCHITECTURAL DRAWINGS FOR WALL CONSTRUCTION.

5. SPACE ABOVE CEILINGS IS LIMITED. COORDINATE DUCT AND PIPE ROUTING WITH ALL OTHER TRADES. OFFSET AND EXTEND DUCTWORK AND PIPING AS REQUIRED TO AVOID CONFLICTS.

6. COORDINATE ALL DUCT, DIFFUSERS, REGISTERS AND GRILLES WITH STRUCTURE AND ALL OTHER TRADES.

7. CONTRACTOR TO PROVIDE ALL LOW VOLTAGE AND LINE VOLTAGE CONTROL WIRING REQUIRED FOR COMPLETE OPERATION OF ALL MECHANICAL EQUIPMENT.

KEYNOTES

M001 REMOVE EXISTING SUPPLY AIR DUCT MAIN TO POINT INDICATED ON DRAWING.

M011 COORDINATE ALL WALL PATCHING REQUIRMENTS WITH ARCHITECTURAL DRAWINGS.

M012 REMOVE EXISTING RETURN AIR DUCT TO POINT INDICATED ON DRAWING. CAP AND INSULATE RA DUCTWORK AT MAIN.

M013 REMOVE EXISTING FIRE DAMPER COMPLETE.

M108 CONNECT NEW DUCTWORK TO EXISTING DUCTWORK. FIELD VERIFY LOCATION OF EXISTING DUCTWORK PRIOR TO WORK.

M110 COORDINATE ALL WALL CUTTING AND PATCHING REQUIRMENTS WITH ARCHITECTURAL DRAWINGS. KEEP HOLES IN RATED MEZZANINE WALL AS MINIMAL AS POSSIBLE.

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DESIGN ARCHITECT: David E. Dubbe
PROJECT ARCHITECT: Dwight Dubbe
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ISSUED: November 3, 2017

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ENLARGED PENTHOUSE PLAN - MECHANICAL

COUNTY BID # 17-282
SHA PROJECT # 17004

M300

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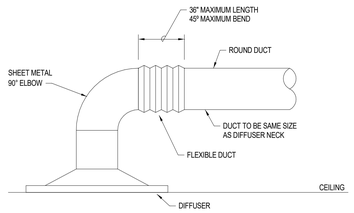
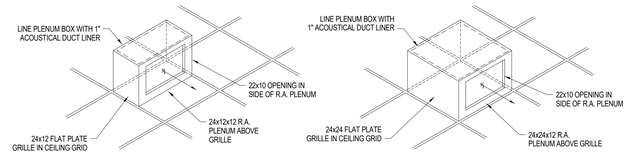


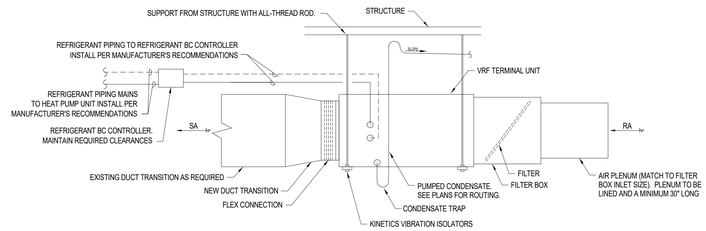
N1 DIFFUSER CONNECTION DETAIL

SCALE: NONE



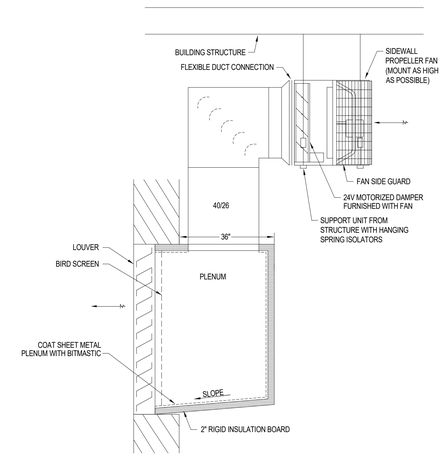
N6 RETURN AIR BOOT DETAIL

SCALE: NONE



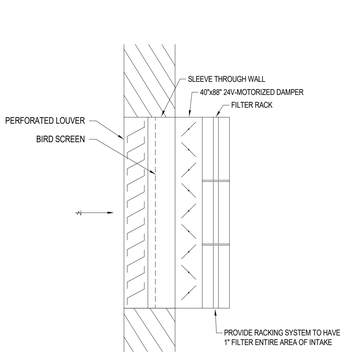
N11 TU INDOOR UNIT (HORIZONTAL) DETAIL

SCALE: NONE



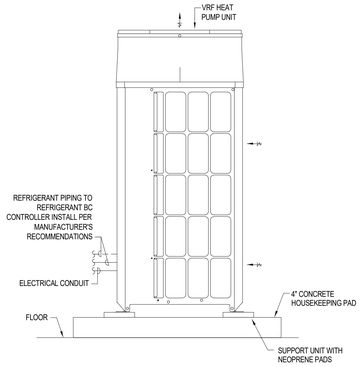
G1 RELIEF FAN AND LOUVER DETAIL

SCALE: NONE



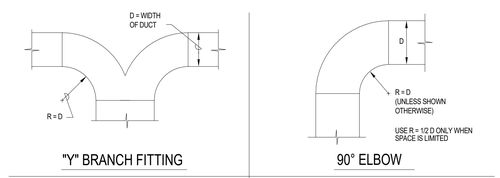
G5 INTAKE LOUVER DETAIL

SCALE: NONE



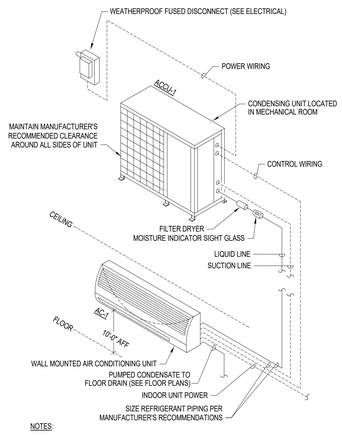
G8 HEAT PUMP SUPPORT DETAIL

SCALE: NONE



G11 DUCT FITTINGS DETAIL

SCALE: NONE



NOTES:

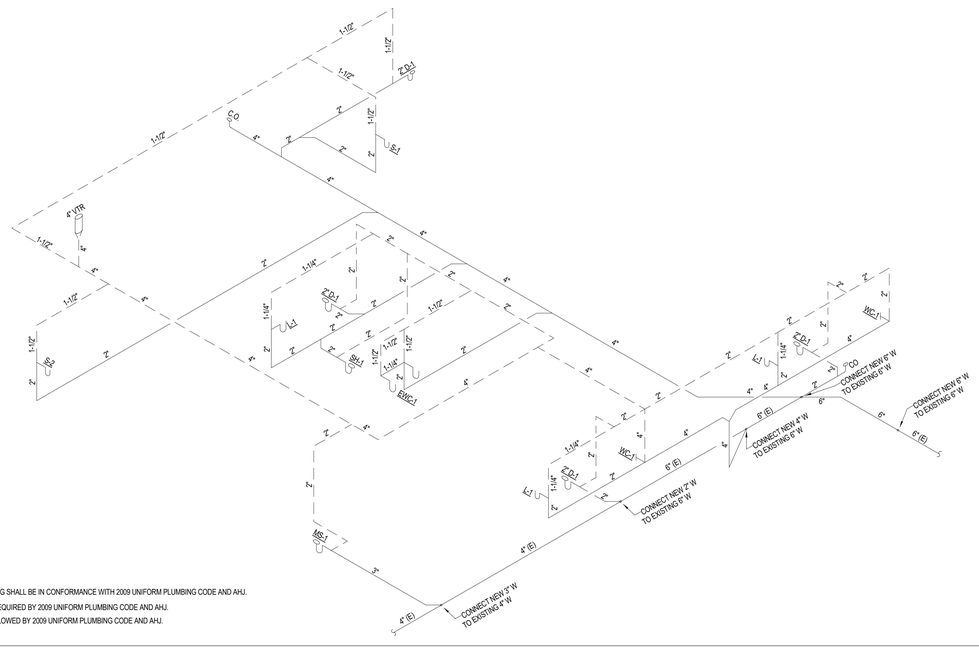
1) WIRING AND PIPING SHOWN ARE GENERAL POINTS-OF-CONNECTION GUIDES ONLY AND ARE NOT INTENDED FOR A SPECIFIC INSTALLATION. REFER TO FLOOR PLANS FOR EQUIPMENT ORIENTATION. ALSO REFER TO MANUFACTURER'S INSTALLATION MANUALS FOR SPECIFIC INSTALLATION REQUIREMENTS.

2) CONDENSATE PIPING ROUTED IN CEILING PLENUMS SHALL BE COPPER AND SHALL BE INSULATED. SEE SPECIFICATIONS.

3) INSULATE SUCTION LINES.

G15 WALL MOUNTED A/C DETAIL

SCALE: NONE

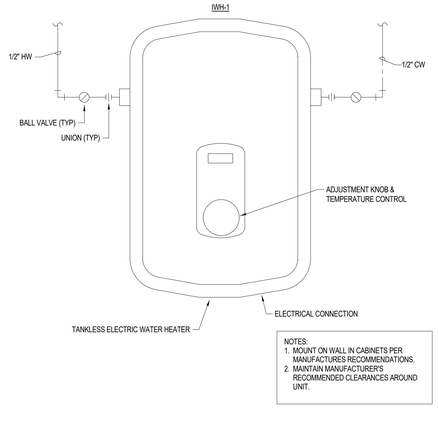


GENERAL NOTES

1. ALL WASTE AND VENT PIPING SHALL BE IN CONFORMANCE WITH 2009 UNIFORM PLUMBING CODE AND AHJ.
2. PROVIDE CLEANOUTS AS REQUIRED BY 2009 UNIFORM PLUMBING CODE AND AHJ.
3. PROVIDE MATERIALS AS ALLOWED BY 2009 UNIFORM PLUMBING CODE AND AHJ.

A1 SANITARY WASTE & VENT RISER DIAGRAMS

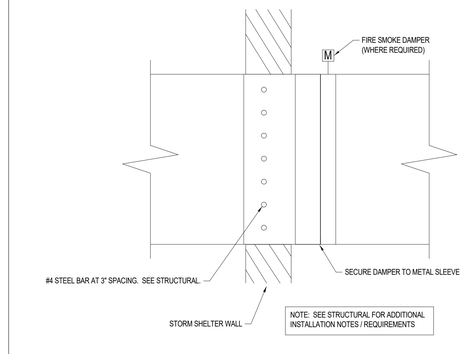
SCALE: NONE



NOTES:
1. MOUNT ON WALL IN CABINETS PER MANUFACTURES RECOMMENDATIONS.
2. MAINTAIN MANUFACTURER'S RECOMMENDED CLEARANCES AROUND UNIT.

A10 TANKLESS ELECTRIC WATER HEATER DETAIL

SCALE: NONE



NOTE: SEE STRUCTURAL FOR ADDITIONAL INSTALLATION NOTES / REQUIREMENTS

A14 STORM SHELTER PENETRATION DETAIL

SCALE: NONE

REVISIONS:

DESIGN ARCHITECT: David E. Dubbe
PROJECT ARCHITECT: Dustin Sinclair
DRAWN BY: AMP
ISSUED: November 3, 2017

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Lancaster County
Emergency Management Relocation / Renovation

MECHANICAL DETAILS

COUNTY BID # 17-282
SHA PROJECT # 17004

M400

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LOUVER SCHEDULE

	PLAN TAG	L-1	L-2	
	MANUFACTURER	GREENHECK	GREENHECK	
	MODEL NUMBER	AFL-501 (4)	ALF-501 (4)	
	FUNCTION	INTAKE	RELIEF	
	DESCRIPTION	STATIONARY	STATIONARY	
	DEFLECTION	HORIZ.	HORIZ.	
	MAX. STATIC PRESSURE (IN W.G.)	0.20	0.27	
	CONSTRUCTION MATERIAL	ALUMINUM	ALUMINUM	
	FINISH	(3)	(3)	
	NECK SIZE (IN)	SEE PLANS	SEE PLANS	
	FACE SIZE (IN)	40"x84" (5)	52"x52" (5)	
	ACCESSORIES	(2)	(2)	
	REMARKS	(1)	(1)	

REMARKS

(1) VERIFY WALL CONSTRUCTION PRIOR TO FURNISHING MATERIAL.

(2) PROVIDE FLANGE FRAME COMPATIBLE WITH WALL CONSTRUCTION, EXPANDED FLATTENED ALUMINUM BIRDSCREEN IN REMOVABLE FRAME.

(3) COLOR TO BE SELECTED BY ARCHITECT.

(4) FEMA-361 AND FEMA-320 (TORNADO) APPROVED LOUVER.

(5) CONTRACTOR TO FIELD VERIFY THE ACTUAL SIZE OF ROUGH OPENINGS PRIOR TO ORDERING LOUVER.

BC CONTROLLERS SCHEDULE

	PLAN TAG	BC-1	
	MANUFACTURER	MITSUBISHI	
	MODEL NUMBER	CMB-P105NU-G1	
	TYPE (DOUBLE / MAIN / SUB)	MAIN	
	SERVES	VRF UNITS	
	CAPACITY (MBH)	270.0	
	SIZE (LxWxH) (IN.)	26"x18"x12"	
	NUMBER OF PORTS	5	
	VOLTS	208	
	PHASE	1	
	MAXIMUM FUSE SIZE (AMPS)	15	
	MINIMUM CIRCUIT AMPACITY (AMPS)	0.44	
	REMARKS	(1) (2) (3) (4) (5)	

REMARKS

(1) ALL CONNECTIONS TO THE BRANCH CONTROLLERS SHALL BE BRAZED.

(2) INCLUDE DIAMONDBACK MANUAL BALL VALVES BV-SERIES, 700 PSIG WORKING PRESSURE, FULL PORT, 410A RATED AT EACH PORT FOR ALL CONNECTED REFRIGERANT LINES. UNUSED PORTS SHALL ALSO HAVE VALVES FOR FUTURE CONNECTION. EACH BRANCH CONTROLLER SHALL HAVE AT LEAST TWO EXTRA PORTS THAT CAN BE CONNECTED TO WITHOUT EVACUATING THE SYSTEM.

(3) ELECTRICAL DISCONNECT BY ELECTRICAL CONTRACTOR. SEE ELECTRICAL DRAWINGS.

(4) PROVIDE PLENUM RATED CONDENSATE PUMP, HARTELL MODEL A2X-1965 DV, 1/10 HP AT 3000 RPM, 115V, 3.5 A, 1-1/4" INLET, 3/8" OUTLET, 1 GALLON CAPACITY, 20' MAX LIFT WITH AUXILARY SAFETY SWITCH.

(5) SEE SCHEMATIC PIPING/CONTROL DIAGRAMS ON SHEETS M500 FOR VRF SYSTEM LAYOUT AND ADDITIONAL REQUIREMENTS.

FAN SCHEDULE

	PLAN TAG	TF-1	
GENERAL	MANUFACTURER	GREENHECK	
	MODEL NUMBER	SBE-3H36-50	
	SERVES	EXHAUST	
	TYPE	SIDEWALL	
	MAXIMUM WEIGHT (LBS)	429	
	ROOF/WALL OPENING SIZE	38"x38"	
	ACCESSORIES	(1)	
FAN	AIRFLOW (CFM)	11,300	
	TOTAL SP (IN. W.C.)	1.0	
	CLASS	-	
	WHEEL TYPE	PROP	
	MINIMUM WHEEL DIA.	-	
	MAXIMUM SONES	46	
	MAXIMUM FAN RPM	1110	
	MAXIMUM FAN BHP	-	
MOTOR	RPM	1725	
	HP	5	
	VOLTS	208	
	PHASE	3	
	TYPE	ODP	
	CONTROL DEVICE	(2)	
	REMARKS	-	
REMARKS		(1) PROVIDE WITH 24V MOTORIZED DAMPER, LONG WALL HOUSING WITH OSHA GUARD, MOTOR WITH THERMAL OVERLOAD PROTECTION, ALUMINUM DAMPER GUARD, AND 1-YEAR WARRANTY. (2) CONTROLLED BY VFD-1.	

VRV AIR-TO-AIR HEAT PUMP SCHEDULE

	PLAN TAG	HP-1	
GENERAL	MANUFACTURER	MITSUBISHI	
	MODEL NUMBER	PURY-P120TLMU-A	
	SERVES	VRF UNITS	
	CONFIGURATION	(2)	
	MAXIMUM SIZE (LxWxH)(IN)	69x30x65	
	MAXIMUM WEIGHT (LBS.)	695	
	REMARKS	(1)	
ELECTRICAL	VOLTS	208	
	PHASE	3	
	MAXIMUM UNIT KW	-	
	MINIMUM CIRCUIT AMPACITY (MCA)	42	
	MAXIMUM OCP (AMPS)	60	
	REMARKS	(6)	
COOLING	AMBIENT AIR TEMPERATURE (F)	95 (3)	
	MINIMUM NET SEER (ARI)	-	
	NOMINAL CAPACITY (TONS)	10	
	TOTAL COOLING (MBH) - NOMINAL	120	
	SENSIBLE COOLING (MBH)	-	
HEATING	AMBIENT AIR TEMPERATURE (F)	30	
	MINIMUM NET EER (ARI)	-	
	MINIMUM HEATING CAPACITY (MBH)	135	
REFRIGERANT	TYPE	R-410A	
	MIN. NUMBER OF CIRCUITS	-	
	REMARKS	-	
COMPRES-SORS	TYPE	(5)	
	QUANITY/SIZE	2	
	HP	-	
	REMARKS	(3) (4)	
CONDENSER FANS	TYPE	PROP	
	QUANITY/SIZE	2	
	HP	-	
	REMARKS	-	
REMARKS		(1) PROVIDE WITH 10 YEAR EXTENDED PARTS AND COMPRESSOR WARRANTY. (2) OUTDOOR VRF HEAT RECOVERY TYPE AIR-TO-AIR HEAT PUMP WITH HYPER HEAT SERVING MULTIPLE INDOOR VARIABLE REFRIGERANT VOLUME UNITS WITH MANUFACTURER'S STANDARD CONTROLS. (3) COOLING CAPACITY AT 100% COMBINATION, 95°F DB OUTDOOR AIR TEMPERATURE AND 67°F INDOOR WB TEMPERATURE. (4) HEATING CAPACITY AT 100% COMBINATION, 0°F DB OUTDOOR AIR TEMPERATURE AND 70°F DB INDOOR AIR TEMPERATURE. (5) INVERTER-DRIVEN SCROLL HERMETIC COMPRESSOR. (6) UNIT INCLUDES (1) UNIT WITH (1) ELECTRICAL CONNECTION. DISCONNECT BY ELECTRICAL CONTRACTOR. SEE ELECTRICAL DRAWINGS.	

INDOOR AIR CONDITIONING UNIT SCHEDULE

	PLAN TAG (8)	TU-18	TU-36	
GENERAL	MANUFACTURER	MITSUBISHI	MITSUBISHI	
	MODEL NUMBER	PEFY-P18NMAU-E	PEFY-P36NMAU-E	
	SERVES	SEE PLANS	SEE PLANS	
	CONFIGURATION	(1) (7)	(1) (7)	
	MAXIMUM SIZE (LxWxH)(IN)	36x29x10	55x29x10	
	REMARKS	(2) (9)	(2) (9)	
FAN	AIRFLOW (CFM)	525	1050	
	EXTERNAL STATIC PRESSURE (IN. W.C.)	0.6	0.6	
	MOTOR KW	-	-	
ELECTRICAL DATA	FULL LOAD AMPS	0.77	1.5	
	MAXIMUM FUSE SIZE	15	15	
	VOLTS	208	208	
	PHASE	1	1	
	REMARKS	(11)	(11)	
COOLING	ENTERING DB (°F)	-	-	
	ENTERING WB (°F)	-	-	
	LEAVING DB (°F)	-	-	
	LEAVING WB (°F)	-	-	
	TOTAL CAPACITY (MBH)	18.0	36.0	
	SENSIBLE CAPACITY (MBH)	-	-	
	REMARKS	(3)	(3)	
HEATING	ENTERING AIR TEMP (°F)	-	-	
	LEAVING AIR TEMP (°F)	-	-	
	TOTAL CAPACITY (MBH)	20.0	40.0	
	REMARKS	(4)	(4)	
ACCESSORIES	FILTERS	(5)	(5)	
	HUMIDIFIER	-	-	
	THERMOSTAT	(6)	(6)	
	REMARKS	(10)	(10)	
REMARKS		(1) ABOVE CEILING, CONCEALED, VARIABLE REFRIGERANT VOLUME SPLIT SYSTEM UTILIZING R-410A REFRIGERANT. MULTIPLE INDOOR UNITS ARE SERVED BY A SINGLE AIR COOLED HEAT PUMP WITH PROGRAMMABLE CONTROLS. (2) PROVIDE INDOOR UNIT WITH THREADED ROD WITH HANGING BRACKETS PER MANUFACTURER'S RECOMMENDATIONS, INTEGRAL CONDENSATE PUMP WITH HIGH CONDENSATE SHUT-OFF SWITCHES, FILTER BOX, VARIABLE SPEED EC FAN MOTOR, AND DISCHARGE DUCT COLLAR. (3) RATED AT RETURN AIR DB/WB TEMPERATURE OF 80°F/67°F AND OUTDOOR AIR DB TEMPERATURE OF 95°F. (4) RATED AT RETURN AIR DB TEMPERATURE OF 70°F AND OUTDOOR AIR DB TEMPERATURE OF 47°F. (5) PROVIDE WITH FBM SERIES FILTER BOX WITH 2" MERV 8 PLEATED DISPOSABLE FILTER AT INLET. PROVIDE 2" PLEATED MERV 8 FILTERS AT TIME OF INSTALLATION AND PROVIDE SECOND SET OF FILTERS DIRECTLY BEFORE BALANCING. (6) PROVIDE MITSUBISHI HARDWIRED SIMPLE MA THERMOSTATS TO CONTROL ALL INDOOR UNITS. SEE FLOOR PLANS FOR THERMOSTAT QUANTITIES AND LOCATIONS. PROVIDE THERMOSTAT SAMPLE FOR OWNER REVIEW. (7) SEE SCHEMATIC PIPING/CONTORL DIAGRAMS ON SHEET M500 FOR INDICATION OF REQUIRED INDOOR UNIT REMOTE CONTROLLERS, SYSTEM CONTROLLERS, AND INTEGRATION DEVICES. (8) SEE FLOOR PLANS FOR QUANTITIES OF UNIT. MULTIPLE UNITS OF EACH SIZE MAY BE REQUIRED. (9) PROVIDE CONNECTION TO MANUFACTURERS BRANCH CONTROLLER (BC) FOR EACH INDOOR UNIT FOR HEAT RECOVERY SYSTEM. SEE BC CONTROLLERS SCHEDULE AND PLANS FOR LOCATIONS. (10) MANUFACTURER'S STANDARD CONTROLS WITH TOUCH SCREEN SYSTEM CONTROLLER. SEE SPECIFICATIONS FOR FURTHER INFORMATION. (11) ELECTRICAL DISCONNECTS BY ELECTRICAL CONTRACTOR. SEE ELECTRICAL DRAWINGS.	

AIR CONDITIONING UNIT SCHEDULE

	PLAN TAG	AC-1	
GENERAL	MANUFACTURER	MITSUBISHI	
	MODEL NUMBER	PKA-A24KA7	
	SERVES	SEE PLANS	
	CONFIGURATION	(1)	
	MAXIMUM SIZE (LxWxH)(IN)	47"x12"X15"	
	REMARKS	(2)	
FAN	AIRFLOW (CFM)	700	
	EXTERNAL STATIC PRESSURE (IN. W.C.)	-	
	MOTOR HP	-	
ELECTRICAL DATA	FLA	-	
	MCA (AMPS)	1	
	VOLTS	208	
	PHASE	1	
	REMARKS	-	
COOLING HEATING	ENTERING DB (°F)	80.0	
	ENTERING WB (°F)	67.0	
	LEAVING DB (°F)	-	
	LEAVING WB (°F)	-	
	TOTAL COOLING CAPACITY (MBH)	24.0	
	TOTAL HEATING CAPACITY (MBH)	-	
	REMARKS	(3)	
REMARKS		(1) WALL MOUNTED, DUCTLESS, AIR COOLED, AIR CONDITIONING UNIT. (2) PROVIDE UNIT WITH HANGING BRACKETS, INTEGRAL FACE GRILLES, HIGH EFFICIENCY FILTER, WIRED WALL MOUNTED CONTROLLER, AND CONDENSATE PUMP (BLUEDIAMOND X87-711) 115V/1PH. (3) SEE AIR COOLED CONDENSING UNIT SCHEDULE.	

CONDENSING UNIT SCHEDULE

	PLAN TAG	ACCU-1	
GENERAL	MANUFACTURER	MITSUBISHI	
	MODEL NUMBER	PUY-A24NHA7	
	SERVES	AC-1	
	CONFIGURATION	-	
	MAXIMUM SIZE (LxWxH)(IN)	38x14x38	
	MAXIMUM WEIGHT (LBS.)	151	
	REMARKS	(3)	
ELECTRICAL	VOLTS	208	
	PHASE	1	
	MAXIMUM UNIT KW	-	
	MOCP	26.0	
	MINIMUM CIRCUIT AMPACITY (MCA)	19.0	
	REMARKS	(4)	
COOLING	AMBIENT AIR TEMPERATURE (F)	95.0	
	MINIMUM EER (AHRI)	12.2	
	NOMINAL CAPACITY (TONS)	2.0	
	TOTAL COOLING (MBH)	(1)	
	SENSIBLE COOLING (MBH)	-	
REFRIGERANT	TYPE	R-410A	
	MIN. NUMBER OF CIRCUITS	1	
	REMARKS	-	
COMPRES-SORS	TYPE	-	
	QUANITY/SIZE	-	
	HP	-	
	REMARKS	(2)	
CONDENSER FANS	TYPE	-	
	QUANITY/SIZE	-	
	HP	-	
	REMARKS	-	
REMARKS		(1) COOLING PERFORMANCE SHALL MATCH SCHEDULED AC UNIT CAPACITIES. (2) PROVIDE DC INVERTER-DRIVEN TWIN ROTARY WITH 7-YEAR COMPRESSOR WARRANTY AND 5-YEAR PART WARRANTY. (3) UNIT SHALL CONSIST OF COMPRESSOR, AIR COOLED COIL, PROPELLER TYPE CONDENSER FAN, ACCUMULATOR, HOLDING REFRIGERANT CHARGE, STEEL WALL MOUNTING BRACKET, AND CONTROL BOX. (4) DISCONNECT BY ELECTRICAL.	

DOMESTIC WATER HEATER SCHEDULE

	PLAN TAG	IWH-1	
GENERAL	MANUFACTURER	RHEEM	
	MODEL NUMBER	RTEX-13	
	SERVES	(6)	
	RECOVERY (GPH@ 90°F RISE)	(7)	
TANK	TYPE	(8)	
	STORAGE CAPACITY (GAL.)	-	
	DIMENSIONS (LxWxH)(IN.)	13"x9"x4"	
	REMARKS	-	
ELECTRIC	VOLTAGE/PHASE	208/1	
	CAPACITY (KW)	10.1	
	NUMBER OF STAGES	1	
	KW PER STAGE	-	
	REMARKS	-	
REMARKS		(1) SINK (S-1) (2) 69° F @ 1.0 GPM (3) INSTANTANEOUS TANKLESS WATER HEATER	

VARIABLE FREQUENCY DRIVE SCHEDULE

	MARK	VFD-1	
GENERAL	SERVES	TF-1	
	LOCATION	SEE PLANS	
ELECTRICAL	MIN. DRIVE CAPACITY (AMPS)	16.7	
	VOLTAGE	208	
	PHASE	3	
	CONNECTED MOTOR HP	5	
	MOTOR TYPE	ODP	
	REMARKS	(1) (2)	
REMARKS		(1) DRIVE SHALL BE COMPATIBLE WITH MOTOR AND APPLICATION. (2) COMBINATION VFD INTERGRAL DISCONNECT, AND FUSES.	

DIFFUSER, REGISTER, AND GRILLE SCHEDULE

PLAN TAG	D-1	R-1	R-2	G-1	G-2	
MANUFACTURER	KRUEGER	KRUEGER	KRUEGER	KRUEGER	KRUEGER	
MODEL NUMBER	PLQ	880H	80H	6490	6490	
FUNCTION	SUPPLY	SA	EA	RETURN	RETURN	
DESCRIPTION	FLAT PLATE	REGISTER	REGISTER	PERFORATED	PERFORATED	
DEFLECTION	4-WAY	DOUBLE	SINGLE	-	-	
MAX. STATIC PRESSURE (IN W.G.)	0.1"	0.1"	0.1"	0.08	0.08	
CONSTRUCTION MATERIAL	STEEL	STEEL	STEEL	STEEL	STEEL	
FINISH	WHITE	WHITE (6)	WHITE (6)	WHITE	WHITE	
NECK SIZE (IN)	SEE PLANS	SEE PLANS	SEE PLANS	22x22	22x10	
FACE SIZE (IN)	24x24	NECK + 1-3/4"	NECK + 1-3/4"	24x24	24x12	
ACCESSORIES (7)	O.B.D.	O.B.D.	O.B.D.	-	-	
REMARKS	(1) (2)	(1) (2)	(1) (2)	(1) (2)	(1) (2)	

REMARKS

(1) VERIFY CEILING CONSTRUCTION PRIOR TO FURNISHING MATERIAL.

(2) NOISE CRITERIA (NC) SHALL BE LESS THAN 25 ON DIFFUSERS, REGISTERS AND GRILLES IN LOCATED OCCUPIED SPACES.

MECHANICAL SYMBOLS

SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
TYPICAL PIPING			
	PIPE TEE / PIPE ELBOW		UNION
	ELBOW ON / ELBOW UP		STRAINER WITH BLOWDOWN
	ISOLATION VALVE (BALL OR BUTTERFLY)		CHECK VALVE (ARROW INDICATES FLOW)
	BALANCING VALVE		AUTOMATIC CONTROL VALVE TWO-WAY / THREE WAY
	GATE VALVE		PRESSURE REGULATING VALVE (PRV)
	GLOBE VALVE		PRESSURE GAUGE
	PRESSURE/TEMPERATURE TEST PORT		THERMOMETER
PLUMBING			
DOMESTIC COLD WATER (CW)			GAS COCK
DOMESTIC HOT WATER (HW) (NUMBER INDICATES TEMPERATURE)		FD Z.D.I.	FLOOR DRAIN - SIZE TYPE
DOMESTIC HOT WATER CIRCULATION (HWC) (NUMBER INDICATES TEMPERATURE)		RD Z.D.I.	ROOF DRAIN - SIZE TYPE
SANITARY WASTE (BELOW GRADE)		OF Z.D.I.	OVERFLOW ROOF DRAIN - SIZE TYPE
SANITARY WASTE (ABOVE GRADE)		HB	HOSE BIBB
VENT PIPING		WH	WALL HYDRANT (NON-FREEZE)
STORM PIPING (BELOW GRADE)		VTR	VENT THROUGH ROOF
STORM PIPING (ABOVE GRADE)		I.E.	I.E. INVERT ELEVATION
OVERFLOW STORM PIPING (BELOW GRADE)		F.L.	FLOW LINE
OVERFLOW STORM PIPING (ABOVE GRADE)		WC	WATER CLOSET (SEE SPECIFICATIONS FOR TYPE)
ACID WASTE PIPING (BELOW GRADE)		UR	URINAL (SEE SPECIFICATIONS FOR TYPE)
ACID WASTE PIPING (ABOVE GRADE)		LAV	LAVATORY (SEE SPECIFICATIONS FOR TYPE)
ACID VENT PIPING		S	SINK (SEE SPECIFICATIONS FOR TYPE)
COMPRESSED AIR PIPING		EWC	ELECTRIC WATER COOLER (SEE SPECIFICATIONS FOR TYPE)
NATURAL GAS PIPING		MS	MOP SINK (SEE SPECIFICATIONS FOR TYPE)
SITE SANITARY PIPING		DI	DUCTILE IRON
SITE STORM PIPING		CI	CAST IRON
SITE WATER PIPING		PVC	POLY VINYL CHLORIDE
MECHANICAL HVAC PIPING			
CONDENSATE DRAIN (SLOPE TO DRAIN)			
REFRIGERATION PIPING			
REFRIGERANT LIQUID LINE			SOLENOID VALVE
REFRIGERANT SUCTION LINE			THERMOSTATIC EXPANSION VALVE (TXV)
REFRIGERANT HOT GAS DISCHARGE LINE			SIGHT GLASS
HVAC			
SIDEWALL SUPPLY REGISTER OR GRILLE	NECK SIZE (IN) TAG / AIRFLOW (CFM)	S	SENSOR
SIDEWALL RETURN OR EXHAUST REGISTER OR GRILLE	NECK SIZE (IN) TAG / AIRFLOW (CFM)	T	THERMOSTAT
SUPPLY AIR REGISTER	NECK SIZE (IN) TAG / AIRFLOW (CFM)	H	HUMIDISTAT
		MD	MOTORIZED CONTROL DAMPER WITH ACTUATOR
		B.D.	BACKDRAFT DAMPER
SUPPLY AIR, OUTSIDE AIR OR MIXED AIR DUCT END OR RISER UP / RISER DN		V.D.	VOLUME DAMPER
		F.D.	FIRE DAMPER WITH SLEEVE AND ACCESS DOOR
		S.D.	SMOKE DAMPER WITH SLEEVE AND ACCESS DOOR
RETURN AIR, EXHAUST AIR OR RELIEF AIR DUCT END OR RISER UP / RISER DN		F.S.D.	FIRE/SMOKE DAMPER WITH SLEEVE AND ACCESS DOOR
		S.A.	SUPPLY AIR
12/8 RECTANGULAR DUCTWORK (WIDTH/DEPTH)(IN) (FIRST NUMBER IS SIDE SHOWN)		R.A.	RETURN AIR
		E.A.	EXHAUST AIR
12" ROUND DUCTWORK (DIAMETER)(IN) (SPIRAL DUCT IN EXPOSED AREAS)		R.L.F.A.	RELIEF AIR
		O.A.	OUTSIDE AIR
TURNING VANES		M.A.	MIXED AIR
FIRE PROTECTION			
FIRE SPRINKLER PIPING			FIRE HYDRANT
STANDPIPE PIPING			POST INDICATOR VALVE
SPRINKLER BRANCH AND HEADS			ALARM CHECK VALVE
FHC FIRE HOSE CABINET			O.S&Y. VALVE
FVC FIRE VALVE CABINET		FS	FLOW SWITCH

REVISIONS:

DESIGN ARCHITECT: David E. Ouade
PROJECT ARCHITECT: Dustin Zeiler
DRAWN BY: AMP
ISSUED: November 3, 2017

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MECHANICAL SCHEDULES

COUNTY BID # 17-282
SHA PROJECT # 17004

M500

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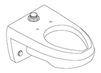
PLUMBING FIXTURE SCHEDULE (1)

TAG	FIXTURE (2)	FAUCET/ FLUSHVALVE/ ACCESSORY (2)	DESCRIPTION	CONNECTIONS			
				CW	HW	WASTE	VENT
WC-1	 MODEL: KOHLER K-4325 "KINGSTON"	MODEL: SLOAN REGAL OPTIMA 111-SMO-XL	DESCRIPTION: ELONGATED, SIPHON JET BOWL, WALL MOUNTED, BACK OUTLET WATER CLOSET WITH FLUSHOMETER. ADA COMPLIANT: YES COLOR: WHITE FLUSHOMETER: TOP SPUD. 1.6 GALLONS PER FLUSH. FLUSHOMETER FINISH: POLISHED CHROME. FLUSHOMETER OPERATION: BATTERY POWERED, SENSOR ACTUATION, AUTOMATIC FLUSH SYSTEM. SEAT: WHITE ELONGATED, OPEN FRONT WITHOUT COVER, SEAT WITH CHECK HINGE. RIM HEIGHT: 17.5"-18"	1"	-	4"	2"
				REMARKS:			
L-1	MODEL: KOHLER K-2005 "KINGSTON"	MODEL: SLOAN OPTIMA EBF-85	DESCRIPTION: WALL HANGING LAVATORY WITH BATTERY POWERED SENSOR FAUCET. ADA COMPLIANT: YES. COLOR: WHITE. FIXTURE DIMENSIONS: 21"x18" SHOWER FLOOR WITH 60"x12" SHOWER ENTRY RAMP CONSTRUCTION: FAUCET INLET SPACING TO MATCH LAVATORY OPENINGS. FAUCET VALVE OPERATION: BATTERY POWERED, SENSOR OPERATED. FAUCET ACCESSORIES: BELOW DECK THERMOSTATIC MIXING VALVE. SPOUT: INTEGRAL WITH BODY, VANDAL RESISTANT AERATOR. 1/2-GPM FLOW. DRAIN: GRID STRAINER. ADA INSULATION KIT: PROVIDE SUPPLY AND DRAIN SOFT MOLDED INSULATION KITS FROM FIXTURE TO WALL. COVERINGS TO BE CUSHIONED JACKET PLASTIC COVERING WITH SELF STICKING FASTENING SYSTEM.	CW	HW	WASTE	VENT
				1/2"	1/2"	1-1/4"	1-1/4"
				REMARKS:			
SH-1	MODEL: SEE DESCRIPTION	MODEL: SEE DESCRIPTION	DESCRIPTION / MODEL #: COMFORT DESIGNS SSS6037BF 39 U-BAR (ADA/ANSI) SHOWER ENCLOSURE WITH KOHLER K-304-KS VALVE, AND DELTA T13H152 UNIVERSAL SHOWER TRIM WITH GRAB BAR SHOWER MUST MEET THE REQUIREMENTS OF ADA. ADA COMPLIANT: YES COLOR: WHITE FIXTURE ENCLOSURE: 60" X 33" X 74" GELCOAT FIBERGLASS, SMOOTH WALLS WITH SLIP RESISTANT, TEXTURED BOTTOM FIXTURE ENCLOSURE INSTALLATION: FLUSH MOUNTED TO THE FLOOR WITH ADA COMPLIANT THRESHOLD. HORIZONTAL GRAB BARS : ADA COMPLIANT U-SHAPED, FACTORY INSTALLED. FIXTURE ENCLOSURE DRAIN: PROVDE JR SMITH MODEL # 2005 SHOWER DRAIN WITH ENCLOSURE. SHOWER CURTAIN ROD: FACTORY INSTALLED. SHOWER VALVE: PRESSURE BALANCED VALVE WITH SCREWDRIVER STOPS. SHOWER HANDLE: SINGLE-LEVER. SHOWER HEAD: ARM AND FLANGE, DELTA T13H152 HANDSHOWER WITH SLIDE BAR.	CW	HW	WASTE	VENT
				1/2"	1/2"	1-1/2"	1-1/2"
				REMARKS:			
S-1	MODEL: ELKAY LRAD-1722	MODEL: KOHLER K-15888-K "CORALAIS DECORATOR SERIES"	DESCRIPTION: COUNTER MOUNTED 18 GA STAINLESS STEEL SINK W/ GOOSENECK SWING SPOUT. ADA COMPLIANT: YES. FIXTURE DIMENSIONS: SINGLE BOWL 17" X 22" X 6-1/2" (ADA) CONSTRUCTION: FAUCET INLET SPACING TO MATCH SINK OPENINGS. HANDLE: DOUBLE POLISHED CHROME ADA LEVER HANDLES. SPOUT: GOOSENECK SWING WITH 1-1/2 GPM FLOW AERATOR. DRAIN: 1-1/2" GRID STRAINER WITH 3-1/2" REMOVABLE STAINLESS STEEL CRUMB CUP. ADA INSULATION KIT: PROVIDE SUPPLY AND DRAIN SOFT MOLDED INSULATION KITS FROM FIXTURE TO WALL. COVERINGS TO BE CUSHIONED JACKET PLASTIC COVERING WITH SELF STICKING FASTENING SYSTEM.	CW	HW	WASTE	VENT
				1/2"	1/2"	1-1/2"	1-1/2"
				REMARKS:			
S-2	MODEL: ELKAY LRAD-3321	MODEL: KOHLER K-15888-K "CORALAIS DECORATOR SERIES"	DESCRIPTION: COUNTER MOUNTED 18 GA STAINLESS STEEL SINK W/ GOOSENECK SWING SPOUT. ADA COMPLIANT: YES. FIXTURE DIMENSIONS: DOUBLE BOWL 33" X 21-1/4" X 6-1/2" (ADA) CONSTRUCTION: FAUCET INLET SPACING TO MATCH SINK OPENINGS. HANDLE: DOUBLE POLISHED CHROME ADA LEVER HANDLES. SPOUT: GOOSENECK SWING WITH 1-1/2 GPM FLOW AERATOR. DRAIN: 1-1/2" GRID STRAINER WITH 3-1/2" REMOVABLE STAINLESS STEEL CRUMB CUP. ADA INSULATION KIT: PROVIDE SUPPLY AND DRAIN SOFT MOLDED INSULATION KITS FROM FIXTURE TO WALL. COVERINGS TO BE CUSHIONED JACKET PLASTIC COVERING WITH SELF STICKING FASTENING SYSTEM. FOOD WASTE DISPOSER: IN-SINK ERATOR, BADGER 5XP, 115VAC, 3/4 [1/2] HP DISPOSER. INCLUDE MOTOR WITH OVERLOAD PROTECTION AND RESET BUTTON, WALL SWITCH, CORROSION RESISTANT CHAMBER WITH JAM RESISTANT STAINLESS STEEL GRINDER, SPLASH GUARD, AND COMBINATION COVER/STOPPER.	CW	HW	WASTE	VENT
				1/2"	1/2"	1-1/2"	1-1/2"
				REMARKS:			
OB-1	MODEL: OATEY #12K		DESCRIPTION: RECESSED WALL OUTLET BOX WITH ISOLATION VALVE.	CW	HW	WASTE	VENT
				1/4"	-	-	-
				REMARKS:			

REMARKS:

(1) SEE SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS INCLUDING STOPS, FITTINGS AND ALL OTHER SPECIALTIES.
(2) PICTURES OF FIXTURES DO NOT INDICATE ACTUAL FIXTURE SPECIFIED. PICTURES ARE GRAPHICAL IN NATURE. SEE DESCRIPTION FOR ACTUAL FIXTURE AND MODEL.

PLUMBING FIXTURE SCHEDULE (1)

TAG	FIXTURE (2)	FAUCET/ FLUSHVALVE/ ACCESSORY (2)	DESCRIPTION	CONNECTIONS			
				CW	HW	WASTE	VENT
EWC-1	MODEL: ELKAY LZSTL8WSSP		DESCRIPTION: BARRIER FREE WALL MOUNTED BI-LEVEL FILTERED WATER COOLER WITH BOTTLE FILLER. ADA COMPLIANT: YES. NUMBER OF BUBBLERS: TWO + BOTTLE FILLER (SEE BELOW). BOTTLE FILLER: SENSOR ACTIVATED, 1.1 GPM LAMINAR FLOW WITH 20 SECOND SHUT OFF, LED LIGHT AND BOTTLES SAVED DIGITAL DISPLAY COUNTER. FIXTURE CABINET MATERIAL: STAINLESS STEEL. THERMOSTAT: ADJUSTABLE SET AT 50°F. ELECTRICAL: 120V, 3 WIRE CORD AND PLUG. ACTIVATION: PUSH BAR ACTUATION MECHANISM. UNIT SHALL INCLUDE 3000-GALLON CAPACITY FILTER, CERTIFIED TO NSF/ANSI 42 & 53, WITH VISUAL FILTER MONITOR TO INDICATE WHEN REPLACEMENT IS NECESSARY AND SHALL AUTOMATICALLY DETECT A NEW FILTER / RESET VISUAL FILTER MONITOR ACCORDINGLY. UNIT SHALL TURN OFF REFRIGERATION SYSTEM AS NEEDED, IN ADDITION TO SELF-DIAGNOSING SYSTEM ISSUES AND DISPLAY RELATED MESSAGES.	1/2"	-	1-1/2"	1-1/2"
				REMARKS: FIXTURE UNIT CAPACITY: 8 GPH.			
MS-1	MODEL: WILLIAMS SB-900 "SERVICECEPTOR"	MODEL: KOHLER K-8907 "KINLOCK"	DESCRIPTION: FLOOR MOUNTED MOP SINK WITH WALL MOUNTED FAUCET. ADA COMPLIANT: NOT REQUIRED FIXTURE DIMENSIONS: 24" x 24" X 12" HIGH FIXTURE CONSTRUCTION: TERRAZZO MOLDED STONE. RIM GUARD: STAINLESS STEEL. FAUCET: ROUGH CHROME, WIDESPREAD BAST BRASS WITH SUPPLIES 8" ON CENTER. FAUCET MOUNTING: WALL CENTERED ON FIXTURE. FAUCET HANDLE: DUAL LEVER. FAUCET SPOUT: INTEGRAL VACUUM BREAKER, PAIL HOOK, AND HOSE THREAD OUTLET. WALL BRACE: ASSEMBLY WITH WALL BRACKET AND SUPPORT TO FAUCET SPOUT. HOSE HOLDER: E.L. MUSTEE & SONS 65.700, HEAVY DUTY 5/8" DIA. 31" RUBBER HOSE AND SPRING LOADED MOLDED RUBBER HOSE HOLDER ON STAINLESS STEEL WALL PLATE. MOP HANGER: E.L. MUSTEE & SONS 65.600, THREE SPRING-LOADED RUBBER MOP HOLDERS ATTACHED TO STAINLESS STEEL WALL PLATE. WALL GUARD: E.L. MUSTEE & SONS 67.2424, 12" HIGH, 20 GAUGE, #304 STAINLESS STEEL WALL GUARD.	CW	HW	WASTE	VENT
				3/4"	3/4"	3"	2"
				REMARKS:			
D-1	MODEL: J.R. SMITH #2005		DESCRIPTION: FLOOR DRAIN WITH CAST IRON BODY, FLASHING COLLAR, 6" ROUND ADJUSTABLE NICKEL BRONZE GRATE.	CW	HW	WASTE	VENT
				-	-	2"	1-1/2"
				-	-	3"	1-1/2
				-	-	4"	2"
				REMARKS: SEE FLOOR PLANS FOR WASTE AND VENT SIZE REQUIREMENTS.			
RD-1	MODEL: J.R. SMITH #1010		DESCRIPTION: ROOF DRAIN WITH CAST IRON BODY, COMBINATION FLASHING COLLAR AND GRAVEL STOP, WITH THE FOLLOWING FEATURES: 1. UNDERDECK CLAMP 2. ADJUSTABLE INSULATION EXTENSION 3. SUMP RECEIVER 4. CAST IRON VANDAL PROOF DOME 5. REQUIRED GASKETS				

REMARKS:

(1) SEE SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS INCLUDING STOPS, FITTINGS AND ALL OTHER SPECIALTIES.
(2) PICTURES OF FIXTURES DO NOT INDICATE ACTUAL FIXTURE SPECIFIED. PICTURES ARE GRAPHICAL IN NATURE. SEE DESCRIPTION FOR ACTUAL FIXTURE AND MODEL.

REVISIONS:

DESIGN ARCHITECT:
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PROJECT ARCHITECT:
Dan Sinclair
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CHECKED:
November 3, 2017

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PLUMBING FIXTURE SCHEDULE

COUNTY BID # 17-282
SHA PROJECT # 17004

M501

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Lancaster County EOC

DIAGRAM SYMBOL LEGEND	
DISPLAY	DESCRIPTION
—///—	POWER WIRE
———	CONTROL WIRE
———	REF. PIPE

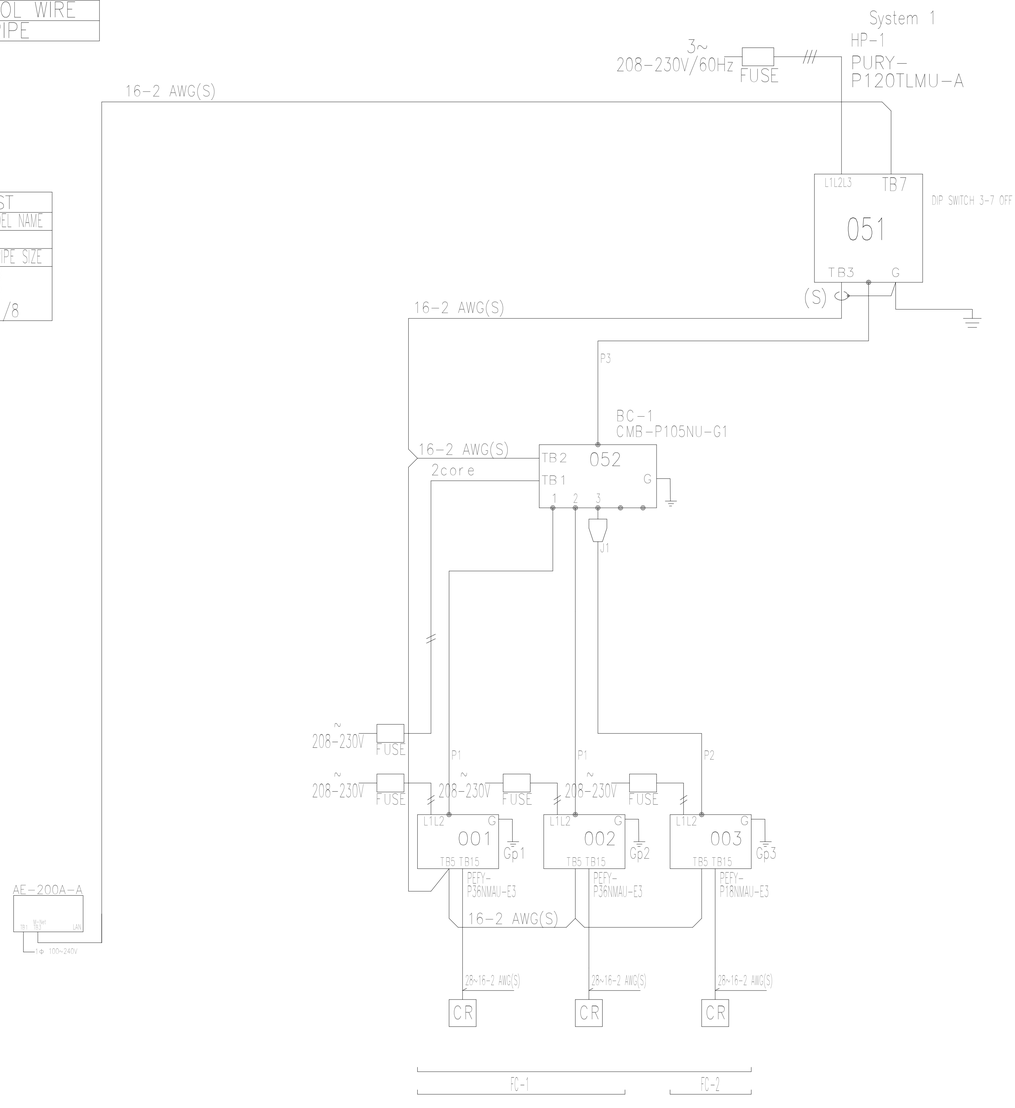
CONT.No		PAGE	

CITY MULTI

SYSTEM SCHEMATIC DWG.

Additional refrigerant charge is needed depending on the size and length of extended piping. Please refer the amount of pre-charge and the formula of calculation which is mentioned on the data book.
1.25mm²(16 AWG) : 1.25mm²(16 AWG) or more. 0.75mm²(20 AWG) : between 0.5mm²(24 AWG) and 0.75mm²(20 AWG).

PIPING LIST		
SYMBOL	BRANCH PIPE MODEL NAME	
J1	Reducer	
SYMBOL	LIQUID PIPE/GAS PIPE SIZE	
P1	3/8	/ 5/8
P2	1/4	/ 1/2
P3	3/4	/ 1-1/8



A1 MECHANICAL SCHEMATICS

SCALE: NONE

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REVISIONS:

DESIGN ARCHITECT: David E. Quade
PROJECT ARCHITECT: David E. Quade
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MECHANICAL SCHEMATICS

COUNTY BID # 17-282
SHA PROJECT # 17004

M600

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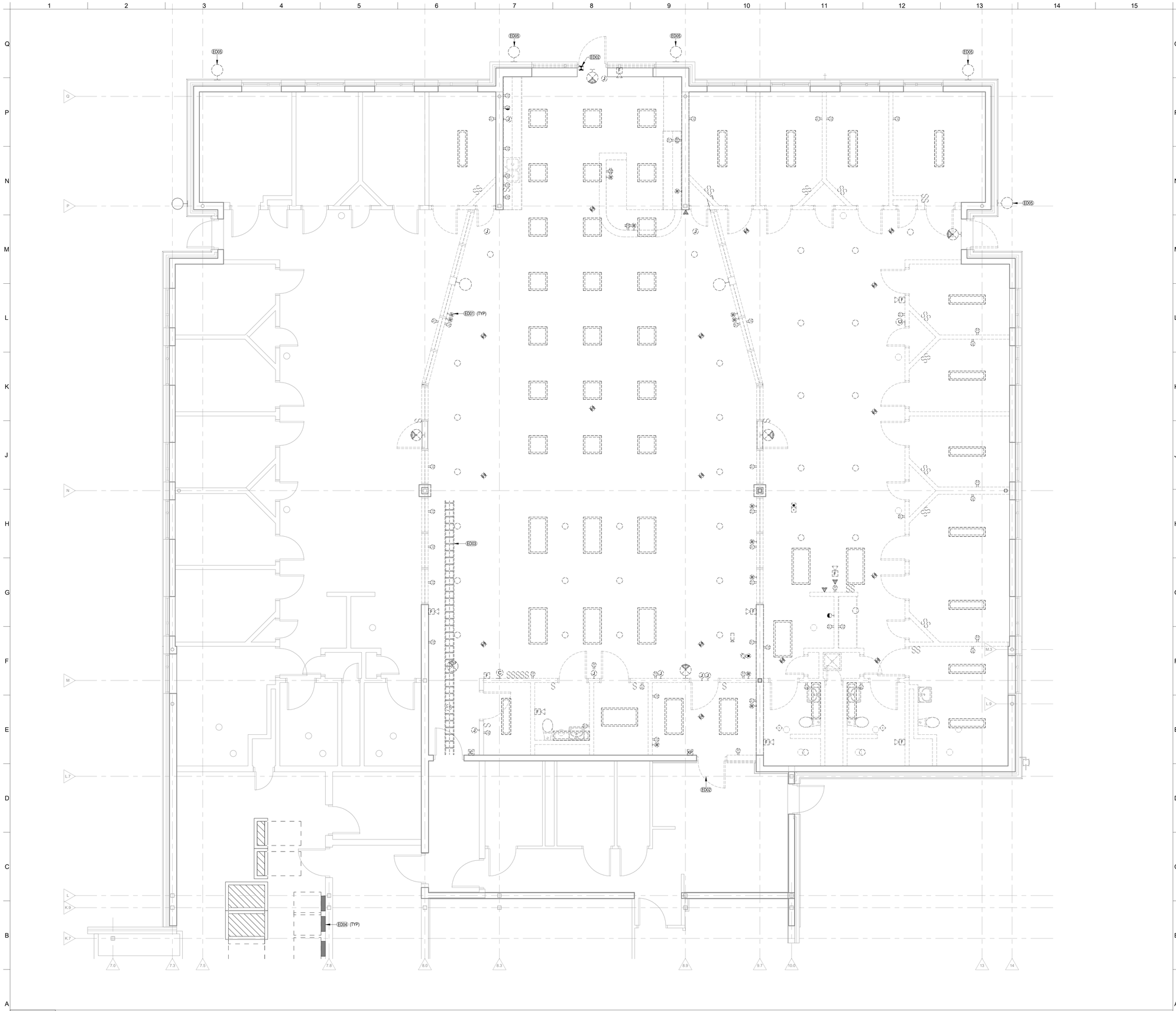

A1 FLOOR PLAN - ELECTRICAL DEMOLITION

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

ELECTRICAL DEMOLITION NOTES

1. THE OWNER SHALL HAVE FIRST SALVAGE RIGHTS TO ALL FIXTURES, DEVICES AND EQUIPMENT REMOVED.
2. WHERE EXISTING CIRCUITS ARE NOT REUSED, REMOVE CONDUCTORS AND ASSOCIATED ACCESSIBLE RACEWAYS BACK TO THE SOURCE. ABANDON CONCEALED CONDUITS IN WALLS WHICH ARE NOT REMOVED.
3. DEMOLITION DRAWINGS INDICATE FIXTURES, DEVICES AND MAJOR PIECES OF EQUIPMENT WHICH ARE TO BE REMOVED OR RECONNECTED. REMOVE INDICATED ITEMS AND ASSOCIATED ITEMS NOT INDICATED BUT WHICH MUST BE REMOVED TO ACCOMMODATE REMODELING. SEE PROJECT MANUAL "WORK IN EXISTING BUILDINGS" FOR ADDITIONAL INFORMATION.
4. ALL EXISTING ELECTRICAL DEVICES, FIXTURES, EQUIPMENT, WIRING AND RACEWAYS INCLUDING DATA/COMMUNICATION SYSTEMS SHALL BE REMOVED UNLESS OTHERWISE INDICATED. WHERE EXISTING WALLS ARE TO BE REMOVED ALL ASSOCIATED ELECTRICAL EQUIPMENT SHALL BE REMOVED. DISCONNECT POWER SO THAT DEVICES AND EQUIPMENT MAY BE REMOVED WITH WALLS. SEE ARCHITECTURAL DRAWINGS FOR WALLS TO BE REMOVED. ABANDON CONCEALED CONDUITS WHERE WALLS ARE NOT REMOVED. REUSE CONDUITS WHERE POSSIBLE. THE CONTRACTOR SHALL VISIT THE SITE AND SHALL BECOME FAMILIAR WITH EXISTING CONDITIONS PRIOR TO THE BID DATE.
5. ARCHITECTURAL ITEMS INDICATED WITH DASHED LINES ARE SCHEDULED TO BE REMOVED.
6. POWER TO EXISTING AREAS NOT BEING REMODELED SHALL BE MAINTAINED AT ALL TIMES EXCEPT FOR SHORT TERM OUTAGES NECESSARY FOR RECONNECTION OF EXISTING CIRCUITS. COORDINATE AND SCHEDULE OUTAGES WITH THE OWNER.
7. COORDINATE DEMOLITION WITH THE WORK OF OTHER TRADES. PROVIDE TEMPORARY POWER AS REQUIRED TO ALLOW THE WORK OF OTHER TRADES TO PROCEED OR AS REQUIRED TO ALLOW THE OWNER TO OCCUPY THE SPACE.
8. REMOVE EXISTING FIRE ALARM DEVICES AND WIRING. REUSE CONDUIT AND BOXES WHERE POSSIBLE FOR INSTALLATION OF NEW FIRE ALARM SYSTEM. SEE PROJECT MANUAL AND NEW WORK DRAWINGS.

KEYNOTES

ED01 COMPLETELY REMOVE ALL EXISTING COPPER AND COAXIAL CABLING FROM EACH COMMUNICATIONS OUTLET SHOWN.

ED02 REMOVE EXISTING ACCESS CONTROL DOOR CONTROLLER AT THIS DOOR.

ED03 REMOVE EXISTING CABLE TRAY IN THIS AREA.

ED04 EXISTING PANELS SERVING AREA OF REMODEL. REMOVE BRANCH CIRCUIT CONDUITS FOR POWER AND LIGHTING CIRCUITS REMOVED IN DEMOLITION. DOCUMENT BREAKERS THAT BECOME SPARE AFTER DEMOLITION IS COMPLETE.

ED05 REMOVE EXISTING FIXTURE, JUNCTION BOX AND CONDUIT TO REMAIN. SEE E100.

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REVISIONS:

DESIGN ARCHITECT: David E. Quade
PROJECT ARCHITECT: David E. Quade
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ELECTRICAL DEMOLITION

COUNTY BID # 17-282
SHA PROJECT # 17004

ED100

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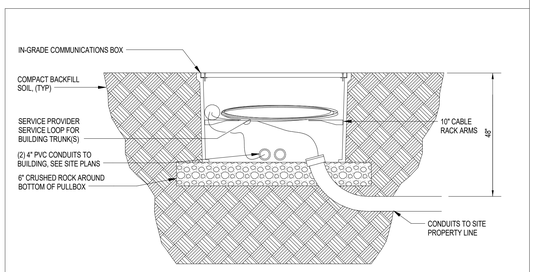
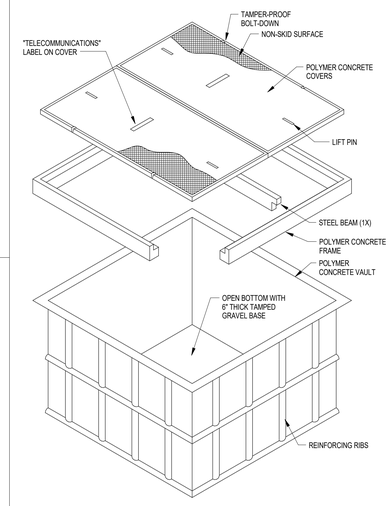


K9 IN-GRADE PULLBOX SECTION

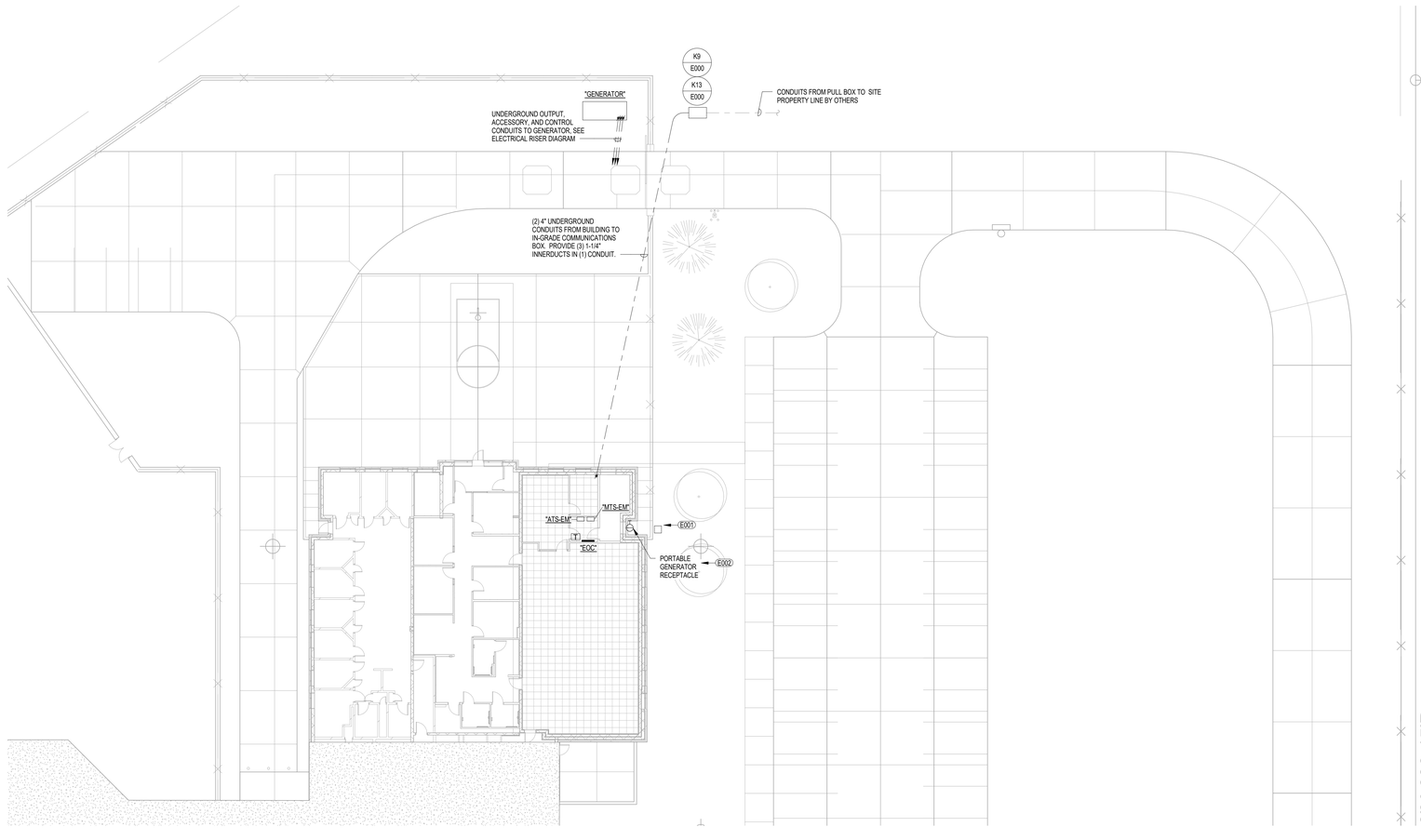
SCALE: NO SCALE



NOTE:
STANDARD 36"L x 60"W x 36"D IN-GRADE COMMUNICATIONS BOX, NEW BASIS # FCA360036. INCLUDE (4) RACKS ATTACHED TO SIDES OF BOX FOR MOUNTING OF EQUIPMENT AND CABLE ARMS. PROVIDE (4) 10" CABLE ARMS, NEW BASIS # CBLARM-10.

K13 IN-GRADE PULLBOX DETAIL

SCALE: NO SCALE



A1 SITE PLAN - ELECTRICAL

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

SITE GENERAL NOTES

1. CONTRACTOR IS RESPONSIBLE FOR DAMAGE TO EXISTING SIDEWALKS, CONCRETE PADS, AND WALKWAYS. CONTRACTOR SHALL REPAIR ANY DAMAGED ELEMENTS BACK TO THE ORIGINAL CONDITION.
2. NOT ALL UTILITIES ARE INDICATED ON PLANS. EXACT LOCATION OF UTILITIES IS NOT KNOWN. CONTRACTOR SHALL FIELD VERIFY ALL EXISTING UTILITIES. CONTRACTOR IS RESPONSIBLE FOR DAMAGE TO EXISTING UTILITYES AND SHALL REPAIR ANY DAMAGED UTILITIES AT NO COST TO THE OWNER.
3. NOT ALL LANDSCAPING AND TREES ARE INDICATED ON DRAWINGS. WORK SHALL BE PLANNED TO MINIMIZE REMOVAL OF EXISTING TREES AND LANDSCAPING. CONTRACTOR SHALL PROVIDE ADEQUATE PROTECTION THROUGHOUT THE COURSE OF WORK, FOR ALL TREES AND LANDSCAPING ON THE SITE IN THE AREA OF CONDUIT AND EQUIPMENT INSTALLATION. CONTRACTOR SHALL BE RESPONSIBLE FOR DAMAGE TO ANY SUCH TREES OR LANDSCAPING DURING THE PERIOD OF CONSTRUCTION AND SHALL REPLACE OR REPAIR, ANY TREES OR LANDSCAPING DAMAGED BY THE CONTRACTOR, IT'S SUBCONTRACTORS, OR EMPLOYEES, WITH PLANTINGS ACCEPTABLE TO THE OWNER AT NO COST TO THE OWNER. DAMAGED SOD AREAS SHALL BE REPLACED WITH TOP GRADE SOD OF A TYPE ACCEPTABLE TO THE OWNER. ALL LANDSCAPE REPAIRS SHALL CARRY A ONE-YEAR FULL GUARANTEE.

Diggers Hotline Of Nebraska
Statewide (800) 331-5666
Metro Omaha 344-3565
Call Before You Dig... Its The Law

KEYNOTES

E001 PROVIDE 12"x12"x12" DEEP IN-GRADE BOX, NEW BASIS FCA1212127 (OR EQUAL). PROVIDE 10'x5/8" DIAMETER GROUND ROD, CENTERED IN BOX, DRIVEN INTO THE GROUND. LEAVE 6" OF ROD EXPOSED ABOVE GRADE WITH #3/0 CONDUCTOR BONDING CLAMP ATTACHED TO ALLOW CONNECTION OF OWNER FURNISHED PORTABLE GENERATOR GROUNDING ELECTRODE CONDUCTOR.

E002 PROVIDE PLAQUE ON WALL ABOVE PORTABLE GENERATOR OUTLET STATING THE FOLLOWING: "PORTABLE GENERATOR GROUND ELECTRODE CONDUCTOR LOCATED IN ADJACENT IN-GRADE BOX. GROUND PORTABLE GENERATOR TO ELECTRODE PER NEC 250.30 PRIOR TO USE."

REVISIONS:

DESIGN ARCHITECT: David E. Ouade
PROJECT ARCHITECT: Dwight Carlson
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ISSUED: November 3, 2017

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SITE PLAN - ELECTRICAL

COUNTY BID # 17-282
SHA PROJECT # 17004

E000

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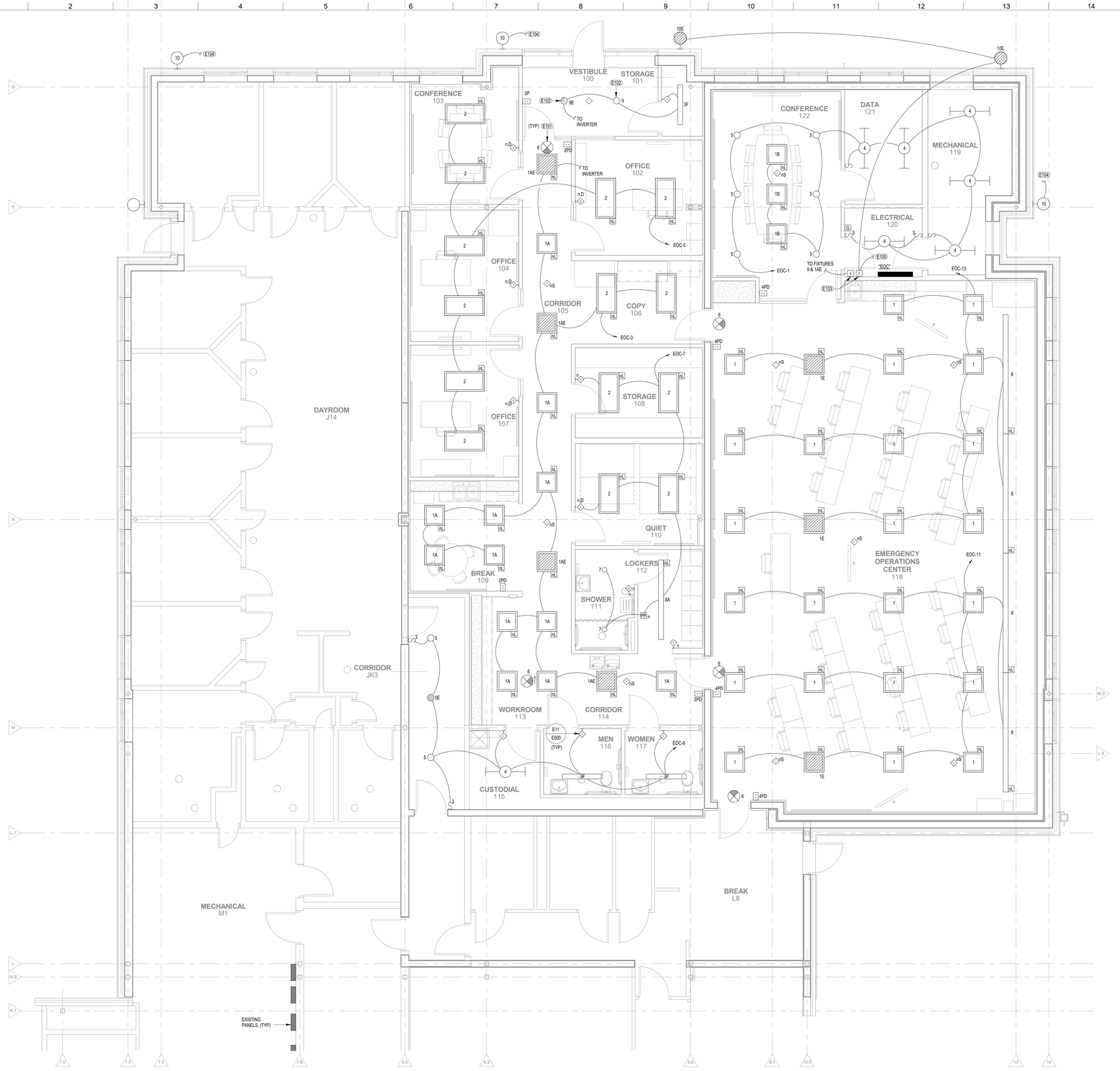
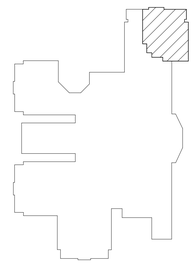


LIGHTING GENERAL NOTES

1. PROVIDE A DEDICATED NEUTRAL CONDUCTOR FOR EACH BRANCH CIRCUIT.
2. PROVIDE A GREEN INSULATED GROUND WIRE IN ALL LIGHTING BRANCH CIRCUITS.
3. MINIMUM SIZE CONDUIT SHALL BE 3/4" UNLESS OTHERWISE INDICATED.
4. CONNECT ALL EXIT SIGNS UNSWITCHED TO NEAREST EMERGENCY LIGHTING CIRCUIT.
5. GENERAL LIGHTING CONTROL NOTES:
   - A. SEE SPECIFICATIONS, LIGHTING CONTROL DEVICE SCHEDULE AND DETAILS FOR ADDITIONAL REQUIREMENTS.
   - B. CONNECT ALL NETWORK LIGHTING CONTROL DEVICES TO NETWORK BRIDGE DEVICES PER MANUFACTURER'S RECOMMENDATIONS.
   - C. PROVIDE BRIDGE AND GATEWAY DEVICES, POWER PACKS, SWITCH PACKS, ENTRY STATIONS, SENSORS, AND ALL LOW VOLTAGE CABLING REQUIRED TO CONNECT DEVICES PER MANUFACTURER'S INSTALLATION INSTRUCTIONS.
   - D. QUANTITY OF BRIDGE DEVICES SHALL BE DETERMINED BY MANUFACTURER. LOCATE BRIDGES IN ACCESSIBLE LOCATIONS NEAR DEVICES BEING SERVED.
   - E. PROVIDE 0-10V CONNECTION TO FIXTURES SERVED BY DIMMING POWER PACKS INDICATED WITH SUBSCRIPT "D". ROUTE ALL 0-10V WIRING IN A SEPARATE 1/2" CONDUIT DOWNSTREAM OF POWER PACK.
   - F. EMERGENCY POWER PACKS REQUIRE CONNECTION TO UNSWITCHED NORMAL CIRCUIT SERVING LIGHTING IN AREA.
   - G. LIGHTING CONTROL DEVICES (POWER PACKS 'PP') ARE SHOWN SCHEMATICALLY FOR CLARITY. LOCATE POWER PACKS ABOVE NEARBY ACCESSIBLE CEILING.

KEYNOTES

- E101 CONNECT ALL EXIT LIGHTS TO NEAREST NORMAL UNSWITCHED LIGHTING CIRCUIT SERVING AREA.
- E102 MOUNT LUMINAIRE SO BOTTOM IS AT +12'-0" AFF.
- E103 PROVIDE BODINE (OR EQUAL) 100 WATT INVERTER, #ELI-S-100. LOCATE INVERTER ABOVE ACCESSIBLE CEILING.
- E104 CONNECT TO EXISTING SWITCHED EXTERIOR LIGHTING CIRCUIT SERVING AREA.
- E105 CONNECT TO EXISTING UNSWITCHED EXTERIOR LIGHTING CIRCUIT FOR MONITORING.



PROJECT KEY PLAN

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ISSUE DATE: November 3, 2017

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Lancaster County
Emergency Management Relocation / Renovation

FLOOR PLAN - LIGHTING

COUNTY BID #	17-282
SHA PROJECT #	17004

E100

A1 FLOOR PLAN - LIGHTING
SCALE: 1/4" = 1'-0"

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POWER GENERAL NOTES

1. MINIMUM DATA/COMMUNICATIONS CONDUIT SIZE SHALL BE 1". SEE DRAWINGS FOR AREAS WHERE LARGER CONDUITS ARE REQUIRED.
2. PROVIDE A DEDICATED NEUTRAL CONDUCTOR FOR EACH BRANCH CIRCUIT.
3. PROVIDE A GREEN INSULATED GROUND WIRE IN ALL RECEPTACLE AND EQUIPMENT BRANCH CIRCUITS.

KEYNOTES

E201 LOCATE RECEPTACLE FOR WATER COOLER SO THAT CORD AND PLUG ARE CONCEALED INSIDE OR BEHIND WATER COOLER. PROVIDE 'GFCI' TYPE CIRCUIT BREAKER.

E202 PROVIDE WIREMOLD (OR EQUAL) CATALOG NUMBER RFB4E-OG ON GRADE FLOOR BOX WITH COVER ASSEMBLY. COORDINATE COVER FINISH WITH ARCHITECT PRIOR TO ORDERING. PROVIDE WITH TWO DUPLEX RECEPTACLES. PROVIDE ALL NECESSARY ACCESSORIES TO ACCOMMODATE LOW VOLTAGE CABLING AND DEVICE FACEPLATES INDICATED. CUT AND PATCH EXISTING FLOOR TO ACCOMMODATE FLOOR BOX AND CONDUITS. COORDINATE LOCATION AND REQUIREMENTS WITH ARCHITECT AND GENERAL CONTRACTOR.

E203 PROVIDE HUBBELL 3-GANG HIGH CAPACITY BOX, #HBL263. LOCATE A/V AND POWER DEVICES WITHIN BOX.

E204 PROVIDE ROUGH-IN FOR DATA/COMMUNICATIONS OUTLET. SEE DETAIL D9/E501.

E206 PROVIDE ROUGH-IN FOR THERMOSTAT/SENSOR AT 44". PROVIDE SINGLE GANG BOX WITH PLASTER RING AND 3/4"C. WITH PULL STRING STUBBED TO ASSOCIATED MECHANICAL UNIT. TERMINATE WITH INSULATING BUSHING.

E209 SPECIAL REQUIREMENTS AT DISCONNECTS INSTALLED ABOVE ACCESSIBLE CEILING: DISCONNECTS OR DISCONNECT SUPPORTS SHALL NOT ATTACH IN ANY WAY TO EQUIPMENT SERVED. PROVIDE SEPARATE INDEPENDENT PLENUM-RATED MOUNTING FRAME SUPPORT FOR DISCONNECT. CONNECT MOUNTING FRAME SUPPORT DIRECTLY TO BUILDING RED-IRON OR TO UNISTRUT SPANS BETWEEN BUILDING RED-IRON. MAINTAIN ACCESS AND WORKING SPACE TO ALL MAINTENANCE FUNCTIONS OF EQUIPMENT SERVED, INCLUDING FILTER REPLACEMENT, REMOVEABLE ACCESS PANELS, ACCESS DOOR SWING CLEARANCE, AND COMPRESSOR REPLACEMENT. MAINTAIN NEC ELECTRICAL CLEARANCE ABOVE-CEILING DISCONNECTS TO COORDINATE WITH THESE REQUIREMENTS AND WITH PRIOR APPROVAL OF THE ARCHITECT/ENGINEER.

E210 AT TERMINAL UNITS AND BRANCH SELECTORS, PROVIDE 2-POLE FUSED MANUAL CONTROLLER, PASS AND SEYMOUR #7812PMD WITH 15-AMP CLASS J FUSES.

E212 PROVIDE 3-GANG J-BOX AND 3/4" CONDUIT TO ABOVE ACCESSIBLE CEILING FOR AV OUTPUT DEVICE.

E213 PROVIDE (1) 1-1/4" CONDUIT TO ABOVE ROOF FOR CAMERA CABLING. STUB CONDUIT INTO BUILDING ABOVE CONFERENCE ROOM CEILING AND TURN INTO DATA ROOM 121. PROVIDE WEATHERHEAD ON CONDUIT.

E214 PROVIDE (2) 2"C. FROM DATA ROOM TO ACCESSIBLE CEILING OF ROOM INDICATED ON PLANS. PROVIDE INSULATED BUSHINGS ON CONDUIT ENDS. PROVIDE 2" 3-CELL MAXCELL (OR APPROVED EQUAL) ALONG LENGTH OF BOTH CONDUITS.

E215 PROVIDE (3) 2"C. FROM DATA ROOM OVERHEAD LADDER RUNWAY TO ABOVE ROOF MEMBRANE. PROVIDE INSULATED BUSHINGS AND EXTERIOR RATED WEATHERHEADS FOR ALL CONDUITS. COORDINATE FINAL PENETRATION LOCATIONS WITH OWNER AND FINAL TOWER LOCATION.

E216 PROVIDE ROOF MOUNTED SELF-SUPPORTING TOWER SECTION, TESSCO # 207553 (OR APPROVED EQUAL). PROVIDE BASE PLATE KIT, TESSCO # 289870 AND CONNECT TO STRUCTURAL SUPPORT ABOVE ROOF. COORDINATE EXACT LOCATION WITH STRUCTURAL ENGINEER AND OWNER PRIOR TO INSTALLATION. COORDINATE MOUNTING TO BUILDING ROOF STRUCTURE WITH STRUCTURAL ENGINEER PRIOR TO INSTALLATION.

E217 PROVIDE 60A, 2-POLE LOCKABLE CIRCUIT BREAKER IN EXISTING PANEL 'LB'.

E218 PROVIDE HUBBEL (OR EQUAL) CATALOG NUMBER #AFB301XX RAISED FLOOR BOX WITH COVER ASSEMBLY. COORDINATE COVER FINISH WITH ARCHITECT PRIOR TO ORDERING. PROVIDE WITH TWO DUPLEX RECEPTACLES. PROVIDE INSULATED GROMMETS IN 1-1/4" KNOCKOUTS FOR DATA CABLING.

E219 PROVIDE 2-#10,#10G IN 1/2"C. TO RESPECTIVE CONDENSING UNIT IN ADJACENT SPACE.

E220 PROVIDE 1/2"C. WITH CONTROL WIRING BETWEEN UNITS. ROUTE WITH REFRIGERANT PIPING.

E221 EXISTING PANELS SERVING AREA OF REMODEL. PROVDE UPDATED PANEL DIRECTORIES AFTER REMODEL IN COMPLETE.

A1 FLOOR PLAN - POWER

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

REVISIONS:

DESIGN ARCHITECT: David E. Dubé
PROJECT ARCHITECT: Dwight Dubé
DRAWN BY: Jeff Hertle
ISSUED: November 3, 2017

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E200

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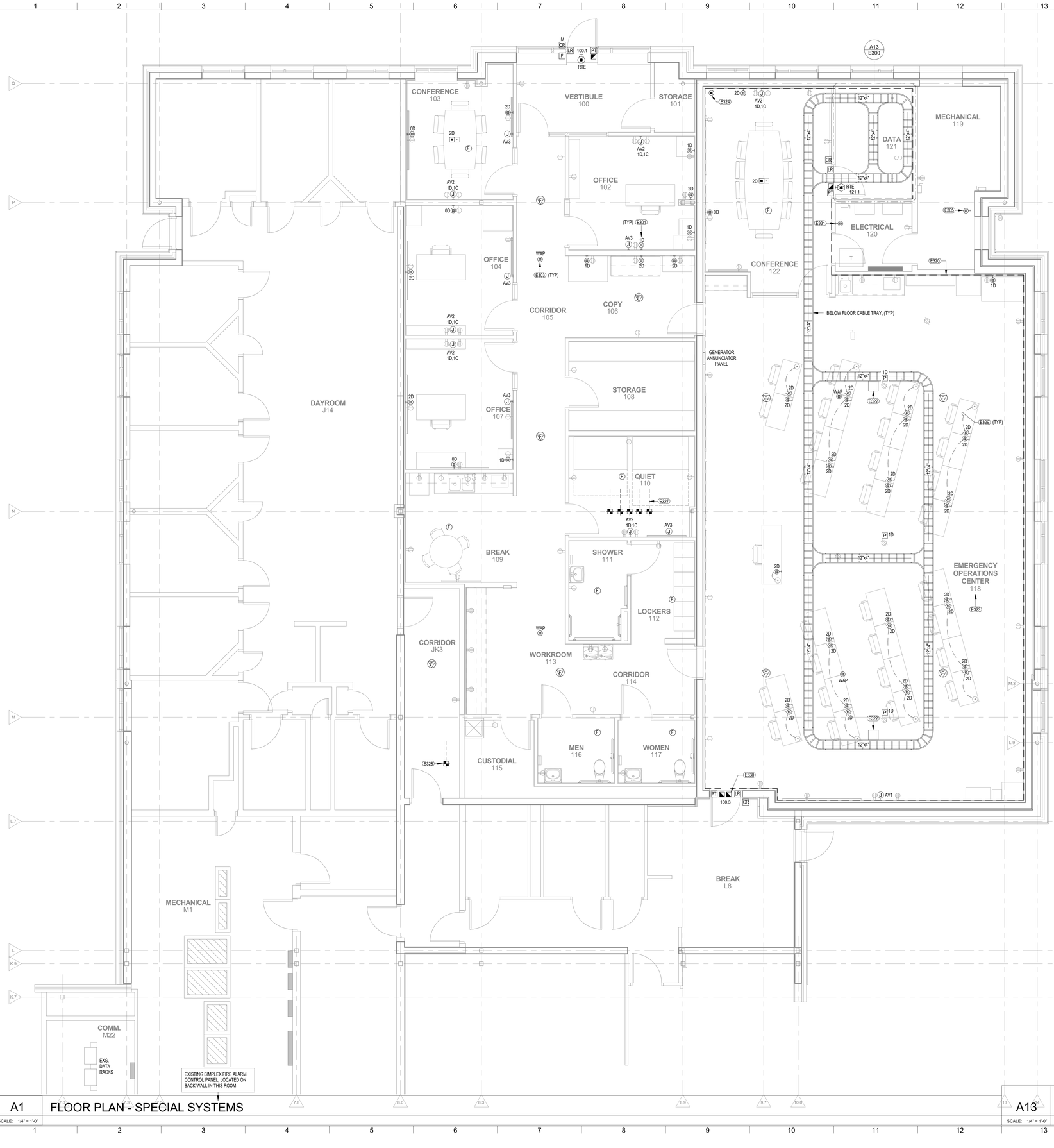


GENERAL NOTES

1. SPECIAL SYSTEMS ROUGH-INS PROVIDED BY ELECTRICAL CONTRACTOR.
2. PROVIDE J-HOOK CABLE SUPPORTS FOR ALL CABLE NOT SUPPORTED BY CABLE TRAY, MAXIMUM SPACING SHALL BE 60".
3. PROVIDE UL LISTED FIRESTOP ASSEMBLY FOR ALL RATED PENETRATIONS.
4. PROVIDE STAINLESS STEEL WALL PLATE WITH MOUNTING STUDS FOR ALL SINGLE CABLE TELEPHONE OUTLETS MOUNTED AT 48".
5. PROVIDE 10' SERVICE LOOP FOR ALL COMMUNICATIONS CABLES AT COMMUNICATION TERMINATION ROOM, 3' SERVICE LOOP AT STATION END.
6. ALL TELECOMMUNICATIONS CABLING SHALL BE TERMINATED TO THE COMMUNICATIONS TERMINATION ROOM DESIGNATED FOR THAT SPECIFIC AREA OF THE FACILITY, UNLESS OTHERWISE INDICATED.
7. MECHANICALLY LABEL TERMINATION BLOCKS AND CABLES, (TYP)
8. BOND ALL SECTIONS OF LADDER RUNWAY WITH BONDING JUMPERS - PANDUIT PART#: GACBJ612U.
9. PROVIDE TWO-HOLE, DOUBLE CRIMP, GROUNDING LUGS WITH VIEWING HOLE, SIZED TO MATCH CONDUCTOR, (TYP)
10. PROVIDE STAINLESS STEEL MOUNTING HARDWARE FOR ALL GROUND CONNECTIONS, (TYP)
11. MECHANICALLY LABEL ALL GROUND BARS AND CONNECTIONS TO BAR.
12. PROVIDE (2) 1-1/2" C. SLEEVES ABOVE ACCESSIBLE CEILING FROM EACH ROOM THROUGH WALL TO ABOVE NEAREST ACCESSIBLE CORRIDOR CEILING OR OVERHEAD PATHWAY. PROVIDE INSULATED BUSHINGS ON EACH END. SEAL BOTH ENDS OF CONDUIT WITH REMOVABLE PLENUM RATED ACOUSTICAL SEALANT.
13. PROVIDE A/V DEVICES AND CABLING AS PART OF PROJECT. REFER TO SPECIFICATIONS 274134 FOR ADDITIONAL INFORMATION.

KEYNOTES

E301 PROVIDE QUANTITY OF DATA CABLES TO EACH OUTLET, QUANTITY INDICATED ON PLANS.

E303 OWNER PROVIDED WIRELESS ACCESS POINT (WAP). PROVIDE ONE (1) DATA CABLE WITH 20' SLACK LOOP. TERMINATE WITH PLENUM RATED SURFACE BOX MOUNTED ABOVE ACCESSIBLE CEILING.

E304 PROVIDE (2) DATA CABLES FOR CONNECTION TO BUILDING ACCESS CONTROL PANEL. TERMINATE WITH SURFACE MOUNT BISCUIT BOX IN PANEL. VERIFY PANEL LOCATION WITH SECURITY CONTRACTOR PRIOR TO INSTALLATION.

E305 PROVIDE (2) DATA CABLES FOR CONNECTION TO TEMPERATURE CONTROL PANEL. TERMINATE WITH SURFACE MOUNT BISCUIT BOX. COORDINATE EXACT LOCATION WITH PANEL.

E310 PROVIDE CABLE DROP-OUTS AT EACH LOCATION WHERE CABLES ENTER / EXIT CABLE RUNWAY.

E311 BOND LADDER RUNWAY TO COMMUNICATIONS GROUND BAR WITH GREEN INSULATED #6 AWG THHN.

E312 BOND EACH SECTION OF LADDER NOT BONDED WITH A FACTORY WELD, REMOVE POWDER COATING UNDER BONDING CONNECTION.

E313 PROVIDE TRIANGULAR SUPPORT KIT FOR EACH INSTANCE LADDER RUNWAY TERMINATES AT WALL, CPI PART#: 11746-712 OR APPROVED EQUAL.

E314 PROVIDE LADDER RUNWAY ADDITIONAL CORNER RADIUS, CPI PART#: 11959-724 OR APPROVED EQUAL.

E315 PROVIDE 12" HORIZONTAL LADDER RUNWAY, CPI PART#: 10250-712 OR APPROVED EQUAL.

E316 PROVIDE 12" VERTICAL LADDER CABLE RUNWAY FOR EACH INSTANCE CABLING DROPS VERTICALLY FROM CONDUITS / SLEEVES INTO HORIZONTAL RUNWAY, CPI PART#: 10250-712 OR APPROVED EQUAL.)

E317 PROVIDE WALL ANGLE SUPPORT KIT FOR EACH INSTANCE LADDER RUNWAY TERMINATES AT WALL, CPI#: 11421-712 OR APPROVED EQUAL.

E318 PROVIDE ONE (1) LADDER RUNWAY TRAPEZE SUPPORT BRACKET EVERY 5', CPI PART#: 34730-712. PROVIDE INDIVIDUAL SUPPORT FOR EACH END OF BRACKET.

E319 PROVIDE COMMUNICATIONS GROUND BAR, 72" A.F.F., SEE DETAIL A9/E501.

E320 STRUCTURED CABLING IN THIS AREA SHALL BE ROUTED BELOW RAISED FLOOR ON CABLE TRAY BELOW UNLESS OTHERWISE INDICATED. CABLE TRAY IN THIS AREA SHALL BE INSTALLED BELOW RAISED FLOOR.

E322 PROVIDE UNDER FLOOR TELECOMMUNICATIONS CONSOLIDATION POINT, CPI PART#A0622-RF. PROVIDE (1) 48 PORT PATCH PANEL FOR CONNECTION TO NETWORK. TERMINATE 48 DATA CABLES IN DESIGNATED TLECOMMUNICATIONS ROOM PATCH PANEL LOCATED IN DATA ROOM 121. SEE TELECOM ELEVATIONS FOR TERMINATION LOCATION.

E323 FOR ALL DATA CABLNG IN THIS ROOM; PROVIDE DATA CABLE FROM CONSOLIDATION POINT TO FURNITURE. ROUTE CABLING THROUGH FLOOR GROMMETS. TERMINATE CABLE TO FEMALE JACK IN FURNITURE. COORDINATE WITH FURNITURE MANUFACTURER.

E324 PROVIDE (1) DATA CABLE FOR CONNECTION TO OWNER PROVIDED SURVEILLANCE CAMERA. TERMINATE WITH SURFACE MOUNT BISCUIT BOX IN ACCESSIBLE CEILING. VERIFY LOCATION WITH SECURITY CONTRACTOR PRIOR TO INSTALLATION.

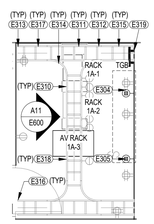
E327 INSTALL ONE DUCT DETECTOR IN EACH OF FOUR SUPPLY DUCTS SERVING EOC SPACE. INSTALL ONE DUCT DETECTOR IN RETURN DUCT. PROGRAM FIRE ALARM SYSTEM TO SHUT DOWN AIR HANDLER UPON ACTIVATION OF ANY DETECTOR PER NFPA REQUIREMENTS.

E328 INSTALL DUCT DETECTOR IN RETURN DUCT. PROGRAM FIRE ALARM SYSTEM TO SHUT DOWN AIR HANDLER UPON ACTIVATION OF ANY DETECTOR PER NFPA REQUIREMENTS.

E329 ROUTE DATA PATCH CORDS FROM BELOW FLOOR CONSOLIDATION POINTS TO OWNER PROVIDED WORKSTATIONS VIA FLOORBOX.

E330 PROVIDE ADDITIONAL CONTACT ON DOOR INDICATED. CONNECT TO EXISTING JUVENILE DETENTION FACILITY ACCESS CONTROL SYSTEM FOR DOOR MONITORING.

E331 PROVIDE (1) DATA CABLE TO LIGHTING CONTROL GATEWAY. TERMINATE WITH PLENUM RATED SURFACE BOX MOUNTED ON WALL ADJACENT TO GATEWAY. PROVIDE 1' PATCH CORD FOR CONNECTION TO GATEWAY.



A1 FLOOR PLAN - SPECIAL SYSTEMS
SCALE: 1/4" = 1'-0"

A13 ENLARGED FLOOR PLAN DATA 121 - SPECIAL SYSTEMS
SCALE: 1/4" = 1'-0"

REVISIONS:

DESIGN ARCHITECT: David E. Dubé
PROJECT ARCHITECT: Dwight Dahl
DRAWN BY: Jeff Hertle
ISSUED: November 3, 2017

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FLOOR PLAN - SPECIAL SYSTEMS

COUNTY BID # 17-282
SHA PROJECT # 17004

E300

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LIGHTING PANEL SCHEDULE

Panel: EOC
Rating: 225 A
Mounting: Surface
Type: MCB W/FEED THRU LUGS AND GND BAR
A.I.C. Rating: 10000
Voltage: 120/208 Wye
Phase: 3
Wire: 4
Remarks:

Circuit Description	OPT	R	P	CKT	A	B	C	CKT	P	R	OPT	Circuit Description
LTG - 119,120,121,122		20	1	1				2	1	20		REC - MECH 119, ELEC 120
LTG - 100,105,106,103,113,114		20	1	3				4	1	20		REC - DATA 121
LTG - 102,103,104,107		20	1	5				6	1	20		REC - DATA 121
LTG - 108,110, 111,112		20	1	7				8	1	20		REC - DATA 121
LTG - 115,116,117		20	1	9				10	1	20		REC - DATA RACK
LTG - 118 SOUTH		20	1	11				12	1	20		REC - DATA RACK
LTG - 118 NORTH		20	1	13				14	1	20		REC - CONFERENCE
SPARE	--	20	1	15				16	1	20		REC - CONFERENCE (TV)
REC - 100,105,106,108,113,114		20	1	17				18	1	20		REC - OFFICE 103
REC - OFFICE 102		20	1	19				20	1	20		REC - OFFICE 103 (TV)
REC - COPY 106		20	1	21				22	1	20		REC - OFFICE 104
REC - COPY 106		20	1	23				24	1	20		REC - OFFICE 107
REC - QUIET ROOM 110		20	1	25				26	1	20		REC - BREAK 109
REC - QUIET ROOM 110		20	1	27				28	1	20	G	REC - BREAK 109 (REFRIG)
EWC (114)	G	20	1	29				30	1	20		REC - BREAK 109 (COUNTER)
REC - EOC WEST WALL		20	1	31				32	1	20		REC - BREAK 109 (COUNTER)
REC - EOC EAST SOUTH WALL		20	1	33				34	1	20	G	REC - BREAK 109 (MICRO)
REC - EOC PLOTTER		20	1	35				36	1	20		REC - JK3, 115, 116, 117
REC - EOC COUNTER		20	1	37				38	1	0	--	SPARE
REC - EOC COUNTER		20	1	39				40	1	20		LOAD CLASSIFICATION
REC - EOC SOUTH WALL		20	1	41				42	1	20	L	FIRE SMOKE DAMPERS
REC - EOC TV / PROJ NORTH		20	1	43				44	1	20		REC - EOC FLOOR
REC - EOC TV / PROJ CENTER		20	1	45				46	1	20		REC - EOC FLOOR
REC - EOC TV / PROJ SOUTH		20	1	47				48	1	20		REC - EOC FLOOR
HP-1 (MECH 119)		60	3	49				50	1	20		REC - EOC FLOOR
				51				52	1	20		REC - EOC FLOOR
				53				54	1	20		REC - EOC FLOOR
REC - DATA RACK		20	1	55				56	1	20		REC - EOC FLOOR
REC - DATA RACK		20	1	57				58	1	20		REC - EOC FLOOR
REC - DATA RACK		20	1	59				60	1	20		REC - EOC FLOOR
REC - DATA RACK		20	1	61				62	1	20		EUH-1 (100)
TU-18 / TU-36 / BC-1 (EOC 115)		15	2	63				64	1	20		REC - OFFICE 102
				65				66				
AC-1 / ACCU-1 (MECH 119)		30	2	67				68	3	30		TF-1 / VFD (MECH 119)
				69				70				
REC - COPY 106		20	1	71				72	1	20	--	GENERATOR DRYER
REC - BREAK 109 (DISPOSAL)	G	20	1	73				74	1	20	--	GENERATOR CHARGER
REC - WORKROOM 113		20	1	75				76	1	20	--	GENERATOR HEATER
SPARE	--	20	1	77				78	1	20	--	GENERATOR RECP.
SPARE	--	0	1	79				80	1	0	--	SPARE
SPARE	--	0	1	81				82	1	0	--	SPARE
SPARE	--	0	1	83				84	1	0	--	SPARE

Notes:
G – GFCI type circuit breaker.
L – Locking handle type circuit breaker.
S – Shunt trip type circuit breaker.
G,S – Combination GFCI and shunt trip type circuit breaker.

LIGHTING CONTROL DEVICE SCHEDULE

SYMBOL	MANUFACTURER	CATALOG NUMBER	DESCRIPTION
	SENSORSWITCH	CM PDT 10	LOW VOLTAGE CEILING SENSOR, STAND ALONE TYPE.
$_{nCM,S}$	SENSORSWITCH	nCM PDT 9	STANDARD RANGE LOW VOLTAGE CEILING SENSOR, CONNECTED TO LIGHTING CONTROL NETWORK
	SENSORSWITCH	WSD PDT	LINE VOLTAGE SINGLE POLE WALL BOX OCCUPANCY SENSOR
$_{nWSX}$	SENSORSWITCH	nWSX PDT LV GY	LOW VOLTAGE WALL SWITCH OCCUPANCY SENSOR, CONNECTED TO LIGHTING CONTROL NETWORK
$_{nWSX,D}$	SENSORSWITCH	nWSX PDT LV DX GY	LOW VOLTAGE WALL SWITCH OCCUPANCY SENSOR W/ RAISE AND LOWER DIMMING CONTROL
PP$_{nPP}$	SENSORSWITCH	nPP 16	LIGHTING CONTROL NETWORK POWER PACK
$_{nPD}$	SENSORSWITCH	nPODM 2P DX	LIGHTING CONTROL NETWORK ENTRY STATION W/ ON AND OFF PUSH BUTTONS, AND RAISE/LOWER DIMMING CONTROL
$_{nPD}$	SENSORSWITCH	nPODM 4P DX	LIGHTING CONTROL NETWORK ENTRY STATION W/ FOUR BUTTON SCENE CONTROL, ON AND OFF PUSH BUTTONS, AND RAISE/LOWER DIMMING CONTROL

NOTES:
1. PRODUCTS LISTED INDICATE BASIS OF DESIGN PRODUCTS. REFER TO SPECIFICATIONS FOR ACCEPTABLE EQUIVALENT MANUFCATURERS.

LUMINAIRE SCHEDULE

MARK	DESCRIPTION	MANUFACTURER	CATALOG NUMBER	LIGHT SOURCE QTY.	LIGHT SOURCE SPECIFICATION	ELECTRICAL CCT	ELECTRICAL TYPE	ELECTRICAL WATTS	ELECTRICAL VOLTS	FINISH	MOUNTING	ACCEPTABLE MANUFACTURERS	REMARKS
1	2x2 VOLUMETRIC	LITHONIA	2FSL2 40L EZ1 LP835 N100	N/A	4000L	3500 K	LED	36 VA	120 V	WHITE	FLUSH	NOTE 1	
1A	2x2 VOLUMETRIC	LITHONIA	2FSL2 20L EZ1 LP835 N100	N/A	2000L	3500 K	LED	18 VA	120 V	WHITE	FLUSH	NOTE 1	
1AE	2x2 VOLUMETRIC	LITHONIA	2FSL2 20L EZ1 LP835 N100 EL14L	N/A	2000L	3500 K	LED	18 VA	120 V	WHITE	FLUSH	NOTE 1	EMERGENCY
1B	2x2 VOLUMETRIC	LITHONIA	2FSL2 33L EZ1 LP835 N100 EL14L	N/A	3300L	3500 K	LED	30 VA	120 V	WHITE	FLUSH	NOTE 1	
1E	2x2 VOLUMETRIC	LITHONIA	2FSL2 40L EZ1 LP835 N100 EL14L	N/A	4000L	3500 K	LED	36 VA	120 V	WHITE	FLUSH	NOTE 1	EMERGENCY
2	2x4 VOLUMETRIC	LITHONIA	2FSL4 48L EZ1 LP835 N100	N/A	4800L	3500 K	LED	47 VA	120 V	WHITE	FLUSH	NOTE 1	
3F	1x4 TROFFER	LITHONIA	TL4 40L FW A12 EZ1 LP835 DGA14	N/A	4000L	3500 K	LED	39 VA	120 V	WHITE	FLUSH	NOTE 1	FLANGE
4	4' STRIP	LITHONIA	ZL1N L48 5000LM FST MVOLT 35K 80CRI WH	N/A	5000L	3500 K	LED	34 VA	120 V	WHITE	SURFACE	NOTE 1	NOTE 4
5	6" DOWNLIGHT	GOTHAM	EVO 35/10 6AR WD LSS MVOLT EZ1	N/A	1000L	3500 K	LED	12 VA	120 V	SEMI SPEC	FLUSH	NOTE 2	
5E	6" DOWNLIGHT	GOTHAM	EVO 35/30 6AR WD LSS MVOLT EZ1 EL	N/A	1000L	3500 K	LED	12 VA	120 V	SEMI SPEC	FLUSH	NOTE 2	EMERGENCY
6	SINGLE FACE EXIT	LITHONIA	LE S 1 R EL N SD	N/A	-	-	LED	1 VA	120 V	BRUSHED AL	NOTE 3	NOTE 1	
7	6" SHOWER	GOTHAM	EVO 35 15 6 DFR MVOLT EZ1	N/A	1500L	3500 K	LED	18 VA	120 V	WHITE	FLUSH	NOTE 2	WET LOCATION
8	4" ASYMMETRIC	FOCAL POINT	FSM4AL FL 375LF 35K 1C UNV LD1 G1 WH 12'	N/A	375L	3500 K	LED	60 VA	120 V	WHITE	FLUSH	NOTE 5	
8A	4" ASYMMETRIC	FOCAL POINT	FSM4AL FL 375LF 35K 1C UNV LD1 G1 WH 8'	N/A	375L	3500 K	LED	40 VA	120 V	WHITE	FLUSH	NOTE 5	
9	6" CYLINDER	GOTHAM	EVO CYL 35/15 6AR WD LSS MVOLT EZ1 ACC DWHG	N/A	1500L	3500 K	LED	18 VA	120 V	WHITE	AIRCRAFT CBL	NOTE 2	
9E	6" CYLINDER	GOTHAM	EVO CYL 35/15 6AR WD LSS MVOLT EZ1 ACC DWHG	N/A	1500L	3500 K	LED	18 VA	120 V	WHITE	AIRCRAFT CBL	NOTE 2	EMERGENCY
10	WALL SCONCE	LITHONIA	WST LED P1 40K VW MVOLT DBLXD	N/A	1500L	4000 K	LED	12 VA	120 V	BLACK	WALL	NOTE 1	
10E	WALL SCONCE	LITHONIA	WST LED P1 40K VW MVOLT DBLXD	N/A	1500L	4000 K	LED	12 VA	120 V	BLACK	WALL	NOTE 1	EMERGENCY

GENERAL REQUIREMENTS

A.CONTRACTOR SHALL VERIFY CATALOG NUMBERS AND INSTALLATION REQUIREMENTS PRIOR TO ORDERING. NOTIFY ENGINEER OF ANY CONFLICTS WITH PROPOSED INSTALLATION.
B.LIGHT SOURCE TYPES: F = FLUORESCENT, CF = COMPACT FLUORESCENT, H = INCANDESCENT/HALOGEN, HID = HIGH INTENSITY DISCHARGE, LED = LIGHT EMITTING DIODE.
C. UNLESS NOTED OTHERWISE, REFER TO PLANS FOR SUSPENSION LENGTHS REQUIRED FOR ALL SUSPENDED LUMINAIRES.

LUMINAIRE SCHEDULE NOTES:

1. LUMINAIRE SHALL BE CONSIDERED EQUAL AS MANUFACTURED BY: ACUITY BRANDS, HUBBELL, COOPER, OR PHILIPS LIGHTING.
2. LUMINAIRE SHALL BE CONSIDERED EQUAL AS MANUFACTURED BY: GOTHAM, PATHWAY, PRESCOLITE, OR COOPER PORTFOLIO.
3. REFER TO PLANS FOR MOUNTING REQUIREMENTS SUCH AS WALL MOUNT, END MOUNT, CEILING MOUNT AND PROVIDE LUMINAIRES ACCORDINGLY. PROVIDE DIRECTIONAL CHEVRON ARROWS AS INDICATED ON PLANS.
4. CHAIN HANG LUMINAIRE. COORDINATE MOUNTING TO AVOIDE DUCTWORK, STRUCTURAL ELEMENTS, ETC.
5. LUMINAIRE SHALL BE CONSIDERED EQUAL AS MANUFACTURED BY: LUMENWERX, ALIGHT.

ELECTRIC HEAT SCHEDULE

MARK	MANUFACTURER	CATALOG NUMBER	WATTS	VOLTAGE	PHASE	LENGTH	REMARKS
EUH-1	QMARK	AWH3180F	1800 VA	120 V	1		NOTE 1

NOTES:
1. PROVIDE WITH INTEGRAL SERVICE DISCONNECT, THERMOSTAT AND ALL HARDWARE ACCESSORIES TO RECESS MOUNT IN GYP WALL. COORDINATE FINISH OF HEATER WITH ARCHITECT PRIOR TO ORDERING. INSTALL PER MANUFACTURER'S RECOMMENDATIONS. INTERNAL DISCONNECT IS TO BE RATED FOR CURRENT PER MANUFACTURER'S RECOMMENDATIONS.

DRY-TYPE TRANSFORMER SCHEDULE

Mark	kVA	Primary Voltage	Secondary Voltage	Grounding	Remarks
TEOC	75KVA	480V	208/120	#2G - 3/4"C.	GP (NOTE 1)

NOTE:
1. TRANSFORMER TYPE DESCRIPTION: GP = GENERAL PURPOSE

ELECTRICAL SYMBOLS

SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
	LIGHTING		
	FLUORESCENT FIXTURE		POLE FIXTURE(S)
x	NUMBER DENOTES FIXTURE TYPE. SEE CORRESPONDING NUMBER IN FIXTURE SCHEDULE		BOLLARD FIXTURE
	SHADING DENOTES FIXTURE CONNECTED TO EMERGENCY CIRCUIT OR WITH BATTERY	S	SINGLE POLE SWITCH
	FLUORESCENT STRIP FIXTURE	S$_D$	DOUBLE POLE SWITCH
	WALL BRACKET FIXTURE	S$_3$	3 - WAY SWITCH
		S$_4$	4 - WAY SWITCH
	CEILING FIXTURE	S$_{MC}$	MOMENTARY CONTACT SWITCH
	WALL FIXTURE	S	WALL BOX DIMMER SWITCH (NUMBER INDICATES WATTAGE: "6"-600W, "10"-1000W, "15"-1500W, "20"-2000W)
	TRACK FIXTURE		
	EMERGENCY BATTERY PACK		EXISTING MOUNTED MOTION SENSOR/SWITCH
	CEILING MOUNTED EXIT LIGHT WITH DIRECTIONAL ARROW - NUMBER INDICATES FIXTURE NUMBER IN SCHEDULE		WALL MOUNTED MOTION SENSOR/SWITCH
			ENTRY STATION, WALL SWITCH(ES)
	WALL OR END MOUNTED EXIT LIGHT WITH DIRECTIONAL ARROW - NUMBER INDICATES FIXTURE NUMBER IN SCHEDULE		OCCUPANCY SENSOR POWER PACK
	FIRE ALARM		
	FIRE ALARM SMOKE DETECTOR		FIRE ALARM HORN & STROBE COMBINATION
	FIRE ALARM HEAT DETECTOR		CEILING FIRE ALARM HORN & STROBE COMBINATION
	DUCT MOUNTED SMOKE DETECTOR		FIRE ALARM MINI-HORN & STROBE COMBINATION
	FIRE ALARM MANUAL PULL STATION		CEILING FIRE ALARM STROBE
	FIRE SPRINKLER VALVE TAMPER SWITCH		WALL FIRE ALARM STROBE
	FIRE SPRINKLER FLOW SWITCH		CEILING FIRE ALARM SPEAKER & STROBE
	FIRE ALARM CONTROL PANEL		WALL FIRE ALARM SPEAKER & STROBE COMBINATION
	FIRE ALARM ANNUNCIATOR PANEL		FIRE ALARM BELL
	FIRE ALARM MAGNETIC DOOR HOLDER		CEILING FIRE ALARM SPEAKER
	FIRE FIGHTERS PHONE JACK		WALL FIRE ALARM SPEAKER
	POWER		
	DUPLEX RECEPTACLE		FLOOR BOX - COMBINATION POWER & TELEPHONE
	"G" DENOTES GFCI TYPE		FLOOR BOX - COMBINATION POWER AND DATA
	TRIANGLE DENOTES ISOLATED GROUND TYPE		FLOOR BOX - COMBINATION POWER, TELEPHONE & DATA
	"H" DENOTES HOSPITAL GRADE TYPE		WALL CLOCK HANGER OUTLET
	"TR" DENOTES TAMPER RESISTANT TYPE		MULTI-OUTLET ASSEMBLY - LENGTH AS INDICATED
	DOUBLE SHADING DENOTES RED DEVICE		MOTOR - NUMBER DENOTES HORSEPOWER
	SINGLE SHADING DENOTES SPLIT WIRED DEVICE		DISCONNECT SWITCH
	HORIZONTAL MOUNTED DUPLEX RECEPTACLE		THERMAL ELEMENT SWITCH
	CEILING MOUNTED DUPLEX RECEPTACLE		SWITCH & FUSE
	FLOOR MOUNTED DUPLEX RECEPTACLE		SWITCH & FUSETAP
	DOUBLE DUPLEX RECEPTACLE		COMBINATION MAGNETIC STARTER/DISCONNECT
	SINGLE RECEPTACLE		MOTOR CONTROL PUSHBUTTON STATION
	DRYER RECEPTACLE NEMA 14-50 (125/250V 30A)		RELAY
	RANGE RECEPTACLE NEMA 14-50 (125/250V 50A)		
	WELDER RECEPTACLE NEMA 6-50 (250V 50A)		
	SPECIAL PURPOSE RECEPTACLE (NEMA CONFIG. AS NOTED)		
	COMMUNICATION		
	TELEPHONE OUTLET		CEILING SPEAKER
	DATA OUTLET		WALL SPEAKER
	COMBINATION TELEPHONE/DATA OUTLET		WALL MICROPHONE OUTLET
	FLOOR TELEPHONE OUTLET		FLOOR MICROPHONE OUTLET
	FLOOR DATA OUTLET		VOLUME CONTROL
	FLOOR COMBINATION TELEPHONE/DATA OUTLET		CALL SWITCH
	TELEVISION/VIDEO OUTLET		INTERCOM OUTLET
	1" CONDUIT SLEEVE UNLESS NOTED ON PLANS		INTERCOM CONTROL PANEL
	SECURITY		
	CEILING MOUNTED SECURITY MOTION DETECTOR		VIDEO CAMERA ("M" INDICATES WALL MOUNTED)
	WALL MOUNTED SECURITY MOTION DETECTOR		SECURITY CARD READER
	DOOR POSITION SWITCH		SECURITY CONTROL PANEL
	GENERAL		
	LIGHTING PANEL		WALL MOUNTED JUNCTION BOX
	DISTRIBUTION PANEL		JUNCTION BOX ("F" INDICATES FLOOR, "C" INDICATES CEILING)
	TELEPHONE TERMINAL CABINET		PHOTOCELL
	BRANCH CIRCUIT EXPOSED		CONDUIT SEAL
	BRANCH CIRCUIT CONCEALED IN CEILING OR WALL		CIRCUIT DOWN
	BRANCH CIRCUIT CONCEALED IN FLOOR		CIRCUIT UP
	HOMERUN TO PANEL (QUANTITY OF ARROWS INDICATES QUANTITY OF CIRCUITS)		CONDUIT STUB-OUT
	SPECIAL PURPOSE HOMERUN AS INDICATED		CIRCUIT BREAK
T	THERMOSTAT	C	CHIME
B	BUZZER	BELL	BELL
(TYP.)	WHERE (TYP.) IS USED ON PLANS INDICATES A TYPICAL NOTE OR CONDITION		PUSH BUTTON
EP	SUBSCRIPT "EP" APPLIED TO ANY SYMBOL INDICATES EXPLOSION PROOF CLASS GROUP & DIVISION AS NOTED	RT	SUBSCRIPT "RT" APPLIED TO ANY SYMBOL INDICATES RAINTIGHT NEMA 3-R EQUIVALENT
WP	SUBSCRIPT "WP" APPLIED TO ANY SYMBOL INDICATES WEATHERPROOF NEMA TYPE 4 OR EQUIVALENT	PD	SUBSCRIPT "PD" APPLIED TO ANY FLOOR OUTLET INDICATES PEDESTAL MOUNTED
E	SUBSCRIPT "E" ADDED TO ANY SYMBOL INDICATES EXISTING	P	SUBSCRIPT "P" ADDED TO ANY SYMBOL INDICATES PILOT LIGHT
K	SUBSCRIPT "K" ADDED TO ANY SYMBOL INDICATES KEY OPERATED	DL	SUBSCRIPT "DL" ADDED TO ANY SYMBOL INDICATES DAMP LOCATION

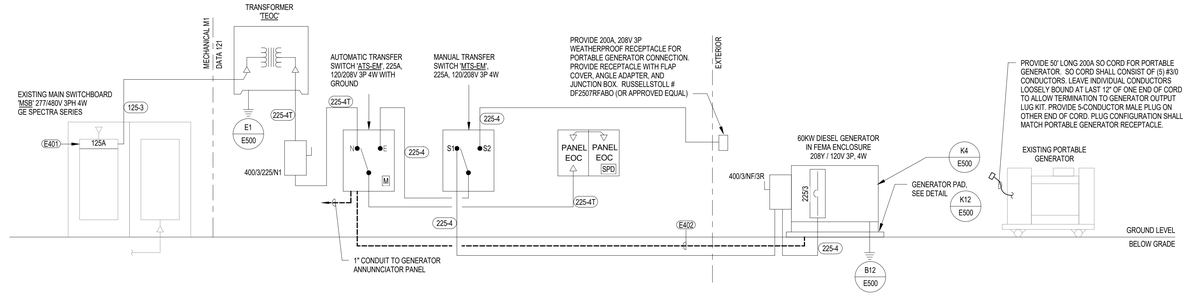
KEYNOTES

E401 PROVIDE 125A, LOCKABLE 3-POLE CIRCUIT BREAKER IN EXISTING SWITCHBOARD, 'MSB' FOR CONNECTION TO TRANSFORMER. PROVIDE LOCATION INFORMATION ON TRANSFORMER 'TEOC' PER NFPA 450.14.

E402 PROVIDE (2) 1" CONDUITS TO TRANSFER SWITCH FOR CONTROL WIRING. PROVIDE CONTROL WIRING BETWEEN ATS AND GENERATOR AS REQUIRED.

FEEDER SCHEDULE

FEEDER	WIRE AND CONDUIT
125-3	3-#1, #6 G - 1-1/2"C.
225-4	4-#4/0, #4 G - 2-1/2"C.
225-4T	4-#4/0, #2 G - 2-1/2"C.



D8 ELECTRICAL RISER DIAGRAM
SCALE: NO SCALE

REVISIONS:	

DESIGN ARCHITECT: David E. Dubbe
PROJECT ARCHITECT: Bryan Headley
DRAWN BY: Jeff Hemje
ISSUED: November 3, 2017

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ELECTRICAL SCHEDULES

COUNTY BID #	17-282
SHA PROJECT #	17004

E400

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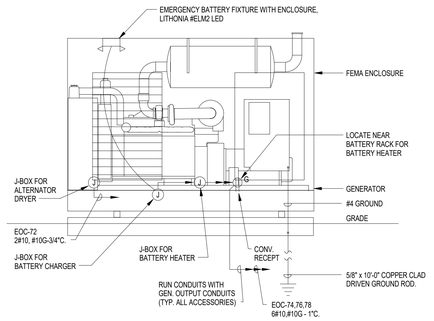
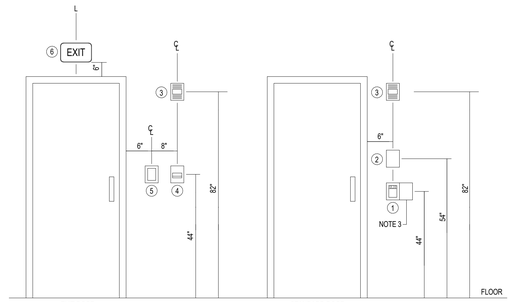


K4 GENERATOR CONNECTION DETAIL

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



NOTES:

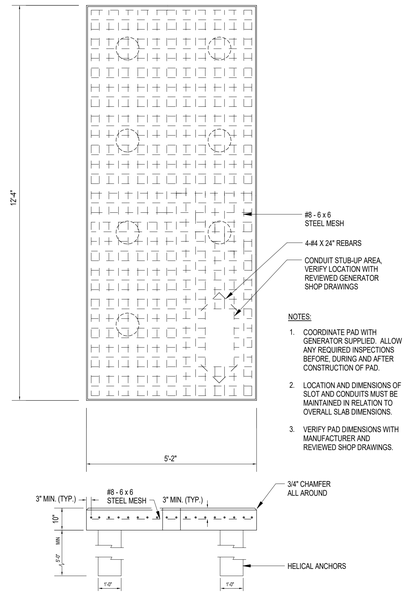
1. ALIGN DEVICES VERTICALLY AND HORIZONTALLY WHEREVER POSSIBLE.
2. NOT ALL DEVICE CONFIGURATIONS AND LOCATIONS ARE DEPICTED ON THIS DETAIL. ADDITIONAL CONFIGURATIONS MAY BE REQUIRED AND SHOULD BE COORDINATED WITH THE ENGINEER PRIOR TO ROUGH-IN. SEE FLOOR PLANS FOR INDIVIDUAL DOOR REQUIREMENTS.
3. WHERE MULTIPLE SWITCHES OR WALL BOX DIMMERS ARE GANGED TOGETHER, ALIGN FIRST GANG WITH DEVICES ABOVE AND ADD DEVICES TO THE RIGHT AS REQUIRED.
4. HORIZONTAL DIMENSIONS ARE TO BE MEASURED FROM OUTSIDE EDGE OF DOOR FRAME OR TRIM. WHERE SIDE LIGHT WINDOWS ARE PROVIDED AT DOORS, DIMENSIONS SHOULD BE MEASURED FROM OUTSIDE EDGE OR TRIM OF SIDE LIGHT WINDOW.

DEVICES

1. OCCUPANCY SENSOR, WALL SWITCH, OR WALL BOX DIMMER
2. THERMOSTAT ROUGH-IN
3. FIRE ALARM AUDIO/VISUAL INDICATING DEVICE
4. FIRE ALARM PULLSTATION
5. ACCESS CONTROL CARD READER ROUGH-IN
6. EXIT LIGHT

K8 DEVICE ALIGNMENT DETAIL

SCALE: NO SCALE

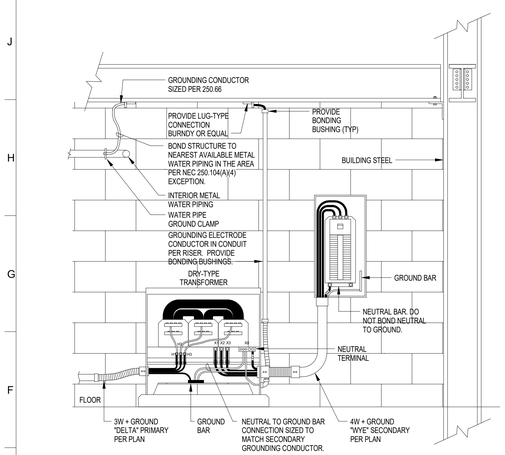


NOTES:

1. COORDINATE PAD WITH GENERATOR SUPPLIED. ALLOW ANY REQUIRED INSPECTIONS BEFORE, DURING AND AFTER CONSTRUCTION OF PAD.
2. LOCATION AND DIMENSIONS OF SLOT AND CONDUITS MUST BE MAINTAINED IN RELATION TO OVERALL SLAB DIMENSIONS.
3. VERIFY PAD DIMENSIONS WITH MANUFACTURER AND REVIEWED SHOP DRAWINGS.

K12 GENERATOR PAD

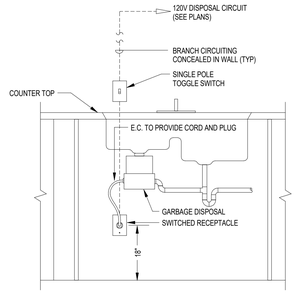
SCALE: NO SCALE



NOTE: PHYSICAL LAYOUT SHOULD BE DETERMINED FROM FLOOR PLAN DRAWINGS AND FIELD DIMENSIONS.

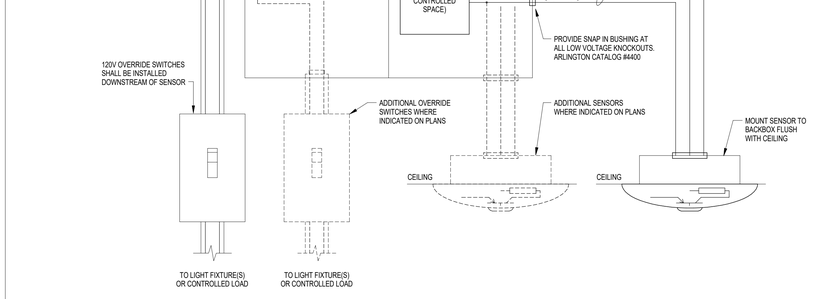
E1 DRY-TYPE TRANSFORMER GROUNDING DETAIL

SCALE: NOT TO SCALE



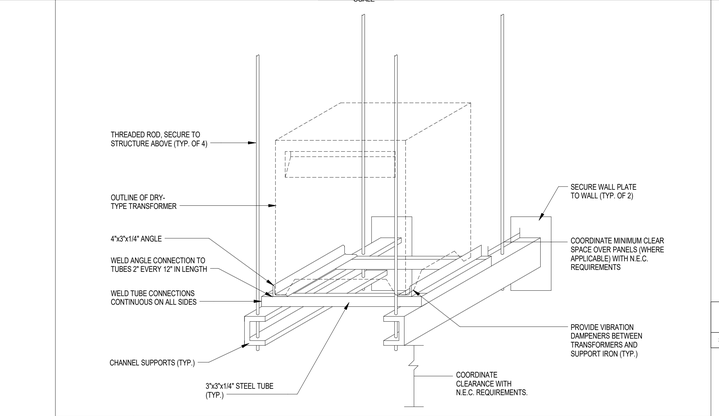
E5 DISPOSAL CONNECTION DETAIL

SCALE: NOT TO SCALE



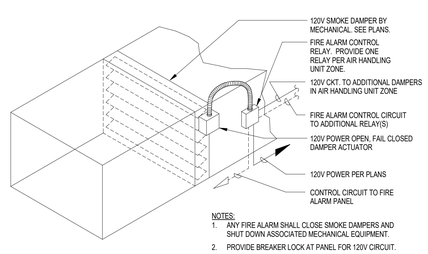
E11 TYPICAL STAND ALONE TYPE OCCUPANCY SENSOR ROOM CONNECTION DETAIL

SCALE: NO SCALE



A3 TRANSFORMER MOUNTING DETAIL (SUSPENDED)

SCALE: NOT TO SCALE

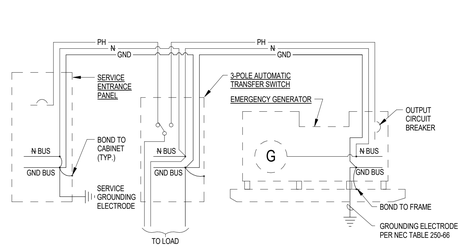


NOTES:

1. ANY FIRE ALARM SHALL CLOSE SMOKE DAMPERS AND SHUT DOWN ASSOCIATED MECHANICAL EQUIPMENT.
2. PROVIDE BREAKER LOCK AT PANEL FOR 120V CIRCUIT.
3. VERIFY AIR HANDLING UNIT ZONES WITH MECHANICAL.

B8 FIRE/SMOKE DAMPER CONNECTION DETAIL

SCALE: NO SCALE



B12 GENERATOR GROUNDING WITH 3-POLE A.T.S. DETAIL

SCALE: NO SCALE

DESIGN ARCHITECT: David E. Ouse
PROJECT ARCHITECT: Dwight Carey
DRAWN BY: Jeff Herrle
ISSUED: November 3, 2017
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Lancaster County
Emergency Management Relocation / Renovation

ELECTRICAL DETAILS

COUNTY BID # 17-282
SHA PROJECT # 17004

E500

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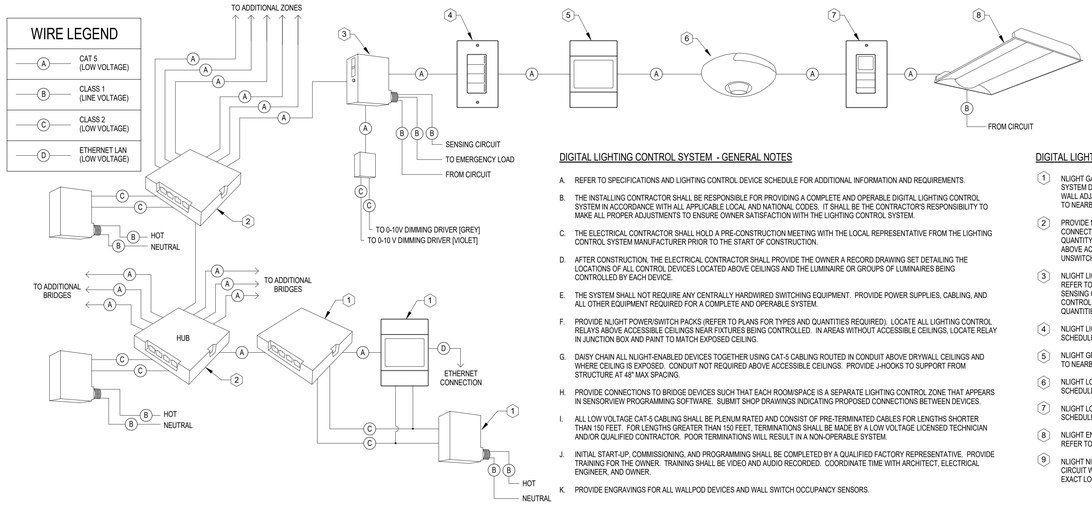
L1 TYPICAL LIGHTING CONTROL DIAGRAM

SCALE: NO SCALE



DIGITAL LIGHTING CONTROL SYSTEM - GENERAL NOTES

A. REFER TO SPECIFICATIONS AND LIGHTING CONTROL DEVICE SCHEDULE FOR ADDITIONAL INFORMATION AND REQUIREMENTS.

B. THE INSTALLING CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING A COMPLETE AND OPERABLE DIGITAL LIGHTING CONTROL SYSTEM IN ACCORDANCE WITH ALL APPLICABLE LOCAL AND NATIONAL CODES. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO MAKE ALL PROPER ADJUSTMENTS TO ENSURE OWNER SATISFACTION WITH THE LIGHTING CONTROL SYSTEM.

C. THE ELECTRICAL CONTRACTOR SHALL HOLD A PRE-CONSTRUCTION MEETING WITH THE LOCAL REPRESENTATIVE FROM THE LIGHTING CONTROL SYSTEM MANUFACTURER PRIOR TO THE START OF CONSTRUCTION.

D. AFTER CONSTRUCTION, THE ELECTRICAL CONTRACTOR SHALL PROVIDE THE OWNER A RECORD DRAWING SET DETAILING THE LOCATIONS OF ALL CONTROL DEVICES LOCATED ABOVE CEILINGS AND THE LUMINAIRE OR GROUPS OF LUMINAIRES BEING CONTROLLED BY EACH DEVICE.

E. THE SYSTEM SHALL NOT REQUIRE ANY CENTRALLY HARDWIRED SWITCHING EQUIPMENT. PROVIDE POWER SUPPLIES, CABLING, AND ALL OTHER EQUIPMENT REQUIRED FOR A COMPLETE AND OPERABLE SYSTEM.

F. PROVIDE NLIGHT POWER/SWITCH PACKS (REFER TO PLANS FOR TYPES AND QUANTITIES REQUIRED). LOCATE ALL LIGHTING CONTROL RELAYS ABOVE ACCESSIBLE CEILINGS NEAR FIXTURES BEING CONTROLLED. IN AREAS WITHOUT ACCESSIBLE CEILINGS, LOCATE RELAY IN JUNCTION BOX AND PAINT TO MATCH EXPOSED CEILING.

G. DAISY CHAIN ALL NLIGHT-ENABLED DEVICES TOGETHER USING CAT-5 CABLING ROUTED IN CONDUIT ABOVE DRYWALL CEILINGS AND WHERE CEILING IS EXPOSED. CONDUIT NOT REQUIRED ABOVE ACCESSIBLE CEILINGS. PROVIDE J-HOOKS TO SUPPORT FROM STRUCTURE AT 48" MAX SPACING.

H. PROVIDE CONNECTIONS TO BRIDGE DEVICES SUCH THAT EACH ROOM/SPACE IS A SEPARATE LIGHTING CONTROL ZONE THAT APPEARS IN SENSORVIEW PROGRAMMING SOFTWARE. SUBMIT SHOP DRAWINGS INDICATING PROPOSED CONNECTIONS BETWEEN DEVICES.

I. ALL LOW VOLTAGE CAT-5 CABLING SHALL BE PLENUM RATED AND CONSIST OF PRE-TERMINATED CABLES FOR LENGTHS SHORTER THAN 150 FEET. FOR LENGTHS GREATER THAN 150 FEET, TERMINATIONS SHALL BE MADE BY A LOW VOLTAGE LICENSED TECHNICIAN AND/OR QUALIFIED CONTRACTOR. POOR TERMINATIONS WILL RESULT IN A NON-OPERABLE SYSTEM.

J. INITIAL START-UP, COMMISSIONING, AND PROGRAMMING SHALL BE COMPLETED BY A QUALIFIED FACTORY REPRESENTATIVE. PROVIDE TRAINING FOR THE OWNER. TRAINING SHALL BE VIDEO AND AUDIO RECORDED. COORDINATE TIME WITH ARCHITECT, ELECTRICAL ENGINEER, AND OWNER.

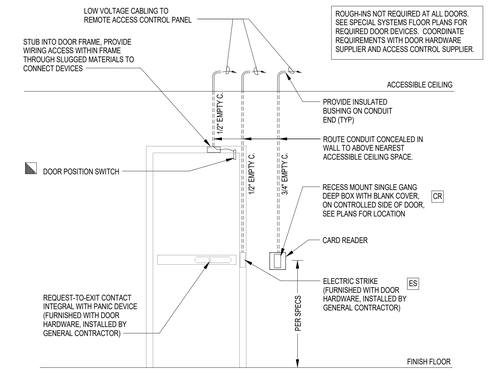
K. PROVIDE ENGRAVINGS FOR ALL WALLPOD DEVICES AND WALL SWITCH OCCUPANCY SENSORS.

DIGITAL LIGHTING CONTROL SYSTEM - KEYNOTES

1. NLIGHT GATEWAY DEVICE WITH POWER SUPPLIES AS REQUIRED TO ACCESS AND CONTROL CONNECTED SYSTEM DEVICES. CONNECT GATEWAY TO BUILDING LOCAL AREA NETWORK. PROVIDE DATA OUTLET ON WALL ADJACENT TO GATEWAY. REFER TO PLANS FOR LOCATION OF DEVICES. CONNECT POWER SUPPLIES TO NEARBY UNSWITCHED CIRCUIT.
2. PROVIDE NLIGHT BRIDGE DEVICES AS REQUIRED TO ROUTE COMMUNICATION AND DISTRIBUTE POWER TO ALL CONNECTED SYSTEM DEVICES. BRIDGES SHALL BE CONNECTED WITH CAT-5 CABLING TO GATEWAY. QUANTITY OF BRIDGE DEVICES TO BE DETERMINED BY SYSTEM MANUFACTURER. LOCATE BRIDGE DEVICE(S) ABOVE ACCESSIBLE CEILING NEAR AREAS BEING SERVED. CONNECT POWER SUPPLIES TO NEARBY UNSWITCHED CIRCUITS.
3. NLIGHT LIGHTING CONTROL NETWORK LOAD CONTROLLER. CONNECT TO LUMINAIRES INDICATED ON PLANS. REFER TO LIGHTING CONTROL DEVICE SCHEDULE FOR ADDITIONAL INFORMATION ABOUT TYPE. PROVIDE SENSING CONNECTION AS REQUIRED FOR OPERATION OF UL924 EMERGENCY DEVICES. PROVIDE 0-10V CONTROL WIRING TO ALL LUMINAIRES CONTROLLED BY 0-10V DIMMING DEVICES. REFER TO PLANS FOR QUANTITIES AND APPROXIMATE LOCATIONS.
4. NLIGHT LIGHTING CONTROL NETWORK PUSH-BUTTON WALLPOD. REFER TO LIGHTING CONTROL DEVICE SCHEDULE FOR ADDITIONAL INFORMATION ABOUT TYPE. REFER TO PLANS FOR LOCATIONS AND QUANTITIES.
5. NLIGHT GRAPHIC WALLPOD. REFER TO PLANS FOR LOCATIONS AND QUANTITIES. CONNECT POWER SUPPLY TO NEARBY UNSWITCHED CIRCUIT.
6. NLIGHT LOW VOLTAGE CEILING MOUNTED OCCUPANCY SENSOR. REFER TO LIGHTING CONTROL DEVICE SCHEDULE FOR ADDITIONAL INFORMATION ABOUT TYPE. REFER TO PLANS FOR LOCATIONS AND QUANTITIES.
7. NLIGHT LOW VOLTAGE WALL OCCUPANCY SENSOR SWITCH. REFER TO LIGHTING CONTROL DEVICE SCHEDULE FOR ADDITIONAL INFORMATION ABOUT TYPE. REFER TO PLANS FOR LOCATIONS AND QUANTITIES.
8. NLIGHT ENABLED LUMINAIRE. REFER TO LUMINAIRE SCHEDULE FOR ADDITIONAL INFORMATION ABOUT TYPE. REFER TO PLANS FOR LOCATIONS AND QUANTITIES.
9. NLIGHT NIO PC KIT WITH OUTDOOR PHOTOCELL. CONNECT POWER SUPPLY TO NEARBY UNSWITCHED 120V CIRCUIT WITH ADEQUATE CAPACITY. REFER TO PLANS FOR LOCATIONS AND QUANTITIES - COORDINATE EXACT LOCATION OF PHOTOCELL WITH ARCHITECT (FACING NORTH).

L13 ACCESS CONTROL DETAIL - ELECTRIC STRIKE

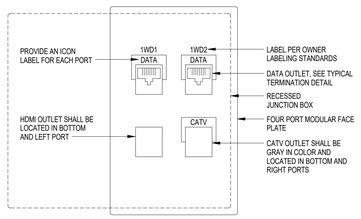
SCALE: NO SCALE



NOTES:
1. NOT ALL DEVICES ROUGHED IN AT ALL DOORS, SEE PLANS FOR SPECIFIC DOOR ROUGH-IN REQUIREMENTS.
2. COORDINATE ACCESS CONTROL ROUGH-IN REQUIREMENTS WITH ARCHITECTURAL DOOR SCHEDULES.
3. COORDINATE ACCESS CONTROL ROUGH-IN REQUIREMENTS WITH SECURITY EQUIPMENT SUPPLIER.

G1 STANDARD DATA OUTLET

SCALE: NO SCALE

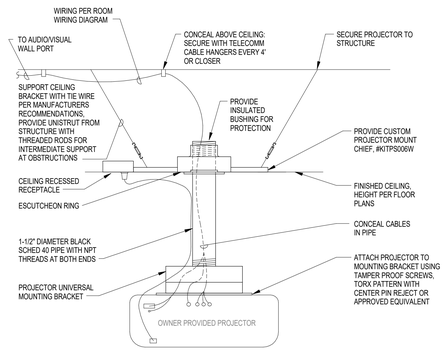


EXAMPLE CABLE COUNTS (ADDITIONAL COMBINATIONS PER DRAWINGS):
- 1D = 1 DATA OUTLET, 3 BLANKS
- 2D = 2 DATA OUTLETS, 2 BLANKS
- 4D = 4 DATA OUTLETS
- TV = 1 DATA OUTLET, 1 COAX OUTLET, 2 BLANKS

JACK COLOR SCHEDULE (COORDINATE LOCATIONS WITH OWNER/ENGINEER):
DATA - BLUE
VOICE - WHITE

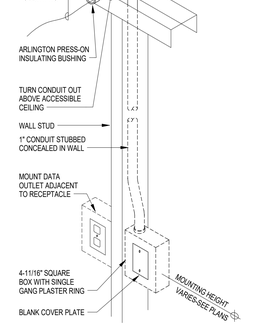
G5 TYPICAL PROJECTOR MOUNTING DETAIL

SCALE: NO SCALE



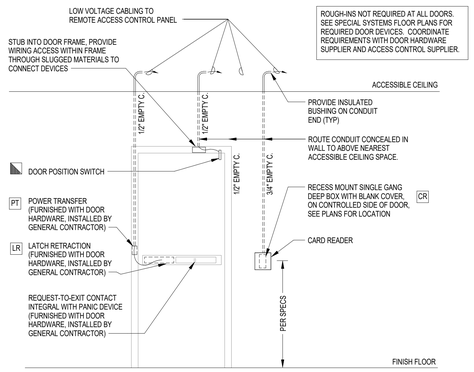
D9 DATA/COMM ROUGH-IN DETAIL

SCALE: NO SCALE



F13 ACCESS CONTROL DETAIL - LATCH RETRACTION

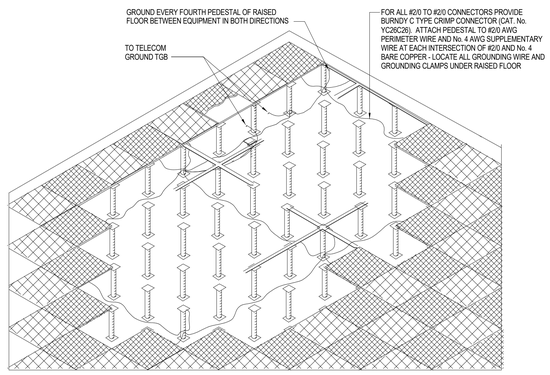
SCALE: NO SCALE



NOTES:
1. NOT ALL DEVICES ROUGHED IN AT ALL DOORS, SEE PLANS FOR SPECIFIC DOOR ROUGH-IN REQUIREMENTS.
2. COORDINATE ACCESS CONTROL ROUGH-IN REQUIREMENTS WITH ARCHITECTURAL DOOR SCHEDULES.
3. COORDINATE ACCESS CONTROL ROUGH-IN REQUIREMENTS WITH SECURITY EQUIPMENT SUPPLIER.

A4 SIGNAL REFERENCE GROUNDING GRID

SCALE: NO SCALE

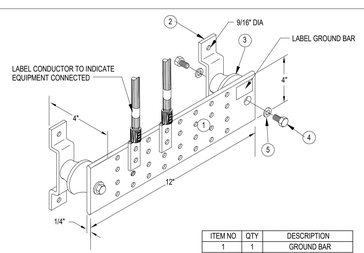


SIGNAL REFERENCE GROUNDING GRID NOTES

1. PROVIDE THE GROUNDING CONDUCTORS, CONNECTORS, AND CONNECTIONS TO THE RAISED FLOOR IN ACCORDANCE WITH THE RAISED FLOOR GROUNDING DETAIL AS SHOWN.
2. PROVIDE A #2/0 AWG BARE, STRANDED COPPER CONDUCTOR FOR THE PERIMETER RING AROUND THE RAISED FLOOR WITH TWO CONNECTIONS AT THE GROUND BAR.
3. PROVIDE A SUPPLEMENTARY SYSTEM OF #4 AWG BARE, STRANDED, COPPER, CONDUCTORS INSIDE THE PERIMETER, CONNECTED TO EVERY 4TH PEDESTAL.
4. AT EACH INTERFACE OF THE #2/0 PERIMETER AND #4 SUPPLEMENTARY CONDUCTORS, CONNECT BOTH CONDUCTORS TO RAISED FLOOR PEDESTAL VIA A BURNDY TYPE GP-G1, U CLAMP.
5. PROVIDE CONNECTION BETWEEN THE RAISED FLOOR GROUND BUS BAR AND THE PERIMETER #2/0 CONDUCTOR. PROVIDE CONNECTING CONDUCTORS OF #2/0 AWG BARE STRANDED COPPER. CRIMP-CONNECT CONDUCTORS USING BURNDY C TAP CRIMP (No. YC26C26 OR APPROVED EQUAL) TO THE #2/0 AWG PERIMETER CONDUCTOR. CRIMP-CONNECT TWO HOLE, PAD TYPE CONNECTORS TO THE BUS BAR.
6. BOND FLOOR MOUNTED AIR CONDITIONER FRAMES AND RX FRAMES TO THE #2/0 PERIMETER CONDUCTOR VIA A #4 AWG, STRANDED COPPER CONDUCTOR BURNDY C TAP CRIMP (No. YC26C26 OR APPROVED EQUAL).
7. LOCATE ALL GROUNDING CONDUCTORS AND CONNECTORS IN THE LOWER PLENUM COMPARTMENT OF THE RAISED FLOOR (TO THE EXTENT POSSIBLE).
8. REMOVE ALL PAINT AROUND PERIMETER OF PEDESTAL AT THE POINT WHERE GROUND CONNECTORS AND CONDUCTORS ARE ATTACHED TO THE PEDESTAL.
9. BOND ALL UNDERFLOOR METALLIC CONDUITS, CABLE TRAY, OR OTHER CONDUCTING STRUCTURES TO THE RAISED FLOOR GROUNDING SYSTEM AT THEIR POINTS OF ENTRY INTO THE RAISED FLOOR AREA.
10. ALL GROUNDING CONDUCTORS UNDER THE RAISED FLOOR SHALL BE BARE COPPER.
11. EXOTHERMICALLY BOND ALL INTERIOR STEEL BUILDING COLUMNS TO RAISED FLOOR PEDESTAL WITH #2/0 AWG COPPER CONDUCTOR UNDER RAISED FLOOR.
12. PROVIDE A GROUNDING WIRE TO EACH FLOOR BOX.

A9 TELECOMMUNICATIONS GROUND BAR

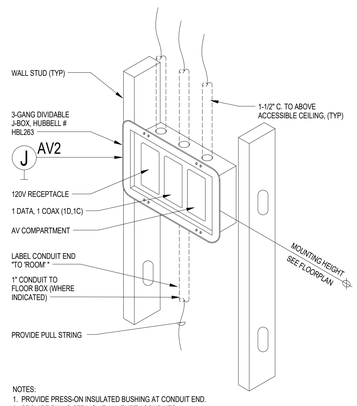
SCALE: NO SCALE



ITEM NO	QTY	DESCRIPTION
1	1	GROUND BAR
2	2	WALL MTG. BRACKET
3	2	INSULATOR
4	4	5/8-11 X 1 HHCS
5	4	5/8 LOCKWASHER

A13 TELEVISION POWER AND A/V ROUGH-IN

SCALE: NO SCALE



NOTES:
1. PROVIDE PRESS-ON INSULATED BUSHING AT CONDUIT END.
2. PROVIDE PULLS-STRING AT ALL EMPTY CONDUITS.
3. SEE FLOORPLAN FOR MOUNTING HEIGHT OF DEVICES.

REVISIONS:

DESIGN ARCHITECT: David E. Ouse
PROJECT ARCHITECT: Dwight Carr
DRAWN BY: Jeff Hertle
ISSUED: November 3, 2017

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Lancaster County
Emergency Management Relocation / Renovation

ELECTRICAL DETAILS

COUNTY BID # 17-282
SHA PROJECT # 17004

E501

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RACK 1A-1

RACK RU	PART NUMBER	DESCRIPTION
1	PANDUIT, FRME1U	RACK MOUNT OPTICAL FIBER ENCLOSURE, 1RU
2	PANDUIT, DP24688TGY	24-PORT CAT 6 PATCH PANEL, 1RU
3	PANDUIT, NM2	HIGH CAPACITY HORIZONTAL CABLE MANAGER, 2RU
4	-	
5	PANDUIT, DP48688TGY	48-PORT CAT 6 PATCH PANEL, 2RU
6	-	
7	PANDUIT, NM2	HIGH CAPACITY HORIZONTAL CABLE MANAGER, 2RU
8	-	
9	PANDUIT, DP48688TGY	48-PORT CAT 6 PATCH PANEL, 2RU
10	-	
11	PANDUIT, NM2	HIGH CAPACITY HORIZONTAL CABLE MANAGER, 2RU
12	-	
13	PANDUIT, DP48688TGY	48-PORT CAT 6 PATCH PANEL, 2RU
14	-	
15	PANDUIT, NM2	HIGH CAPACITY HORIZONTAL CABLE MANAGER, 2RU
16	-	
17	TBD	
18	TBD	
19	TBD	
20	TBD	
21	PANDUIT, CMPHF1	D-RING HORIZONTAL CABLE MANAGER, 1RU
22	UNKNOWN	OWNER PROVIDED NETWORK SWITCH, 1RU
23	PANDUIT, CMPHF1	D-RING HORIZONTAL CABLE MANAGER, 1RU
24	UNKNOWN	OWNER PROVIDED NETWORK SWITCH, 1RU
25	PANDUIT, CMPHF1	D-RING HORIZONTAL CABLE MANAGER, 1RU
26	UNKNOWN	OWNER PROVIDED NETWORK SWITCH, 1RU
27	PANDUIT, CMPHF1	D-RING HORIZONTAL CABLE MANAGER, 1RU
28	TBD	
29	TBD	
30	TBD	
31	TBD	
32	TBD	
33	TBD	
34	TBD	
35	TBD	
36	TBD	
37	TBD	
38	TBD	
39	TBD	
40	TBD	
41	TBD	
42	TBD	
43	TBD	
44	UNKNOWN	OWNER PROVIDED UPS, 2RU
45	-	

NOTE:
1. PROVIDE AND INSTALL ALL ITEMS LISTED IN FULL TONE, HALF TONE ITEMS SHOWN FOR COORDINATION ONLY.

RACK 1A-2

RACK RU	PART NUMBER	DESCRIPTION
1	TBD	
2	TBD	
3	TBD	
4	TBD	
5	TBD	
6	TBD	
7	TBD	
8	TBD	
9	TBD	
10	TBD	
11	TBD	
12	TBD	
13	TBD	
14	TBD	
15	TBD	
16	TBD	
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35	TBD	
36	TBD	
37	TBD	
38	TBD	
39	TBD	
40	TBD	
41	TBD	
42	TBD	
43	TBD	
44	UNKNOWN	OWNER PROVIDED UPS, 2RU
45	-	

NOTE:
1. PROVIDE AND INSTALL ALL ITEMS LISTED IN FULL TONE, HALF TONE ITEMS SHOWN FOR COORDINATION ONLY.

RACK 1A-3

RACK RU	PART NUMBER	DESCRIPTION
1	TBD	
2	TBD	
3	TBD	
4	TBD	
5	TBD	
6	TBD	
7	TBD	
8	TBD	
9	TBD	
10	TBD	
11	TBD	
12	TBD	
13	TBD	
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35	TBD	
36	TBD	
37	TBD	
38	TBD	
39	TBD	
40	TBD	
41	TBD	
42	TBD	
43	TBD	
44	UNKNOWN	OWNER PROVIDED UPS, 2RU
45	-	

NOTE:
1. PROVIDE AND INSTALL ALL ITEMS LISTED IN FULL TONE, HALF TONE ITEMS SHOWN FOR COORDINATION ONLY.

COMMUNICATIONS RACK 1A-1

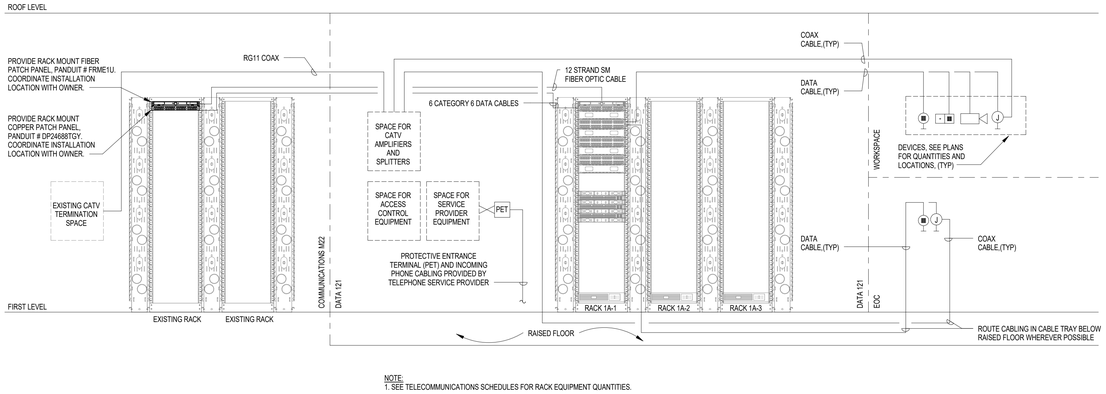
QUAN.	PART NUMBER	DESCRIPTION
1	PANDUIT, R2P	7' TWO-POST COMMUNICATIONS RACK
1	PANDUIT, R2PPEVWF	RACK TOP CABLE MANAGEMENT TROUGH
2	PANDUIT, PRV8	8" WIDE VERTICAL CABLE MANAGER, W/DOOR
2	PANDUIT, RGS134-1Y	RACK MOUNT VERTICAL GROUND STRIP

COMMUNICATIONS RACK 1A-2

QUAN.	PART NUMBER	DESCRIPTION
1	PANDUIT, R2P	7' TWO-POST COMMUNICATIONS RACK
1	PANDUIT, R2PPEVWF	RACK TOP CABLE MANAGEMENT TROUGH
1	PANDUIT, PRV8	8" WIDE VERTICAL CABLE MANAGER, W/DOOR
2	PANDUIT, RGS134-1Y	RACK MOUNT VERTICAL GROUND STRIP

COMMUNICATIONS RACK 1A-3

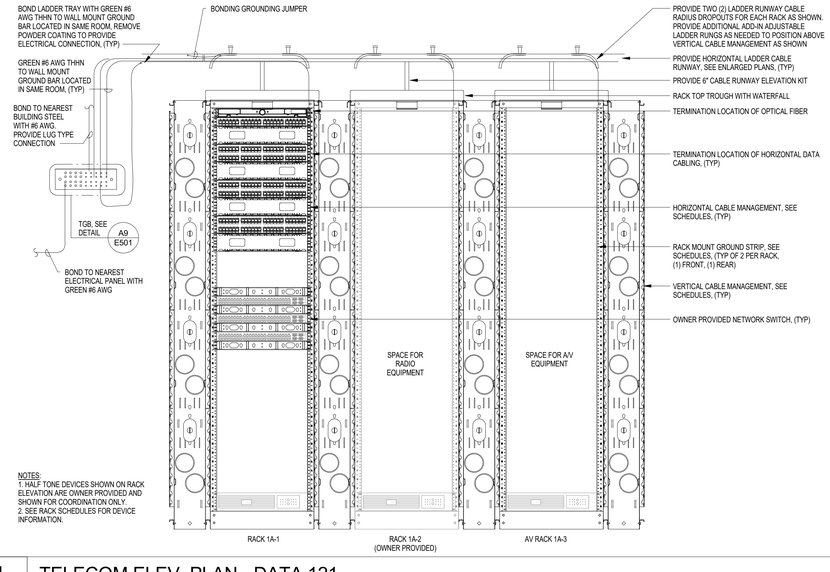
QUAN.	PART NUMBER	DESCRIPTION
1	PANDUIT, R2P	7' TWO-POST COMMUNICATIONS RACK
1	PANDUIT, R2PPEVWF	RACK TOP CABLE MANAGEMENT TROUGH
2	PANDUIT, PRV8	8" WIDE VERTICAL CABLE MANAGER, W/DOOR
2	PANDUIT, RGS134-1Y	RACK MOUNT VERTICAL GROUND STRIP



NOTE:
1. SEE TELECOMMUNICATIONS SCHEDULES FOR RACK EQUIPMENT QUANTITIES.

A2 TELECOMMUNICATIONS RISER DIAGRAM

SCALE: NO SCALE



NOTES:
1. HALF TONE DEVICES SHOWN ON RACK ELEVATION ARE OWNER PROVIDED AND SHOWN FOR COORDINATION ONLY.
2. SEE RACK SCHEDULES FOR DEVICE INFORMATION.

A11 TELECOM ELEV. PLAN - DATA 121

SCALE: NO SCALE

REVISIONS:

DESIGN ARCHITECT: David E. Ouade
PROJECT ARCHITECT: Daniel J. Cuka
DRAWN BY: Jeff Herrle
ISSUED: November 3, 2017

FOR BIDDING PURPOSES ONLY

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Lancaster County

Emergency Management Relocation / Renovation

TELECOM DETAILS

COUNTY BID # 17-282
SHA PROJECT # 17004

E600

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ADDENDUM #2
Issue Date: 11/09/2017
Lancaster County Bid # 17-282
FOR
Lancaster County Emergency Management Agency Renovation / Relocation

Addenda are instruments issued by the Purchasing Department prior to the date for receipt of offers which will modify or interpret the specification document by addition, deletion, clarifications, or correction. Please acknowledge receipt of this addendum in the space provided in the Attribute Section.
Be advised of the following changes to the specifications and bidding documents:

GENERAL QUESTIONS AND CLARIFICATIONS

ADD 2-1. Roofing, Section 075216.
Question: *Would the County be willing to accept bids for this project with an EPDM or TPO membrane roof?*
Response: No. The existing and adjacent roof on the remainder of the existing facility is a Modified Bituminous assembly and the intent is to retain the same assembly on the entire roof area. No change in system will be permitted.

ADD 2-2. Original Youth Services Center Construction Drawings.
Statement: *Several questions were raised during the pre-bid walk-through in reference to thicknesses of existing slabs on grade, construction assembly of existing GWB ceilings scheduled for removal etc.*.
Response: As part of this addendum, we are publishing scans of the original construction drawings for the Youth Services Center to assist the bidder in better understanding the existing conditions they will be working with. These documents were used by the Design Team during the process of documenting the current bid documents.

ADD 2-3. Pre-Bid Attendance.
Statement: *The list of people who attended the Pre-Bid meeting at 1:00pm on Wednesday November 8, 2017 is included for information purposes.*

ATTACHMENTS
- Pre-Bid Attendance Sheet (1 page)

End of Addendum

Company Name	Name	Email
Kidwell	Kelly Schroer	Kschroer@Kidwellinc.com
Excel	Curtis Adkins	Curtis@exceldg.com
McGinnis Inc.	Mark Stava	mark.stava@mcginnisinc.com
Titanium Fire	Bill Reineke	Bill@titanium-Fire.Com
Jung Elect.	David Jung	djung@jungelectricservice.com
Willmar Electric	Dan Williams	dwilliams@willmar-electric.com
~~Beues~~ Beues HVAC	Gene Beues	marybeues@beueshvac.com
ABC Electric	Jon Eicher	jone@abcelectric.net
INTECONNEX	MATT HOEKE	mhoeke@inteconnex.com
PROPERTY MGMT	~~DEE~~ DEE ADAMS	DADAMS@LANCASTER.NET
Morrissey Engineering	Jeff Henje	jhenje@morrisseyengineering.com
SINCLAIR HILLE	DAVID QUADE	DQuade@sinclairhille.com
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Tru-Built	Logan Hanzlick	logan@tru-built.net
Sampson	Mike Callaway	mike.callaway@sampson-construction.com
KINGERY	CHRIS PRO	chrisp@kccobuilders.com
Rogge General Contr.	Randy Rogge	rrogge@roggeinc.com
Electronic Contracting	Matt Thorne	mthorne@eccoinc.com
KRIVDA AND SON MASONRY	CHRIS KRIVDA	KRIVDAANDSONMASONRY@GMAIL.COM
MECO-HENNE CONTRACTING	JAMES WOLZ	JWOLZ@MECOHENNE.com
Dan Emken	New Horizons	dan@NewHorizons-LLC.com
Dickey-Hinds-Muir	Jaden Johnson	jaden.johnson@dickeyhindsmuir.com
~~Brian Clinton~~	~~Che~~	
Cheever	Brian Clinto	bclinton@cheeverconstruction.com

ADDENDUM #3

Issue Date: 11/13/2017

Lancaster County Bid # 17-282
FOR

Lancaster County Emergency Management Agency Renovation / Relocation

Addenda are instruments issued by the Purchasing Department prior to the date for receipt of offers which will modify or interpret the specification document by addition, deletion, clarifications, or correction. Please acknowledge receipt of this addendum in the space provided in the Attribute Section.

Be advised of the following changes to the specifications and bidding documents:

GENERAL QUESTIONS AND CLARIFICATIONS

ADD 3-1. Original Youth Services Center Construction Drawings - Partial.

Statement: *As part of Addendum No. 2 we indicated that we would be publishing scans of the original construction drawings for the Youth Services Center to facilitate contractors desire to better understand the composition of the existing facilities that they will be demolishing and connecting to.*

We did not take into consideration the sensitivity of the security issues with the facility so the drawings were not published when the addendum was issued. We have since deleted and masked out portions of the building that are not relevant to this renovation effort.

ATTACHMENTS

- Original Youth Services Center Drawings (43 sheets)

End of Addendum #3

N

SCALE: 1"=40'

0 20 40 80

SCALE IN FEET

LEGAL DESCRIPTION

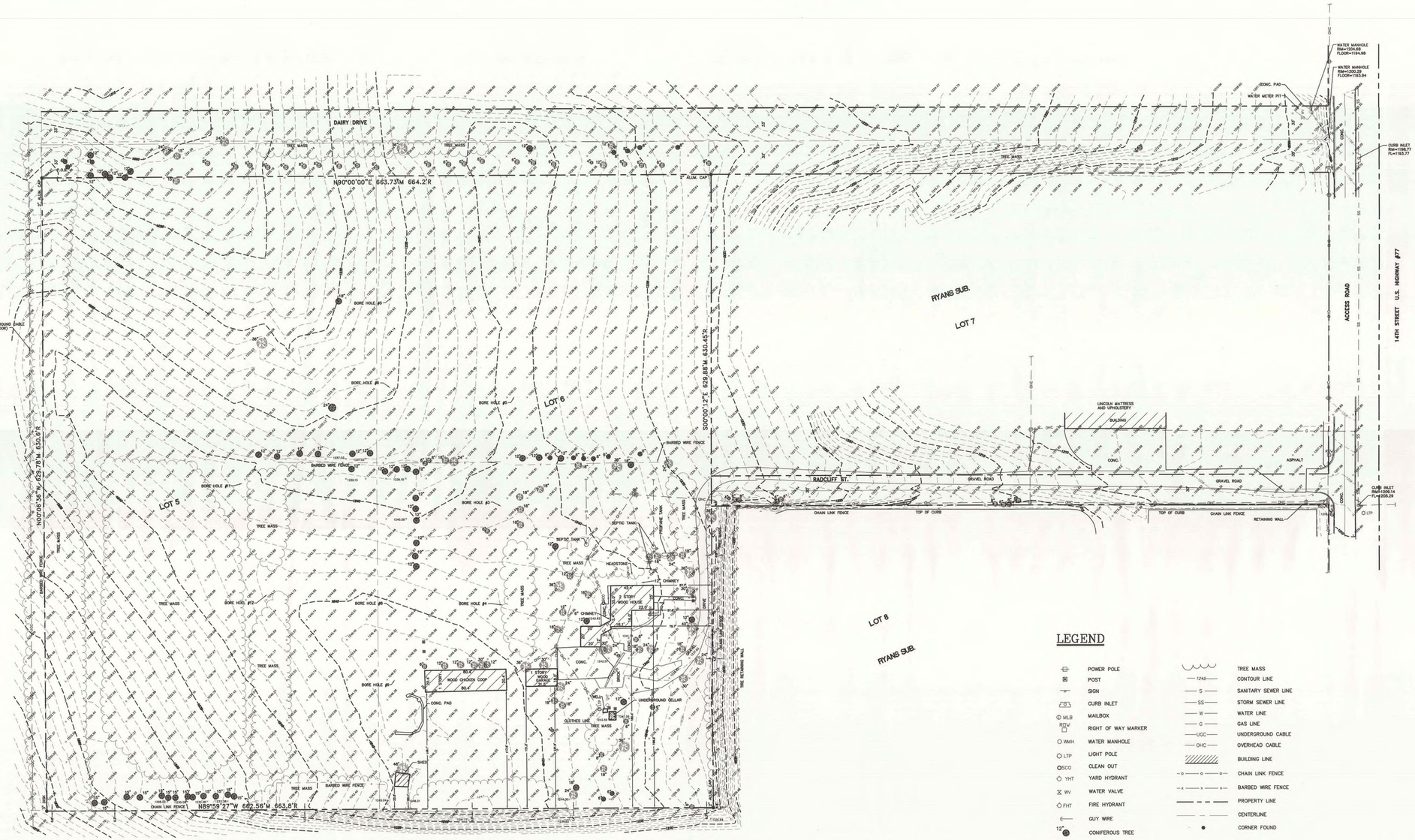
A TRACT OF LAND CONSISTING OF LOTS 5 AND 6, LEAVITT'S SUBDIVISION, LOCATED IN THE NORTHEAST QUARTER OF SECTION 11, TOWNSHIP 9 NORTH, RANGE 6 EAST OF THE 6TH P.M., CITY OF LINCOLN, LANCASTER COUNTY, NEBRASKA, AND MORE PARTICULARLY DESCRIBED AS FOLLOWS:

BEGINNING AT THE NORTHWEST CORNER OF SAID LOT 5, THENCE EASTERLY ALONG THE NORTH LINE OF SAID LOTS 5 AND 6, ON AN ASSUMED BEARING OF NORTH 90 DEGREES 00 MINUTES 00 SECONDS EAST, A DISTANCE OF 663.73 FEET TO THE NORTHEAST CORNER OF SAID LOT 6; THENCE SOUTH 00 DEGREES 00 MINUTES 12 SECONDS EAST ALONG THE EAST LINE OF SAID LOT 6, A DISTANCE OF 629.88 FEET TO THE SOUTHEAST CORNER OF SAID LOT 6; THENCE NORTH 89 DEGREES 59 MINUTES 27 SECONDS WEST ALONG THE SOUTH LINE OF SAID LOTS 5 AND 6, A DISTANCE OF 662.56 FEET TO THE SOUTHWEST CORNER OF SAID LOT 5; THENCE NORTH 00 DEGREES 06 MINUTES 36 SECONDS WEST ALONG THE WEST LINE OF SAID LOT 5, A DISTANCE OF 629.78 FEET TO THE POINT OF BEGINNING.

SAID TRACT CONTAINS A CALCULATED AREA OF 417,669 SQUARE FEET OR 9.59 ACRES MORE OR LESS.

BENCHMARKS

1. NOS U-A13 1933, STAMPED IN DISK, SW. CORNER HIGHWAY #2, AND 14TH STREET, NE. OF STATE PENITENTIARY. ELEV.=1178.32 (N.A.V.D. '88)
2. RAILROAD SPIKE IN POWER POLE, 75' W. OF CENTER OF EAST LINE, N. OF HOUSE. ELELV.=1238.42 (N.A.V.D. '88)
3. SW. CORNER OF STOOP, ON SW. CORNER OF CHICKEN COOP. ELEV.=1247.13 (N.A.V.D. '88)



LEGEND

- POWER POLE
- POST
- SIGN
- CURB INLET
- MLB MAILBOX
- RDW RIGHT OF WAY MARKER
- WMH WATER MANHOLE
- LTP LIGHT POLE
- SCO CLEAN OUT
- YHT YARD HYDRANT
- WV WATER VALVE
- FHT FIRE HYDRANT
- GUY WIRE
- CONIFEROUS TREE
- DECIDUOUS TREE
- SPOT ELEVATION
- TOP OF CURB ELEVATION
- GUTTER ELEVATION
- BENCHMARK
- TREE MASS
- CONTOUR LINE
- SANITARY SEWER LINE
- STORM SEWER LINE
- WATER LINE
- GAS LINE
- UGC UNDERGROUND CABLE
- OHC OVERHEAD CABLE
- BUILDING LINE
- CHAIN LINK FENCE
- BARBED WIRE FENCE
- PROPERTY LINE
- CENTERLINE
- CORNER FOUND

NEBRASKA REGISTERED LS.444 LAND SURVEYOR GERALD L. KAMTZ

Land Surveyor's Seal

Signed this 8th day of September 19 99

Name: Gerald L. Kamtz

Surveyor's license No. L.S. 444

OLSSON ASSOCIATES

CONSULTING ENGINEERS
1111 Lincoln Mall
P.O. Box 84608
Lincoln, NE 68501-4608
402-474-6311

TOPOGRAPHIC SURVEY

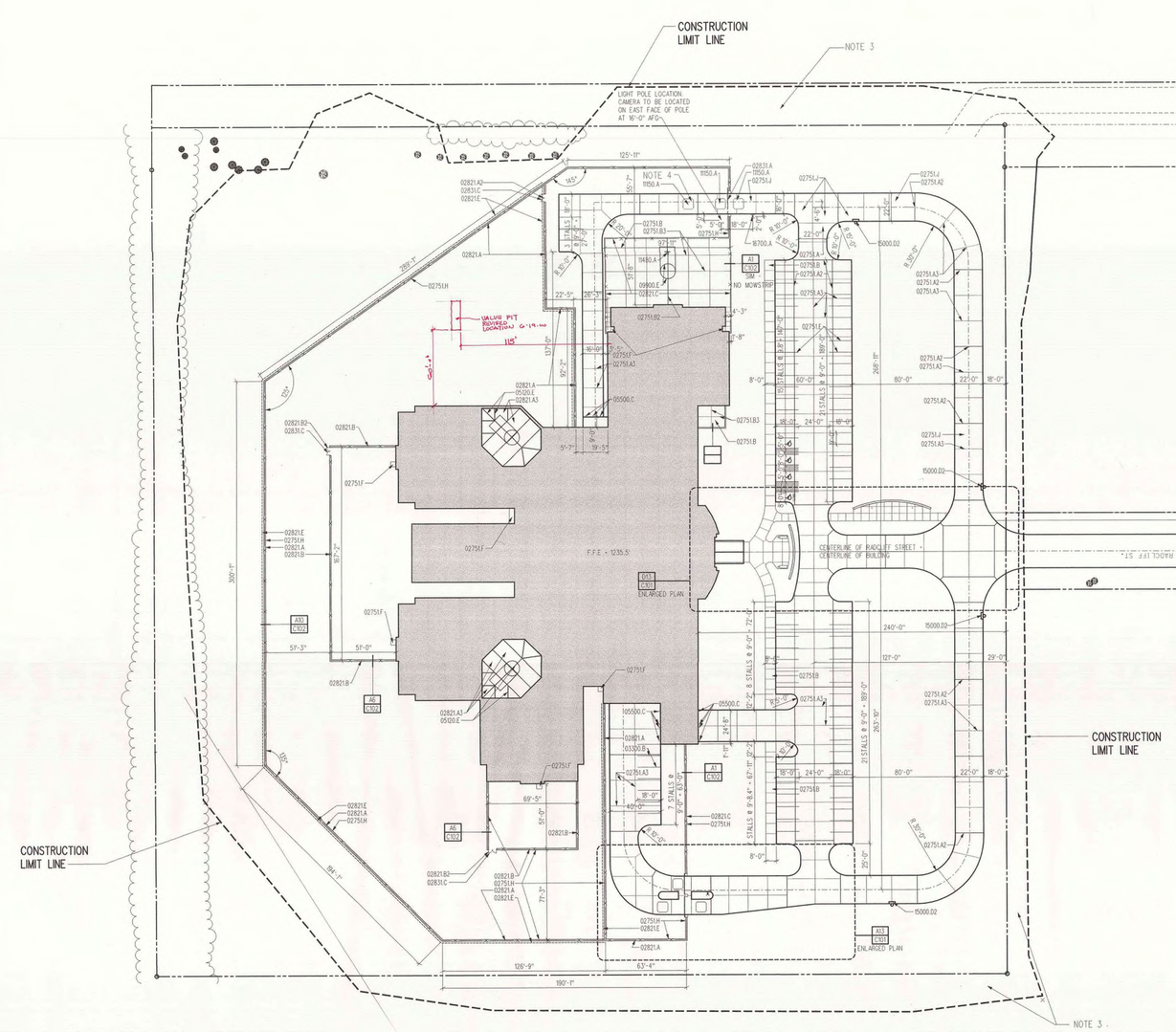
SINCLAIR HILLE

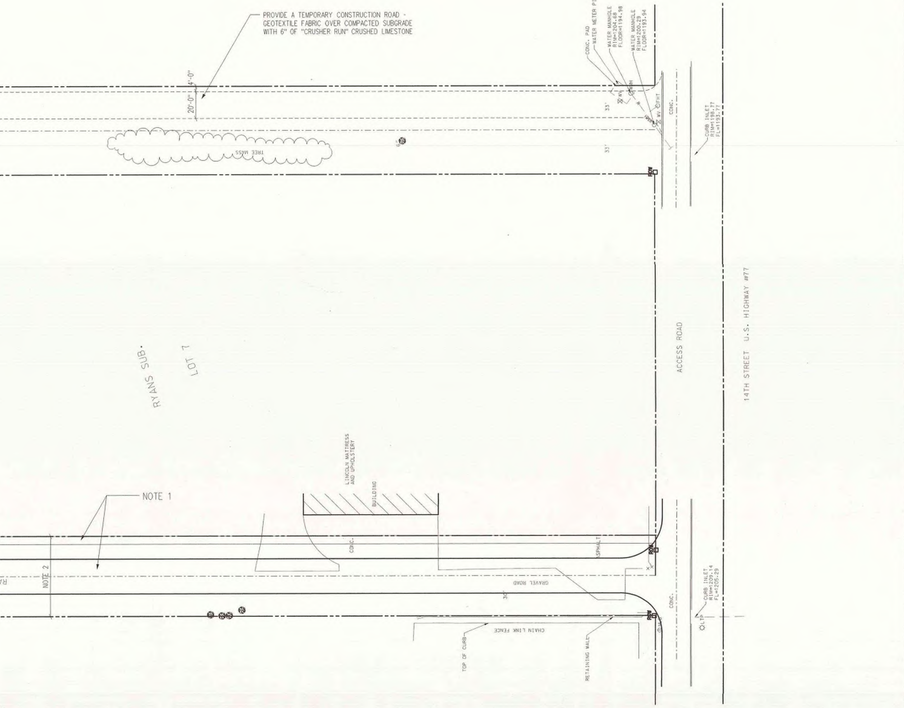
LANCASTER COUNTY JUVENILE DETENTION CENTER

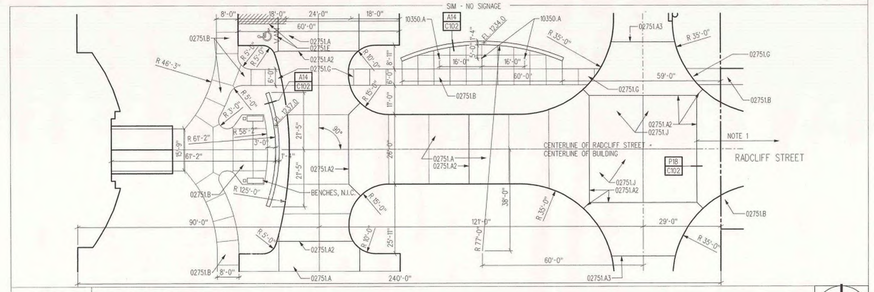
LINCOLN NEBRASKA 1999

drawn by: SLF
checked by: JLK
approved by: JLK
project no.: 990529.01
drawing no.: 4845
date: 09/08/99
revisions:

SHEET 01 OF 01



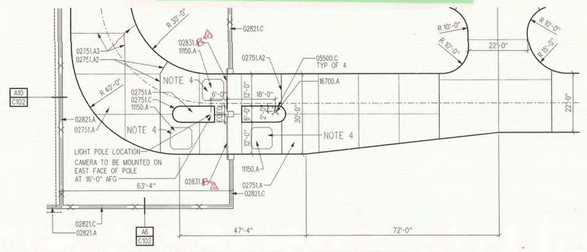




D13 ENLARGED PLAN

SCALE: 1" = 20'-0" MAIN BUILDING ENTRY

Refer to Sheet C100, Plan A13. The two gates that are noted as 02831.A should be 02831.B - Enclosed drive sliding vehicle gate/law enforcement entrance 11'-0" high x 10-0" wide clear opening.



A13 ENLARGED PLAN

SCALE: 1" = 20'-0" INTAKE SALLYPORT GATE

CONDOC KEYNOTES

02751 CEMENT CONCRETE PAVEMENT

02751.A 6" THICK CONCRETE PAVEMENT
02751.A2 PAVEMENT EXPANSION JOINT
02751.A3 PAVEMENT CONTROL JOINT
02751.B 5" THICK CONCRETE WALKWAY
02751.B2 WALKWAY EXPANSION JOINT
02751.B3 WALKWAY CONTROL JOINT
02751.C CONCRETE CURB / GUTTER
02751.E PAVEMENT MARKING PAINT
02751.F STRUCTURAL CONCRETE STOOP
02751.G CURB RAMP, CITY STANDARD TYPE IV
02751.H 5" THICK X 1'-6" WIDE MOWSTRIP
02751.J 7" THICK CONCRETE PAVEMENT

02821 CHAIN LINK FENCES AND GATES

02821.A FENCING TYPE "A" (PERIMETER FENCE)
02821.A2 6'-0" X 7'-0" PEDESTRIAN GATE
02821.A3 1 3/4" GALVANIZED CHAIN LINK FABRIC, SEE DIVISION 1 SECTION "ALTERNATES".
02821.B FENCING TYPE "B" (HIGH SECURITY FENCE)
02821.B2 6'-0" X 7'-0" PEDESTRIAN GATE
02821.C FENCING TYPE "C" (PUBLIC SIDE FENCE)
02821.E STAINLESS STEEL BARBED TAPE STRIP, SEE DIVISION ONE "ALTERNATES"

02831 ENCLOSED DRIVE SLIDING GATE

02831.A ENCLOSED DRIVE SLIDING VEHICLE GATE / SERVICE ENTRANCE 14'-0" X 16'-0" CLEAR OPENING
02831.C ENCLOSED DRIVE SLIDING MOWER GATE ENTRANCE 8'-0" X 8'-0" CLEAR OPENING, SEE DIVISION 1 "ALTERNATES"

03300 CAST-IN-PLACE CONCRETE

03300.B 5" CONCRETE SLAB ON GRADE

05120 STRUCTURAL STEEL

05120.E STRUCTURAL FRAMING ASSEMBLY TO COVER OUTDOOR RECREATION AREAS, SEE DIVISION 1 "ALTERNATES"

05500 METAL FABRICATIONS

05500.C PIPE BOLLARD, 6" DIA. FILLED W/ CONCRETE

09900 PAINTING

09900.E EXTERIOR GAME LINES 2" WIDE

10350 FLAGPOLES

10350.A TAPERED ALUMINUM FLAGPOLE

11150 PARKING CONTROL EQUIPMENT

11150.A VEHICLE LOOP DETECTOR

11480 ATHLETIC, RECREATIONAL, AND THERAPEUTIC EQUIPMENT

11480.A EXTERIOR BASKETBALL GOAL

15000 MECHANICAL

15000.02 CITY STANDARD CURB INLET TYPE "A-1"

16700 SECURITY

16700.A POST MOUNTED INTERCOM, SEE SHEET SP-1

SHEET SPECIFIC NOTES

NOTE 1 PAVEMENT AND UTILITY IMPROVEMENTS UNDER SEPARATE CONTRACT

NOTE 2 RADCLIFF R.O.W. IS TO BE REDEDICATED AS A 60' R.O.W. ADDITIONAL WIDTH TO BE OBTAINED FROM NORTH PROPERTY OWNER.

NOTE 3 OWNER TO OBTAIN GRADING EASEMENTS FROM ADJACENT PROPERTY OWNERS.

NOTE 4 EXACT SIZE AND LOCATION OF VEHICLE LOOP DETECTOR TO BE DETERMINED BY MANUFACTURER.

A1 SITE CONSTRUCTION PLAN

SCALE: 1" = 40'-0"

Lancaster Co. Juvenile Detention Center

SINCLAIR HILLE & Associates Inc Architects
105 No. 8th Street, Suite 100, Lincoln, NE
402-476-7331

11-19-99
CHRISTOPHER A. COE
REGISTERED PROFESSIONAL ARCHITECT
A-2712
STATE OF NEBRASKA

Site Construction Plan

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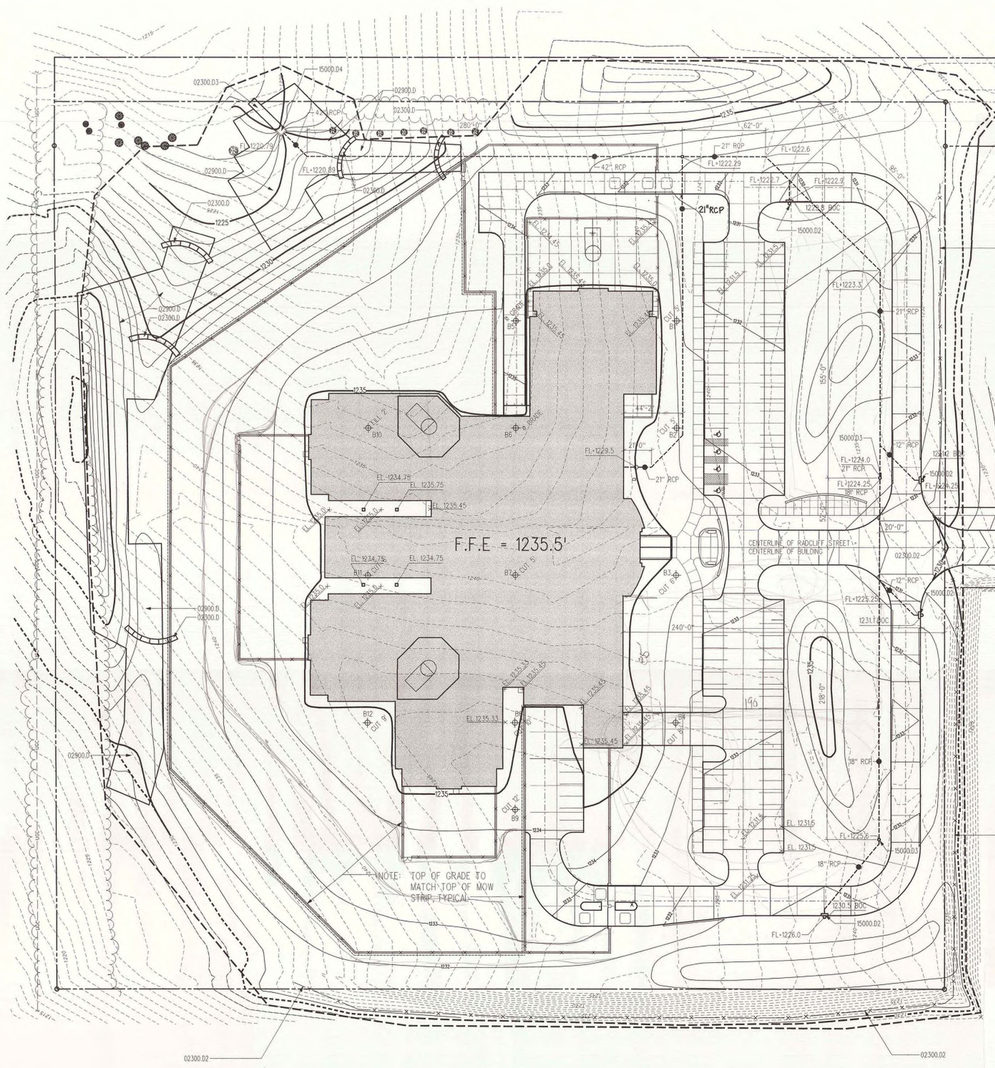
JH, MH, KC	98056
PROJECT ARCH.	ISSUED
CB, LK	11/19/99
INTERN ARCH.	REVISION
DU	

C 100


F.F.E = 1235.5'
NOTE: TOP OF GRADE TO MATCH TOP OF MOW STRIP, TYPICAL
PROVIDE GRADING AS REQUIRED FOR TEMPORARY ROADWAY TO SITE
CENTERLINE OF RADCLIFF STREET
CENTERLINE OF BUILDING
02300.02
02900.D
15000.04
15000.D3
15000.D2
42" RCP
21" RCP
18" RCP
12" RCP
FL=1220.85
FL=1222.29
FL=1222.7
FL=1222.8
FL=1223.3
FL=1224.0
FL=1224.25
FL=1225.25
FL=1226.0
FL=1229.5
EL. 1234.75
EL. 1235.45
EL. 1235.33
EL. 1231.5
EL. 1230.5
B10
B8
B12
B11
B9
240'-0"
62'-0"
55'-0"
20'-0"
1225
1230
1235
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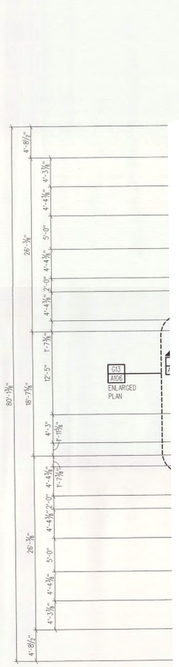
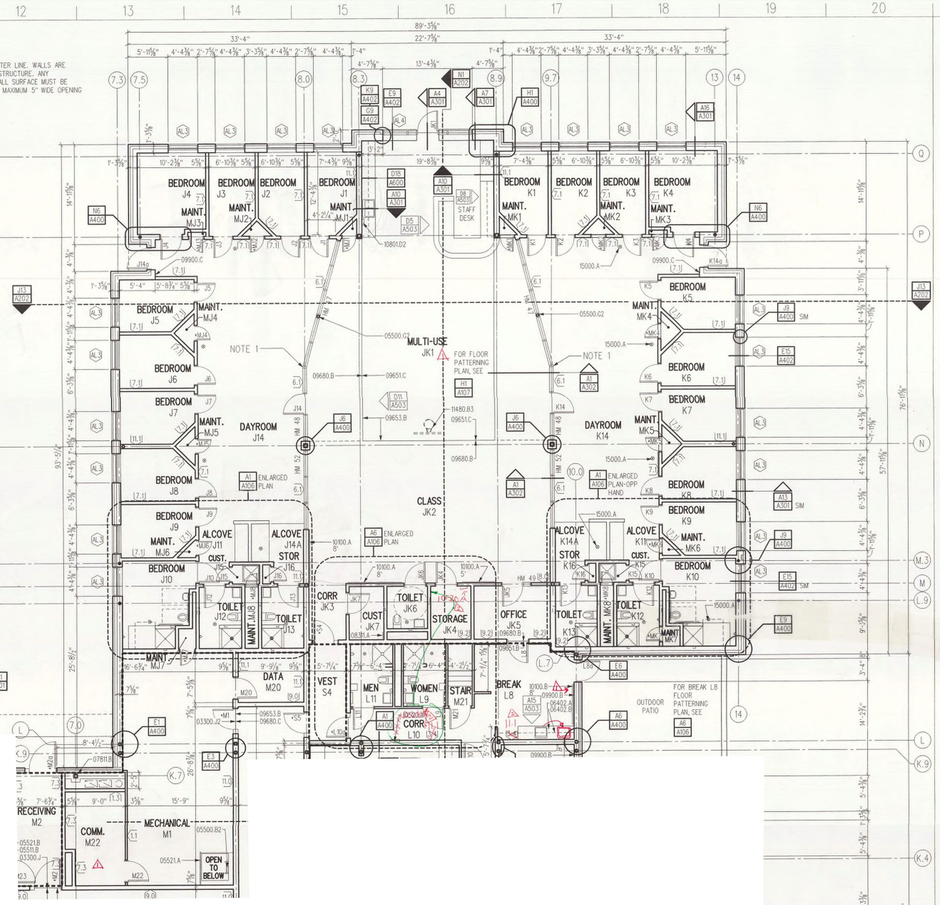
Refer to Sheet A100, Plan A1. The south wall of Classroom P6 is to have an additional layer of 09260.A from floor to structure. Refer to A101, Plan A1. The south wall of Classroom P7 is to have an additional layer of 09260.A from floor to structure.
Refer to Sheet A100, Plan A1. The chase in the southwest corner of Comm M22 is 1'-0 3/8" clear interior dimension east to west, 5'-0" clear interior dimension north to south.
Refer to Sheet A100, Plan A1. In Break L8, the length of the markerboard (10100.A) on the east wall should read 6 feet.

Refer to Sheet A100, Plan A1. Move Fire extinguisher cabinets as follows: (Verify exact location with Architect prior to installation. Cabinets are semi-recessed-coordinate with wall installation)
a. From Office EF3 to Storage EF4.
b. From Corr L10 to Storage JK4.
c. From Corr M4 to Kitchen M6.
d. Add one fire extinguisher cabinet in Control S1on east wall behind door S1.

Wall Mounted Projection Screens: Projection screen are to be included in the following rooms:
Classroom P6 (south wall above 10100.A), Classroom P7 (north wall above 10100.A),
Classroom P8 (north wall above 10100.A), Life Skills P9 (north wall above 10100.A), Training L12 (west wall above 10100.A). Verify exact location with Architect prior to installation.
Coordinate location with other trades.
Grommets: 06402.E7. In the following locations, install the number of grommets indicated:
Classroom P6 - 3 grommets
Classroom P7 - 3 grommets
Classroom P8 - 3 grommets
Multi-Use AB1 - 3 grommets at staff desk
Multi-Use CD1 - 3 grommets at staff desk
Multi-Use EF1 - 3 grommets at staff desk
Multi-Use JK1 - 3 grommets at staff desk
Lobby L25 - 2 grommets at reception desk
Office T9 - 2 grommets at east desk; 2 grommets at west desk
Intake Desk T11 - 2 grommets





CONDOC KEYNOTES

02751 CEMENT CONCRETE PAVEMENT
02751.B 5" THICK CONCRETE WALKWAY

03300 CAST-IN-PLACE CONCRETE
03300.J CONCRETE HARDENER FINISH
03300.J2 CONCRETE CURE & SEAL FINISH
03300.K3 4" HIGH CONCRETE LOCKER BASE W/ WOOD NAILER CAST INTO BASE FOR ANCHORING THE LOCKERS.

04810 UNIT MASONRY ASSEMBLIES
04810.B2 6" BULLNOSE CONCRETE MASONRY UNIT

05500 METAL FABRICATIONS
05500.G2 TUBE STEEL SUPPORT ASSEMBLY FOR HOLLOW METAL FRAMING, 2" X 6" X 3/16" W/ 7" X 10" X 3/8" BASE PLATE.

05511 METAL STAIRS
05511.B GALVANIZED STEEL FLOOR GRATING TREAD

05521 PIPE AND TUBE RAILINGS
05521.A STEEL GUARDRAIL ASSEMBLY, PAINT FINISH
05521.B 1 1/2" O.D. STEEL HANDRAIL

06402 INTERIOR ARCHITECTURAL WOODWORK
06402.A LAMINATE CLAD BASE CABINET
06402.B LAMINATE CLAD WALL-HUNG CABINET
06402.C HIGH PRESSURE DECORATIVE LAMINATE COUNTERTOP W/ INTEGRAL BACKSPLASH

07810 PLASTIC UNIT SKYLIGHTS
07810.A PLASTIC UNIT SKYLIGHT

07811 SPRAYED FIRE-RESISTIVE MATERIALS
07811.B SPRAYED FIRE RESISTIVE MATERIAL - 2 HOUR FIRE PROTECTION FOR PRIMARY STRUCTURE.

08311 ACCESS DOORS AND FRAMES
08311.A 16" X 16" ACCESS DOOR AND FRAME IN MASONRY PARTITION
08311.B 12" X 12" ACCESS DOOR AND FRAME IN GYPSUM WALLBOARD PARTITION

08814 MIRRORED GLASS
08814.A SILVERED MIRRORED GLASS WITH VINYL BACK

09622 RESILIENT ATHLETIC-FLOORING
09622.A RESILIENT ATHLETIC FLOORING, SEE DIVISION 1 "ALTERNATES"
09622.B GAMELINES 3" WIDTH, TWO COLORS, ONE FOR BASKETBALL AND ONE FOR VOLLEYBALL

09651 RESILIENT TILE FLOORING
09651.B RUBBER TILE, RBR•1-CREAM
09651.C RUBBER TILE, RBR•2-GRAY1

09653 RESILIENT WALL BASE AND ACCESSORIES
09653.B RESILIENT TRANSITION STRIP

09680 CARPET
09680.B CARPET, CPT•2 - (UNITS)
09680.C CARPET, CPT•3 - (CORRIDORS)

09900 PAINTING
09900.A PAINT FINISH
09900.B ACCENT COLOR •1
09900.C ACCENT COLOR •2
09900.D ACCENT COLOR •3

10100 VISUAL DISPLAY BOARDS
10100.A PORCELAIN ENAMEL MARKER BOARD

10505 METAL LOCKERS
10505.A DOUBLE TIER WARDROBE LOCKER

10520 FIRE PROTECTION SPECIALTIES
10520.A FIRE EXTINGUISHER CABINET

10753 WALL MOUNTED TELEPHONE ENCLOSURES
10753.A WALL MOUNTED TELEPHONE ENCLOSURE
10753.B WALL MOUNTED TELEPHONE

10801 TOILET AND BATH ACCESSORIES
10801.D2 PAPER TOWEL DISPENSER
10801.M CUP DISPENSER

11480 ATHLETIC, RECREATIONAL, AND THERAPEUTIC EQUIPMENT
11480.A EXTERIOR BASKETBALL GOAL
11480.B INTERIOR BASKETBALL GOAL, W/ 6'-0" EXTENSION FROM WALL
11480.B2 INTERIOR BASKETBALL GOAL,W/ 4'-0" EXTENSION FROM WALL
11480.B3 INTERIOR BASKETBALL GOAL,W/ 12" EXTENSION FROM WALL
11480.C WALL PADS - 24" X 72"

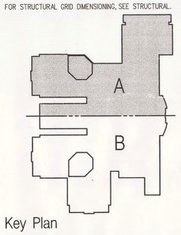
12690 FLOOR MATS AND FRAMES
12690.A RECESSED FLOOR MAT AND FRAME

15000 MECHANICAL
15000.A FLOOR DRAIN, SEE MECH.

SHEET SPECIFIC NOTES
NOTE 1 FRAMES TO BE FULLY WELDED AND GROUND SMOOTH

GENERAL NOTES
TYPICAL HOUSING UNIT PLAN DETAILS FOR UNITS AB, CD, AND EF ARE REFERENCED ON UNIT CD ON SHEET A101.

FOR STRUCTURAL GRID DIMENSIONING, SEE STRUCTURAL.



Key Plan

Lancaster Co. Juvenile Detention Center

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REGISTERED PROFESSIONAL ARCHITECT Gregory M. Hille A-2875 11/19/99 STATE OF NEBRASKA

First Level Plan – Area A

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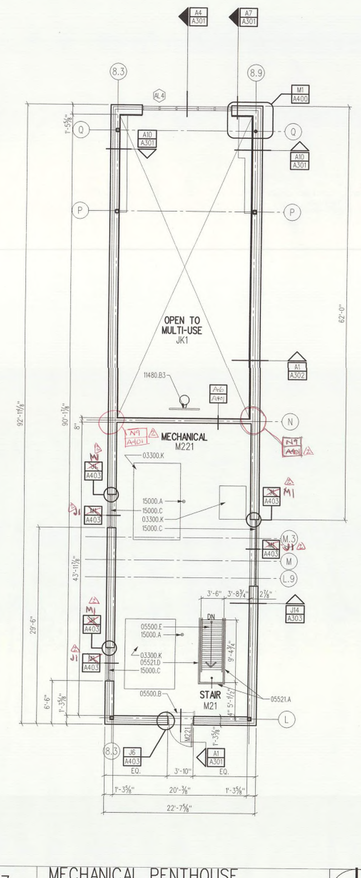
PROJECT ARCH. CB, LK	ISSUED 11/19/99
INTERN ARCH. DU	DIVISION

A 100

A1 FIRST LEVEL PLAN - AREA A
SCALE: 1/8" - 1'-0"

Refer to Sheet A101, Plan 1. Add PHE-1 Pass Hopper under frame HM 43 at Control S1. See PHE-1 description in Project Manual Addendum #2 Article A.



G17 MECHANICAL PENTHOUSE PLAN - M221

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

CONDOC KEYNOTES

02711.FOUNDATION DRAINAGE SYSTEMS

02711.A UNDER FLOOR DRAINAGE SYSTEM SLOPE TO SUMP PIT

03300 CAST-IN-PLACE CONCRETE

03300.A CAST-IN-PLACE CONCRETE FOUNDATION WALL
03300.K 4" HIGH HOUSEKEEPING PAD COORDINATE LOCATION WITH MECHANICAL.
03300.K2 4" HIGH CONCRETE CURB AROUND ALL OPENINGS IN PENTHOUSE FLOOR. COORDINATE WITH MECHANICAL.

03450 PLANT-PRECAST ARCHITECTURAL CONCRETE

03450.A 9" SEMI-COMPOSITE LOAD BEARING PRECAST CONCRETE INSULATED WALL PANELS.

05500 METAL FABRICATIONS

05500.B ACCESS LADDER
05500.E SHIP'S LADDER

05511 METAL STAIRS

05511.B GALVANIZED STEEL FLOOR GRATING TREAD

05521 PIPE AND TUBE RAILINGS

05521.A STEEL GUARDRAIL ASSEMBLY, PAINT FINISH
05521.D PROVIDE 6'-0" SECTION OF REMOVEABLE RAILING

11480 ATHLETIC, RECREATIONAL, AND THERAPEUTIC EQUIPMENT

11480.B INTERIOR BASKETBALL GOAL, W/ 6'-0" EXTENSION FROM WALL.
11480.B2 INTERIOR BASKETBALL GOAL, W/ 4'-0" EXTENSION FROM WALL.
11480.B3 INTERIOR BASKETBALL GOAL, W/ 12" EXTENSION FROM WALL.

15000 MECHANICAL

15000.A FLOOR DRAIN, SEE MECH.
15000.C LOUVER, SEE MECH.

Lancaster Co. Juvenile Detention Center

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PROJECT ARCH.	ISSUED
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INTERN ARCH.	REVISION
DU	

A 102

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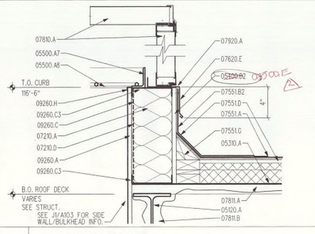
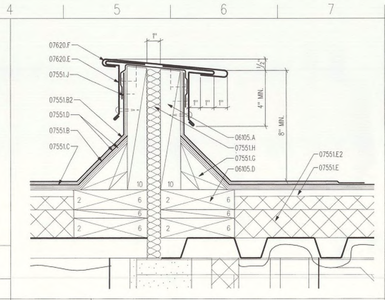
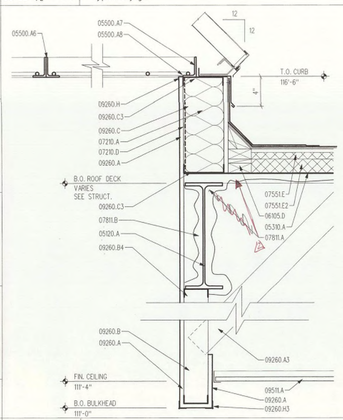


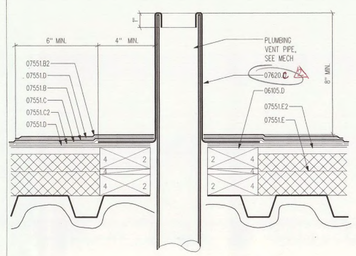
P1	FLASHING DETAIL
SCALE: 1½" = 1'-0"	Typical Skylight



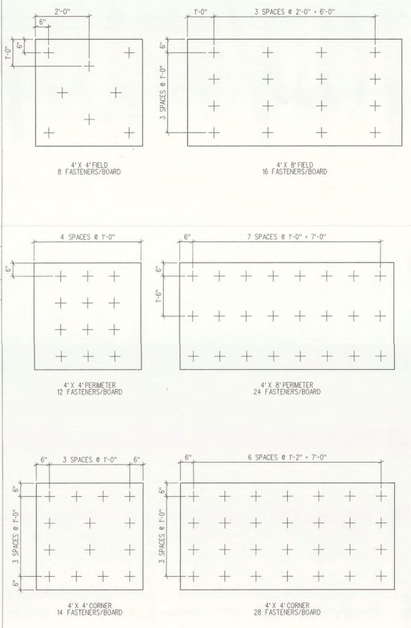
N4	FLASHING DETAIL
SCALE: 3" = 1'-0"	Roof Expansion Joint Curb



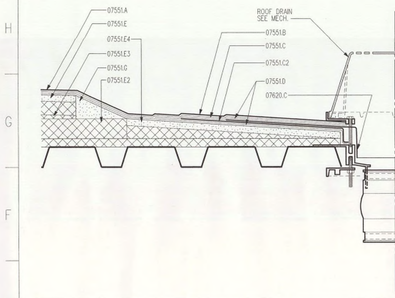
J1	FLASHING DETAIL
SCALE: 1½" = 1'-0"	Typical Skylight



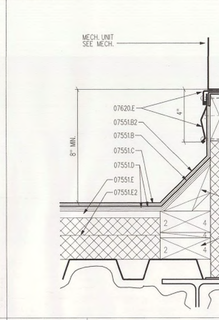
J4	FLASHING DETAIL
SCALE: 3" = 1'-0"	Typical Plumbing Vent



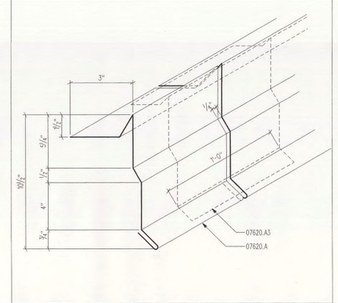
J8	INSULATION ANCHORING PATTERN PLANS
SCALE: NONE	



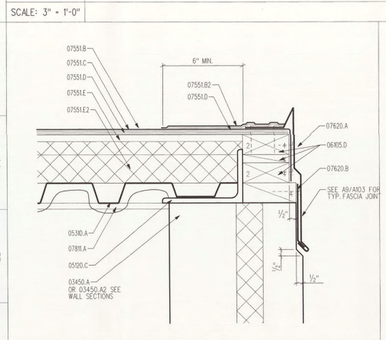
E1	TYPICAL ROOF DRAIN SUMP FLASHING DETAIL
SCALE: 3" = 1'-0"	



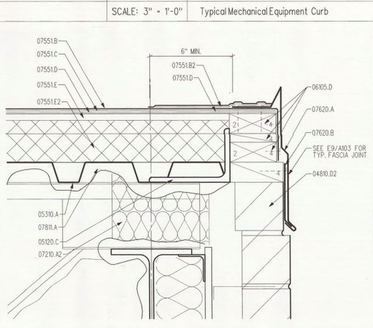
E6	COUNTERFLASHING DETAIL
SCALE: 3" = 1'-0"	Typical Mechanical Equipment Curb



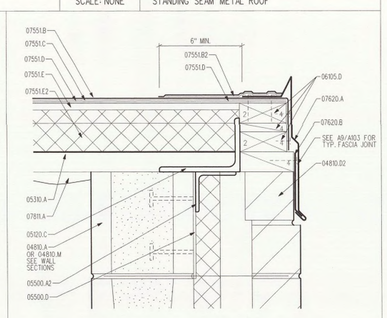
E9	FASCIA JOINT DETAIL
SCALE: NONE	STANDING SEAM METAL ROOF



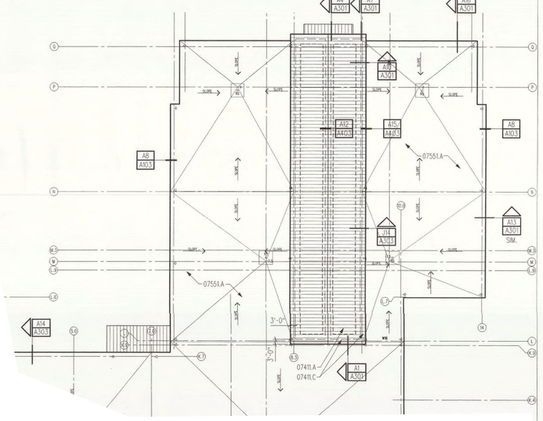
A1	ROOF EDGE DETAIL
SCALE: 3" = 1'-0"	Typical Precast Semi-Composite Panel



A4	ROOF EDGE DETAIL
SCALE: 3" = 1'-0"	Typical Stud Backup w/ Brick Veneer



A8	ROOF EDGE DETAIL
SCALE: 3" = 1'-0"	Typical CMU Backup w/ Brick Veneer



A12	ROOF PLAN
SCALE: 1/16" = 1'-0"	

CONDOC KEYNOTES

02821 CHAIN LINK FENCES AND GATES
02821.D WALL MOUNTED BARBED WIRE STAND-OFF SPACED AT 10'-0" O.C. W/ THREE STRANDS OF BARBED WIRE

03450 PLANT-PRECAST ARCHITECTURAL CONCRETE
03450.A 9" SEMI-COMPOSITE LOAD BEARING PRECAST CONCRETE INSULATED WALL PANELS.

04810 UNIT MASONRY ASSEMBLIES
04810.A 8" CONCRETE MASONRY UNIT
04810.D2 FACE BRICK

05120 STRUCTURAL STEEL
05120.A STEEL BEAM, SEE STRUCTURAL
05120.C STEEL ANGLE, SEE STRUCTURAL

05310 STEEL DECK
05310.A 1 1/2" GALVANIZED STEEL ROOF DECK

05400 COLD FORMED METAL FRAMING
05400.D2 SILL SEALER GASKET

05500 METAL FABRICATIONS
05500.A2 3" X 3" X 1/4" X 0'-6" CLIP ANGLE @ 4'-0" O.C.
05500.A6 BACK TO BACK 3" X 2" X 1/4" STEEL ANGLES, LLV.
05500.A7 STEEL ANGLE FRAME, 2" X 3" X 1/4" LLV, SCREW FASTEN TO STEEL STUD CURB WITH SECURITY HEAD SCREWS.
05500.A8 6" X 6" X 8 GAUGE GALVANIZED WIRE MESH, WELD TO STEEL ANGLE FRAME
05500.D 8" X 8" X 3/16" STL PLATE W/ STUD ANCHORS, PLATE ASSEMBLY @ 4'-0" O.C.

06105 MISC. CARPENTRY
06105.A WOOD BLOCKING, CCA TREATED, CONTINUOUS
06105.D WOOD NAILER, CCA TREATED, CONTINUOUS

07210 BUILDING INSULATION
07210.A 8.25" GLASS-FIBER BATT INSULATION R-30
07210.A2 GLASS-FIBER BATT INSULATION, FILL VOID
07210.D POLYETHYLENE VAPOR RETARDER

07411 MANUFACTURED ROOF PANELS
07411.A 22 GAUGE PREFINISHED GALVANIZED STEEL, 1 3/4" HIGH STANDING SEAM ROOFING
07411.C WATERPROOF UNDERLAYMENT

07551 APP-MODIFIED BITUMINOUS MEMBRANE ROOFING
07551.A APP-MODIFIED BITUMINOUS MEMBRANE ROOFING SYSTEM
07551.B APP-MODIFIED BITUMINOUS SHEET, MINERAL-GRANULE SURFACED, 180 MIL THICKNESS.
07551.B2 BASE FLASHING, MODIFIED BITUMINOUS SHEET, MINERAL-GRANULE SURFACED, 180 MIL THICKNESS
07551.C APP-MODIFIED BITUMINOUS SHEET, SMOOTH SURFACED, 160 MIL THICKNESS
07551.C2 BASE FLASHING, MODIFIED BITUMINOUS SHEET, SMOOTH SURFACED, 160 MIL THICKNESS
07551.D BASE SHEET, UNPERFORATED, ASPHALT IMPREGNATED AND COATED GLASS FIBER SHEET
07551.E POLYISOCYANURATE COMPOSITE BOARD INSULATION WITH 1/2" THICK PERLITE FACER, 1 3/4" TOTAL THICKNESS
07551.E2 POLYISOCYANURATE BOARD INSULATION, 1 3/4" THICKNESS
07551.E3 TAPERED POLYISOCYANURATE BOARD INSULATION
07551.E4 TAPERED POLYISOCYANURATE COMPOSITE BOARD INSULATION WITH 1/2" THICK PERLITE FACER
07551.G PERLITE TAPERED EDGE STRIP
07551.H FIBERGLASS BATT INSULATION
07551.J 60 MIL EPDM STRIP FLASHING

07620 SHEET METAL FLASHING AND TRIM
07620.A 0.050" PRE-FINISHED ALUMINUM FASCIA
07620.A3 0.032" PRE-FINISHED ALUMINUM SPLICE
07620.B CONTINUOUS 0.040" ALUMINUM CLEAT
07620.C LEAD ROOF PENETRATION FLASHING
07620.D PRE-FINISHED 0.050 ALUMINUM GUTTER
07620.E 0.032" PRE-FINISHED ALUMINUM COUNTERFLASHING
07620.F 0.040" ROOF EXPANSION JOINT COVER

07810 PLASTIC UNIT SKYLIGHTS
07810.A PLASTIC UNIT SKYLIGHT

07811 SPRAYED FIRE-RESISTIVE MATERIALS
07811.A SPRAYED FIRE RESISTIVE MATERIAL - 1 HOUR FIRE RATED ROOF CEILING ASSEMBLY
07811.B SPRAYED FIRE RESISTIVE MATERIAL - 2 HOUR FIRE PROTECTION FOR PRIMARY STRUCTURE.

07920 JOINT SEALANTS
07920.A ELASTOMERIC JOINT SEALANT, ES#1

09260 GYPSUM BOARD ASSEMBLIES
09260.A 5/8" ABUSE RESISTANT GYPSUM FIBER PANEL WALLBOARD
09260.A3 3 5/8" STEEL STUD DIAGONAL BRACING @ 4'-0" O.C.
09260.B 3 5/8" STEEL STUDS @ 16" O.C.
09260.B4 3 5/8" STEEL STUD TRACK
09260.C 6" STEEL STUDS @ 16" O.C.
09260.C3 6" STEEL STUD TRACK
09260.H "L" BEAD
09260.H3 CORNERBEAD

09511 ACOUSTICAL PANEL CEILINGS
09511.A ACOUSTICAL PANEL CEILING SYSTEM, SEE FINISH SCHEDULE FOR PANEL TYPES.

Lancaster Co. Juvenile Detention Center

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REGISTERED PROFESSIONAL ARCHITECT
11-19-99
CHRISTOPHER D. BAEHLER
A-2712
STATE OF NEBRASKA

Roof Plan & Details

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DESIGN ARCH.	ARCH. JOB NO.
JH, MH, KC	98056
PROJECT ARCH.	ISSUED
CB, LK	11 /19 /99
INTERN ARCH.	REVISION
DU	— —

A 103

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Refer to Sheet A104 and A105, Plan A1. The first General Note should read "All ceilings to be 09511.A unless noted otherwise. Refer to room finish schedule for acoustical panel ceiling types".

Refer to Sheet A104, Plan A1. The ceiling in Custodial JK7 is to be 09260.B2

CONDOC KEYNOTES

03300 CAST-IN-PLACE CONCRETE
03300.C2 8" FORMED ELEVATED REINFORCED CONCRETE COMPOSITE SLAB W/ INTEGRAL CURB

05120 STRUCTURAL STEEL
05120.A STEEL BEAM, SEE STRUCTURAL

05500 METAL FABRICATIONS
05500.A6 BACK TO BACK 3" X 2" X 1/4" STEEL ANGLES, LLV.
05500.A8 6" X 6" X 8 GAUGE GALVANIZED WIRE MESH. WELD TO STEEL ANGLE FRAME

09260 GYPSUM BOARD ASSEMBLIES
09260.B2 5/8" ABUSE RESISTANT GYPSUM FIBER PANEL WALLBOARD OVER 3 5/8" STEEL STUDS @ 16" O.C.

09290 PORTLAND CEMENT PLASTER
09290.A 3/4" PORTLAND CEMENT PLASTER OVER EXPANDED METAL LATH
09290.C2 EXPANSION JOINT, DO NOT BRIDGE JOINT WITH FURRING AND LATHING OR OTHER ACCESSORIES

09511 ACOUSTICAL PANEL CEILINGS
09511.A ACOUSTICAL PANEL CEILING SYSTEM, SEE FINISH SCHEDULE FOR PANEL TYPES.

09900 PAINTING
09900.A PAINT FINISH

12511 HORIZONTAL LOUVER BLINDS
12511.A HORIZONTAL LOUVER BLINDS

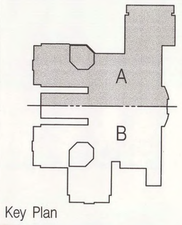
---------- DENOTES SECURE PERIMETER LINE. WALLS ARE SOLID FROM FLOOR TO STRUCTURE. ANY PENETRATIONS IN THE WALL SURFACE MUST BE SECURITY RATED WITH A MAXIMUM 5" WIDE OPENING IN ALL DIRECTIONS

GENERAL NOTES

ALL ACOUSTICAL PANEL CEILINGS TO BE 09511.A UNLESS NOTED OTHERWISE. REFER TO ROOM FINISH SCHEDULE FOR ACOUSTICAL PANEL CEILING TYPES.

REFER TO ROOM FINISH SCHEDULE FOR FINISH ON 09260.B2 CEILINGS.

SEE MECHANICAL FOR LOCATION OF FIRE SPRINKLER HEADS IN FIRE RATED CORRIDORS. FIRE RATING OF RATED CORRIDOR GLAZED OPENINGS WILL BE ACHIEVED BY SPRINKLER HEAD/ POLYCARBONATE GLAZING COMBINATION.



Key Plan

Lancaster Co. Juvenile Detention Center

SINCLAIR HILLE & : Sloped Structural members at oon joint 09290.C2 at ridge. See

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First Level Reflected Ceiling Plan – Area A

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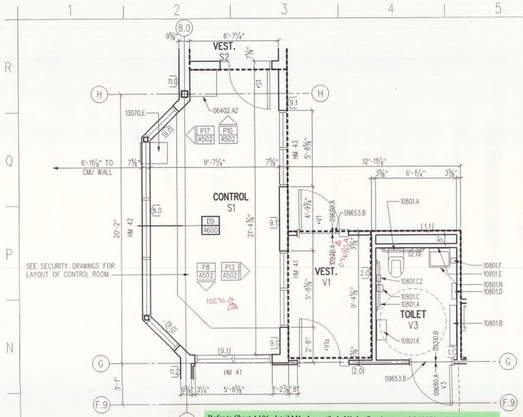
PROJECT ARCH. CB, LK	ISSUED 11/19/99		
INTERN ARCH. DU	REVISION		

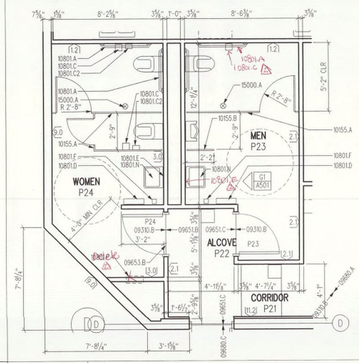
A1 FIRST LEVEL REFLECTED CEILING PLAN - AREA A

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



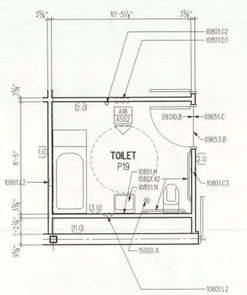
M1 ENLARGED PLAN

SCALE: 3/4" = 1'-0" CONTROL S1 AND TOILET V3



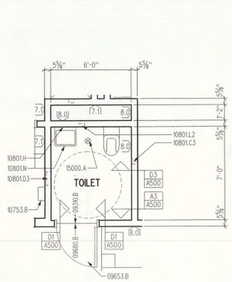
M6 ENLARGED PLAN

SCALE: 3/4" = 1'-0" WOMEN P24 AND MEN P23



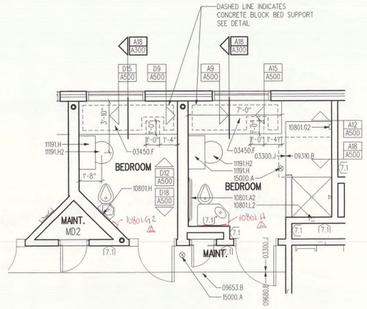
M10 ENLARGED PLAN

SCALE: 3/4" = 1'-0" TOILET P19



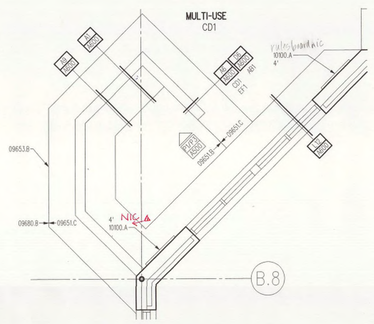
M13 ENLARGED PLAN

SCALE: 3/4" = 1'-0" TYPICAL DETENTION MULTI-USE TOILET ROOM - ROOMS CD5, EF5



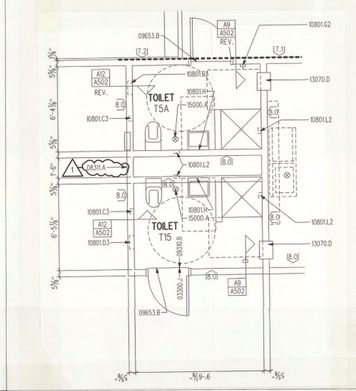
M16 ENLARGED PLAN

SCALE: 3/4" = 1'-0" TYPICAL STANDARD DETENTION BEDROOM & TYPICAL ACCESSIBLE DETENTION BEDROOM



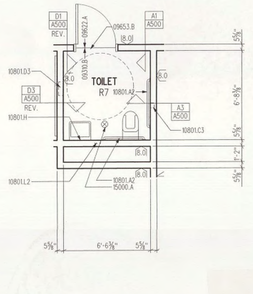
G1 ENLARGED PLAN

SCALE: 3/4" = 1'-0" MULTI-USE STAFF DESK



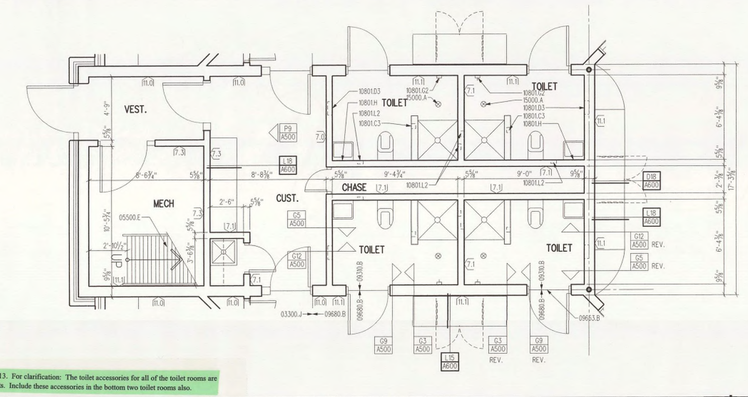
G6 ENLARGED PLAN

SCALE: 3/4" = 1'-0" TOILET T5A AND TOILET T15



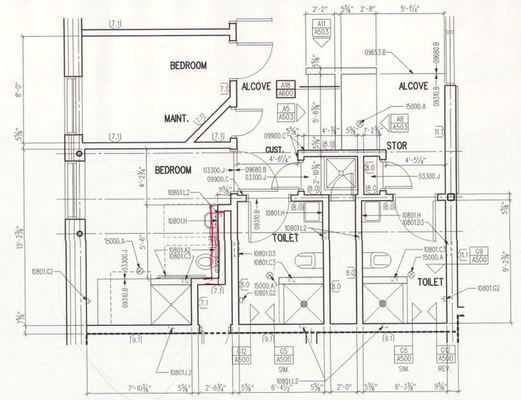
G10 ENLARGED PLAN

SCALE: 3/4" = 1'-0" TOILET R7



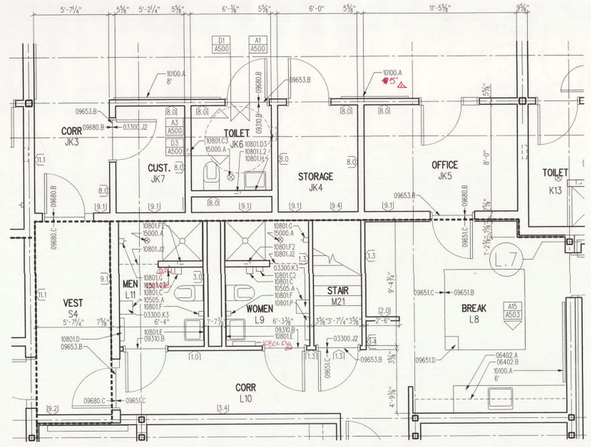
G13 ENLARGED PLAN

SCALE: 3/4" = 1'-0" TYPICAL DETENTION SHOWER ROOMS - UNITS 1, 2, 3



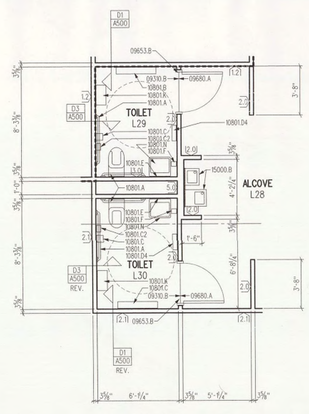
A1 ENLARGED PLAN

SCALE: 3/4" = 1'-0" STAFF SECURE TYPICAL BEDROOM AND SHOWER ROOM



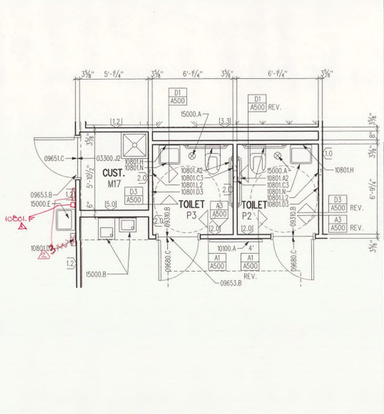
A6 ENLARGED PLAN

SCALE: 3/4" = 1'-0" MEN L11, WOMEN L9, BREAK L8,TOILET JK6,



A13 ENLARGED PLAN

SCALE: 3/4" = 1'-0" TOILET L29 AND TOILET L30



M17 ENLARGED PLAN

SCALE: 3/4" = 1'-0" TOILET P2 AND TOILET P3

CONDOC KEYNOTES

03300 CAST-IN-PLACE CONCRETE
03300.J CONCRETE HARDENER FINISH
03300.J2 CONCRETE CURE & SEAL FINISH
03300.K3 4" HIGH CONCRETE LOCKER BASE W/ WOOD NAILER CAST INTO BASE FOR ANCHORING THE LOCKERS.

03450 PLANIT-PRECAST ARCHITECTURAL CONCRETE
03450.F PRECAST CONCRETE BED PLATFORM, 4" THICKNESS

05500 METAL FABRICATIONS
05500.E SHIP'S LADDER

06402 INTERIOR ARCHITECTURAL WOODWORK
06402.A LAMINATE CLAD BASE CABINET
06402.A2 LAMINATE CLAD CABINET
06402.B LAMINATE CLAD WALL-HUNG CABINET

09310 CERAMIC TILE
09310.B UNGLAZED CERAMIC FLOOR TILE

09622 RESILIENT ATHLETIC-FLOORING
09622.A RESILIENT ATHLETIC FLOORING, SEE DIVISION 1 "ALTERNATES"

09651 RESILIENT TILE FLOORING
09651.B RUBBER TILE, RBR•1-(CREAM)
09651.C RUBBER TILE, RBR•2-(GRAY)
09651.D RUBBER TILE, RBR•3-(BLACK)

09653 RESILIENT WALL BASE AND ACCESSORIES
09653.B RESILIENT TRANSITION STRIP

09680 CARPET
09680.A CARPET, CPT•1 - (MULTI)
09680.B CARPET, CPT•2 - (UNITS)
09680.C CARPET, CPT•3 - (CORRIDORS)

09900 PAINTING
09900.C ACCENT COLOR •2

10100 VISUAL DISPLAY BOARDS
10100.A PORCELAIN ENAMEL MARKER BOARD

10155 TOILET COMPARTMENTS
10155.A TOILET COMPARTMENT
10155.B URINAL SCREEN

10270 ACCESS FLOORING
10270.A ACCESS FLOORING

10505 METAL LOCKERS
10505.A DOUBLE TIER WARDROBE LOCKER

10753 WALL MOUNTED TELEPHONE ENCLOSURES
10753.B WALL MOUNTED TELEPHONE

10801 TOILET AND BATH ACCESSORIES
10801.A GRAB BARS
10801.A2 SECURITY RATED GRAB BAR
10801.B CHANGING STATION
10801.C TOILET PAPER DISPENSER
10801.C2 SANITARY NAPKIN DISPOSAL
10801.C3 SECURITY TOILET PAPER DISPENSER
10801.D PAPER TOWEL DISPENSER / DISPOSAL (RESTROOMS)
10801.D2 PAPER TOWEL DISPENSER
10801.D3 FULLY RECESSED PAPERTOWEL DISPENSER (RESIDENT RESTROOMS)
10801.D4 PAPER TOWEL DISPOSAL (PUBLIC RESTROOMS)
10801.E 18" X 36" MIRROR, FRAMED
10801.F SOAP DISPENSER
10801.F2 SHOWER LIQUID SOAP DISPENSER
10801.G TOWEL / CLOTHING HOOK
10801.G2 SECURITY TOWEL / CLOTHING HOOK
10801.H STAINLESS STEEL DETENTION MIRROR
10801.J2 SHOWER CURTAIN ROD, AND HOOKS
10801.K AIR HAND DRYER
10801.L2 SECURITY SOAP DISH
10801.N PIPING PROTECTION
10801.P FEMININE NAPKIN / TAMPON DISPENSER

11191 SECURITY / DETENTION EQUIPMENT
11191.H WALL/HUNG WRITING SURFACE / SHELF, AS MANUFACTURED BY GLASSPEC•2412 WHO, 1-800-328-0888
11191.H2 CYLINDRICAL STOOL, AS MANUFACTURED BY GLASSPEC•CYLIN-S, 1-800-328-0888

13070 BULLET RESISTANT EQUIPMENT
13070.D PASS HOPPER (CLOTHING)
13070.E LARGE CAPACITY TRANSACTION DRAWER, (KEYS AND RADIO)

15000 MECHANICAL
15000.A FLOOR DRAIN, SEE MECH.
15000.B DRINKING FOUNTAIN, SEE MECH
15000.E HANDSINK

GENERAL NOTES:

PLUMBING FIXTURES THAT ARE SHOWN ARE SCHEMATIC IN NATURE. REFER TO PLUMBING FIXTURE SCHEDULE FOR EXACT FIXTURE TYPE AND CONFIGURATION.

REFER TO SHEET G101 FOR STANDARD MOUNTING HEIGHT INFORMATION.

---------- DENOTES SECURE PERIMETER LINE. WALLS ARE SOLID FROM FLOOR TO STRUCTURE. ANY PENETRATIONS IN THE WALL SURFACE MUST BE SECURITY RATED WITH A MAXIMUM 5" WIDE OPENING IN ALL DIRECTIONS

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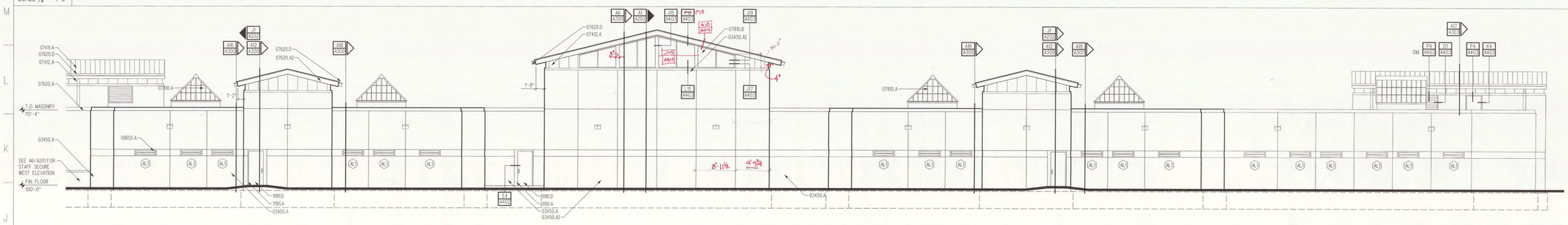
A 106

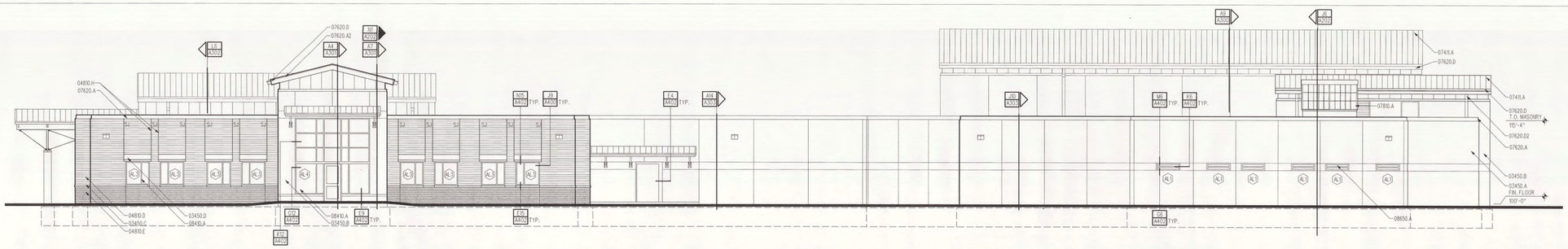
N1 EAST ELEVATION

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



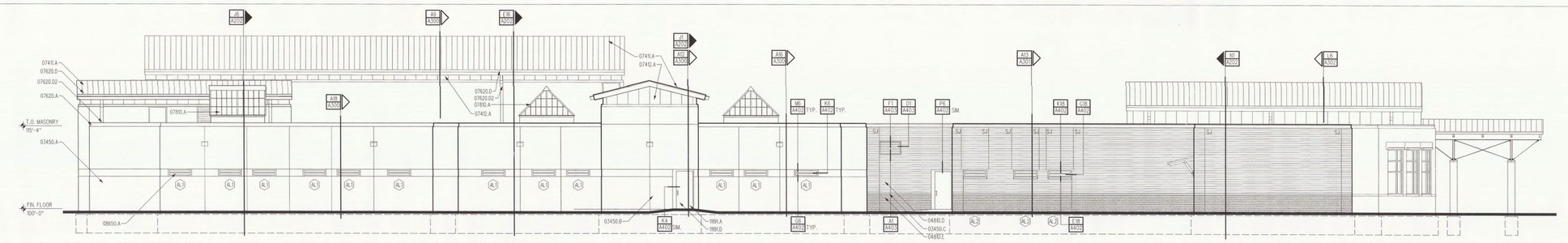
I1 WEST ELEVATION

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



E1 NORTH ELEVATION

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



A1 SOUTH ELEVATION

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

CONDOC KEYNOTES

03450 PLANT-PRECAST ARCHITECTURAL CONCRETE

03450.A 9" SEMI-COMPOSITE LOAD BEARING PRECAST CONCRETE INSULATED WALL PANELS.
03450.A2 10" SEMI-COMPOSITE LOAD BEARING PRECAST CONCRETE INSULATED WALL PANELS.
03450.B PRECAST ARCHITECTURAL CONCRETE WALL PANEL
03450.C PRECAST ARCHITECTURAL CONCRETE SILL
03450.C2 RABBESD PRECAST ARCHITECTURAL CONCRETE SILL
03450.D PRECAST ARCHITECTURAL CONCRETE LINTEL
03450.D2 RABBESD PRECAST ARCHITECTURAL CONCRETE LINTEL

04810 UNIT MASONRY ASSEMBLIES

04810.D FACE BRICK, 3 5/8" x 3 5/8" x 7 5/8" "TYPE A"(UPPER, LIGHT COLOR)
04810.E FACE BRICK, 3 5/8" x 3 5/8" x 7 5/8" "TYPE B"(LOWER DARK COLOR)
04810.H SEALED SOFT JOINT, (MORTARLESS JOINT) W/ SEALANT, CYLINDRICAL BACKING AND COMPRESSIBLE FILLER THE ENTIRE DEPTH (3 1/2") OF THE JOINT, SEE DETAIL Q6/A403

07411 MANUFACTURED ROOF PANELS

0741I.A 22 GAUGE PREFINISHED GALVANIZED STEEL, 1 3/4" HIGH STANDING SEAM ROOFING

07412 MANUFACTURED WALL PANELS

07412.A INSULATED ALUMINUM WALL PANELS, 1" THICKNESS R=7

07620 SHEET METAL FLASHING AND TRIM

07620.A 0.050" PRE-FINISHED ALUMINUM FASCIA
07620.A2 0.050" PRE-FINISHED ALUMINUM TRIM
07620.D PRE-FINISHED 0.050 ALUMINUM GUTTER
07620.D2 PRE-FINISHED 0.050 ALUMINUM DOWNSPOUT

07810 PLASTIC UNIT SKYLIGHTS

07810.A PLASTIC UNIT SKYLIGHT
07810.B TRANSLUCENT PLASTIC UNIT WALL PANEL

08110 STEEL DOORS AND FRAMES

08110.A HOLLOW METAL DOOR, SEE SCHEDULE FOR SIZE
08110.B HOLLOW METAL FRAME GROUTED SOLID, ALL GROUT HOLES BY FRAME SUPPLIER (SWING DOORS)

08331 OVERHEAD COILING DOORS

08331.A INSULATED OVERHEAD COILING DOOR WITH POSITION INDICATOR, COORDINATE WITH SECURITY SYSTEM

08410 ALUMINUM ENTRANCES AND STOREFRONTS

08410.A ALUMINUM STOREFRONT SYSTEM
08410.B ALUMINUM ENTRANCE, SEE DOOR SCHEDULE FOR SIZE

08650 DETENTION / SECURITY WINDOWS

08650.A STAINLESS STEEL, THERMALLY BROKEN SECURITY WINDOW WITH ALUMINUM EXTERIOR.

11191 SECURITY / DETENTION EQUIPMENT

11191.A HOLLOW METAL FRAME ASSEMBLY, GROUTED SOLID, ALL GROUT HOLES BY JAMB SUPPLIER
11191.D METAL DOOR,FLUSH TYPE

Lancaster Co. Juvenile Detention Center

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INTERN ARCH.	REVISION
DU	— — —

A 200

CONDOC KEYNOTES

03450 PLANT-PRECAST ARCHITECTURAL CONCRETE

03450.A2 10" SEMI-COMPOSITE LOAD BEARING PRECAST CONCRETE INSULATED WALL PANELS.

03450.C PRECAST ARCHITECTURAL CONCRETE SILL

04810 UNIT MASONRY ASSEMBLIES

04810.D FACE BRICK, 3 5/8" x 3 5/8" x 7 5/8" "TYPE A"/UPPER, LIGHT COLORS

04810.E FACE BRICK, 3 5/8" x 3 5/8" x 7 5/8" "TYPE B"/LOWER DARK COLOR

04810.H SEALED SOFT JOINT, (MORTARLESS JOINT) W/ SEALANT, CYLINDRICAL BACKING AND COMPRESSIBLE FILLER THE ENTIRE DEPTH (3 1/2") OF THE JOINT, SEE DETAIL 08/A401

05511 METAL STAIRS

05511.A STEEL STAIR ASSEMBLY

07411 MANUFACTURED ROOF PANELS

07411.A 22 GAUGE PREFINISHED GALVANIZED STEEL, 1 3/4" HIGH STANDING SEAM ROOFING

07412 MANUFACTURED WALL PANELS

07412.A INSULATED ALUMINUM WALL PANELS, 1" THICKNESS R=7

07620 SHEET METAL FLASHING AND TRIM

07620.A 0.050" PRE-FINISHED ALUMINUM FASCIA

07620.D PRE-FINISHED 0.050 ALUMINUM GUTTER

07620.D2 PRE-FINISHED 0.050 ALUMINUM DOWNSPOUT

08110 STEEL DOORS AND FRAMES

08110.A HOLLOW METAL DOOR, SEE SCHEDULE FOR SIZE

08110.B HOLLOW METAL FRAME GROUTED SOLID, ALL GROUT HOLES BY FRAME SUPPLIER (SWING DOORS)

08311 ACCESS DOORS AND FRAMES

08311.A 16" X 16" ACCESS DOOR AND FRAME IN MASONRY PARTITION

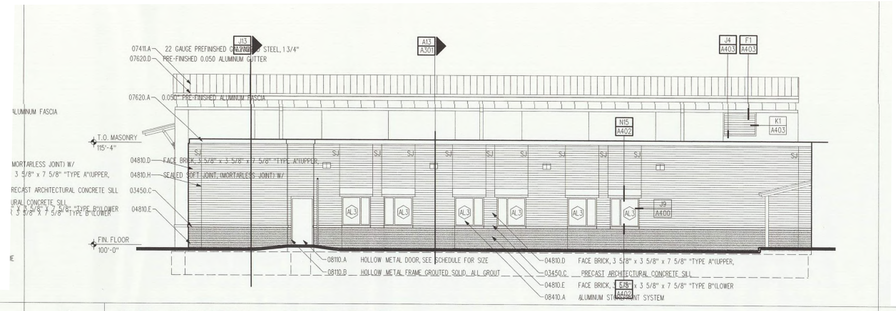
08410 ALUMINUM ENTRANCES AND STOREFRONTS

08410.A ALUMINUM STOREFRONT SYSTEM

11191 SECURITY / DETENTION EQUIPMENT

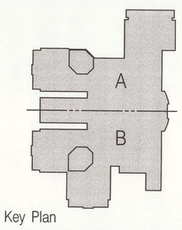
11191.A HOLLOW METAL FRAME ASSEMBLY, GROUTED SOLID, ALL GROUT HOLES BY JAMB SUPPLIER

11191.D METAL DOOR, FLUSH TYPE



A See sheet A200 - Detail N1

A1	WEST ELEVATION @ SALLYPORT	A6	WEST ELEVATION @ STAFF SECURE	A14	NORTH ELEVATION @ GYMNASIUM
SCALE: 1/8" = 1'-0"		SCALE: 1/8" = 1'-0"		SCALE: 1/8" = 1'-0"	



Key Plan

Lancaster Co. Juvenile Detention Center

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INTERN ARCH.	REVISION
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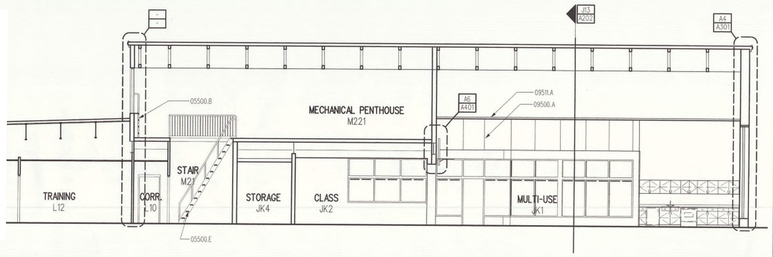
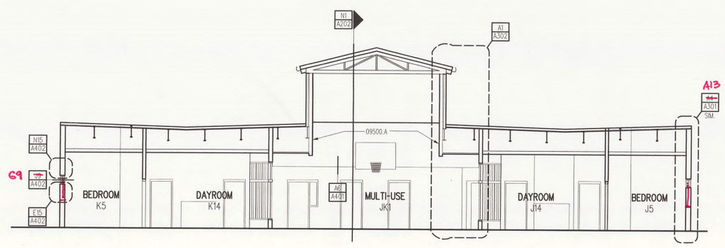


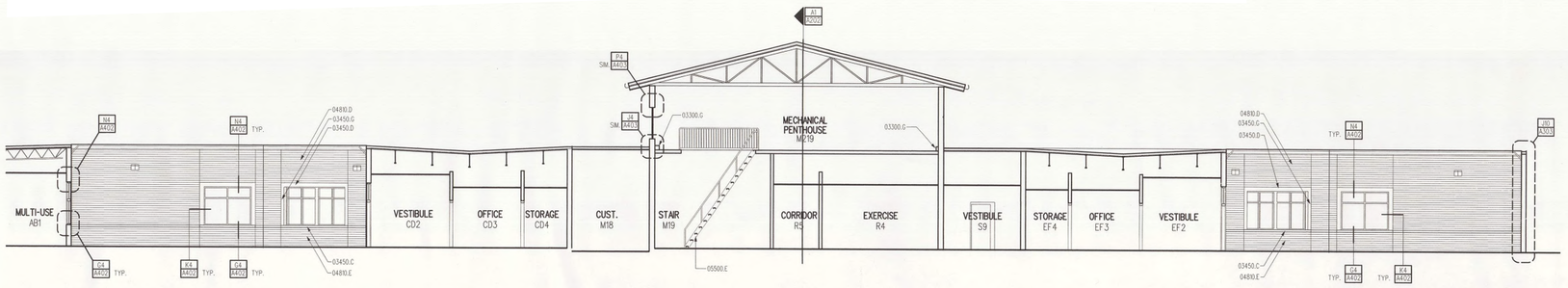
N1 BUILDING SECTION

SCALE: 1/8" = 1'-0" — South/North Section Through Assessment, Administration and Staff Secure Looking South



J13 BUILDING SECTION

SCALE: 1/8" = 1'-0" — East/West Section Through Staff Secure Looking South



E1 BUILDING SECTION

SCALE: 1/8" = 1'-0" — South/North Section Through Yards and Gymnasium Penthouse Looking West

A1 BUILDING SECTION

SCALE: 1/8" = 1'-0" — East/West Section Through Gymnasium and Lobby Looking South

CONDOC KEYNOTES

03300 CAST-IN-PLACE CONCRETE
03300.G CAST-IN-PLACE CONCRETE CURB

03450 PLANT-PRECAST ARCHITECTURAL CONCRETE
03450.C PRECAST ARCHITECTURAL CONCRETE SILL
03450.D PRECAST ARCHITECTURAL CONCRETE LINTEL
03450.G PRECAST ARCHITECTECTURAL CONCRETE JAMB

04810 UNIT MASONRY ASSEMBLIES
04810.D FACE BRICK, 3 5/8" x 3 5/8" x 7 5/8" "TYPE A"/UPPER, LIGHT COLOR)
04810.E FACE BRICK, 3 5/8" x 3 5/8" x 7 5/8" "TYPE B"/LOWER DARK COLOR)

05500 METAL FABRICATIONS
05500.B ACCESS LADDER
05500.E SHIP'S LADDER

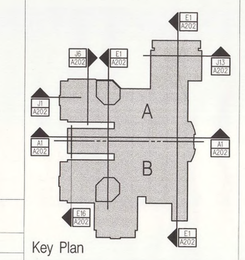
07841 THROUGH-PENETRATION FIRESTOP SYSTEMS
07841.B WALL PENETRATION FIRESTOP

08110 STEEL DOORS AND FRAMES
08110.A HOLLOW METAL DOOR, SEE SCHEDULE FOR SIZE
08110.B HOLLOW METAL FRAME GROUTED SOLID, ALL GROUT HOLES BY FRAME SUPPLIER (SWING DOORS)

09500 ACOUSTICAL WALL PANELS
09500.A ACOUSTICAL WALL PANELS
09500.A2 ACOUSTICAL WALL PANEL INFILL

09511 ACOUSTICAL PANEL CEILINGS
09511.A ACOUSTICAL PANEL CEILING SYSTEM, SEE FINISH SCHEDULE FOR PANEL TYPES.

11480 ATHLETIC, RECREATIONAL, AND THERAPEUTIC EQUIPMENT
11480.B INTERIOR BASKETBALL GOAL, W/ 6'-0" EXTENSION FROM WALL
11480.B2 INTERIOR BASKETBALL GOAL,W/ 4'-0" EXTENSION FROM WALL
11480.C WALL PADS - 24" X 72"



Lancaster Co. Juvenile Detention Center

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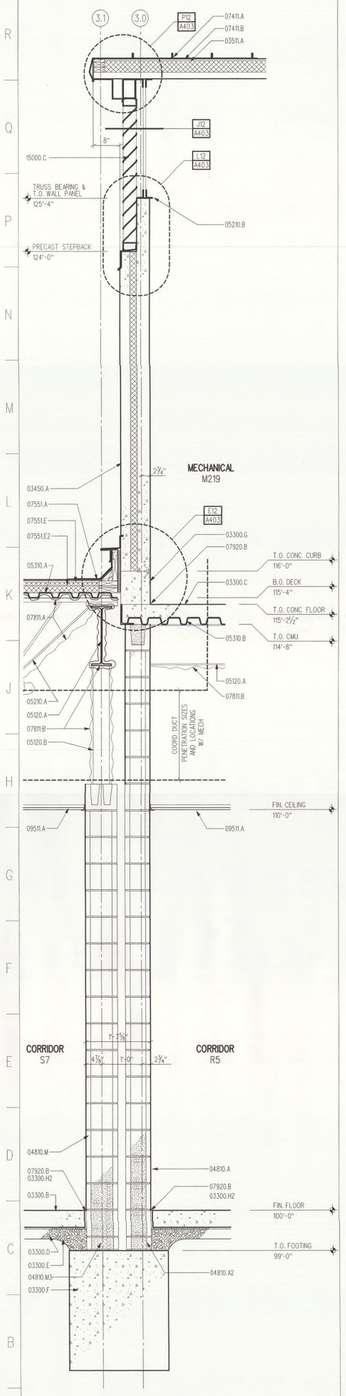

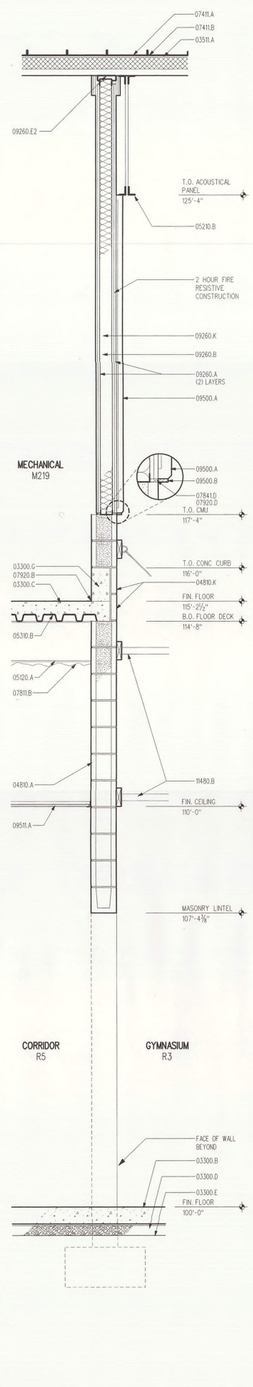

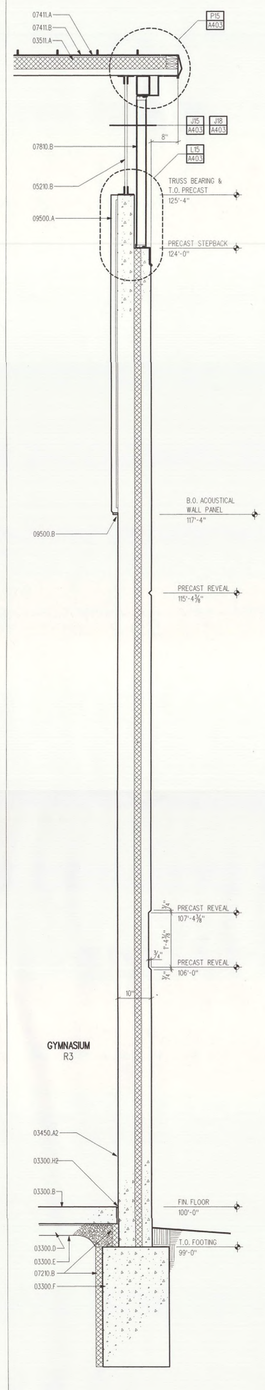

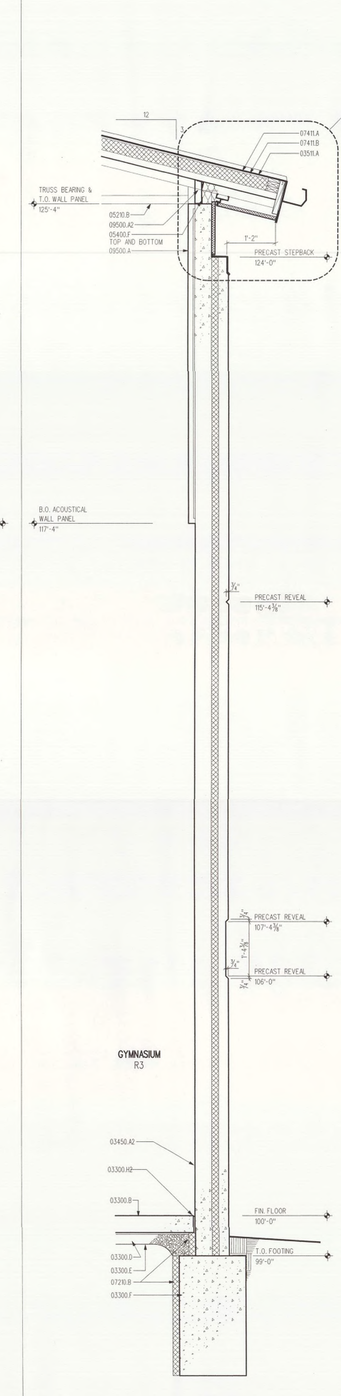

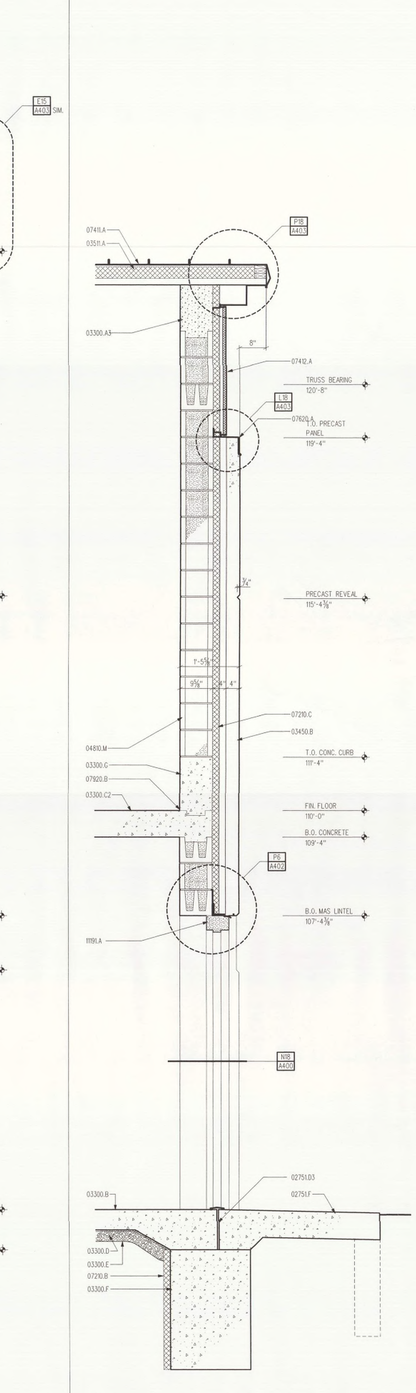

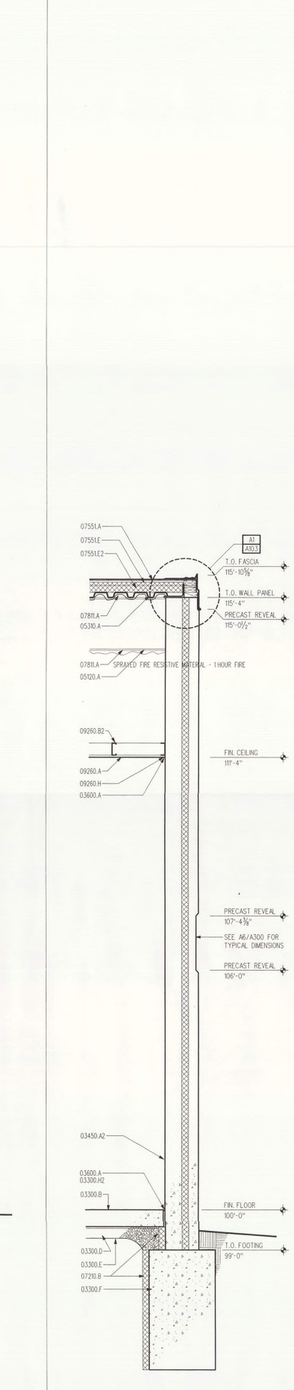

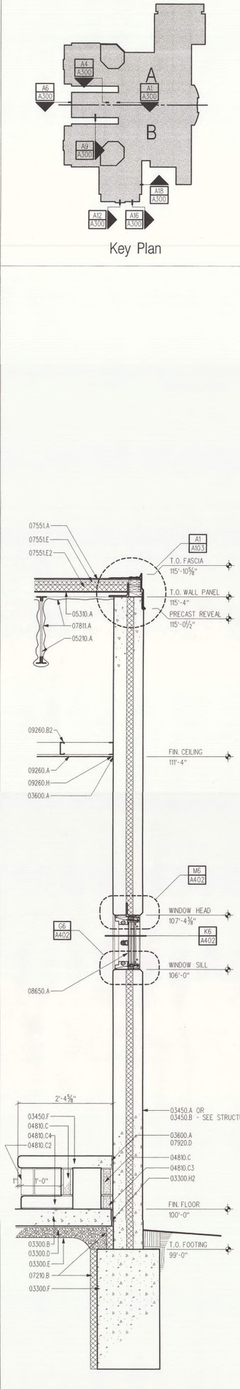

A1	WALL SECTION		A4	WALL SECTION		A6	WALL SECTION		A9	WALL SECTION		A12	WALL SECTION		A16	WALL SECTION		A18	WALL SECTION	
SCALE: ¾" = 1'-0"	East Wall -- Gymnasium Penthouse		SCALE: ¾" = 1'-0"	West Wall -- Gymnasium Penthouse		SCALE: ¾" = 1'-0"	West Wall -- Gymnasium		SCALE: ¾" = 1'-0"	North and South Wall -- Gymnasium		SCALE: ¾" = 1'-0"	End Wall -- Housing Penthouse		SCALE: ¾" = 1'-0"	Typical Bearing Wall -- Housing		SCALE: ¾" = 1'-0"	Typical Wall -- Housing	

CONDOC KEYNOTES

02751 CEMENT CONCRETE PAVEMENT
02751.D3 EXPANSION JOINT FILLER STRIP
02751.F STRUCTURAL CONCRETE STOOP

03300 CAST-IN-PLACE CONCRETE
03300.A3 CONTINUOUS CONCRETE CAP, TOP TO MATCH ROOF SLOPE, SEE STRUCTURAL
03300.B 5" CONCRETE SLAB ON GRADE
03300.C 6 1/2" REINFORCED CONCRETE COMPOSITE SLAB
03300.C2 8" FORMED ELEVATED REINFORCED CONCRETE COMPOSITE SLAB W/ INTEGRAL CURB
03300.D CRUSHED LIMESTONE BASE,,3" DEPTH, WITH 1/2" CHOKER COARSE OF SAND
03300.E VAPOR BARRIER
03300.F CONCRETE FOOTING, SEE STRUCTURAL
03300.G CAST-IN-PLACE CONCRETE CURB
03300.H2 BOND BREAKER, 30 LB BUILDERS FELT

03450 PLANT-PRECAST ARCHITECTURAL CONCRETE
03450.A 8" SEMI-COMPOSITE LOAD BEARING PRECAST CONCRETE INSULATED WALL PANELS.
03450.A2 10" SEMI-COMPOSITE LOAD BEARING PRECAST CONCRETE INSULATED WALL PANELS.
03450.B PRECAST ARCHITECTURAL CONCRETE WALL PANEL
03450.F PRECAST CONCRETE BED PLATFORM, 4" THICKNESS

0351 CEMENTITIOUS WOOD-FIBER DECK
0351.1A COMPOSITE CEMENTITIOUS WOOD-FIBER DECK

03600 EPOXY SEALANTS
03600.A EPOXY SEALANT, TOOLED TO BEVEL

04810 UNIT MASONRY ASSEMBLIES
04810.A 8" CONCRETE MASONRY UNIT
04810.A2 8" WIDE X 4" HIGH CONCRETE MASONRY UNIT
04810.C 4" CONCRETE MASONRY UNIT
04810.C2 4" BULLNOSE CONCRETE MASONRY UNIT
04810.C3 4" X 4" CONCRETE MASONRY UNIT (BED BASE)
04810.C4 4" SOLID CONCRETE MASONRY BULLNOSE UNIT (BED ALCOVE BASE)
04810.K SOLID CONCRETE MASONRY UNIT (SOAP UNIT)
04810.M 10" CONCRETE MASONRY UNIT
04810.M3 10" X 4" HIGH CONCRETE MASONRY UNIT

05120 STRUCTURAL STEEL
05120.A STEEL BEAM, SEE STRUCTURAL
05120.B STEEL COLUMN, SEE STRUCTURAL

05210 STEEL JOISTS
05210.A STEEL BAR JOIST, SEE STRUCTURAL
05210.B STEEL CABLE TRUSS, SEE STRUCTURAL

05310 STEEL DECK
05310.A 1 1/2" GALVANIZED STEEL ROOF DECK
05310.B 2" GALVANIZED STEEL COMPOSITE FLOOR DECK

05400 COLD FORMED METAL FRAMING
05400.F 2" X 2" X 18 GA CLIP ANGLE

07210 BUILDING INSULATION
07210.B 2" EXTRUDED POLYSTYRENE PERIMETER INSULATION
07210.C 2" CAVITY WALL INSULATION

07411 MANUFACTURED ROOF PANELS
0741.1A 22 GAUGE PREFINISHED GALVANIZED STEEL, 1 3/4" HIGH STANDING SEAM ROOFING
0741.1B ASPHALT SATURATED ORGANIC FELT

07412 MANUFACTURED WALL PANELS
0741.2A INSULATED ALUMINUM WALL PANELS, 1" THICKNESS R-7

07551 APP-MODIFIED BITUMINOUS MEMBRANE ROOFING
07551.A APP-MODIFIED BITUMINOUS MEMBRANE ROOFING SYSTEM
07551.E POLYISOCYANURATE COMPOSITE BOARD INSULATION WITH 1/2" THICK PERLITE FACER,1 3/4" TOTAL THICKNESS
07551.E2 POLYISOCYANURATE BOARD INSULATION, 1 3/4" THICKNESS

07620 SHEET METAL FLASHING AND TRIM
07620.A 0.050" PRE-FINISHED ALUMINUM FASCIA

07810 PLASTIC UNIT SKYLIGHTS
07810.B TRANSLUCENT PLASTIC UNIT WALL PANEL

07811 SPRAYED FIRE-RESISTIVE MATERIALS
0781.1A SPRAYED FIRE RESISTIVE MATERIAL - 1 HOUR FIRE RATED ROOF CEILING ASSEMBLY
0781.1B SPRAYED FIRE RESISTIVE MATERIAL - 2 HOUR FIRE PROTECTION FOR PRIMARY STRUCTURE.

07841 THROUGH-PENETRATION FIRESTOP SYSTEMS
0784.1D GYPSUM BASED SEALANT

07920 JOINT SEALANTS
07920.B ELASTOMERIC JOINT SEALANT, ES*2
07920.D CYLINDRICAL SEALANT BACKING

08650 DETENTION / SECURITY WINDOWS
08650.A STAINLESS STEEL THERMALLY BROKEN SECURITY WINDOW WITH ALUMINUM EXTERIOR.

09260 GYPSUM BOARD ASSEMBLIES
09260.A 5/8" ABUSE RESISTANT GYPSUM FIBER PANEL WALLBOARD
09260.B 3 5/8" STEEL STUDS @ 16" O.C.
09260.B2 5/8" ABUSE RESISTANT GYPSUM FIBER PANEL WALLBOARD OVER 3 5/8" STEEL STUDS @ 16" O.C.
09260.E2 FIRE RATED DEFLECTION TRACK ASSEMBLY
09260.H "L" BEAD
09260.K 3 1/2 SOUND ATTENUATION BLANKETS

09500 ACOUSTICAL WALL PANELS
09500.A ACOUSTICAL WALL PANELS
09500.A2 ACOUSTICAL WALL PANEL INFILL
09500.B 1 1/2" X 4 1/2" WOOD TRIM - PAINT FINISH

0951 ACOUSTICAL PANEL CEILINGS
0951.1A ACOUSTICAL PANEL CEILING SYSTEM, SEE FINISH SCHEDULE FOR PANEL TYPES.

11191 SECURITY / DETENTION EQUIPMENT
11191.A HOLLOW METAL FRAME ASSEMBLY, GROUTED SOLID, ALL GROUT HOLES BY JAMB SUPPLIER

11480 ATHLETIC, RECREATIONAL, AND THERAPEUTIC EQUIPMENT
11480.B INTERIOR BASKETBALL GOAL, W/ 6'-0" EXTENSION FROM WALL.

15000 MECHANICAL
15000.C LOUVER, SEE MECH.

Lancaster Co. Juvenile Detention Center

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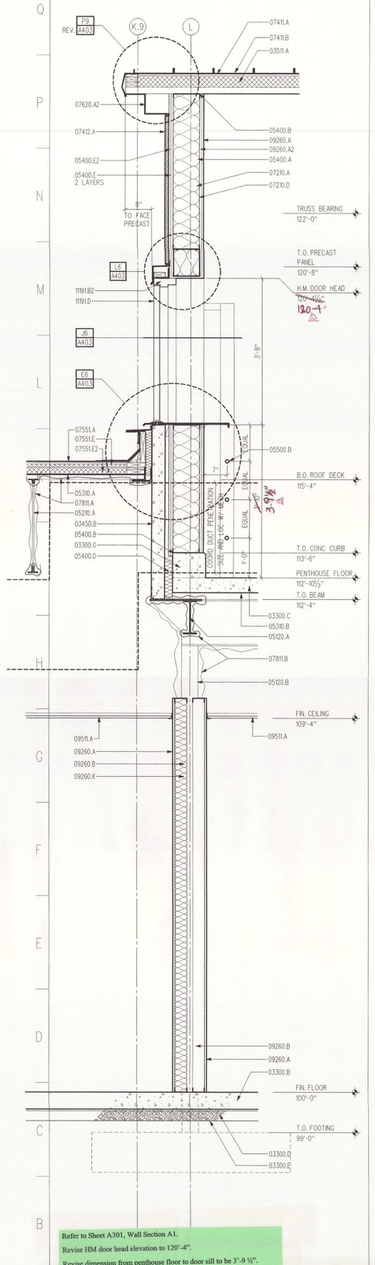
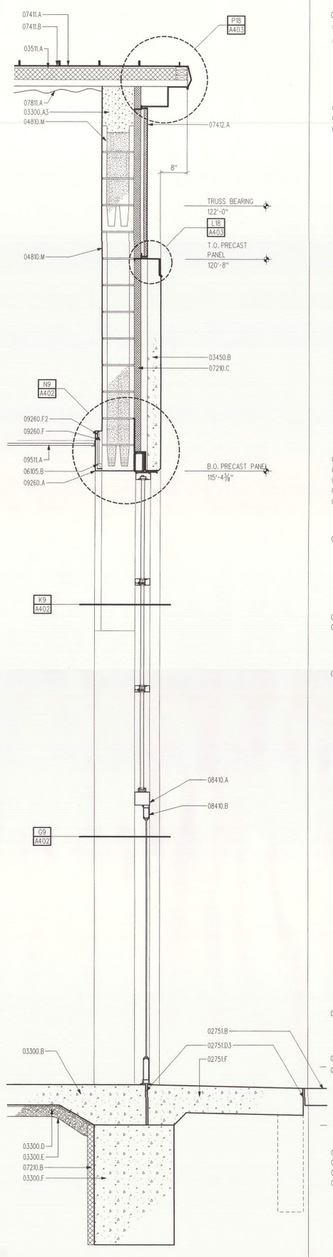
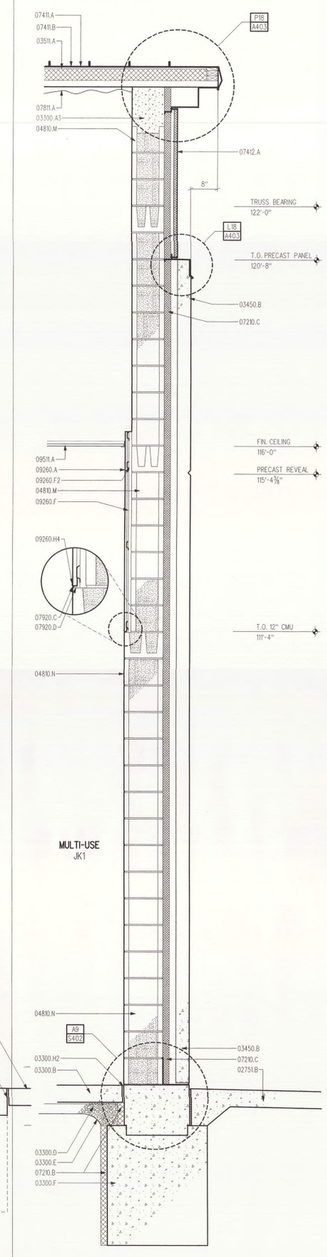


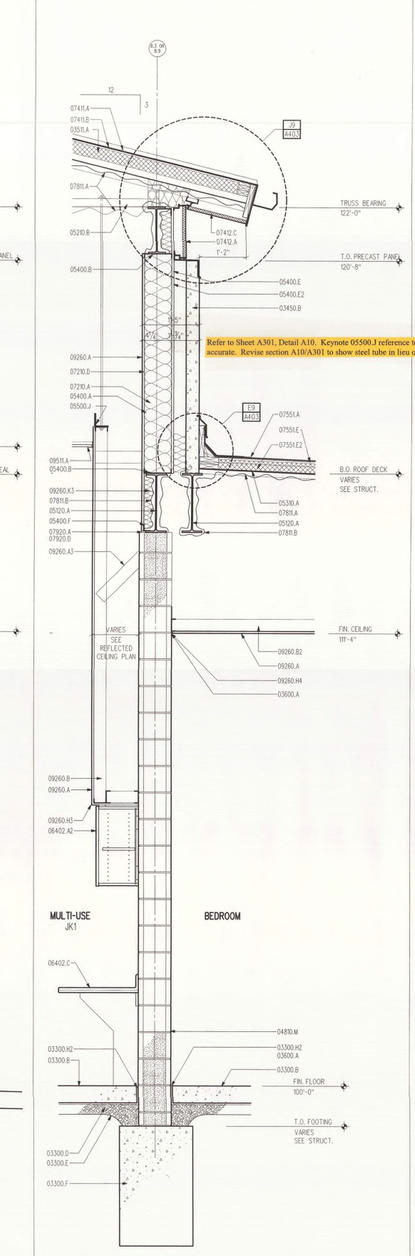
A1 WALL SECTION
SCALE: 3/4" = 1'-0"
South Wall Staff Secure Mechanical M221



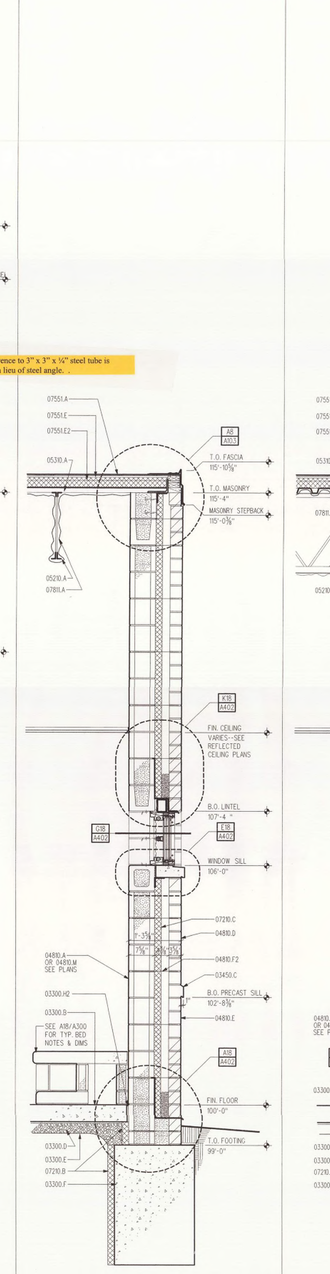
A4 WALL SECTION
SCALE: 3/4" = 1'-0"
North Wall Staff Secure Multi-Use JK1



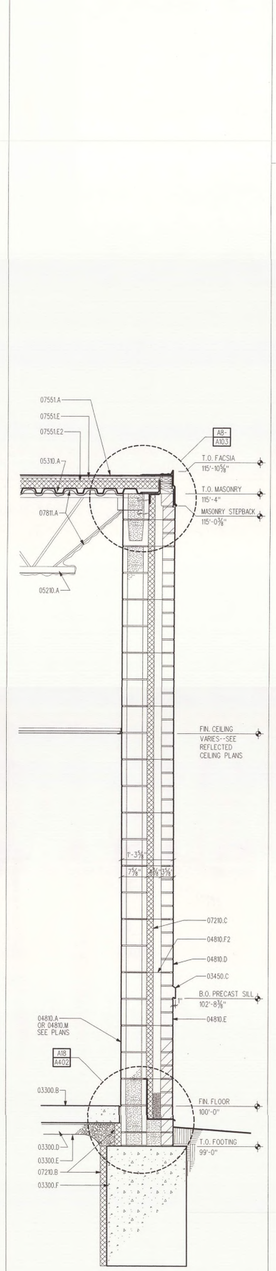
A7 WALL SECTION
SCALE: 3/4" = 1'-0"
North Wall Staff Secure Multi-Use JK1



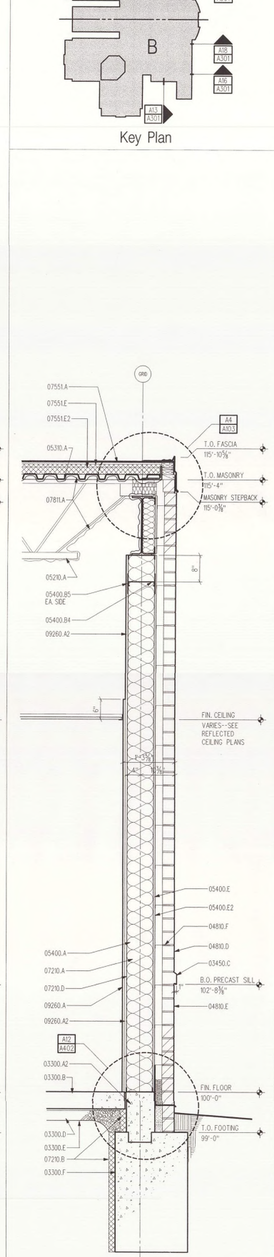
A10 WALL SECTION
SCALE: 3/4" = 1'-0"
East & West Wall Staff Secure Multi-Use JK1



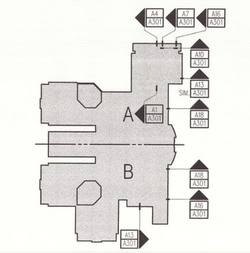
A13 WALL SECTION
SCALE: 3/4" = 1'-0"
Non-Bearing Wall--CMU Cavity w/ Face Brick



A16 WALL SECTION
SCALE: 3/4" = 1'-0"
Bearing Wall--CMU Cavity w/ Face Brick



A18 WALL SECTION
SCALE: 3/4" = 1'-0"
Bearing Wall--8" Stud Cavity w/ Face Brick



CONDOC KEYNOTES

02751 CEMENT CONCRETE PAVEMENT
02751.B 5" THICK CONCRETE WALKWAY
02751.D3 EXPANSION JOINT FILLER STRIP
02751.F STRUCTURAL CONCRETE STOOP

03300 CAST-IN-PLACE CONCRETE
03300.A2 CAST-IN-PLACE CONCRETE STEM WALL
03300.A3 CONTINUOUS CONCRETE CAP, TOP TO MATCH ROOF SLOPE, SEE STRUCTURAL
03300.B 5" CONCRETE SLAB ON GRADE
03300.C 1 1/2" REINFORCED CONCRETE COMPOSITE SLAB
03300.D CRUSHED LIMESTONE BASE, 7" DEPTH, WITH 1/2" CHOKER COURSE OF SAND
03300.E VAPOR BARRIER
03300.F CONCRETE FOOTING, SEE STRUCTURAL
03300.G CAST-IN-PLACE CONCRETE CURB
03300.H2 BOND BREAKER, 30 LB BUILDERS FELT

03450 PLANT-PRECAST ARCHITECTURAL CONCRETE
03450.B PRECAST ARCHITECTURAL CONCRETE WALL PANEL
03450.C PRECAST ARCHITECTURAL CONCRETE SILL

03511 CEMENTITIOUS WOOD-FIBER DECK
03511.A COMPOSITE CEMENTITIOUS WOOD-FIBER DECK

03600 EPOXY SEALANTS
03600.A EPOXY SEALANT, TOOLED TO BEVEL

04810 UNIT MASONRY ASSEMBLIES
04810.A 8" CONCRETE MASONRY UNIT
04810.D FACE BRICK, 2 5/8" x 3 5/8" x 7 5/8" "TYPE A"(UPPER, LIGHT COLOR)
04810.E FACE BRICK, 3 5/8" x 3 5/8" x 7 5/8" "TYPE B"(LOWER, DARK COLOR)
04810.F VENEER ANCHORS @ 24" O.C. HORIZ. & @ 12" O.C. VERTICALLY
04810.F2 CAVITY WALL, BRICK TIES @ 16" O.C. HORIZ. & VERT.
04810.M 10" CONCRETE MASONRY UNIT
04810.N 12" CONCRETE MASONRY UNIT

05120 STRUCTURAL STEEL
05120.A STEEL BEAM, SEE STRUCTURAL
05120.B STEEL COLUMN, SEE STRUCTURAL

05210 STEEL JOISTS
05210.A STEEL BAR JOIST, SEE STRUCTURAL
05210.B STEEL GABLE TRUSS, SEE STRUCTURAL

05310 STEEL DECK
05310.A 1½" GALVANIZED STEEL ROOF DECK
05310.B 2" GALVANIZED STEEL COMPOSITE FLOOR DECK

05400 COLD FORMED METAL FRAMING
05400.A 8" X 0.042" (18GA.) STEEL STUDS @ 24" O.C.
05400.B 8" STEEL TRACK, 0.053" (16GA.) THICK
05400.B4 STUD BLOCKING, EVERY OTHER STUD SPACE.
05400.B5 STEEL STRAP, 6" X 20GA X CONTINUOUS
05400.D THERMAL ISOLATION
05400.E GLASS MAT GYPSUM SHEATHING BOARD, 5/8" THICKNESS
05400.E2 AIR-INFILTRATION BARRIER, ASPHALT -SATURATED ORGANIC FELT
05400.F 2" X 2" X 18 GA. CLIP ANGLE

05500 METAL FABRICATIONS
05500.B ACCESS LADDER
05500.J 5/8" DIAMETER THREADED ROD HANGER @ EA. JOIST SURROUNDING 3" X 3" X 1/4" STEEL TUBE CONT. (CABINETS)

06105 MISC. CARPENTRY
06105.B WOOD BACKING, FIRE TREATED

06402 INTERIOR ARCHITECTURAL WOODWORK
06402.A2 LAMINATE CLAD CABINET
06402.C HIGH PRESSURE DECORATIVE LAMINATE COUNTERTOP W/ INTEGRAL BACKSPLASH

07210 BUILDING INSULATION
07210.A 8.25" GLASS-FIBER BATT INSULATION R-30
07210.B 2" EXTRUDED POLYSTYRENE PERIMETER INSULATION
07210.C 2" CAVITY WALL INSULATION
07210.D 10Q POLYSTYLENE VAPOR RETARDER

07411 MANUFACTURED ROOF PANELS
07411.A 22 GAUGE PREPAINTED GALVANIZED STEEL, 1 3/4" HIGH STANDING SEAM ROOFING
07411.B ASPHALT -SATURATED ORGANIC FELT

07412 MANUFACTURED WALL PANELS
07412.A INSULATED ALUMINUM WALL PANELS, 1" THICKNESS R-7
07412.C INSULATED ALUMINUM SOFFIT PANELS, 1" THICKNESS R-7

07551 APP-MODIFIED BITUMINOUS MEMBRANE ROOFING
07551.A APP-MODIFIED BITUMINOUS MEMBRANE ROOFING SYSTEM
07551.E POLYISOCYANURATE COMPOSITE BOARD INSULATION WITH 1/2" THICK PERLITE FACER, 1 3/4" TOTAL THICKNESS
07551.E2 POLYISOCYANURATE BOARD INSULATION, 1 3/4" THICKNESS

07620 SHEET METAL FLASHING AND TRIM
07620.A2 .0355" PRE-FINISHED ALUMINUM TRIM

07811 SPRAYED FIRE-RESISTIVE MATERIALS
07811.A SPRAYED FIRE RESISTIVE MATERIAL - 1 HOUR FIRE RATED ROOF CEILING ASSEMBLY
07811.B SPRAYED FIRE RESISTIVE MATERIAL - 2 HOUR FIRE PROTECTION FOR PRIMARY STRUCTURE.

07920 JOINT SEALANTS
07920.A ELASTOMERIC JOINT SEALANT, ESM
07920.C PICK-PROOF SECURITY JOINT SEALANT
07920.D CYLINDRICAL SEALANT BACKING

08410 ALUMINUM ENTRANCES AND STOREFRONTS
08410.A ALUMINUM STOREFRONT SYSTEM
08410.B ALUMINUM ENTRANCE, SEE DOOR SCHEDULE FOR SIZE

09260 GYPSUM BOARD ASSEMBLIES
09260.A 5/8" ABUSE RESISTANT GYPSUM FIBER PANEL WALLBOARD
09260.A2 5/8" TYPE X GYPSUM WALLBOARD.
09260.A3 3 5/8" STEEL STUD DIAGONAL BRACING @ 4'-0" O.C.
09260.B 3 5/8" STEEL STUDS @ 8" O.C.
09260.B2 5/8" ABUSE RESISTANT GYPSUM FIBER PANEL WALLBOARD OVER 3 5/8" STEEL STUDS @ 16" O.C.
09260.F 7/8" HAT CHANNELS @ 16" O.C.
09260.F2 1/2" RESILIENT CHANNELS @ 16" O.C.
09260.H3 CORNERBEAD
09260.H4 "H" BEAD
09260.X 3 1/2 SOUND ATTENUATION BLANKETS
09260.X3 FILL VOIDS WITH SOUND ATTENUATION INSUL.

09511 ACOUSTICAL PANEL CEILINGS
09511.A ACOUSTICAL PANEL CEILING SYSTEM, SEE FINISH SCHEDULE FOR PANEL TYPES.

11911 SECURITY / DETENTION EQUIPMENT
1191.B2 HOLLOW METAL FRAME ASSEMBLY, SEE FRAME ELEVATIONS FOR EXTENT OF GROUTING.
1191.D METAL DOOR, FLUSH TYPE

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JH, MH, KC	98056
PROJECT ARCH.	ISSUED
CB, LK	11 /19 /99
INTERN ARCH.	REVISION
DU	

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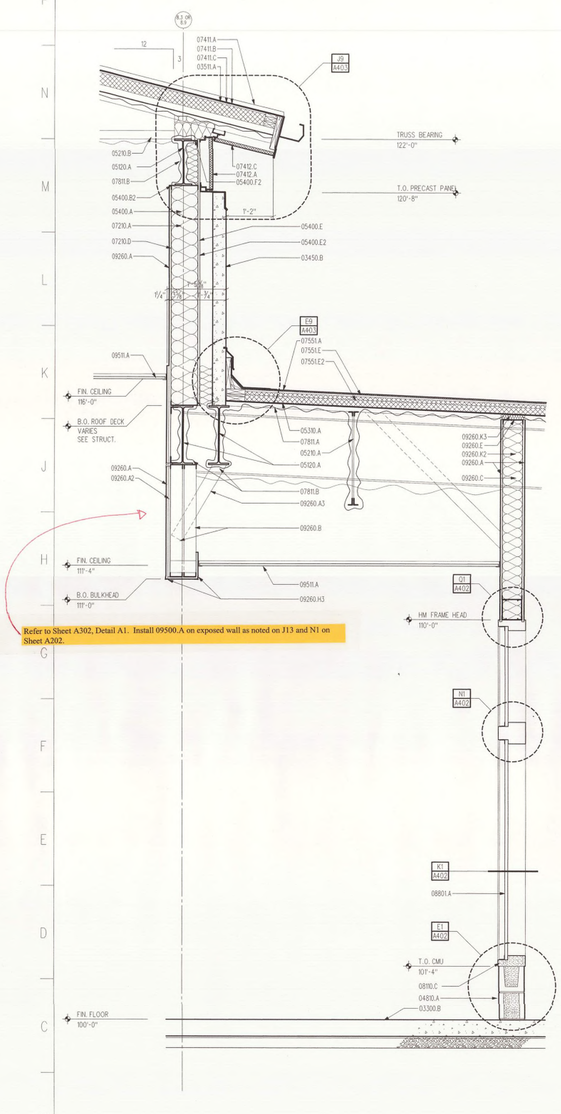

CONDOC KEYNOTES

02751 CEMENT CONCRETE PAVEMENT
02754F STRUCTURAL CONCRETE STOOP

03300 CAST-IN-PLACE CONCRETE
03300.A2 CAST-IN-PLACE CONCRETE STEM WALL
03300.B 5" CONCRETE SLAB ON GRADE
03300.D CRUSHED LIMESTONE BASE, 3" DEPTH, WITH 1/2" CHOKER COARSE OF SAND
03300.E VAPOR BARRIER
03300.F CONCRETE FOOTING, SEE STRUCTURAL
03300.H COMPRESSIBLE FILLER, 1/2" THICKNESS
03300.H2 BOND BREAKER, 30 LB BUILDERS FELT

03450 PLANT-PRECAST ARCHITECTURAL CONCRETE
03450.B PRECAST ARCHITECTURAL CONCRETE WALL PANEL
03450.C2 RADIUSED PRECAST ARCHITECTURAL CONCRETE SILL
03450.D PRECAST ARCHITECTURAL CONCRETE LINTEL
03450.D2 RADIUSED PRECAST ARCHITECTURAL CONCRETE LINTEL

03516 CEMENTITIOUS WOOD-FIBER DECK
03516.A COMPOSITE CEMENTITIOUS WOOD-FIBER DECK

04810 UNIT MASONRY ASSEMBLIES
0481I.A 8" CONCRETE MASONRY UNIT
0481D.D FACE BRICK, 3 5/8" x 3 5/8" x 7 5/8" "TYPE A"(UPPER, LIGHT COLOR)
0481D.E FACE BRICK, 3 5/8" x 3 5/8" x 7 5/8" "TYPE B"(LOWER DARK COLOR)
0481D.F VENEER ANCHORS @ 24" O.C. HORIZ. & @ 12" O.C. VERTICALLY
0481D.M 10" CONCRETE MASONRY UNIT

05120 STRUCTURAL STEEL
05120.A STEEL BEAM, SEE STRUCTURAL
05120.D STEEL TUBE, SEE STRUCTURAL

05210 STEEL JOISTS
05210.A STEEL BAR JOIST, SEE STRUCTURAL
05210.B STEEL CABLE TRUSS, SEE STRUCTURAL

05310 STEEL DECK
05310.A 1 1/2" GALVANIZED STEEL ROOF DECK

05400 COLD FORMED METAL FRAMING
05400.A 6" X 0.043" (18GA.) STEEL STUDS @ 24" O.C.
05400.B 8" STEEL TRACK, 0.0538" (16GA.) THICK
05400.B2 SINGLE DEEP LEG DEFLECTION TRACK, 0.0538" 116 GA.) THICK
05400.B4 STUD BLOCKING EVERY OTHER STUD SPACE.
05400.B5 STEEL STRAP, 6" X 20GA X CONTINUOUS
05400.D THERMAL INSULATION
05400.E GLASS MAT GYPSUM SHEATHING BOARD, 5/8" THICKNESS
05400.E2 AIR-INFILTRATION BARRIER, ASPHALT -SATURATED ORGANIC FELT
05400.F 2" X 2" X 1" 18 GA. CLIP ANGLE.
05400.F2 2" X 4" X 18 GA. CLIP ANGLE.

06105 MISC. CARPENTRY
06105.D WOOD BACKING, FIRE TREATED

07210 BUILDING INSULATION
0721D.A 8.25" GLASS-FIBER BATT INSULATION R-30
0721D.A2 GLASS-FIBER BATT INSULATION, FILL VOID
0721D.B 2" EXTRUDED POLYSTYRENE PERIMETER INSULATION
0721D.D POLYETHYLENE VAPOR RETARDER

0741I MANUFACTURED ROOF PANELS
0741I.A 22 GAUGE PREFINISHED GALVANIZED STEEL, 1 3/4" HIGH STANDING SEAM ROOFING
0741I.B ASPHALT -SATURATED ORGANIC FELT
0741I.E WATERPROOF UNDERLAYMENT
0741I.E POLYISOCYANURATE BOARD INSULATION, 1 3/4" THICKNESS
0741I.F 7/16"ORIENTED STRAND BOARD SHEATHING MECHANICALLY FASTENED TO ROOF DECK.

07421 MANUFACTURED WALL PANELS
0742I.A INSULATED ALUMINUM WALL PANELS, 7" THICKNESS R-7
0742I.C INSULATED ALUMINUM SOFFIT PANELS, 7" THICKNESS R-7

07551 APP-MODIFIED BITUMINOUS MEMBRANE ROOFING
0755I.A APP-MODIFIED BITUMINOUS MEMBRANE ROOFING SYSTEM
0755I.E POLYISOCYANURATE COMPOSITE BOARD INSULATION WITH 9/2" THICK PERLITE FACER, 1 3/4" TOTAL THICKNESS
0755I.E2 POLYISOCYANURATE BOARD INSULATION, 1 3/4" THICKNESS
0755I.E3 TAPERED POLYISOCYANURATE BOARD INSULATION
0755I.F 5/8" GLASS-MAT THERMAL BARRIER, MECHANICALLY FASTENED TO STEEL ROOF DECK.

07819 SPRAYED FIRE-RESISTIVE MATERIALS
0781I.A SPRAYED FIRE RESISTIVE MATERIAL - 1 HOUR FIRE RATED ROOF CEILING ASSEMBLY
0781I.B SPRAYED FIRE RESISTIVE MATERIAL - 2 HOUR FIRE PROTECTION FOR PRIMARY STRUCTURE.

07841 THROUGH-PENETRATION FIRESTOP SYSTEMS
0784I.B WALL PENETRATION FIRESTOP
0784I.C2 SLAG WOOL FIBER CAFING INSULATION

07920 JOINT SEALANTS
0792D.A ELASTOMERIC JOINT SEALANT, ES=1
0792D.D CYLINDRICAL SEALANT BACKING

08110 STEEL DOORS AND FRAMES
0811D.C HOLLOW METAL BORROW LITE FRAME

08410 ALUMINUM ENTRANCES AND STOREFRONTS
0841D.A ALUMINUM STOREFRONT SYSTEM
0841D.B ALUMINUM ENTRANCE, SEE DOOR SCHEDULE FOR SIZE

08801 SECURITY GLAZING
0880I.A SECURITY GLAZING, SEE FRAME ELEVATIONS FOR TYPE, SCHEDULE IS IN SPECIFICATION.

09260 GYPSUM BOARD ASSEMBLIES
09260.A 5/8" ABUSE RESISTANT GYPSUM FIBER PANEL WALLBOARD.
09260.A2 5/8" TYPE X GYPSUM WALLBOARD.
09260.A3 3 5/8" STEEL STUD DIAGONAL BRACING @ 4'-0" O.C.
09260.B 3 5/8" STEEL STUDS @ 16" O.C.
09260.B2 5/8" ABUSE RESISTANT GYPSUM FIBER PANEL WALLBOARD OVER 3 5/8" STEEL STUDS @ 16" O.C.
09260.C 6" STEEL STUDS @ 16" O.C.
09260.D 1 5/8" METAL STUDS @ 16" O.C.
09260.E DEFLECTION TRACK
09260.E2 FIRE RATED DEFLECTION TRACK ASSEMBLY
09260.H3 CORNERBEAD
09260.H4 "Y" BEAD
09260.K2 6" SOUND ATTENUATION BLANKETS
09260.K3 FILL VOIDS WITH SOUND ATTENUATION INSUL.

09309 PORTLAND CEMENT PLASTER
09290.A 3/4" PORTLAND CEMENT PLASTER OVER EXPANDED METAL LATH

09511 ACOUSTICAL PANEL CEILINGS
0951I.A ACOUSTICAL PANEL CEILING SYSTEM, SEE FINISH SCHEDULE FOR PANEL TYPES.

Lancaster Co. Juvenile Detention Center

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DESIGN ARCH. JH, MH, KC	ARCH. JOB NO. 98056		
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INTERN ARCH. DU	REVISION		

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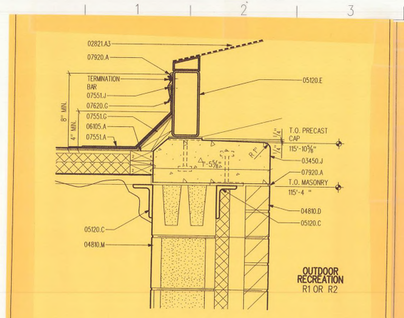

ROOF EDGE DETAIL – ALTERNATE

SCALE: 1 1/2" = 1'-0"
TYPICAL @ OUTDOOR RECREATION—SEE DIVISION 1: ALTERNATES

Attachment to:	Addendum #1	Attachment No.:	05
Date:	December 9, 1999		
Project Name:	Lancaster County Juvenile Detention Facility		
Project Number:	98056		

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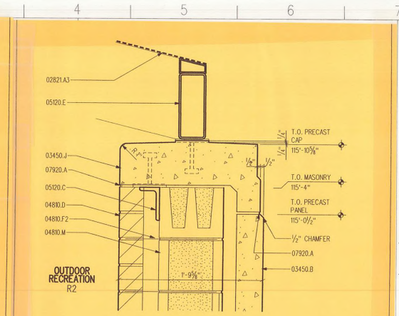

CAP FLASHING DETAIL – ALTERNATE

SCALE: 1 1/2" = 1'-0"
TYPICAL NORTH WALL OUTDOOR REC R2—SEE DIVISION 1: ALTERNATES

Attachment to:	Addendum #1	Attachment No.:	06
Date:	December 9, 1999		
Project Name:	Lancaster County Juvenile Detention Facility		
Project Number:	98056		

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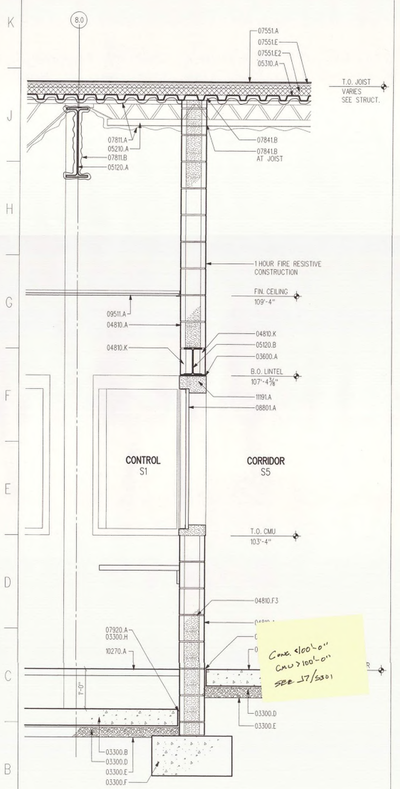
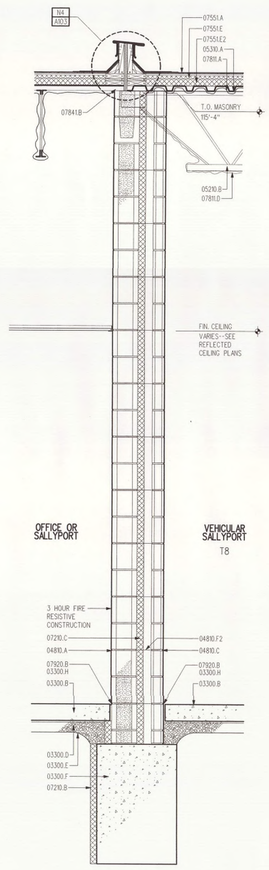
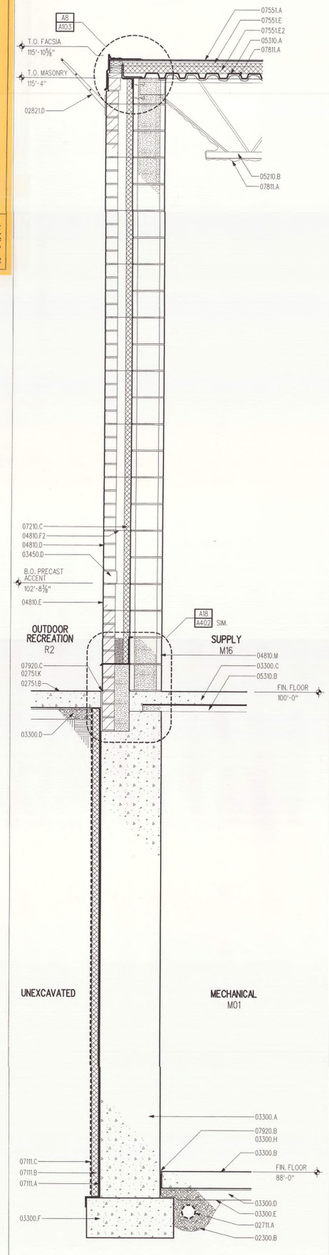
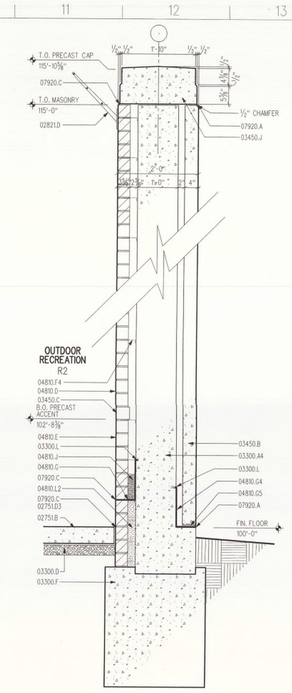


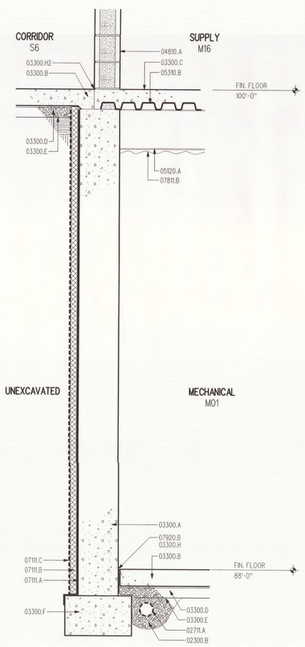






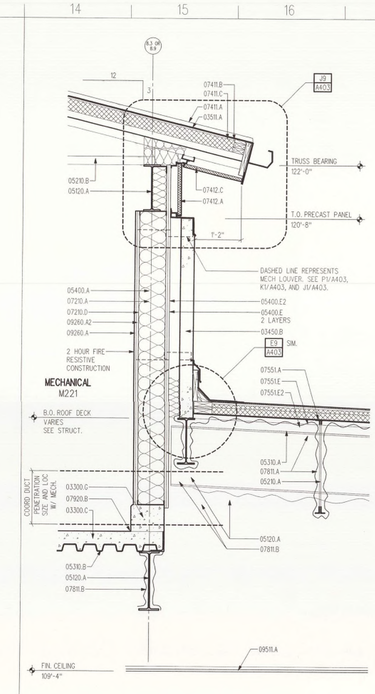
J10 WALL SECTION

SCALE: 3/4" = 1'-0" — North Wall Outdoor Rec R2



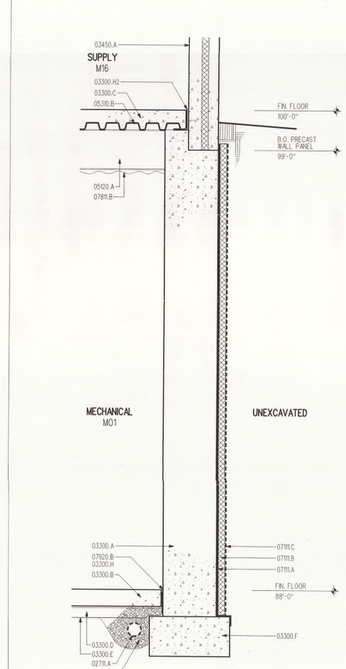
A10 WALL SECTION

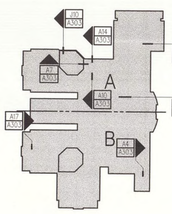
SCALE: 3/4" = 1'-0" — South Wall Basement (Mechanical M01)



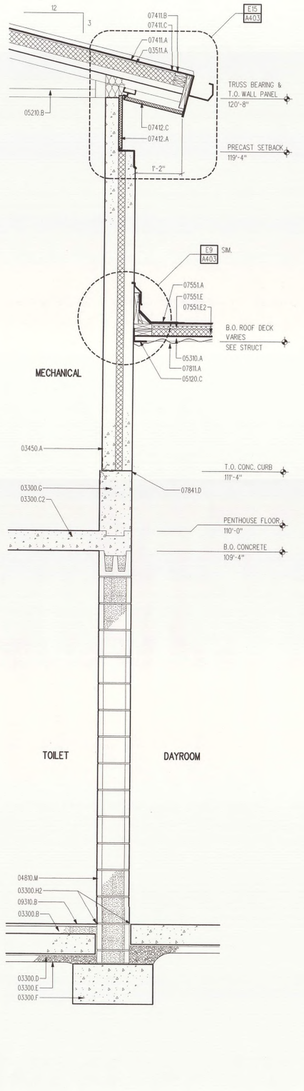
J14 WALL SECTION

SCALE: 3/4" = 1'-0" — East and West Wall Staff Secure Mechanical Penthouse (M221)





Key Plan



A17 WALL SECTION

SCALE: 3/4" = 1'-0" — Typical Bearing Wall @ Housing Penthouse

CONDOC KEYNOTES

02300 EARTHWORK
02300.B "4700" DRAINAGE FILL

02774 FOUNDATION DRAINAGE SYSTEMS
02778.A UNDER FLOOR DRAINAGE SYSTEM SLOPE TO SUMP PIT

02751 CEMENT CONCRETE PAVEMENT
02751.B 5" THICK CONCRETE WALKWAY
02751.D3 EXPANSION JOINT FILLER STRIP
02751.K COMPRESSIBLE JOINT FILLER

02821 CHAIN LINK FENCES AND GATES
02821.D WALL MOUNTED BARBED WIRE STAND-OFF SPACED AT 10'-0" O.C. W/ 3 WIRE STRANDS OF BARBED WIRE

03300 CAST-IN-PLACE CONCRETE
03300.A CAST-IN-PLACE CONCRETE FOUNDATION WALL
03300.A4 CAST-IN-PLACE CONCRETE WALL
03300.B 5" CONCRETE SLAB ON GRADE
03300.C 6 1/2" REINFORCED CONCRETE COMPOSITE SLAB
03300.C2 8" FORMED ELEVATED REINFORCED CONCRETE COMPOSITE SLAB W/ INTEGRAL CURB
03300.D CRUSHED LIMESTONE BASE, 3" DEPTH, WITH 1/2" CHOKER COARSE OF SAND
03300.E VAPOR BARRIER
03300.F CONCRETE FOOTING, SEE STRUCTURAL
03300.G CAST-IN-PLACE CONCRETE CURB
03300.H COMPRESSIBLE FILLER, 1/2" THICKNESS
03300.H2 BOND BREAKER, 30 LB BUILDERS FELT
03300.L 1/2" X 3 1/4"D REGLET CAST INTO CONCRETE WALL FOR TERMINATION OF THROUGH WALL FLASHING

03450 PLANT-PRECAST ARCHITECTURAL CONCRETE
03450.A 9" SEMI-COMPOSITE LOAD BEARING PRECAST CONCRETE INSULATED WALL PANELS
03450.B PRECAST ARCHITECTURAL CONCRETE WALL PANEL
03450.C PRECAST ARCHITECTURAL CONCRETE SILL
03450.D PRECAST ARCHITECTURAL CONCRETE LINTEL
03450.E PRECAST ARCHITECTURAL CONCRETE CAP

03600 CEMENTITIOUS WOOD-FIBER DECK
03511.A COMPOSITE CEMENTITIOUS WOOD-FIBER DECK

03900 EPOXY SEALANTS
03900.A EPOXY SEALANT, TOOLED TO BEVEL

04810 UNIT MASONRY ASSEMBLIES
04810.A 8" CONCRETE MASONRY UNIT
04810.C 4" CONCRETE MASONRY UNIT
04810.D FACE BRICK, 3 5/8" x 3 5/8" x 7 5/8" "TYPE A"/UPPER, LIGHT COLOR
04810.E FACE BRICK, 3 5/8" x 3 5/8" x 7 5/8" "TYPE B"/LOWER DARK COLOR
04810.F2 CAVITY WALL BRICK TIES @ 16" O.C. HORIZ. & VERT.
04810.F3 HORIZONTAL REINFORCING @ 16" O.C. HORIZ. & VERT.
04810.F4 ADJUSTABLE DOVETAIL BRICK TIES @ 16" O.C. HORIZ. & VERT.
04810.G THROUGH WALL FLASHING WITH WEEPS @ 16" O.C.
04810.G4 THROUGH WALL FLASHING
04810.G5 WEEP TUBES W/ ROPES AT EACH VERTICAL JOINT.
04810.J CAVITY DRAINAGE MATERIAL
04810.K SOLID CONCRETE MASONRY UNIT (SCMU UNIT)
04810.L2 GROUT
04810.M 16" CONCRETE MASONRY UNIT

05050 STRUCTURAL STEEL
05050.A STEEL BEAM, SEE STRUCTURAL
05050.B STEEL COLUMN, SEE STRUCTURAL
05050.C STEEL ANGLE, SEE STRUCTURAL

05210 STEEL JOISTS
05210.A STEEL BAR JOIST, SEE STRUCTURAL
05210.B STEEL CABLE TRUSS, SEE STRUCTURAL

05310 STEEL DECK
05310.A 1 1/2" GALVANIZED STEEL ROOF DECK
05310.B 2" GALVANIZED STEEL COMPOSITE FLOOR DECK

05400 COLD FORMED METAL FRAMING
05400.A 8" X 0.0428" (18GA.) STEEL STUDS @ 24" O.C.
05400.E GLASS MAT GYPSUM SHEATHING BOARD, 5/8" THICKNESS
05400.E2 AIR INFILTRATION BARRIER, ASPHALT - SATURATED ORGANIC FELT

07111 SELF ADHERING SHEET WATERPROOFING
07111.A BELOW GRADE WALL WATERPROOFING
07111.B 2" EXTRUDED-POLYSTYRENE BOARD INSULATION W/ DRAINAGE CHANNELS
07111.C NON-WOVEN FILTRATION FABRIC.

07210 BUILDING INSULATION
07210.A 8.25" GLASS-FIBER BATT INSULATION R-30
07210.B 2" EXTRUDED POLYSTYRENE PERIMETER INSULATION
07210.C 2" CAVITY WALL INSULATION
07210.D POLYETHYLENE VAPOR RETARDER

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07410.C WATERPROOF UNDERLAYMENT

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07551.C POLYISOCYANURATE COMPOSITE BOARD INSULATION WITH 1/2" THICK PERLITE FACER, 1 3/4" TOTAL THICKNESS
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07811.A SPRAYED FIRE RESISTIVE MATERIAL - 1 HOUR FIRE RATED ROOF CEILING ASSEMBLY
07811.B SPRAYED FIRE RESISTIVE MATERIAL - 2 HOUR FIRE PROTECTION FOR PRIMARY STRUCTURE
07811.D EXPOSED SPRAYED FIRE RESISTIVE MATERIAL, 1 HOUR FIRE RATED ROOF CEILING ASSEMBLY

07841 THROUGH-PENETRATION FIRESTOP SYSTEMS
07841.B WALL PENETRATION FIRESTOP
07841.D GYPSUM BASED SEALANT

07920 JOINT SEALANTS
07920.A ELASTOMERIC JOINT SEALANT, ES#1
07920.B ELASTOMERIC JOINT SEALANT, ES#1
07920.C PICK-PROOF SECURITY JOINT SEALANT

08800 SECURITY GLAZING
08801.A SECURITY GLAZING, SEE FRAME ELEVATIONS FOR TYPE, SCHEDULE IS IN SPECIFICATION.

09250 GYPSUM BOARD ASSEMBLIES
09260.A 5/8" ABUSE RESISTANT GYPSUM FIBER PANEL WALLBOARD
09260.A2 5/8" TYPE X GYPSUM WALLBOARD.

09310 CERAMIC TILE
09310.B UNGLAZED CERAMIC FLOOR TILE

09511 ACOUSTICAL PANEL CEILINGS
09511.A ACOUSTICAL PANEL CEILING SYSTEM, SEE FINISH SCHEDULE FOR PANEL TYPES.

10270 ACCESS FLOORING
10270.A ACCESS FLOORING

11191 SECURITY / DETENTION EQUIPMENT
11191.A HOLLOW METAL FRAME ASSEMBLY, GROUTED SOLID, ALL GROUT HOLES BY JAMB SUPPLIER

Lancaster Co. Juvenile Detention Center

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CHRISTOPHER J. BRADLEY — 11-19-99 — A-2712 — REGISTERED PROFESSIONAL ENGINEER — STATE OF NEBRASKA

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Mechanical/Electrical Engineer: Alvine and Associates Inc., 1102 Douglas On The Mall, Omaha, NE 68102, (402) 346-7007	Food Service Consultant: Thomas Morrow Associates, 3600 South 98th Street, Lincoln, NE 68520, (402) 489-3926

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JH, MH, KC	98056
PROJECT ARCH.	ISSUED
CB, LK	11 /19 /99
INTERN ARCH.	REVISION
DU	

A 303

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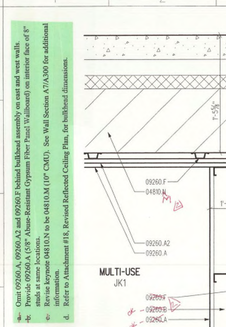
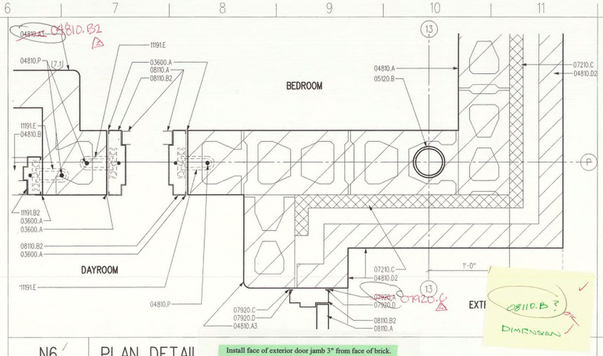


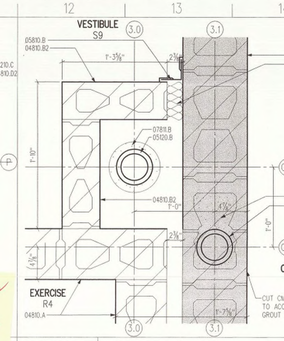
M1 PLAN DETAIL

SCALE: 1½" = 1'-0" CMU Wall Transition @ Staff Secure Mulit-Use JK1--El: 115-4" to 122'-0"



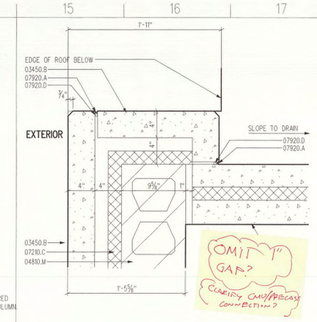
N6 PLAN DETAIL

SCALE: 1½" = 1'-0" CMU Wall Transition @ Staff Secure Egress Door



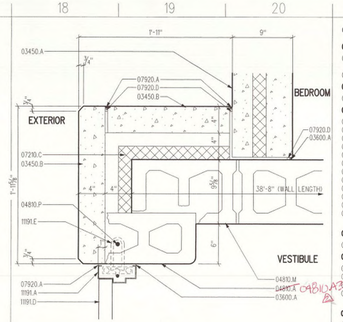
N12 PLAN DETAIL

SCALE: 1½" = 1'-0" Bldg EJ @ Exercise R4



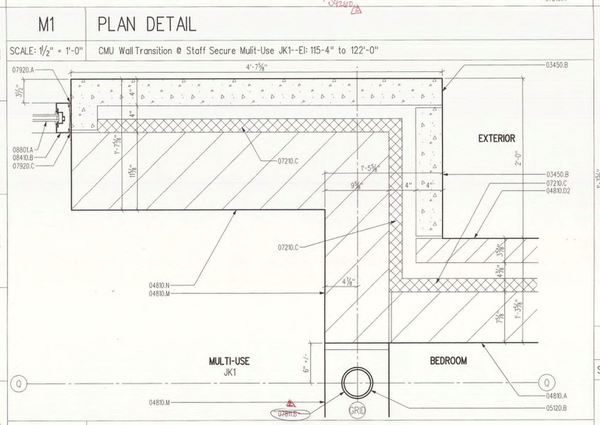
N15 PLAN DETAIL

SCALE: 1½" = 1'-0" Typ. Wall Transition @ Housing Penthouse: El. 115'-4" to 120'-8"



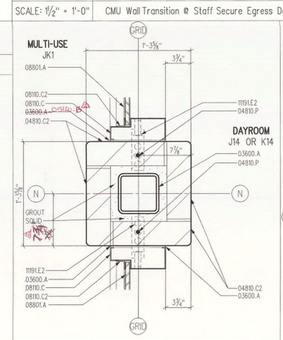
N18 PLAN DETAIL

SCALE: 1½" = 1'-0" Typ. Wall Transition @ Housing Penthouse: El. 99'-0" to 115'-4"



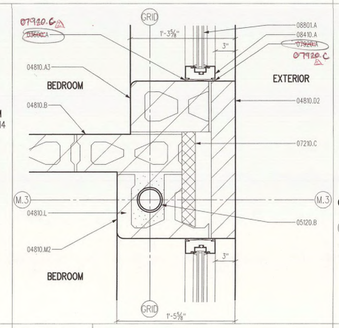
H1 PLAN DETAIL

SCALE: 1½" = 1'-0" CMU Wall Transition @ Staff Secure Mulit-Use JK1--El: 100'-0" to 115'-4".



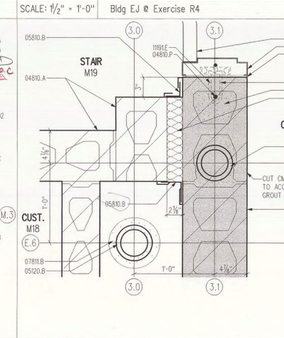
J6 PLAN DETAIL

SCALE: 1½" = 1'-0" Column Protection @ Grid N-8.0, and N-9.7



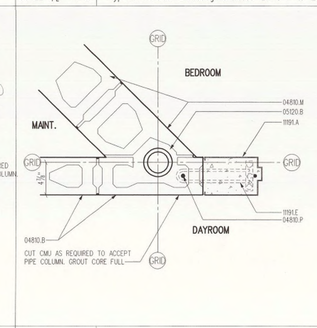
J9 PLAN DETAIL

SCALE: 1½" = 1'-0" CMU Transition @ Grid M.3-14 AND M.3-7.3



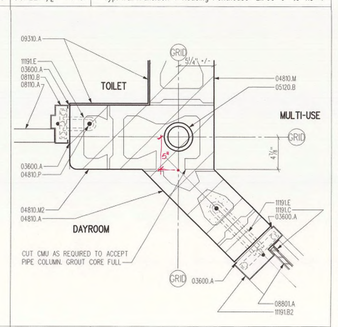
J12 PLAN DETAIL

SCALE: 1½" = 1'-0" Bldg EJ @ Stair M19



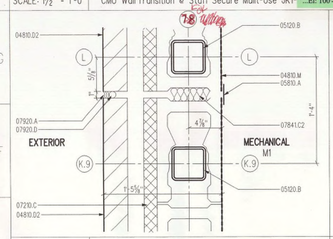
J15 PLAN DETAIL

SCALE: 1½" = 1'-0" Typ. Col. Protection @ Bedroom/Mech Chase



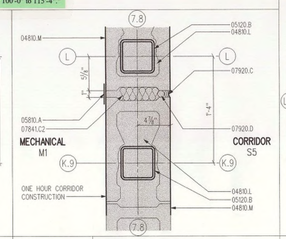
J18 PLAN DETAIL

SCALE: 1½" = 1'-0" Typ. ColProtection @ Housing Toilet/Multi-Use



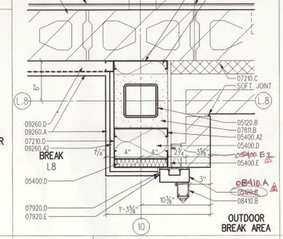
E1 PLAN DETAIL

SCALE: 1½" = 1'-0" Bldg EJ @ Grid L-7.8



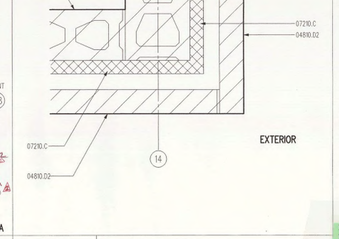
E3 PLAN DETAIL

SCALE: 1½" = 1'-0" Bldg EJ @ Grid L-7.8



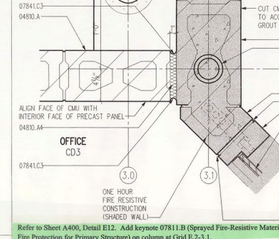
E6 PLAN DETAIL

SCALE: 1½" = 1'-0" Cavity Wall Transition @ L.8-10



E9 PLAN DETAIL

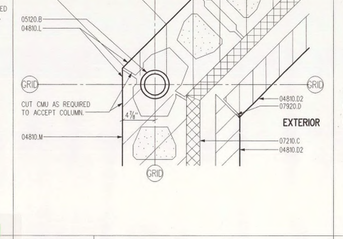
SCALE: 1½" = 1'-0" CMU Transition @ SE Corner Staff Secure



Refer to Sheet A400, Detail E12. Add keynote 07811.B (Sprayed Fire-Resistive Material - 2 Hour Fire Protection for Primary Structure) on column at Grid E.2-3.1.

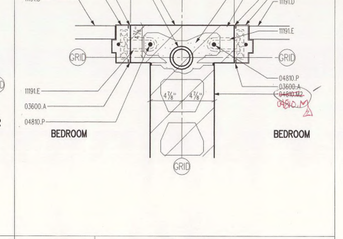
E12 PLAN DETAIL

SCALE: 1½" = 1'-0" Bldg EJ @ Housing Office



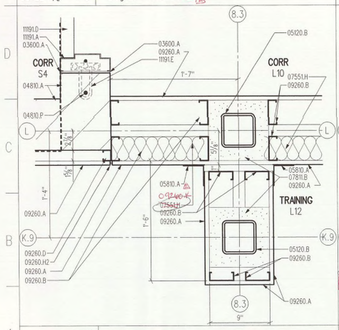
E15 PLAN DETAIL

SCALE: 1½" = 1'-0" Typ. Col. Protection in CMU Cavity @ Multi-Use/O.D. Rec



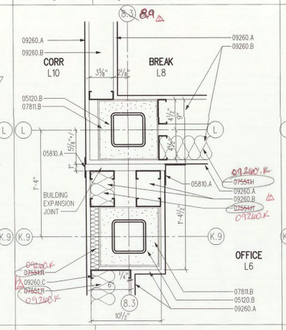
E18 PLAN DETAIL

SCALE: 1½" = 1'-0" Typ. ColProtection @ Bedroom/Dayroom



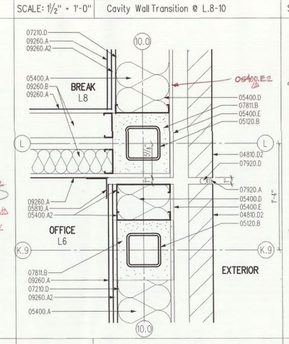
A1 PLAN DETAIL

SCALE: 1½" = 1'-0" Bldg EJ @ Grid L-8.3



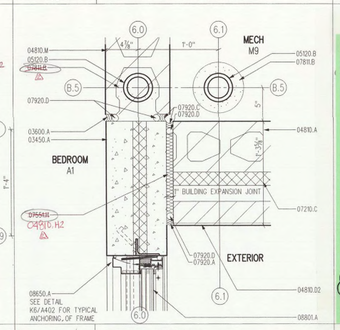
A3 PLAN DETAIL

SCALE: 1½" = 1'-0" Bldg EJ @ Grid L-8.9



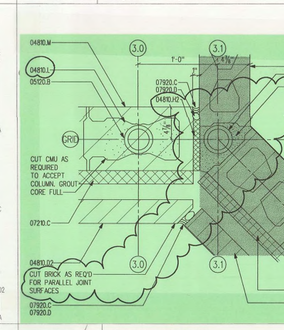
A6 PLAN DETAIL

SCALE: 1½" = 1'-0" Bldg EJ @ Grid L-10.0



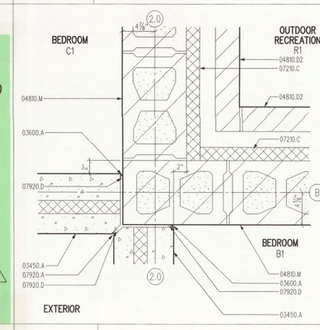
A9 PLAN DETAIL

SCALE: 1½" = 1'-0" Bldg EJ/Wall Transition @ Mech M9



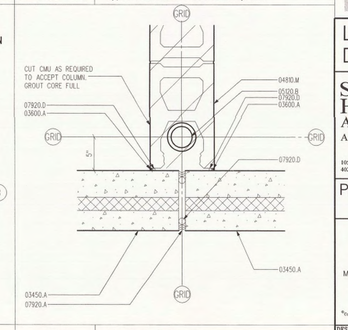
A12 PLAN DETAIL

SCALE: 1½" = 1'-0" Bldg EJ @ Outdoor Rec



A15 PLAN DETAIL

SCALE: 1½" = 1'-0" Typ. Wall Transition Precast to Cavity Wall @ Outdoor Rec



A18 PLAN DETAIL

SCALE: 1½" = 1'-0" Typ. Col. Protection @ Bedroom/Exterior Wall

CONDOC KEYNOTES

03450 PLANT-PRECAST ARCHITECTURAL CONCRETE
03450.A 9" SEMI-COMPOSITE LOAD BEARING PRECAST CONCRETE INSULATED WALL PANELS
03450.B PRECAST ARCHITECTURAL CONCRETE WALL PANEL

03600 EPOXY SEALANTS
03600.A EPOXY SEALANT, TOOLED TO BEVEL

04810 UNIT MASONRY ASSEMBLIES
04810.A 8" CONCRETE MASONRY UNIT
04810.A3 8" BULLNOSE CONCRETE MASONRY UNIT
04810.A4 8" CMU 45 DEGREE ANGLE CORNER
04810.B 6" CONCRETE MASONRY UNIT - REINFORCED
04810.B2 6" BULLNOSE CONCRETE MASONRY UNIT
04810.C2 4" BULLNOSE CONCRETE MASONRY UNIT
04810.D2 FACE BRICK
04810.L FULLY GROUTED CONCRETE MASONRY UNIT
04810.M 10" CONCRETE MASONRY UNIT
04810.M2 10" BULLNOSE CONCRETE MASONRY UNIT
04810.N 12" CONCRETE MASONRY UNIT
04810.P GROUTED CELL WITH #5 REBAR INSERTED IN ANCHOR.

05120 STRUCTURAL STEEL
05120.B STEEL COLUMN,SEE STRUCTURAL

05400 COLD FORMED METAL FRAMING
05400.A 8" X 0.0428" (18GA.) STEEL STUDS @ 24" O.C.
05400.A2 8" X 0.0428" (18GA.) STEEL STUD
05400.D THERMAL INSULATION
05400.E GLASS MAT GYPSUM SHEATHING BOARD, 5/8" THICKNESS

05810 EXPANSION JOINT ASSEMBLIES
05810.A SELF CENTERING METAL WALL EXPANSION ASSEMBLY
05810.B TWO HOUR FIRE RATED EXPANSION JOINT ASSEMBLY

07210 BUILDING INSULATION
07210.A 8.25" GLASS-FIBER BATT INSULATION R-30
07210.C 2" CAVITY WALL INSULATION
07210.D POLYETHYLENE VAPOR RETARDER

07551 APP-MODIFIED BITUMINOUS MEMBRANE ROOFING
07551.H FIBERGLASS BATT INSULATION

07811 SPRAYED FIRE-RESISTIVE MATERIALS
07811.B SPRAYED FIRE RESISTIVE MATERIAL - 2 HOUR FIRE PROTECTION FOR PRIMARY STRUCTURE.

07841 THROUGH-PENETRATION FIRESTOP SYSTEMS
07841.C2 SLAG-WOOL FIBER SAFING INSULATION
07841.C3 FIRECODE COMPOUND 1" THICKNESS MINIMUM EACH SIDE OF WALL

07920 JOINT SEALANTS
07920.A ELASTOMERIC JOINT SEALANT, ES*1
07920.C PICK-PROOF SECURITY JOINT SEALANT
07920.D CYLINDRICAL SEALANT BACKING
07920.E LATEX JOINT SEALANT

08110 STEEL DOORS AND FRAMES
08110.A HOLLOW METAL DOOR, SEE SCHEDULE FOR SIZE
08110.B HOLLOW METAL FRAME GROUTED SOLID, ALL GROUT HOLES BY FRAME SUPPLIER. (CENC DOORS)
08110.B2 HOLLOW METAL FRAME SEE FRAME ELEVATIONS FOR EXTENT OF GROUTING.
08110.C HOLLOW METAL BORROW LITE FRAME
08110.C2 GLAZING STOP

08410 ALUMINUM ENTRANCES AND STOREFRONTS
08410.A ALUMINUM STOREFRONT SYSTEM
08410.B ALUMINUM ENTRANCE, SEE DOOR SCHEDULE FOR SIZE

08650 DETENTION / SECURITY WINDOWS
08650.A STAINLESS STEEL, THERMALLY BROKEN SECURITY WINDOW WITH ALUMINUM EXTERIOR.

08801 SECURITY GLAZING
08801.A SECURITY GLAZING, SEE FRAME ELEVATIONS FOR TYPE, SCHEDULE IS IN SPECIFICATION.

09260 GYPSUM BOARD ASSEMBLIES
09260.A 5/8" ABUSE RESISTANT GYPSUM FIBER PANEL WALLBOARD
09260.A2 5/8" TYPE X GYPSUM WALLBOARD.
09260.B 3 5/8" STEEL STUDS @ 16" O.C.
09260.C 6" STEEL STUDS @ 16" O.C.
09260.D 1 5/8" METAL STUDS @ 16" O.C.
09260.F 7/8" HAT CHANNELS @ 16" O.C.
09260.H2 ONE PIECE CONTROL JOINT

09310 CERAMIC TILE
09310.A GLAZED WALL TILE
09310.C TILE CONTROL JOINT

11191 SECURITY / DETENTION EQUIPMENT
11191.A HOLLOW METAL FRAME ASSEMBLY, GROUTED SOLID, ALL GROUT HOLES BY JAMB SUPPLIER
11191.B2 HOLLOW METAL FRAME ASSEMBLY, SEE FRAME ELEVATIONS FOR EXTENT OF GROUTING.
11191.C GLAZING STOP
11191.D METAL DOOR, FLUSH TYPE
11191.E 3/8" BENT STEEL LOOP, WELD TO GALVANIZED STEEL PLATE
11191.E2 2" X 8" X 10GA GALVANIZED STEEL PLATE WITH THREE(3) 3/4" DIA GROUT HOLES

---------- DENOTES SECURE PERIMETER LINE.
DENOTES ONE HOUR FIRE RESISTIVE CORRIDOR

Lancaster Co. Juvenile Detention Center

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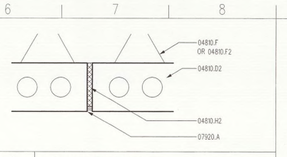
PROJECT ARCH.	ISSUED		
CB, LK	11/19/99		
INTERN ARCH.	REVISION		
DU			

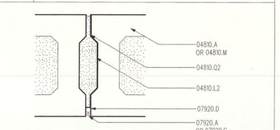
Refer to Sheet A401, Detail N12.

a. Clarification: Detail has been rotated 90 degrees from plan orientation.
b. Provide column 05120.B at F.2-11 and at F.8-11 as indicated in Structural drawings. Provide 07811.B (Sprayed Fire-Resistive Material - 2 Hour Fire Protection for Primary Structure) as required on column.
c. Revise dimension from grid F.2/F.8 to face of brick to be 10 3/8".
d. Revise dimension of brick return along grid F.2/F.8 to be 7 5/8".



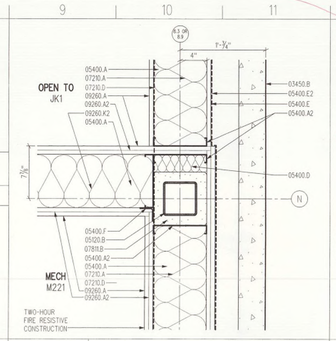
Q6 PLAN DETAIL

SCALE: 3" = 1'-0" | Typical Brick Soft Joint Detail



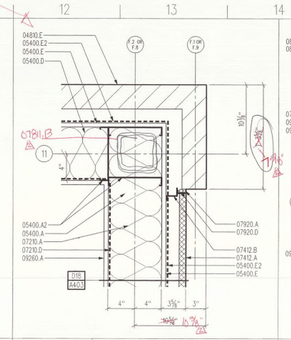
N6 PLAN DETAIL

SCALE: 3" = 1'-0" | Typical CMU Control Joint Detail



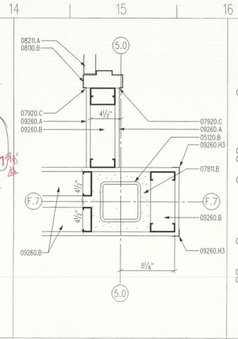
N9 PLAN DETAIL

SCALE: 1½" = 1'-0" | "Column Protection at Grids N-8.3 and N-8.9".



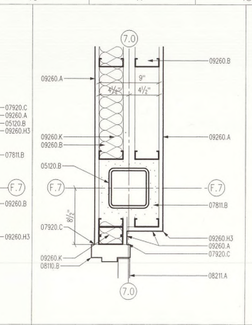
N12 PLAN DETAIL

SCALE: 1½" = 1'-0" | ENTRY PILASTER (GRID F.2-11 & F.8-11) ELEV. 116'-0" - 118'-3"



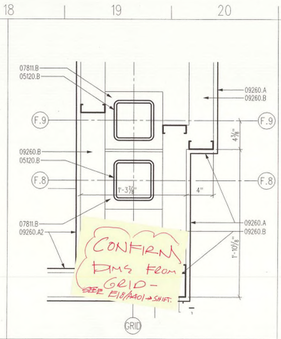
N14 PLAN DETAIL

SCALE: 1½" = 1'-0" | Col. Protection @ Resource P1



N16 PLAN DETAIL

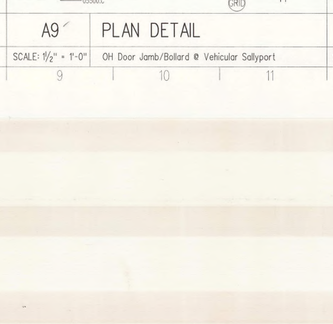
SCALE: 1½" = 1'-0" | Col. Protection @ Grid F.7-7.0



N18 PLAN DETAIL

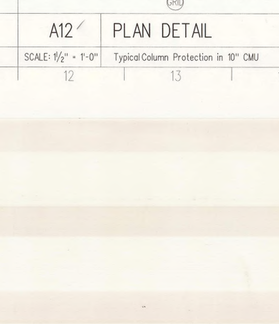
SCALE: 1½" = 1'-0" | Column Protection @ Lobby L25

Refer to Sheet A401, Detail N6. The following general note should be added to this detail: "CMU control joints to be 30'-0" o.c. maximum at all locations. Coordinate exact locations with the Architect."



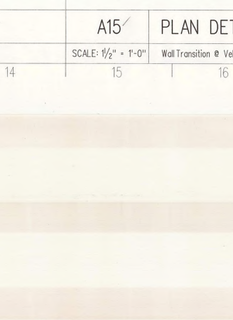
J9 PLAN DETAIL

SCALE: 1½" = 1'-0" | Grid L.6-2.0



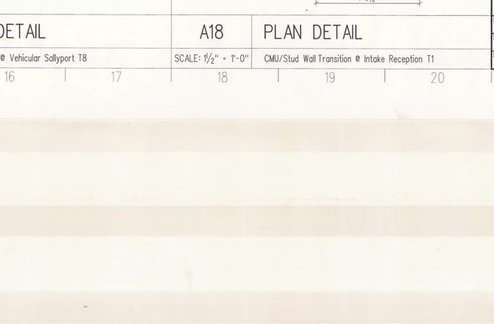
J12 PLAN DETAIL

SCALE: 1½" = 1'-0" | Column Protection @ Grid L.6-2.8



J14 PLAN DETAIL

SCALE: 1½" = 1'-0" | Typ. Col. Protection @ Stud Wall



Refer to Sheet A401, Details E18 and J16. The brick exterior corners should be made by special brick shapes instead of cut brick.

J16 PLAN DETAIL

SCALE: ¾" = 1'-0" | Typ. Col Protection @ Housing Toilet/Multi-Use

E6 HEAD DETAIL

SCALE: 1½" = 1'-0" | Sallyport Overhead Door Head Condition

E9 PLAN DETAIL

SCALE: 1½" = 1'-0" | Column Protection/ HM Jamb @ Grid F.5-3.1

E12 PLAN DETAIL

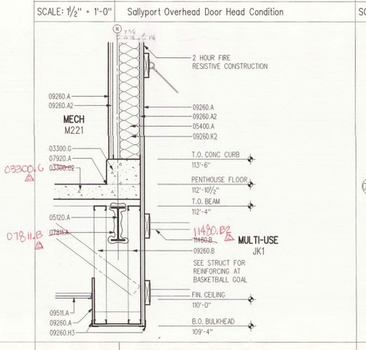
SCALE: 1½" = 1'-0" | CMU Wall Transition: 10" to 8"

E15 PLAN DETAIL

SCALE: 1½" = 1'-0" | Typ. Pier in Curved Wall @ Public Entry

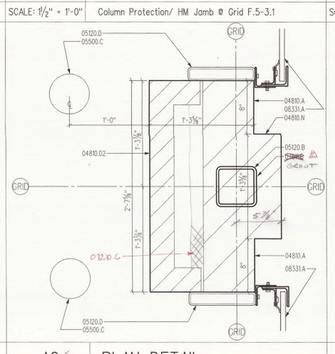
E18 PLAN DETAIL

SCALE: ¾" = 1'-0" | Curved Wall/Pilaster Transition @ Public Entry



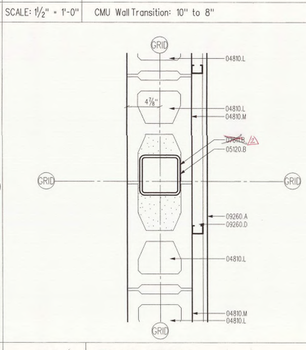
A6 SECTION DETAIL

SCALE: ¾" = 1'-0"



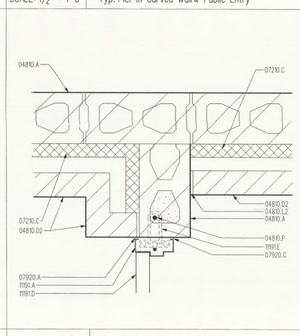
A9 PLAN DETAIL

SCALE: 1½" = 1'-0" | OH Door Jamb/Bollard @ Vehicular Sallyport



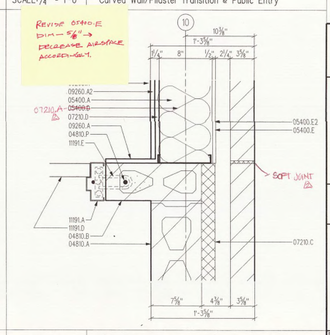
A12 PLAN DETAIL

SCALE: 1½" = 1'-0" | Typical Column Protection in 10" CMU



A15 PLAN DETAIL

SCALE: 1½" = 1'-0" | Wall Transition @ Vehicular Sallyport T8



A18 PLAN DETAIL

SCALE: ¾" = 1'-0" | CMU/Stud Wall Transition @ Intake Reception T1

CONDOC KEYNOTES

03300 CAST-IN-PLACE CONCRETE
03300.C2 8" FORMED ELEVATED REINFORCED CONCRETE COMPOSITE SLAB W/ INTEGRAL CURB
03300.G CAST-IN-PLACE CONCRETE CURB

03450 PLANT-PRECAST ARCHITECTURAL CONCRETE
03450.A 9" SEMI-COMPOSITE LOAD BEARING PRECAST CONCRETE INSULATED WALL PANELS
03450.B PRECAST ARCHITECTURAL CONCRETE WALL PANEL
03450.C2 RADIUSED PRECAST ARCHITECTURAL CONCRETE SILL

03600 EPOXY SEALANTS
03600.A EPOXY SEALANT, TOOLED TO BEVEL

04810 UNIT MASONRY ASSEMBLIES
04810.A 8" CONCRETE MASONRY UNIT
04810.A6 8" BONDBEAM CONCRETE MASONRY UNIT
04810.B 6" CONCRETE MASONRY UNIT - REINFORCED
04810.D2 FACE BRICK
04810.E FACE BRICK, 3 5/8" x 3 5/8" x 7 5/8" "TYPE B"FLOWER DARK COLOR)
04810.F VENEER ANCHORS @ 24" O.C. HORIZ. & @ 12" O.C. VERTICALLY
04810.F2 CAVITY WALL BRICK TIES @ 16" O.C. HORIZ. & VERT.
04810.H2 COMPRESSIBLE FILLER
04810.L FULLY GROUTED CONCRETE MASONRY UNIT
04810.L2 GROUT
04810.M 12" CONCRETE MASONRY UNIT
04810.N 12" CONCRETE MASONRY UNIT
04810.P GROUTED CELL WITH #5 REBAR INSERTED IN ANCHOR
04810.Q2 BOND BREAKER, (BUILDER'S FELT)

05120 STRUCTURAL STEEL
05120.A STEEL BEAM, SEE STRUCTURAL
05120.B STEEL COLUMN, SEE STRUCTURAL
05120.D STEEL TUBE, SEE STRUCTURAL

05400 COLD FORMED METAL FRAMING
05400.A 8" X 0.0428" (18GA.) STEEL STUDS @ 24" O.C.
05400.A2 8" X 0.0428" (18GA.) STEEL STUD
05400.D THERMAL INSULATION
05400.E GLASS MAT GYPSUM SHEATHING BOARD, 5/8" THICKNESS
05400.E2 AIR-INFILTRATION BARRIER, ASPHALT -SATURATED ORGANIC FELT
05400.F 2" X 2" X 18 GA CLIP ANGLE

05500 METAL FABRICATIONS
05500.A10 STEEL TUBE WITH STEEL PLATE LINTEL, SEE STRUCTURAL FOR SIZE OF MEMBERS
05500.C PIPE BOLLARD, 6" DIA FILLED W/ CONCRETE

05810 EXPANSION JOINT ASSEMBLIES
05810.B TWO HOUR FIRE RATED EXPANSION JOINT ASSEMBLY

06105 MISC CARPENTRY
06105.A WOOD BLOCKING, CCA TREATED, CONTINUOUS

07210 BUILDING INSULATION
07210.A 8.25" GLASS-FIBER BATT INSULATION R-30
07210.C 2" CAVITY WALL INSULATION
07210.D POLYETHYLENE VAPOR RETARDER

07412 MANUFACTURED WALL PANELS
07412.A INSULATED ALUMINUM WALL PANELS, 1" THICKNESS R-7
07412.B SECONDARY FRAMING FOR PANEL SUPPORT

07811 SPRAYED FIRE-RESISTIVE MATERIALS
07811.A SPRAYED FIRE RESISTIVE MATERIAL - 1 HOUR FIRE RATED ROOF CEILING ASSEMBLY
07811.B SPRAYED FIRE RESISTIVE MATERIAL - 2 HOUR FIRE PROTECTION FOR PRIMARY STRUCTURE

07841 THROUGH-PENETRATION FIRESTOP SYSTEMS
07841.C2 SLAG-WOOL FIBER SAFING INSULATION

07920 JOINT SEALANTS
07920.A ELASTOMERIC JOINT SEALANT, ES-1
07920.C PICK-PROOF SECURITY JOINT SEALANT
07920.D CYLINDRICAL SEALANT BACKING

08110 STEEL DOORS AND FRAMES
08110.A HOLLOW METAL DOOR, SEE SCHEDULE FOR SIZE
08110.B HOLLOW METAL FRAME GROUTED SOLID. ALL GROUT HOLES BY FRAME SUPPLIER (SWING DOORS)

08211 FLUSH WOOD DOORS
08211.A PLASTIC LAMINATE FACED, SOLID CORE DOOR

08331 OVERHEAD COILING DOORS
08331.A INSULATED OVERHEAD COILING DOOR WITH POSITION INDICATOR, COORDINATE WITH SECURITY SYSTEM

08410 ALUMINUM ENTRANCES AND STOREFRONTS
08410.A ALUMINUM STOREFRONT SYSTEM

08801 SECURITY GLAZING
08801.A SECURITY GLAZING, SEE FRAME ELEVATIONS FOR TYPE, SCHEDULE IS IN SPECIFICATION.

09260 GYPSUM BOARD ASSEMBLIES
09260.A 5/8" ABUSE RESISTANT GYPSUM FIBER PANEL WALLBOARD
09260.A2 5/8" TYPE X GYPSUM WALLBOARD
09260.B 3 5/8" STEEL STUDS @ 16" O.C.
09260.D 1 5/8" METAL STUDS @ 16" O.C.
09260.H3 CORNERBEAD
09260.K 3 1/2 SOUND ATTENUATION BLANKETS
09260.K2 6" SOUND ATTENUATION BLANKETS

09511 ACOUSTICAL PANEL CEILINGS
09511.A ACOUSTICAL PANEL CEILING SYSTEM, SEE FINISH SCHEDULE FOR PANEL TYPES.

11191 SECURITY / DETENTION EQUIPMENT
11191.A HOLLOW METAL FRAME ASSEMBLY, GROUTED SOLID, ALL GROUT HOLES BY JAMB SUPPLIER
11191.B2 HOLLOW METAL FRAME ASSEMBLY, SEE FRAME ELEVATIONS FOR EXTENT OF GROUTING.
11191.D METAL DOOR, FLUSH TYPE
11191.E 3/8" BENT STEEL LOOP, WELD TO GALVANIZED STEEL PLATE

11480 ATHLETIC, RECREATIONAL, AND THERAPEUTIC EQUIPMENT
11480.B INTERIOR BASKETBALL GOAL, W/ 6'-0" EXTENSION FROM WALL.

Lancaster Co. Juvenile Detention Center

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INTERN ARCH. DJ	REVISION		

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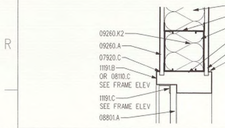
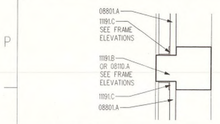


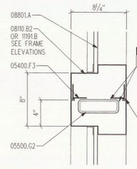
Q1 HM BORROW LITE HEAD DTL.

SCALE: 1½" = 1'-0" Typical @ Multi-Use Rooms



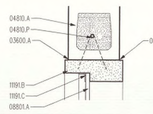
N1 HM BORROW LITE TRANSOM

SCALE: 1½" = 1'-0" Typical @ Multi-Use Rooms



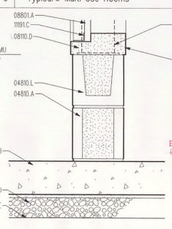
K1 HM BORROW LITE VERT. MUL. DTL.

SCALE: 1½" = 1'-0" Typical @ Multi-Use Rooms



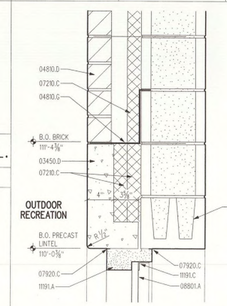
H1 HM BORROW LITE JAMB DTL.

SCALE: 1½" = 1'-0" Typical @ Multi-Use Rooms



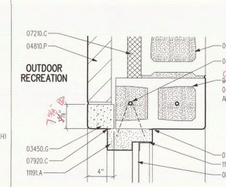
E1 HM BORROW LITE SILL DTL.

SCALE: 1½" = 1'-0" Typical @ Multi-Use Rooms



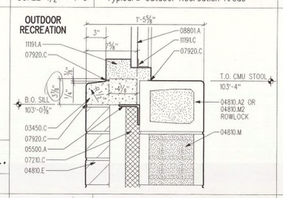
N4 HM WDW HEAD DETAIL

SCALE: 1½" = 1'-0" Typical @ Outdoor Recreation Areas



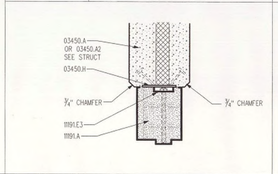
K4 HM WDW JAMB DTL

SCALE: 1½" = 1'-0" Typical @ Outdoor Recreation Areas



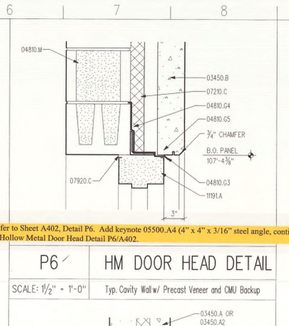
G4 HM WDW SILL DTL

SCALE: 1½" = 1'-0" Typical @ Outdoor Recreation Areas



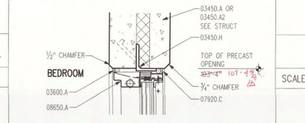
E4 HM JAMB DETAIL

SCALE: 1½" = 1'-0" Typical @ Precast Wall



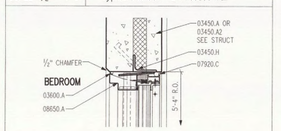
P6 HM DOOR HEAD DETAIL

SCALE: 1½" = 1'-0" Typ. Cavity Wall w/ Precast Veneer and CMU Backup



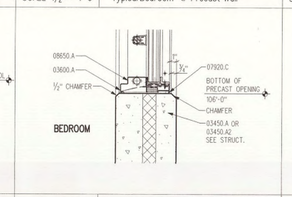
M6 DET. WDW HEAD DETAIL

SCALE: 1½" = 1'-0" Typical Bedroom @ Precast Wall



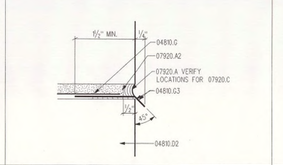
K6 DET. WDW JAMB DTL

SCALE: 1½" = 1'-0" Typical Bedroom @ Precast Wall



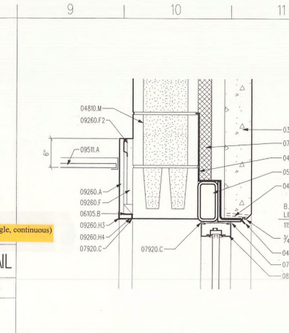
G6 DET. WDW SILL DTL

SCALE: 1½" = 1'-0" Typical Bedroom @ Precast Wall



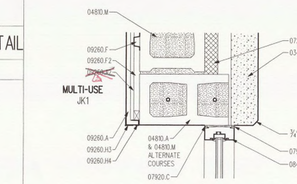
E6 SECTION DETAIL

SCALE: 1½" = 1'-0" Typical Thru-Wall Flashing Drip Edge



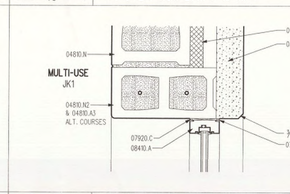
N9 ALUM. WDW HEAD DETAIL

SCALE: 1½" = 1'-0" Frame AL-4 @ Staff Secure Multi-Use JK1



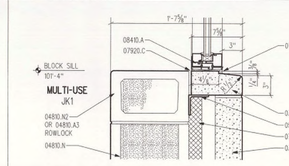
K9 ALUMINUM WDW JAMB DETAIL

SCALE: 1½" = 1'-0" Frame AL-4 From El. 111'-4" to 115'-4"



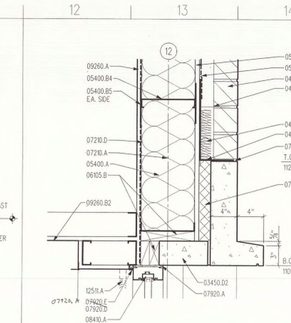
G9 ALUMINUM WDW JAMB DETAIL

SCALE: 1½" = 1'-0" Frame AL-4 From El. 101'-4" to 111'-4"



N12 ALUMINUM WDW HEAD DETAIL

SCALE: 1½" = 1'-0" Typical @ Curved Cavity Wall Near Public Entrance


12
0926.A
0540.B4
0540.B5
EA. SIDE
0721.D
0721.A
0540.A
0610.B
0926.B2
0345.D2
0792.A
0792.E
0792.D
0841.A
0792.A
0792.C
0481.F
0481.J
0481.G
0792.A
T.O. LINTEL
112'-0"
0721.C
B.O. BRICK
108'-8⅝"
0345.D
0481.J
0481.D4
B.O. PRECAST LINTEL
107'-4⅞"
0481.G5
B.O. LINTEL
110'-8½"
0345.D2
0792.A
0792.C
0792.D
0841.A
0792.A
0792.C
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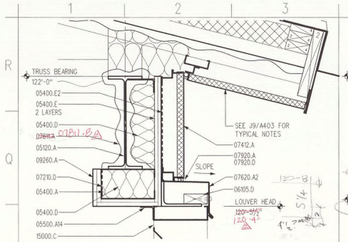
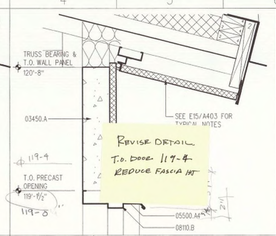
0792.C
0792.E



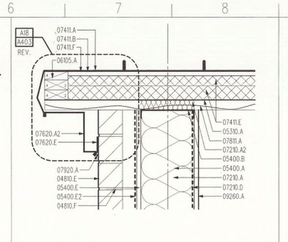
P1 MECH LOUVER HEAD DETAIL

SCALE: 1½" = 1'-0" Staff Secure Penthouse (Mechanical M221)



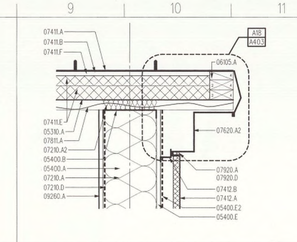
P4 HM DOOR HEAD DETAIL

SCALE: 1½" = 1'-0" Typical @ Housing Penthouse Roof Access



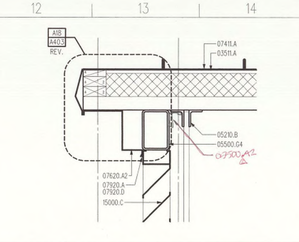
P6 RAKE FLASHING DETAIL

SCALE: 1½" = 1'-0" Cavity Wall w/ Brick Veneer and Stud Backup @ Public Entry



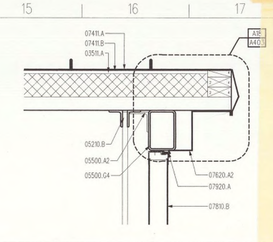
P9 RAKE FLASHING DETAIL

SCALE: 1½" = 1'-0" Typical @ Cavity Wall w/ Precast Veneer & Stud Backup



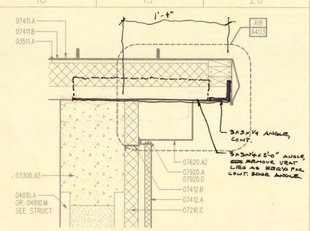
P12 LOUVER FLASHING DETAIL

SCALE: 1½" = 1'-0" Relief Louver @ East Wall of Mechanical M219



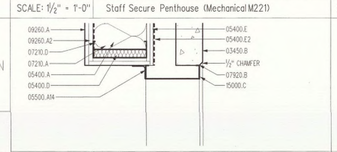
P15 RAKE FLASHNG DETAIL

SCALE: 1½" = 1'-0" Translucent Wall Panel Head @ Gymnasium R3



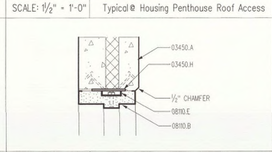
P18 RAKE FLASHING DETAIL

SCALE: 1½" = 1'-0" Typical @ Cavity Wall w/ Precast Veneer @ CMU Backup



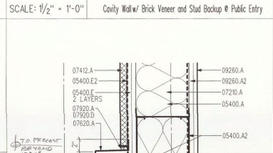
K1 M1 MECH. LOUVER JAMB DETAIL

SCALE: 1½" = 1'-0" Staff Secure Penthouse (Mechanical M221)



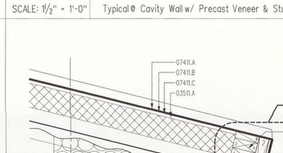
K4 M4 HM DOOR JAMB DETAIL

SCALE: 1½" = 1'-0" Typical @ Housing Penthouse Roof Access



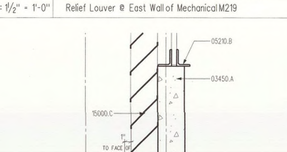
L6 HM DOOR HEAD DETAIL

SCALE: 1½" = 1'-0" Roof Access Door M221



L9 GUTTER/SOFFIT DETAIL

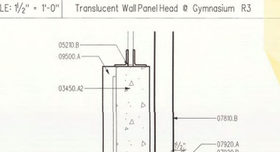
SCALE: 1½" = 1'-0" Typical Cavity Wall w/ Precast Veneer & Stud Backup



L12 LOUVER SILL FLASHING DETAIL

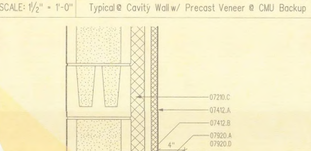
SCALE: 1½" = 1'-0" Relief Louver @ East Wall of Mechanical M219

Refer to Sheet A402, Detail J15. Revise keynote 05500.A10 to be 05500.A11 (4" x 3" x 3/8" Steel Angle).



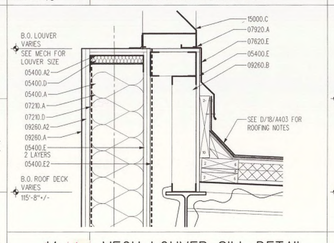
L15 FLASHING DETAIL

SCALE: 1½" = 1'-0" Translucent Wall Panel Flashing



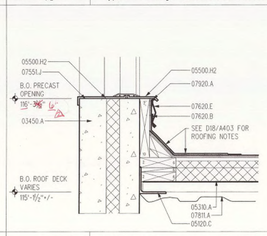
L18 METAL PANEL FLASHING DETAIL

SCALE: 1½" = 1'-0" Typical @ Cavity Wall w/ Precast Veneer & CMU Backup



J4 J1 MECH LOUVER SILL DETAIL

SCALE: 1½" = 1'-0" Staff Secure Penthouse (Mechanical M221)

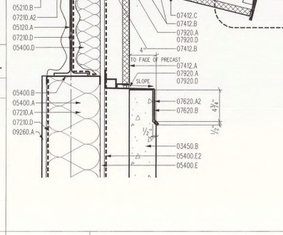


J4 HM DOOR JAMB DETAIL

SCALE: 1½" = 1'-0" Typical @ Housing Penthouse Roof Access

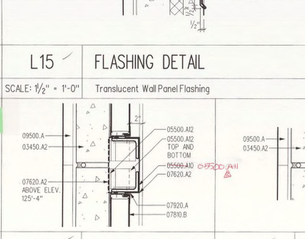
J6 HM DOOR JAMB DETAIL

SCALE: 1½" = 1'-0" Roof Access Door M221



J9 GUTTER/SOFFIT DETAIL

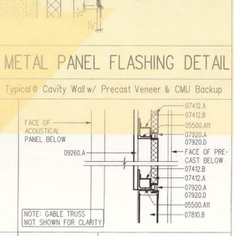
SCALE: 1½" = 1'-0" Typical Cavity Wall w/ Precast Veneer & Stud Backup



J15 FLASHING DETAIL

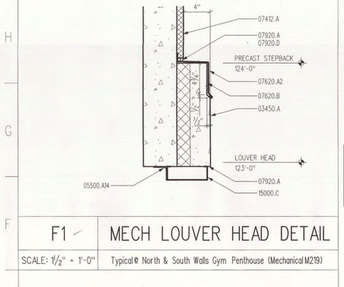
SCALE: 3" = 1'-0"

J17 FLASHING DETAIL



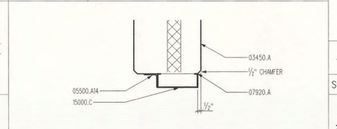
J19 FLASHING DETAIL

SCALE: 1½" = 1'-0"



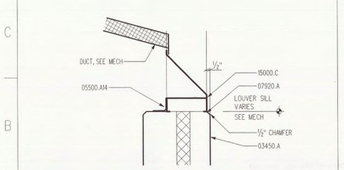
F1 MECH LOUVER HEAD DETAIL

SCALE: 1½" = 1'-0" Typical @ North & South Walls Gym Penthouse (Mechanical M219)



D1 MECH LOUVER JAMB DETAIL

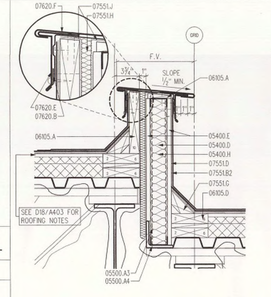
SCALE: 1½" = 1'-0" Typical @ Semi-Composite Precast Wall



Refer to Sheet A403, Detail A1. Provide 07620.E (0.032" Prefinished Aluminum Counterflashing)—profile similar to counterflashing in detail J1/A403—at similar condition (typical housing penthouse).

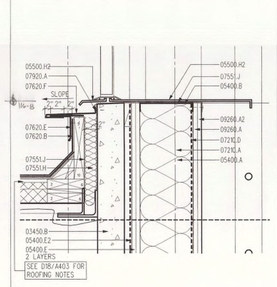
A1 MECH LOUVER SILL DETAIL

SCALE: 1½" = 1'-0" Typical @ Semi-Composite Precast Wall



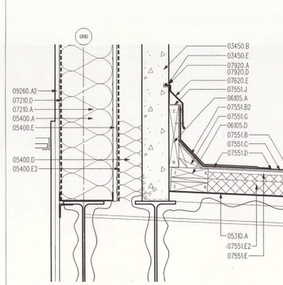
E4 ROOF EJ CURB DETAIL

SCALE: 1½" = 1'-0"



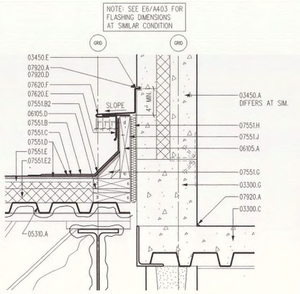
E6 HM DOOR SILL DETAIL

SCALE: 1½" = 1'-0" Roof Access Door M221



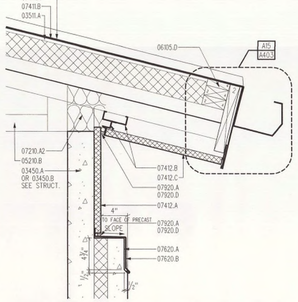
E9 FLASHING DETAIL

SCALE: 1½" = 1'-0" Typical Low Slope Roof @ Staff Secure Penthouse



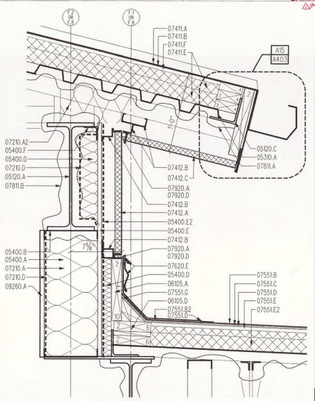
E12 FLASHING DETAIL

SCALE: 1½" = 1'-0" Roof EJ @ Mechanical M219



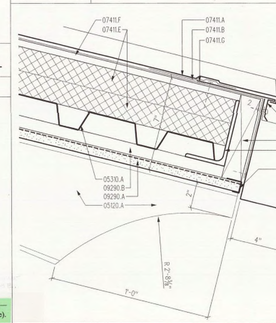
E15 GUTTER/SOFFIT DETAIL

SCALE: 1½" = 1'-0" Typical Insulated Precast Wall Panel



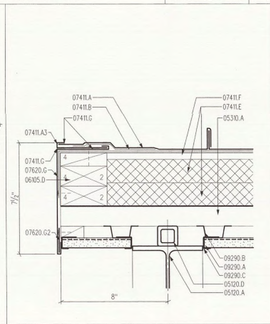
E18 GUTTER/SOFFIT DETAIL

SCALE: 1½" = 1'-0" Low Slope Roof @ Public Entry



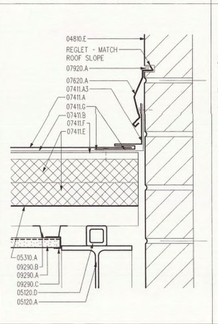
A4 FLASHING DETAIL

SCALE: 3" = 1'-0" Main Entrance Canopy Gutter



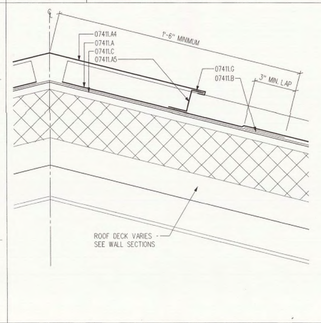
A7 FLASHING DETAIL

SCALE: 3" = 1'-0" Main Entrance Canopy Rake



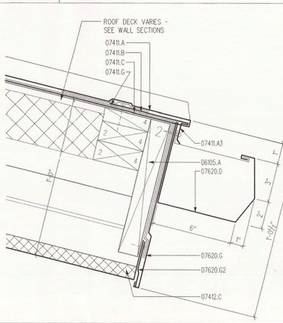
A10 FLASHING DETAIL

Main Entrance Canopy Counterflashing



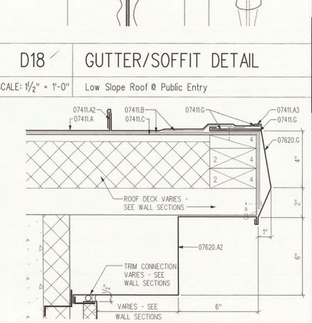
A12 TYP. RIDGE FLASHING DETAIL

SCALE: 3" = 1'-0"



A15 TYP. GUTTER FLASHING DETAIL

SCALE: 3" = 1'-0"



A18 TYP. RAKE FLASHING DTL.

SCALE: 3" = 1'-0"

CONDOC KEY/NOTES

03300 CAST-IN-PLACE CONCRETE
03300.G CONTINUOUS CONCRETE CAP, TOP TO MATCH ROOF SLOPE, SEE STRUCTURAL
03300.C 6" REINFORCED CONCRETE COMPOSITE SLAB
03300.G CAST-IN-PLACE CONCRETE CURB

03400 PLANT-PRECAST ARCHITECTURAL CONCRETE
03450.A 8" SEMI-COMPOSITE LOAD BEARING PRECAST CONCRETE INSULATED WALL PANELS.
03450.A2 10" SEMI-COMPOSITE LOAD BEARING PRECAST CONCRETE INSULATED WALL PANELS.
03450.B PRECAST ARCHITECTURAL CONCRETE WALL PANEL
03450.C 1/2" @ 4 3/4" O. REBUET CAST INTO PANEL CONTINUOUS
03450.H STEEL EMBED PLATE FOR CONNECTION BY PRECAST FABRICATOR

03300 CEMENTITIOUS WOOD-FIBER DECK
03511.A COMPOSITE CEMENTITIOUS WOOD-FIBER DECK

04810 UNIT MASONRY ASSEMBLIES
04810.A 8" CONCRETE MASONRY UNIT
04810.E FACE BRICK, 3 5/8" x 3 5/8" x 7 5/8" **TYPE B**/LOWER GRADE/ COLORS
04810.F VENEER ANCHORS @ 24" O.C. HORIZ. & @ 12" O.C. VERTICALLY
04810.M 10" CONCRETE MASONRY UNIT

05120 STRUCTURAL STEEL
05120.A STEEL BEAM, SEE STRUCTURAL
05120.C STEEL ANGLE, SEE STRUCTURAL
05120.D STEEL TUBE, SEE STRUCTURAL

05210 STEEL JOISTS
05210.B 15'0" GABLE TRUSS, SEE STRUCTURAL

05310 STEEL DECK
05310.A 1 1/2" GALVANIZED STEEL ROOF DECK

05400 COLD FORMED METAL FRAMING
05400.A 8" x 0.043" (18GA.) STEEL STUDS @ 24" O.C.
05400.A2 8" x 0.043" (18GA.) STEEL STUD
05400.B 8" STEEL TRACK, 0.0538" (16GA.) THICK
05400.D THERMAL INSULATION
05400.E GLASS MAT GYPSUM SHEATHING BOARD, 5/8" THICKNESS
05400.E2 AIR/MOISTURATION BARRIER, ASPHALT - SATURATED ORGANIC FELT
05400.F 2" x 2" x 16 GA CLIP ANGLE
05400.H 2 1/2" X 0.043" (16GA) STEEL STUDS @ 24" O.C.

05500 METAL FABRICATIONS
05500.A2 3" x 3" x 5/16" x 2'-0" CLIP ANGLE @ 4'-0" O.C.
05500.A3 2" x 2" x 1/4" STEEL ANGLE, WELD TO TOP OF EACH JOIST
05500.A4 4" x 4" x 5/16" STEEL ANGLE CONTINUOUS
05500.A9 4" x 2" x 3/4" STEEL ANGLE CONT.
05500.A10 STEEL TUBE WITH STEEL PLATE LINTEL, SEE STRUCTURAL FOR SIZE OF MEMBERS
05500.A11 4" x 3" x 3/8" STEEL ANGLE
05500.A12 3" x 2" x 3/8" STEEL ANGLE
05500.A14 2" x 2" x 1/4" STEEL ANGLE CONT.
05500.A16 4" x 3" x 3/16" STEEL TUBE CONTINUOUS, PROVIDE ACCESS HOLES @ 24" O.C. IN ONE SIDE FOR ACCESS TO FASTENERS
05500.H2 GALVANIZED STEEL BENT PLATE (DOOR SILL)

06105 MISC. CARPENTRY
06105.A WOOD BLOCKING, CCA TREATED, CONTINUOUS
06105.D WOOD NAILER, CCA TREATED, CONTINUOUS

07210 BUILDING INSULATION
07210.A 8.25" GLASS-FIBER BATT INSULATION R-30
07210.D GLASS-FIBER BATT INSULATION, FILL VOID
07210.C 2" CAVITY WALL INSULATION
07210.D POLYETHYLENE VAPOR RETARDER

07410 MANUFACTURED ROOF PANELS
07410.A 22 GAUGE PREPAINTED GALVANIZED STEEL, 1 3/4" HIGH STANDING SEAM ROOFING
07410.A2 HIGH PERFORMANCE ROOF CLIP
07410.D 22 GAUGE PREPAINTED GALVANIZED STEEL RETAINER TRIM
07410.M 22 GAUGE PREPAINTED GALVANIZED STEEL RIDGE CAP
07410.R 22 GAUGE PREPAINTED GALVANIZED STEEL CLOSURE "Z" TRIM WITH SEALANT @ EDGES.
07410.S ASPHALT SATURATED ORGANIC FELT WATERPROOF UNDERLAYMENT
07410.C POLYISOCYANURATE BOARD INSULATION, 1 3/4" THICKNESS
07410.F 1/2" OSB STRUCTURAL SHEATHING BOARD MECHANICALLY FASTENED TO ROOF DECK.
07410.G SEALANT AS REQUIRED BY MANUFACTURER

07412 MANUFACTURED WALL PANELS
07412.A INSULATED ALUMINUM WALL PANELS, 1" THICKNESS R=7
07412.B SECONDARY FRAMING FOR PANEL SUPPORT
07412.C INSULATED ALUMINUM SOFFIT PANELS, 1" THICKNESS R=7

07550 MFR-MODIFIED BITUMINOUS MEMBRANE ROOFING
07550.F APP-MODIFIED BITUMINOUS SHEET, MINERAL-GRANULE SURFACED, 180 MIL THICKNESS.
07550.B2 BASE FLASHING: MODIFIED BITUMINOUS SHEET, MINERAL-GRANULE SURFACED, 180 MIL THICKNESS
07550.C APP-MODIFIED BITUMINOUS SHEET, SMOOTH SURFACED, 90 MIL THICKNESS
07550.D BASE SHEET, UNPERFORATED, ASPHALT IMPREGNATED AND COATED GLASS FIBER SHEET
07550.E POLYISOCYANURATE COMPOSITE BOARD INSULATION WITH 1/2" THICK PERLITE FACER, 1 3/4" TOTAL THICKNESS
07550.E2 POLYISOCYANURATE BOARD INSULATION, 1 3/4" THICKNESS
07550.G PERLITE TAPERED EDGE STRIP
07550.H FIBERGLASS BATT INSULATION
07550.J 60 MIL EPDM STRIP FLASHING

07620 SHEET METAL FLASHING AND TRIM
07620.A 0.032" PRE-FINISHED ALUMINUM FASCIA
07620.A2 0.032" PRE-FINISHED ALUMINUM TRIM
07620.B 0.032" PRE-FINISHED ALUMINUM CLEAT
07620.D PRE-FINISHED 0.050 ALUMINUM GUTTER
07620.E 0.032" PRE-FINISHED ALUMINUM COUNTERFLASHING
07620.F 0.040" ROOF EXPANSION JOINT COVER
07620.G 24GA PRE-FINISHED COIL COATED GALVANIZED SHEET METAL FASCIA
07620.G2 24 GA STEEL CLEAT, CONTINUOUS.

07700 PLASTIC UNIT SKYLIGHTS
07700.B TRANSLUCENT PLASTIC UNIT WALL PANEL

07810 SPRAYED FIRE-RESISTIVE MATERIALS
07811.A SPRAYED FIRE RESISTIVE MATERIAL - 1 HOUR FIRE RATED ROOF CEILING ASSEMBLY
07811.B SPRAYED FIRE RESISTIVE MATERIAL - 2 HOUR FIRE PROTECTION FOR PRIMARY STRUCTURE.

07900 JOINT SEALANTS
07920.A ELASTOMERIC JOINT SEALANT, EOH
07920.B ELASTOMERIC JOINT SEALANT, EOH
07920.D CHEMICAL SEALANT BACKING

08100 STEEL DOORS AND FRAMES
08110.B HOLLOW METAL FRAME, GROUTED SOLID, ALL GROUT HOLES BY FRAME SUPPLIER (USING DOORS)
08110.E BENT STEEL PLATE WITH THREADED NUT WELDED TO SHE SIDE TO ANCHOR FRAME TO EMBED PLATE

08260 GYPSUM BOARD ASSEMBLIES
09260.A 5/8" MOISTURE RESISTANT GYPSUM FIBER PANEL WALLBOARD
09260.A2 5/8" TYPE X GYPSUM WALLBOARD.
09260.B 3 5/8" STEEL STUDS @ 16" O.C.

09280 PORTLAND CEMENT PLASTER
09280.A 3/4" PORTLAND CEMENT PLASTER OVER EXPANDED METAL LATH
09290.B 7/8" HAT CHANNELS @ 16" O.C.
09290.C CASING BEAD

09500 ACOUSTICAL WALL PANELS
09500.A ACOUSTICAL WALL PANELS

15000 MECHANICAL
15000.C LOUVER, SEE MECH.

Lancaster Co. Juvenile Detention Center

SINCLAIR HILLE & Associates Inc
Architects

105 No. 8th Street, Lincoln, NE 402-476-7331 — Suite 100

REGISTERED PROFESSIONAL ENGINEER 11-19-99 A-2712 STATE OF NEBRASKA

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DESIGN ARCH.	ARCH. JOB NO.
JH, MH, KC	98006
PROJECT ARCH.	ISSUED
CB, LK	11/19/99
INTERN ARCH.	REVISION
DU	

A 403

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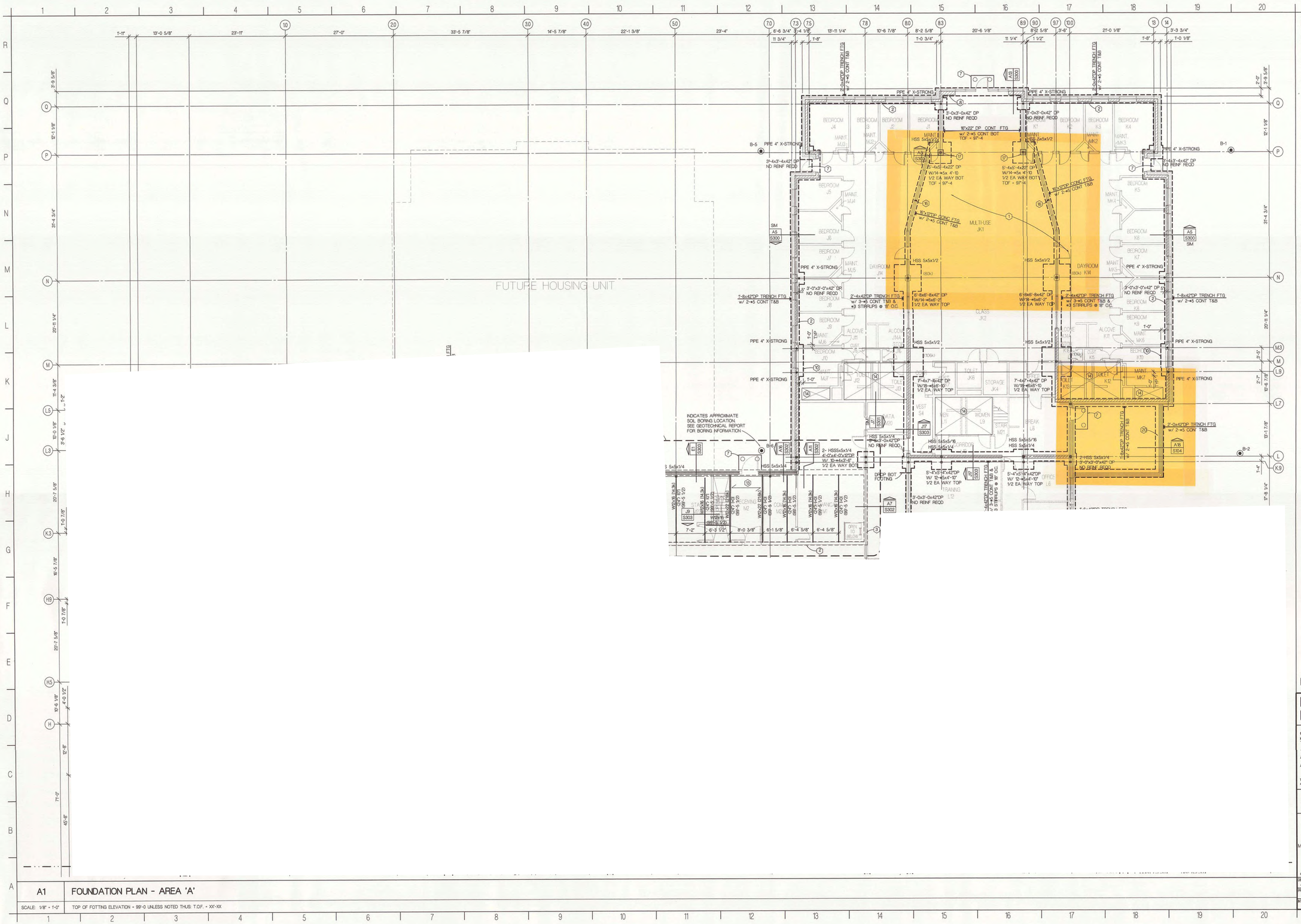
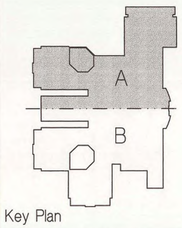


PLAN NOTES

1. INDICATES 5" CONC SLAB ON 2 1/2 COMPACTED LIMESTONE BASE W/ 1/2" AND CHOKER COURSE -- SEE SLAB ON GRADE DETAILS. REINFORCE WITH #4 @ 18" O.C. E.W. CENTERED IN SLAB
2. INDICATES 8" REINFORCED MASONRY WALL TO BE GROUTED SOLID. SEE DETAIL FOR REINFORCING REQUIREMENTS
3. INDICATES 10" REINFORCED MASONRY WALL TO BE GROUTED SOLID. SEE DETAIL FOR REINFORCING REQUIREMENTS
4. INDICATES 9" PRECAST SANDWICH WALL PANEL
5. INDICATES 10" PRECAST SANDWICH WALL PANEL
6. INDICATES 6" CONC SLAB ON 2VLI20 GALVANIZED METAL DECK. REINFORCE WITH 6x6 - W2.9xW2.9 W.W.F. SEE DETAIL E5/S200 FOR PLACEMENT
7. INDICATES STRUCTURAL STOOP. SEE DETAIL A5/S200 FOR REINFORCING. SEE ARCH FOR DIMENSIONS
8. INDICATES REINFORCED MASONRY WALL. TO BE GROUTED SOLID. SEE DETAIL FOR SIZE AND REINFORCING.
9. PROVIDE 10" THICKENED SLAB AT LAUNDRY EQUIPMENT. VERIFY LOCATION AND EXTENT WITH MECHANICAL.
10. PROVIDE ADDITIONAL CONTINUOUS BAR TOP & BOTTOM AT WIDENED FOOTING.
11. INDICATES 3'-4x3'-4x12"DP PAD FOOTING. NO ADDITIONAL PAD REINFORCING REQUIRED.
12. PROVIDE 2-#6 VERT EACH END AND EACH SIDE OF OPENING IN SHEAR WALL
13. INDICATES 6 1/2" CONCRETE ON 2VLI20 GALVANIZED METAL DECK. REINFORCE w/ 6x6-W2.9xW2.9 W.W.F. PLACED IN SHEETS.
14. INDICATES 3" RECESSED SLAB. SEE DETAIL J7/S301 FOR SIMILAR CONDITION. SEE ARCH FOR EXTENT.
15. INDICATES 12" RECESSED SLAB. SEE DETAIL J7/S301 FOR SIMILAR CONDITION. SEE ARCH FOR EXTENT.
16. INDICATES HSS6x2x1/4 IN HOLLOW METAL FRAME COORDINATE LOCATION W/ ARCH.
17. INDICATES 16"x16" CONCRETE PIER. SEE DETAIL FOR REINFORCING.
18. INDICATES 12" POURED CONCRETE WALL. SEE DETAIL FOR REINFORCING.
19. INDICATES 8" MASONRY WALL. REINFORCE W/ #5 @ 24"o.c. VERT. GROUT WALL SOLID.



Key Plan

Lancaster Co. Juvenile Detention Facility

SINCLAIR HILLE & Associates Inc Architects
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REGISTERED PROFESSIONAL ENGINEER ROY D. YOUKER E-5972 STATE OF NEBRASKA

FOUNDATION PLAN AREA - 'A'

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STRUC. ENGR. PROJ. NO. 99012

DESIGN ARCH. JH, MH, KC	ARCH. JOB NO. 98036		
PROJECT ARCH. CB, LK	ISSUED 11/15/99	S	100
INTERN ARCH. DU	REVISION		

A1 FOUNDATION PLAN - AREA 'A'

SCALE: 1/8" = 1'-0" TOP OF FOTTING ELEVATION = 99'-0 UNLESS NOTED THUS: T.O.F. = XX'-XX

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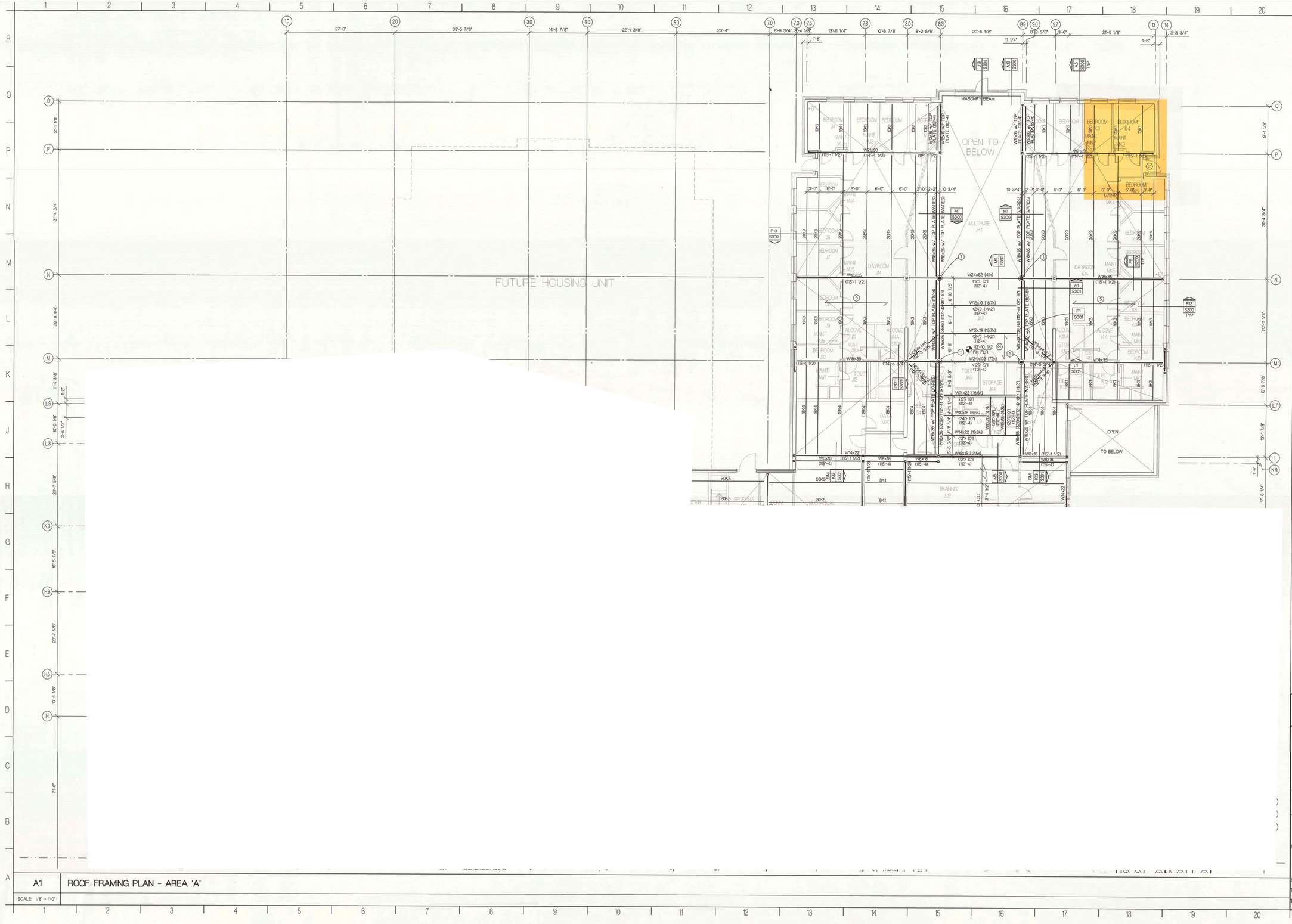
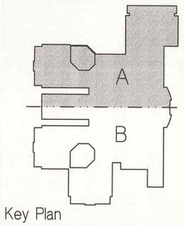


PLAN NOTES

1. INDICATES HSS5x5x3/16 COLUMN TO ROOF ABOVE.
2. 6 1/2" CONCRETE SLAB ON 2VLI20 GALVANIZED COMPOSITE DECK. REINFORCE WITH 6x6-W2.9xW2.9 W.W.F. PLACED IN SHEETS. SEE DETAIL.
3. INDICATES HSS4x4x3/16 AT ROOF
4. INDICATES W8x18 w/ HSS1 1/2x1 1/2x3/16 SLOPE TO MATCH ROOF
5. INDICATES 15B 20 GAGE GALVANIZED ROOF DECK
6. INDICATES W8x18 LINTEL w/ 7 1/2x1/4xCONT BOTTOM PLATE. TOS = 108'-0 3/4
7. INDICATES PIPE 3" STD HANGER TO SUPPORT LINTEL.
8. INDICATES HSS6x2x1/4 HOLLOW METAL FRAME SUPPORT. SEE DETAIL FOR CONNECTION.
9. INDICATES W8x18 BEAM. SLOPES FROM 115'-1 1/2 TO 114'-9 7/8.
10. INDICATES 24" DP MASONRY LINTEL. PROVIDE 2-#5 CONT - BOTTOM
11. INDICATES 16" DP MASONRY LINTEL. PROVIDE 2-#5 CONT - BOTTOM



Key Plan

Lancaster Co. Juvenile Detention Facility

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ROOF FRAMING PLAN AREA - 'A'

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STRUC.-ENGR. PROJ. NO. 9901Z

DESIGN ARCH. JH, MH, KC	ARCH. JOB NO. 98056		
PROJECT ARCH. CB, LK	ISSUED 11/15/99	S	102
INTERN ARCH. DU	REVISION		

A1 ROOF FRAMING PLAN - AREA 'A'

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

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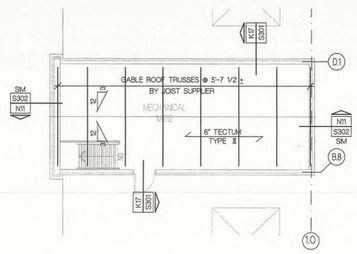
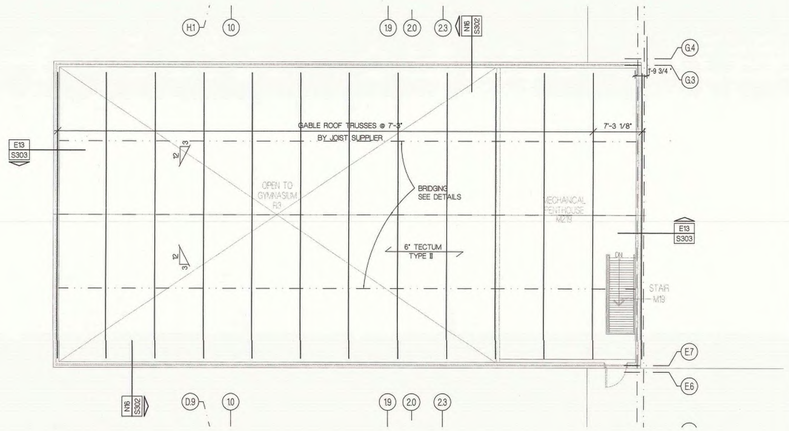


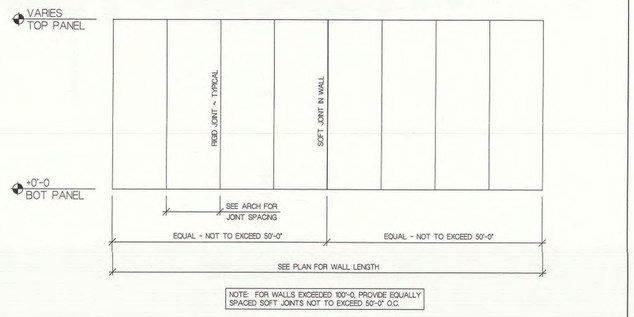
M1 HIGH ROOF FRAMING PLAN

SCALE: 1/8" = 1'-0" | HOUSING PODS, 2 LOCATIONS TYPICAL - 1 LOCATION SIMILAR



L6 GYMANASIUM ROOF FRAMING PLAN

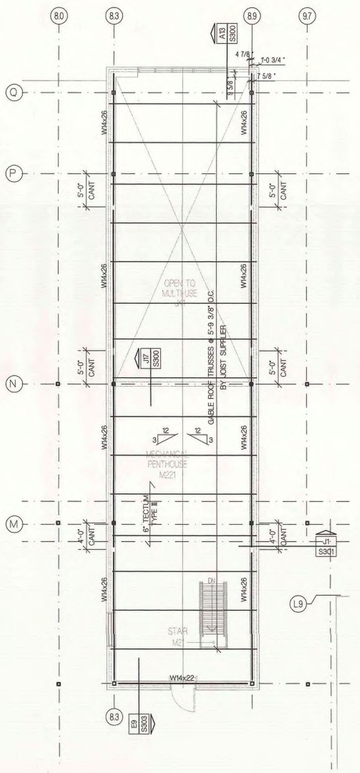
SCALE: 1/8" = 1'-0"



NOTE: FOR WALLS EXCEEDED 100'-0, PROVIDE EQUALLY SPACED SOFT JOINTS NOT TO EXCEED 50'-0" O.C.

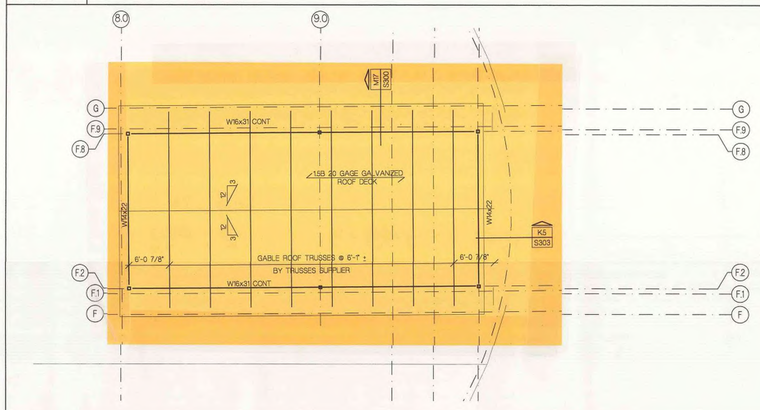
L15 SCHEMATIC WALL JOINTING DIAGRAM

NO SCALE



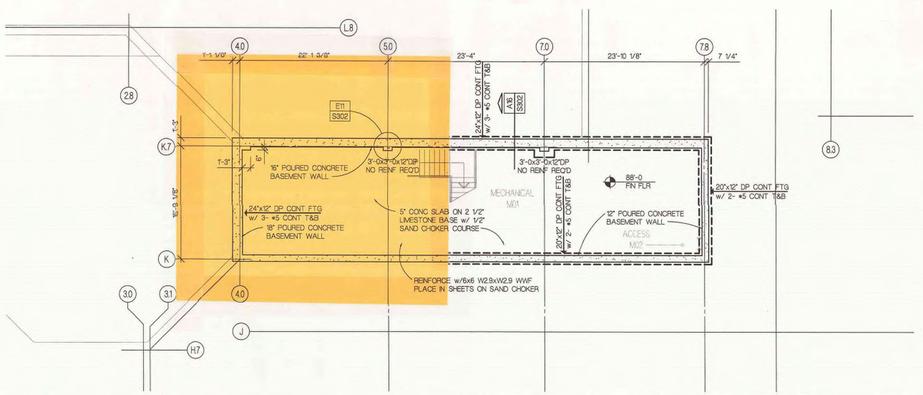
A1 HIGH ROOF FRAMING PLAN - STAFF SECURE

SCALE: 1/8" = 1'-0" | TOP STEEL BEAM ELEVATION = 122'-0



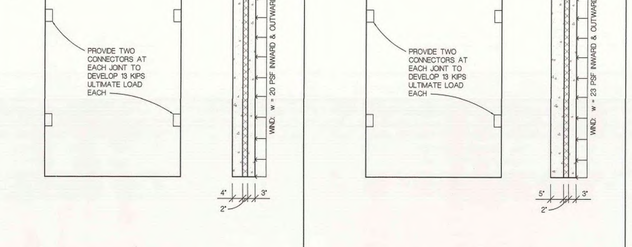
F6 ENTRANCE ROOF FRAMING PLAN

SCALE: 1/8" = 1'-0" | TOP STEEL BEAM ELEVATION = 118'-3



A6 BASEMENT FOUNDATION PLAN

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

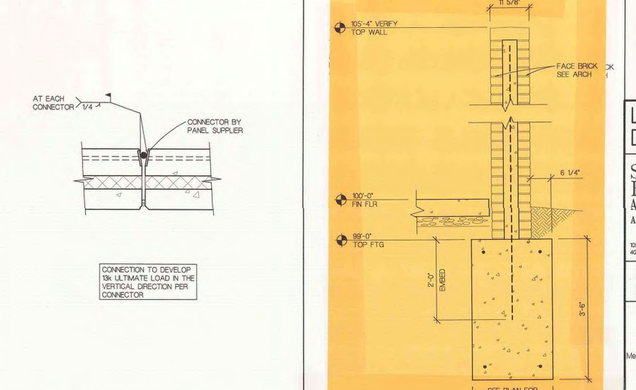


F15 9" WALL PANEL

NO SCALE

F18 10" WALL PANEL

NO SCALE



A15 JOINT DETAILS

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

A18 SCREEN WALL DETAIL

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

Lancaster Co. Juvenile Detention Facility

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STRUC. ENGR. PROJ. NO. 99012

DESIGN ARCH.	ARCH. JOB NO.
JH, MH, KC	98056
PROJECT ARCH	ISSUED
CB, LK	11/15/99
INTERN ARCH	REVISION
DU	—

S 104

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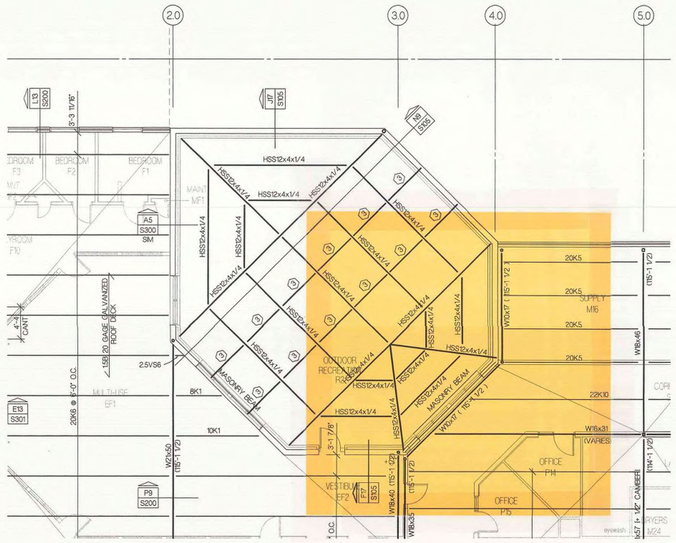
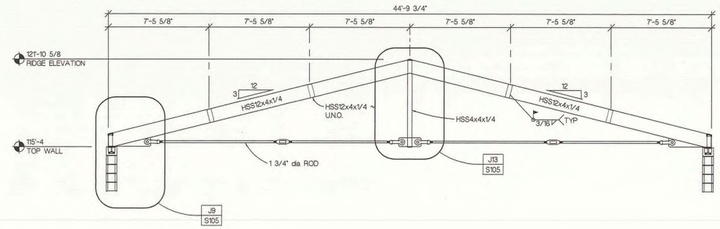


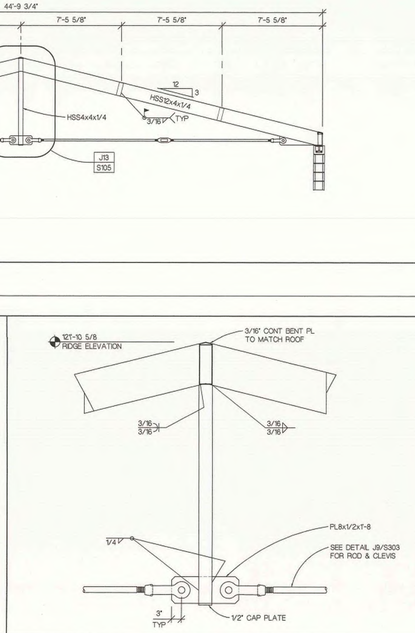
Refer to Sheet S105; detail J1, Alternate Roof Framing at Outdoor Recreation Areas. The steel structure which is indicated to span over the outdoor recreation areas are to be galvanized and not painted.

a. The structure indicated above will not require sprayed applied fire proofing.

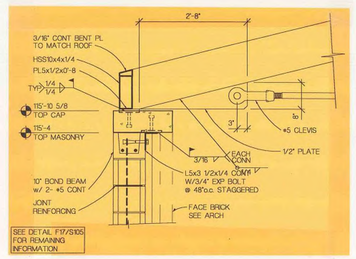
J1	ROOF FRAMING PLAN - ALTERNATE BID ITEM
SCALE: 1/8" = 1'-0"	ROOF FRAMING AT OUTDOOR RECREATION R1 SIMILAR



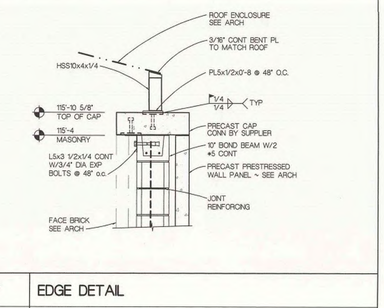
N9	TRUSS ELEVATION
SCALE: 1/4" = 1'-0"	OUTDOOR RECREATION ROOF - ALTERNATE BID ITEM



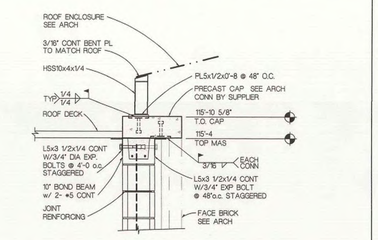
J13	TRUSS CONNECTION DETAIL
SCALE: 3/4" = 1'-0"	OUTDOOR RECREATION ROOF - ALTERNATE BID ITEM



J9	TRUSS BEARING DETAIL
SCALE: 3/4" = 1'-0"	OUTDOOR RECREATION ROOF - ALTERNATE BID ITEM

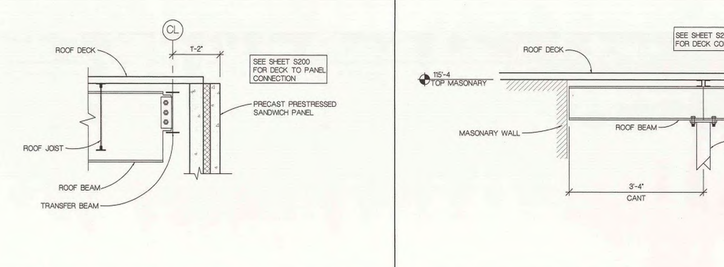


J17	EDGE DETAIL
SCALE: 3/4" = 1'-0"	OUTDOOR RECREATION ROOF - ALTERNATE BID ITEM

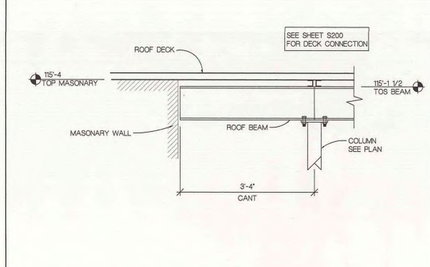


F17	DECK BEARING DETAIL
SCALE: 3/4" = 1'-0"	OUTDOOR RECREATION ROOF - ALTERNATE BID ITEM

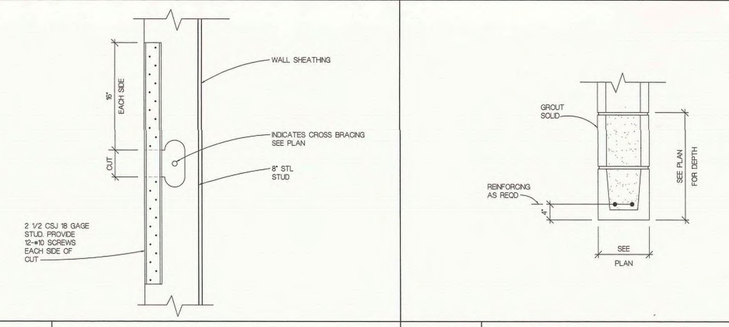
A1	FOUNDATION PLAN - ALTERNATE BID ITEM
SCALE: 1/8" = 1'-0"	TOP OF FOOTING ELEVATION = 99'-0 UNLESS NOTED THUS: T.O.F. = XX'-XX



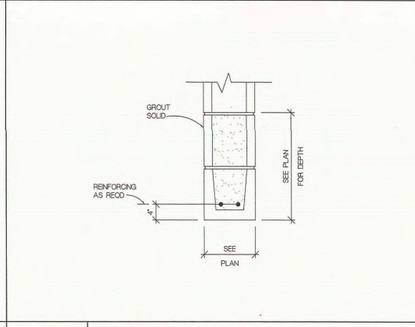
E9	TRANSFER BEAM DETAIL
SCALE: 3/4"=1'-0"	



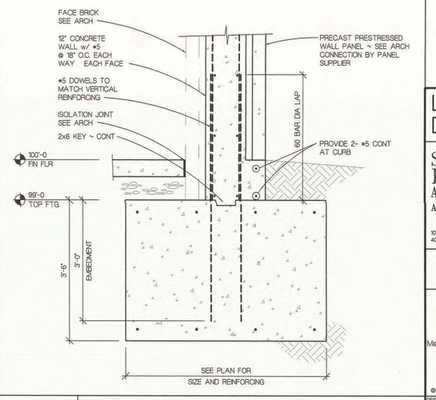
E13	BEAM DETAIL
SCALE: 3/4"=1'-0"	



A9	STL STUD REPAIR DETAIL
SCALE: 1 1/2"=1'-0"	



A13	TYPICAL BOND BEAM DETAIL
SCALE: 1 1/2"=1'-0"	



A17	WALL DETAIL
SCALE: 3/4" = 1'-0"	OUTDOOR REC R2

PLAN NOTES

1. INDICATES 5" CONC SLAB ON 2 1/2 COMPACTED LIMESTONE BASE W/ 1/2" AND CHOKER COURSE ~ SEE SLAB ON GRADE DETAILS. REINFORCE WITH #4 @ 18" O.C. E.W. CENTERED IN SLAB
2. INDICATES 10" REINFORCED MASONARY WALL TO BE GROUTED SOLID. SEE DETAIL FOR REINFORCING REQUIREMENTS
3. INDICATES HSS4x4x3/16 ROOF MEMBER
4. INDICATES 9" PRECAST SANDWICH WALL PANEL
5. INDICATES STRUCTURAL STOOP. SEE DETAIL A5/S3200 FOR REINFORCING. SEE ARCH FOR DIMENSIONS

Lancaster Co. Juvenile Detention Facility

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STRUC. ENGR. PROJ. NO. 99012

DESIGN ARCH: JH, MH, KC	ARCH JOB NO.: 98026	S	105
PROJECT ARCH: CES, LK	ISSUED: 11/15/99		
INTERN ARCH: DU	REVISION:		

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1. LIVE LOADS USED IN DESIGN:

   A. ROOF (FLAT).....25 + 5 PSF FOR RAIN ACCUMULATION
   ROOF (SLOPED).....21 PSF
   MECHANICAL FLOOR.....125 PSF
   WIND (EXPOSURE C,I=1.0).....80 MPH
   SEISMIC (Hi0).....ZONE 1

2. CONCRETE

   A. ALL CONCRETE WORK SHALL CONFORM TO ACI 301 LATEST EDITION.

   B. ALL SLAB CONCRETE SHALL DEVELOP 4000 PSI COMPRESSIVE STRENGTH IN 28 DAYS. MIX SHALL HAVE 30% LIMESTONE AGGREGATE. USE LOW RANGE WATER REDUCER. MAX W/C = .45. MAXIMUM FLY ASH CONTENT 15%.

   C. ALL OTHER CONCRETE SHALL DEVELOP 3000 PSI COMPRESSIVE STRENGTH IN 28 DAYS. MAX W/C = .53 MAX FLYASH CONTENT = 30%.

   D. ALL REINFORCING SHALL BE HIGH STRENGTH DEFORMED BARS, ASTM DESIGNATION A615 WITH 60,000 PSI MINIMUM YIELD POINT AND SHALL CONFORM TO LATEST ASTM SPECIFICATIONS. (EXCEPT #3 COLUMN TIES AND BEAM STIRRUPS WHICH MAY BE INTERMEDIATE GRADE BARS.)

   E. REINFORCEMENT PROTECTION

      1. CONCRETE POURED AGAINST EARTH.....3"
      2. CONCRETE POURED IN FORMS BUT EXPOSED TO WEATHER OR EARTH
         A. IF BARS ARE LARGER THAN #5.....2"
         B. IF BARS ARE #5 OR SMALLER.....1 1/2"
      3. CONCRETE POURED IN FORMS NOT EXPOSED TO WEATHER OR EARTH
         A. WALLS AND SLABS.....¾"
         B. BEAMS AND COLUMNS.....1 1/2"

   F. ALL BAR LENGTHS TO SCALE UNLESS NOTED. LAP SPLICES ARE 48 BAR DIAMETERS, WITH A MINIMUM LAP OF 24". MAKE ALL BARS CONTINUOUS AROUND CORNERS AND THROUGH INTERSECTIONS. (NOT REQUIRED IN FOOTINGS)

   G. DETAIL BARS IN ACCORDANCE WITH A.C.I. DETAILING MANUAL, LATEST EDITION.

   H. PROVIDE ALL ACCESSORIES NECESSARY TO SUPPORT REINFORCING AT POSITIONS SHOWN ON PLANS.

   I. SLABS, BEAMS, JOISTS AND FOOTINGS SHALL NOT HAVE JOINTS IN A HORIZONTAL PLANE. ANY STOP IN CONCRETE WORK MUST BE MADE AT CENTER OF SPAN WITH VERTICAL BULKHEADS AND HORIZONTAL KEYS, UNLESS OTHERWISE SHOWN OR APPROVED.

   J. WIRE MESH REINFORCEMENT MUST LAP ONE FULL MESH AT SIDE AND END LAPS AND BE WIRED TOGETHER.

   K. SYNTHETIC FIBER REINFORCING TO BE FIBERMESH MEETING ASTM C-1018-89 AND C-1116-89 OR EQUAL.

   L. SLAB ON GRADE CONSTRUCTION JOINTS SHALL BE 20'-0" MAXIMUM O.C. AND LOCATED UNDER PARTITIONS OR AT CENTERLINES WHEN POSSIBLE UNLESS SHOWN OTHERWISE. PROVIDE CONTROL JOINTS MAXIMUM 20'-0" O.C.

   M. ALL CONCRETE SHALL BE THOROUGHLY CONSOLIDATED IN PLACE USING CONCRETE VIBRATOR.

   N. PLACE 1- #4 EACH SIDE FLOOR OPENINGS. EXTEND BARS 2'-0" PAST OPENINGS.

   O. PLACE 2- #5 (1 EACH FACE) WITH 2'-6" PROJECTION AROUND CONCRETE WALL OPENINGS.

3. STEEL

   A. ALL STRUCTURAL STEEL SHALL MEET ASTM A572/A572M-94c STANDARD SPECIFICATION FOR HIGH-STRENGTH LOW-ALLOY COLUMBIUM-VANADIUM STRUCTURAL STEEL GRADE 50, EXCEPT :

      1. PIPE COLUMNS ASTM SPECIFICATION A53 (GRADE B)
      2. TUBE STEEL ASTM A500 F_y = 46 ksi
      3. MISCELLANEOUS STEEL (CHANNELS, ANGLES & PLATES) TO MEET ASTM SPECIFICATIONS A36

   B. STRUCTURAL STEEL SHALL BE DETAILED, FABRICATED, AND ERECTED IN ACCORDANCE WITH LATEST PROVISIONS OF A.I.S.C. MANUAL OF STEEL CONSTRUCTION.

   C. USE STANDARD FRAMED BEAM CONNECTIONS WITH 3/4" DIA. BOLTS (OR WELDED EQUIVALENT) UNLESS OTHERWISE NOTED. SELECT CONNECTIONS TO SUPPORT 50 PERCENT OF THE TOTAL UNIFORM LOAD CAPACITY FOR EACH GIVEN BEAM AND SPAN. THE EFFECT OF CONCENTRATED LOADS SHALL ALSO BE CONSIDERED.

   D. BEAMS BEARING ON TOP OF COLUMNS SHALL BE CONNECTED TO COLUMN THROUGH 1/2" THICK CAP PLATE WITH 2 STAGGERED 5/8" DIA. BOLTS WHERE BEAM IS CONT. OVER COLUMN.

   E. STEEL JOISTS SHALL BE DESIGNED, FABRICATED, AND ERECTED IN ACCORDANCE WITH STEEL JOIST INSTITUTE SPECIFICATIONS.

   F. STEEL DECK SHALL BE DESIGNED, FABRICATED, AND ERECTED IN ACCORDANCE WITH STEEL DECK INSTITUTE SPECIFICATIONS.

   G. ALL WELDERS SHALL HAVE EVIDENCE OF PASSING THE A.W.S. STANDARD QUALIFICATION TESTS.

   H. PROVIDE GOVERNMENT ANCHORS FOR BEAMS BEARING ON MASONRY WHERE ANCHOR BOLTS ARE NOT SPECIFIED.

   I. SHOP DRAWINGS ARE TO BE PREPARED UNDER THE DIRECT SUPERVISION OF A PROFESSIONAL ENGINEER LICENSED IN THE STATE OF NEBRASKA.

4. MASONRY

   A. ALL MASONRY WORK SHALL CONFORM TO BUILDING CODE REQUIREMENTS FOR MASONRY STRUCTURES ACI 530.1/ASCE 6 LATEST EDITION.

   B. ALL REINFORCING IN MASONRY WALLS SHALL BE FULLY GROUTED IN PLACE.

   C. HORIZONTAL JOINT REINFORCING TO BE MEDIUM LADUR TYPE DUR-O-WALL AT 16" O.C. JOINT REINFORCING TO BE CONTINUOUS AROUND CORNERS AND THROUGH INTERSECTIONS. PROVIDE "L" 's AND "T" 's AS REQUIRED.

   D. FILL ALL VOIDS AND BLOCK CELLS SOLIDLY WITH MORTAR FOR A DISTANCE OF 24" BENEATH AND 12" EACH SIDE OF ALL BEAM REACTIONS OR OTHER CONCENTRATED LOADS.

   E. CONCRETE BLOCK SHALL DEVELOP 2500 PSI COMPRESSIVE STRENGTH ON NET AREA.

   F. CONCRETE GROUT IN MASONRY SHALL BE POURED IN LIFTS OF 5'-4" MAXIMUM. (SEE SPECIFICATIONS FOR DESIGN REQUIREMENTS.)

   G. TYPE S MORTAR MEETING ASTM C270 SHALL BE USED TO SET CONCRETE BLOCK.

   H. GROUT TO BE COARSE GROUT MEETING ASTM C476.

   I. $F'm$ USED IN DESIGN: 1.5 KSI.

5. COLD-FORMED METAL FRAMING

   A. ALL COLD-FORMED METAL FRAMING SHALL MEET A MINIMUM YIELD STRENGTH OF 40 KSI.

   B. WORK SHALL MEET THE REQUIREMENTS OF THE FOLLOWING STANDARDS.

      1. AMERICAN IRON AND STEEL INSTITUTE (A.I.S.I.) "DESIGN OF COLD FORMED STEEL STRUCTURAL STEEL MEMBERS", LATEST EDITION.

      2. AMERICAN INSTITUTE OF STEEL CONSTRUCTION (A.I.S.C.) "MANUAL OF STEEL CONSTRUTION", LATEST EDITION.

   C. COLD-FORMED METAL FRAMING SHALL BE DETAILED, FABRICATED, AND ERECTED IN ACCORDANCE WITH THE LATEST PROVISIONS OF THE A.I.S.I. SPECIFICATIONS.

   D. ALL FRAMING MEMBERS SHALL BE CUT SQUARELY FOR ATTACHMENT TO PERPENDICULAR MEMBERS, OR AS REQUIRED FOR AN ANGULAR FIT.

   E. MEMBERS AXIALLY LOADED SHALL HAVE FULL BEARING AGAINST INSIDE TRACK WEB PRIOR TO STUD AND TRACK ATTACHMENT. SPLICES IN AXIALLY LOADED MEMBERS ARE NOT PERMITTED.

   F. WELDING SHALL BE PERFORMED BY OPERATORS QUALIFIED IN ACCORDANCE WITH SECTION 6.0 OF THE A.W.S. "S "STRUCTURAL WELDING CODE - SHEET METAL" (AWS D13-8)-.

6. WALL SHEATHING

   A. EXTERIOR AND SHEARWALL SHEATHING TO BE 5/8" DENS-GLASS FIRESTOP GYPSUM SHEATHING.

   B. FASTEN PANELS TO WALL FRAMING WITH 1 1/4", #8, TYPE S, BUGLE HEAD, SELF TAPPING SCREWS. SPACE 8" O.C. AT PANEL EDGES AND 12" O.C. AT INTERMEDIATE STUDS.

   C. ALL PANEL EDGES ARE TO BE BLOCKED AT SHEARWALL CONSTRUCTION.

7. PRECAST CONCRETE WALL PANELS - TO BE A PRE-ENGINEERED PRODUCT

   A. PANELS TO BE DESIGNED IN ACCORDANCE WITH ACI 318 AND UNIFORM BUILDING CODE, LATEST EDITIONS.

   B. PANELS TO BE PRESTRESSED IN LONGITUDINAL DIRECTION AND REINFORCED IN TRANSVERSE DIRECTION.

   C. PANELS TO BE DESIGNED FOR VERTICAL AND LATERAL LOADS PERPENDICULAR TO WALL PANEL. DESIGN TO BE PERFORMED BY A PROFESSIONAL ENGINEER REGISTERED IN THE STATE OF NEBRASKA.

   D. PANELS TO BE SANDWICH TYPE UTILIZING THE "THERMOMASS BUILDING SYSTEM".

   E. PANELS TO BE PRODUCED BY A P.C.I. CERTIFIED PRECAST PLANTS.

   F. SEE SHEET S104 FOR TYPICAL DETAILS AND REQUIREMENTS FOR CONNECTION AND DESIGN.

8. FOUNDATIONS

   A. SOIL BEARING PRESSURE USED IN DESIGN: 2500 PSF SEE SOIL REPORT FOR PREPARATION REQUIREMENTS.

   B. SOIL TO BE CHECKED AND APPROVED BY SOILS ENGINEER PRIOR TO PLACING FOOTING.

9. ALL DIMENSIONS ON STRUCTURAL DRAWINGS SHALL BE CHECKED AGAINST ARCHITECTURAL.

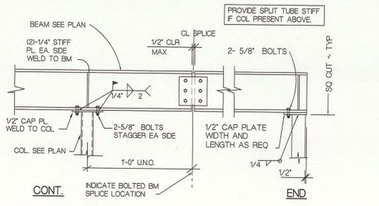
10. ARCHITECT'S APPROVAL MUST BE SECURED FOR ALL SUBSTITUTIONS.

11. DO NOT PLACE BACKFILL AGAINST BASEMENT WALLS UNTIL FIRST FLOOR AND BASEMENT SLABS ARE IN PLACE.

12. VERIFY ALL OPENINGS THROUGH FLOOR AND WALLS WITH MECHANICAL AND ELECTRICAL CONTRACTOR.

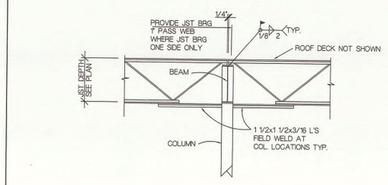
A1 GENERAL NOTES

NO SCALE



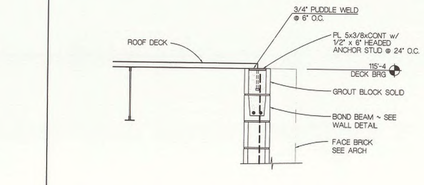
P5 TYPICAL BEAM TO COLUMN CONNECTIONS

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



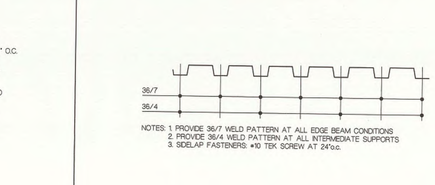
P9 TYPICAL JOIST TO BEAM CONNECTIONS

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



P13 TYPICAL ROOF EDGE DETAIL AT MASONRY WALL

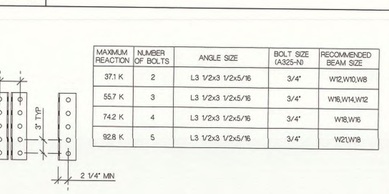
SCALE: 3/4" = 1'-0"



NOTES: 1. PROVIDE 36/7 WELD PATTERN AT ALL EDGE BEAM CONDITIONS
2. PROVIDE 36/4 WELD PATTERN AT ALL INTERMEDIATE SUPPORTS
3. SIDELAP FASTENERS: #10 TEK SCREW AT 24"o.c.

P17 1.5B METAL DECK WELD PATTERN

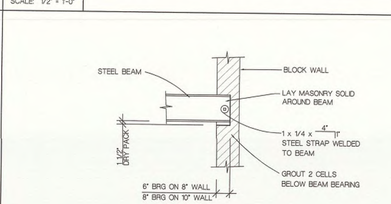
NO SCALE



MAXIMUM REACTION	NUMBER OF BOLTS	ANGLE SIZE	BOLT SIZE (A325-N)	RECOMMENDED BEAM SIZE
37.1 K	2	L3 1/2x3 1/2x5/16	3/4"	W12,W10,W8
55.7 K	3	L3 1/2x3 1/2x5/16	3/4"	W16,W14,W12
74.2 K	4	L3 1/2x3 1/2x5/16	3/4"	W18,W16
92.8 K	5	L3 1/2x3 1/2x5/16	3/4"	W21,W18

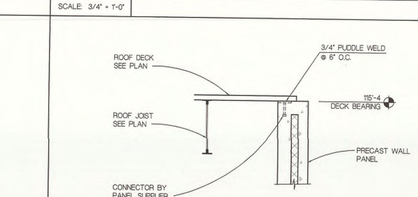
L5 CONNECTION SCHEDULE

NO SCALE



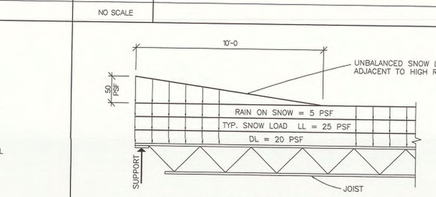
L9 BEAM BEARING ON MASONRY WALL DETAIL

NO SCALE



L13 TYPICAL ROOF EDGE DETAIL AT PRECAST PANEL

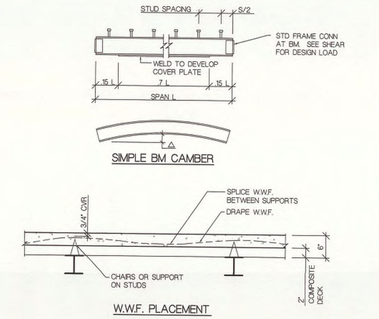
SCALE: 3/4" = 1'-0"



NOTES: 1. SEE PLAN FOR JOIST SPACING.
2. DESIGN JOIST FOR UNBALANCED LOADING SHPWN AND SUBMIT CALCULATIONS FOR APPROVAL

L17 SCHEMATIC DRIFTING SNOW DIAGRAM

NO SCALE

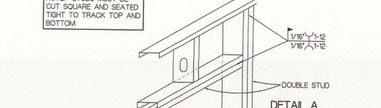


OPENING	SIZE	BRG.	RMK
THRU 3'-4	L 3X3-1/2X1/4	4"	S.L.V.
3'-5 THRU 5'-4	L 4X3-1/2X1/4	6"	L.L.V.
5'-5 THRU 7'-4	L 6X3-1/2X5/16	6"	L.L.V.
7'-5 THRU 9'-4	HSS6x2x3/16 w/ L 6x3 1/2x5/16	8"	℄ L.L.V.

NOTES: 1. SEE ARCHITECT FOR MASONRY OPENINGS. USE ONLY FOR MASONRY VENEERS.
2. PROVIDE ONE ANGLE FOR EACH 4" OF MASONRY WHERE NO BEAMS EXIST TO CARRY MASONRY.
3. PROVIDE SOLID JAMB AT BEARING.

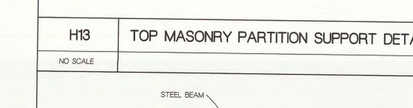
E5 COMPOSITE BEAM DETAILS

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



E9 SCHEMATIC STEEL STUD DETAILS

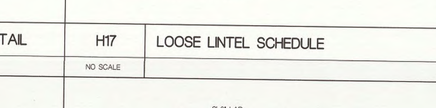
NO SCALE



CONN TO DECK | CONN TO BM OR JST

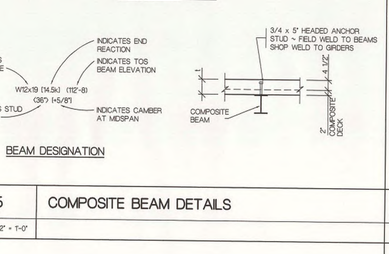
E13 TYPICAL BEAM BEARING DETAIL

NO SCALE



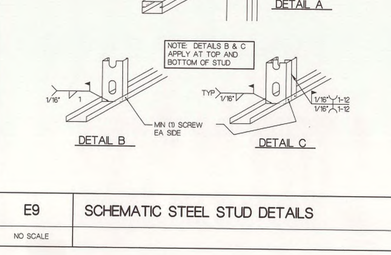
E17 DROPPED FOOTING DETAIL

NO SCALE



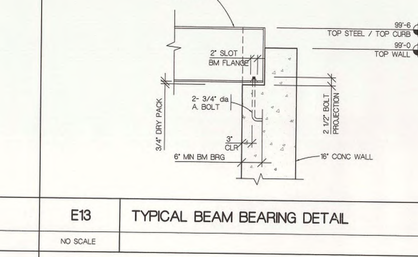
A5 STRUCTURAL STOOP DETAIL

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



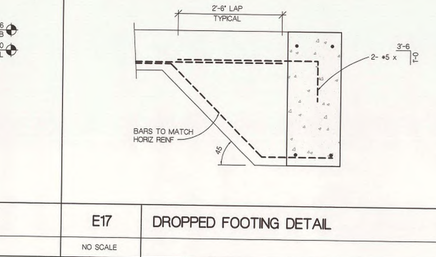
A9 SLAB ON GRADE DETAILS

SCALE: 1" = 1'-0"



A13 TYPICAL INTERIOR PAD FOOTING DETAIL

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



A17 TYPICAL CONTINUOUS FOOTING DETAIL

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

Lancaster Co. Juvenile Detention Facility

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GENERAL NOTES AND TYPICAL DETAILS

DESIGN ARCH: LH, MH, KO	ARCH. JOB NO.: 98056	STRUC. ENGR. PROJ. NO.: 99312	
PROJECT ARCH: CB, LK	ISSUED: 11/15/99	S	200
INTERN ARCH: DU	REVISION:		

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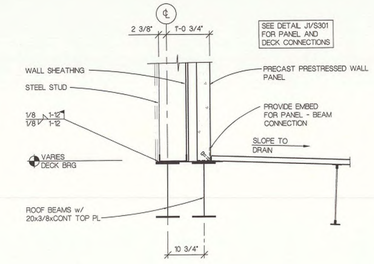
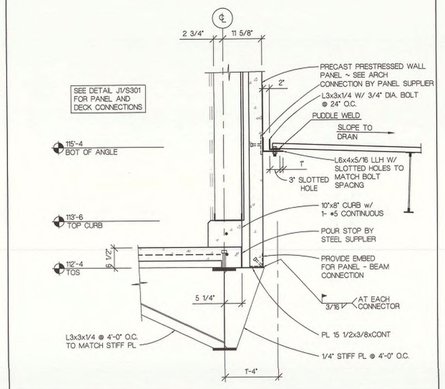


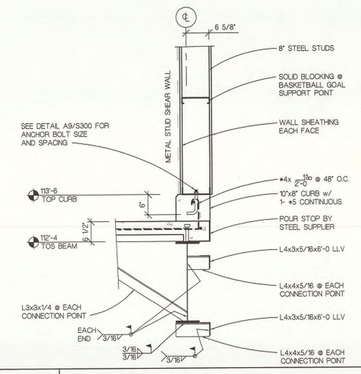
M1 DETAIL AT DECK BEARING

SCALE: 3/4" = 1'-0" | SIDE WALLS AT STAFF SECURE MULTI-USE



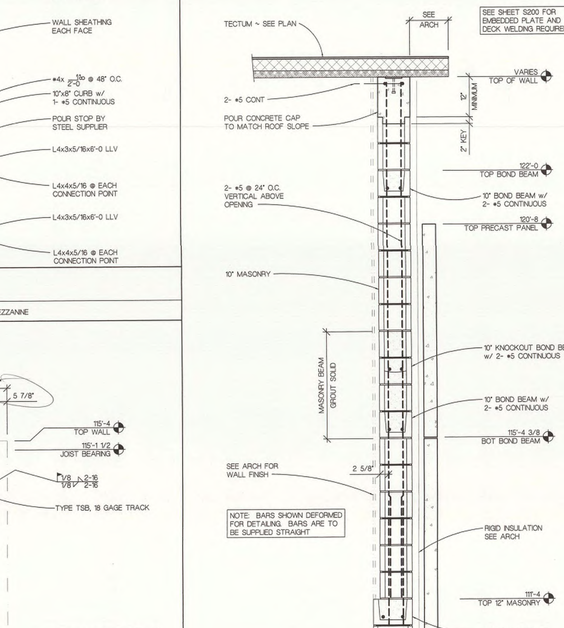
M5 END WALL DETAIL

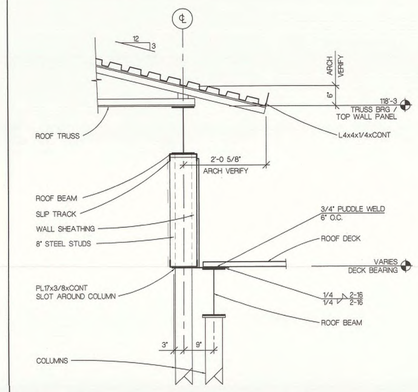
SCALE: 3/4" = 1'-0" | SOUTH WALL STAFF SECURE MECHANICAL MEZZANINE



M9 END WALL DETAIL

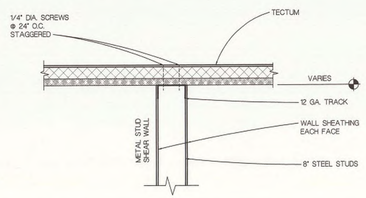
SCALE: 3/4" = 1'-0" | NORTH WALL STAFF SECURE MECHANICAL MEZZANINE





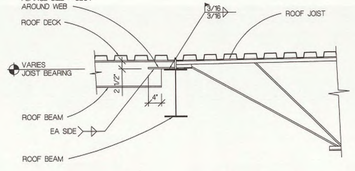
M17 ROOF TRUSS BEARING DETAIL

SCALE: 3/4" = 1'-0" | CLERESTORY AT VISITING/LOBBY



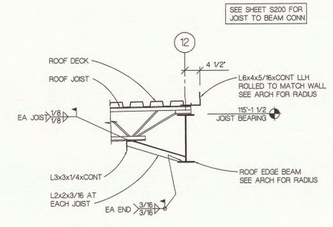
J17 CONNECTION TOP SHEAR WALL

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



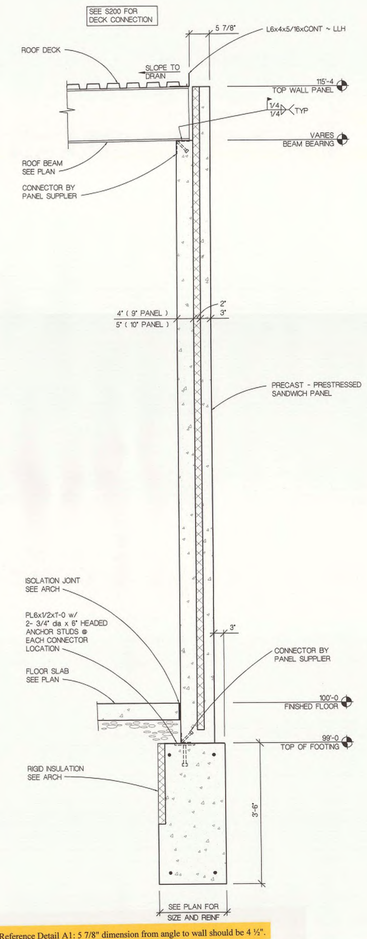
E17 CONNECTION DETAIL

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



A17 BEAM BEARING DETAIL

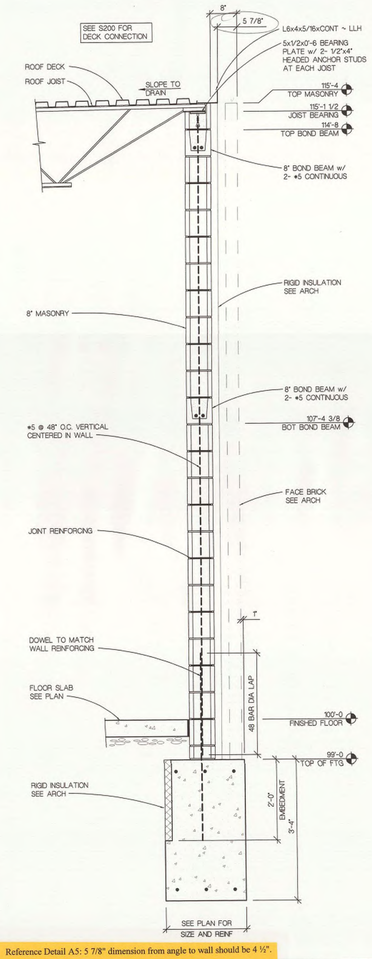
SCALE: 3/4" = 1'-0"



Reference Detail A1: 5 7/8" dimension from angle to wall should be 4 ½".

A1 WALL SECTION AT PRECAST PANEL

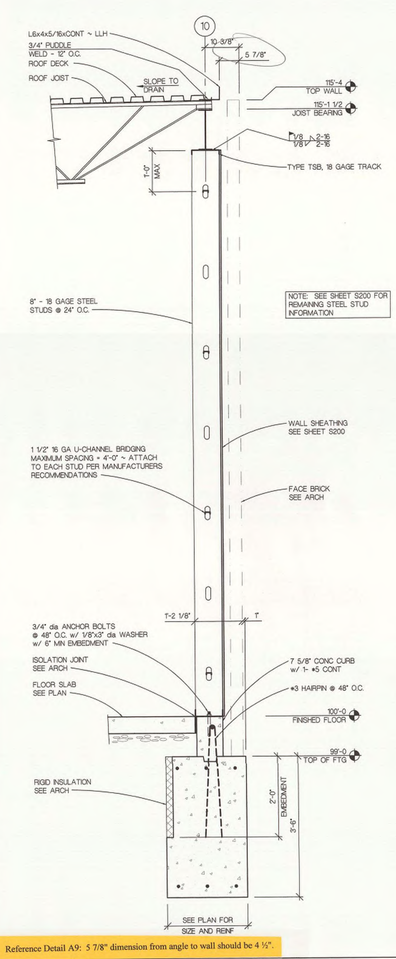
SCALE: 3/4" = 1'-0" | TYPICAL UNLESS NOTED OTHERWISE



Reference Detail A5: 5 7/8" dimension from angle to wall should be 4 ½".

A5 WALL SECTION AT 8" MASONRY

SCALE: 3/4" = 1'-0" | 10" MASONRY SIMILAR



Reference Detail A9: 5 7/8" dimension from angle to wall should be 4 ½".

A9 WALL SECTION AT STEEL STUD

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

A13 WALL SECTION AT CLERESTORY ENDWALL

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

Lancaster Co. Juvenile Detention Facility

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402/476-7331

LICENSED PROFESSIONAL ENGINEER — BOYD J. YOUKER — E-8372 — STATE OF NEBRASKA

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Food Service Consultant
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STRUC. ENGR. PROJ. NO. 99012

DESIGN ARCH.	ARCH. JOB NO.
JH, MH, KC	98056
PROJECT ARCH.	ISSUED
CB, LK	11/15/99
INTERN ARCH.	REVISION
DU	

S 300

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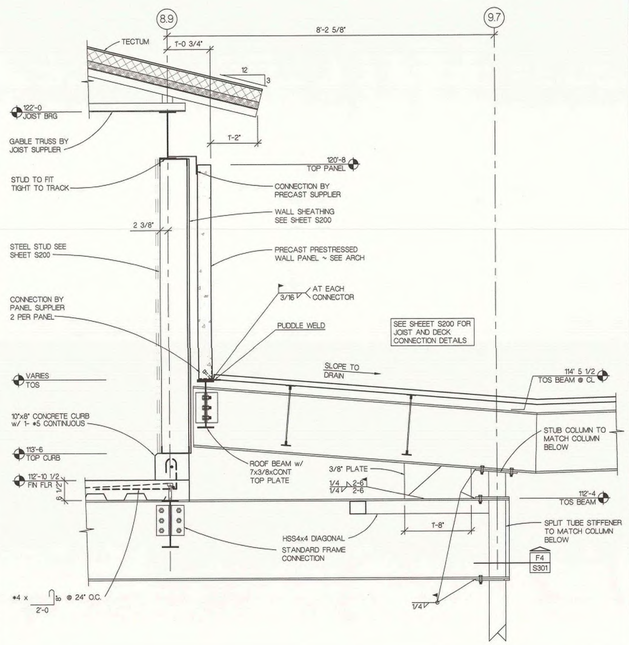
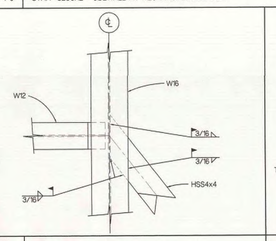


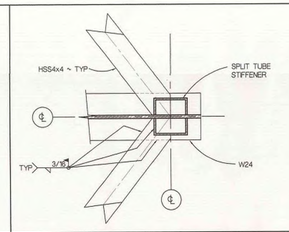
J1 SECTION

SCALE: 3/4" = 1'-0" STAFF SECURE - SIDEWALL AT MECHANICAL MEZZANINE



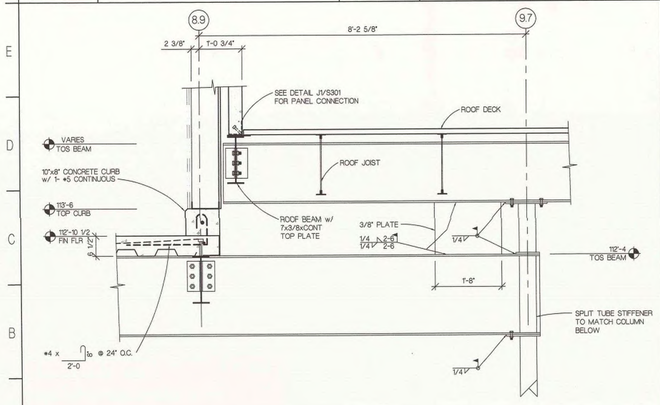
F1 CONNECTION DETAIL

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



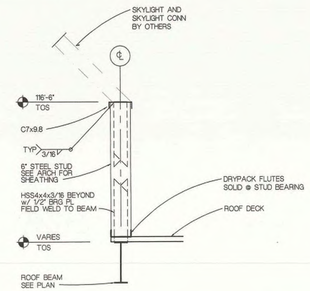
F4 CONNECTION DETAIL

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



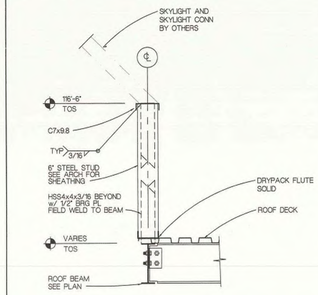
A1 DETAIL

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



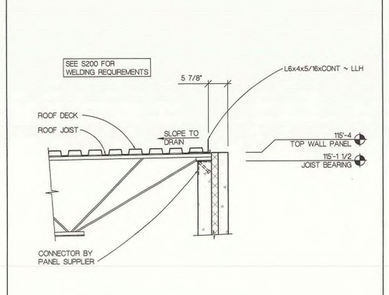
N7 DETAIL AT SKYLIGHT

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



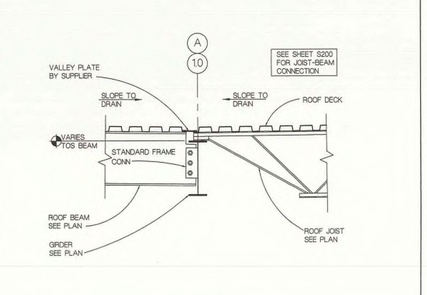
N10 DETAIL AT SKYLIGHT

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



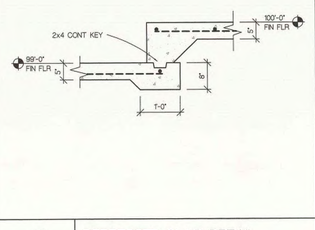
N13 JOIST BEARING DETAIL

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



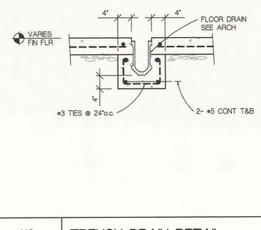
N17 BEARING DETAIL

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



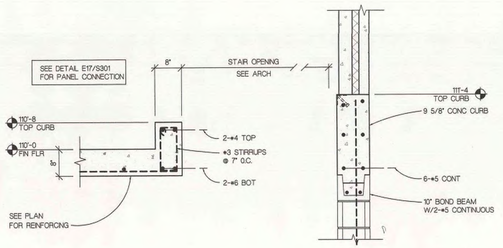
J7 DEPRESSED SLAB DETAIL

SCALE: 3/4" = 1'-0" Reference Detail J7: Revise 1'-0" dimension to read 1'-4".



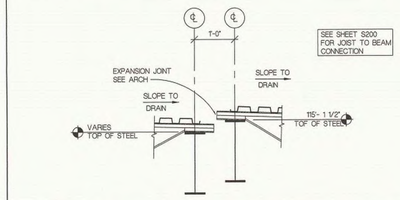
J10 TRENCH DRAIN DETAIL

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



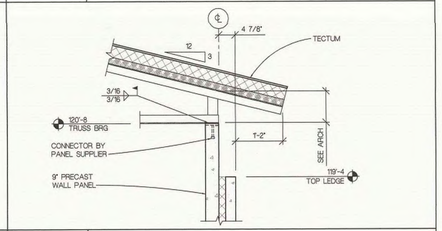
E7 SECTION AT STAIR OPENING

SCALE: 3/4" = 1'-0" HOUSING POD MECHANICAL MEZZANINE



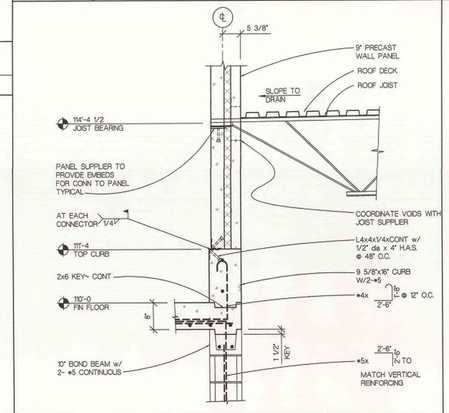
K13 DETAIL AT EXPANSION JOINT

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



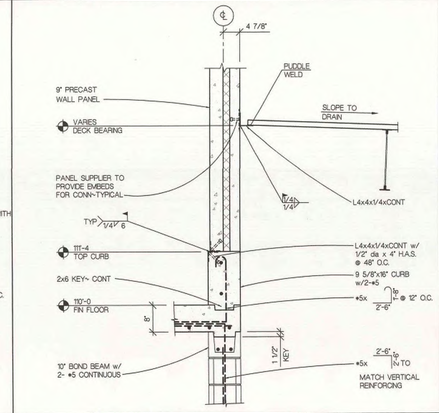
K17 ROOF TRUSS BEARING DETAIL

SCALE: 3/4" = 1'-0" HOUSING MECHANICAL MEZZANINE ROOF



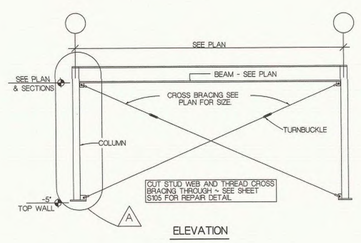
E13 END WALL DETAIL

SCALE: 3/4" = 1'-0" BACK WALL - HOUSING POD MECHANICAL MEZZANINE



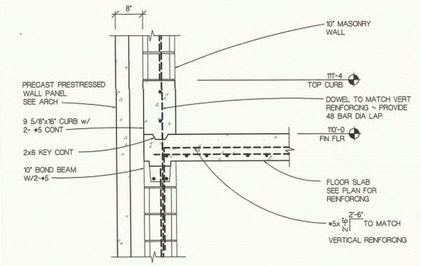
E17 SIDE WALL DETAIL

SCALE: 3/4" = 1'-0" SIDE WALL HOUSING POD MECHANICAL MEZZANINE



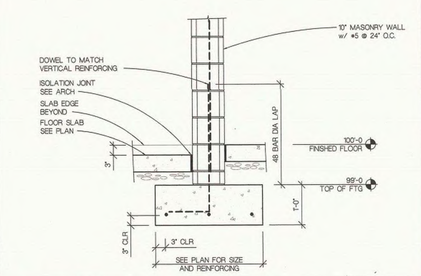
A7 SCHEMATIC CROSS BRACING DETAIL

NO SCALE



A13 END WALL DETAIL

SCALE: 3/4" = 1'-0" FRONT WALL - HOUSING POD MECHANICAL MEZZANINE



A17 SIDE WALL DETAIL

SCALE: 3/4" = 1'-0" PERIMETER WALL HOUSING POD MECHANICAL MEZZANINE

Lancaster Co. Juvenile Detention Facility

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ROY O. YOUKER E-8272 REGISTERED PROFESSIONAL ENGINEER STATE OF NEBRASKA

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STRUC. ENGR. PROJ. NO. 99012

DESIGN ARCH	ARCH. JOB NO.
LH, MH, KC	98056
PROJECT ARCH	ISSUED
DS, LK	11/15/99
INTERN ARCH	REVISION
DU	

S 301

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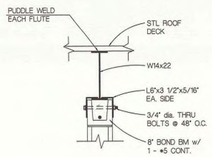
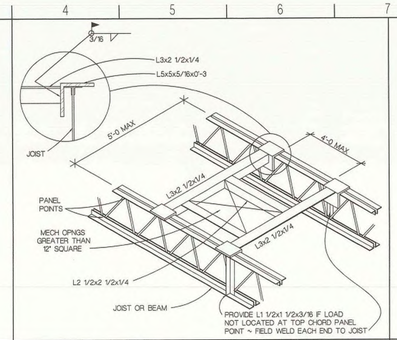


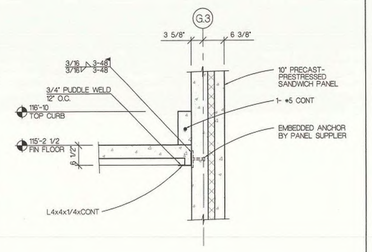
N1 TOP MASONRY SHEAR WALL

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



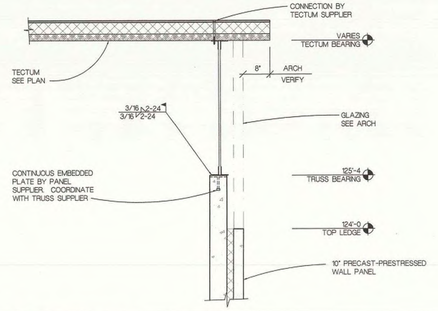
N4 SCHEMATIC ROOF OPENING FRAMING

NO SCALE



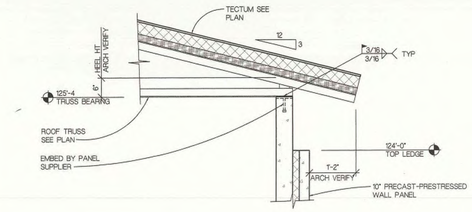
N7 DECK BEARING DETAIL

SCALE: 3/4" = 1'-0" GYMNASIUM MECHANICAL MEZZANINE



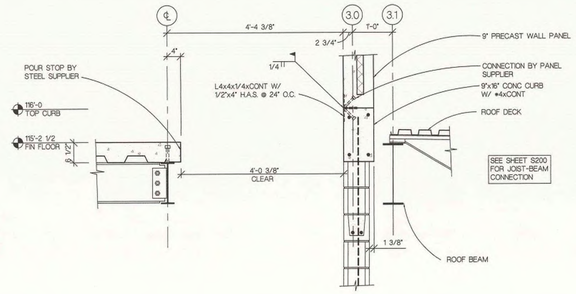
N11 ROOF TRUSS BEARING DETAIL

SCALE: 3/4" = 1'-0" GYMNASIUM END WALL



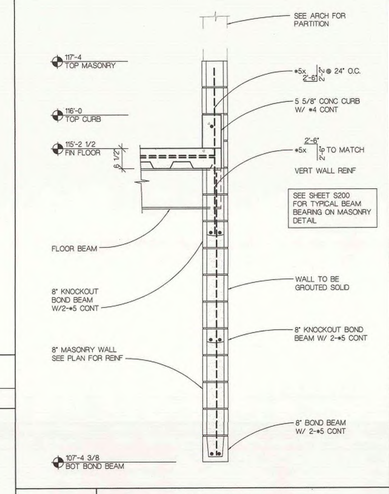
N16 ROOF TRUSS BEARING DETAIL

SCALE: 3/4" = 1'-0" GYMNASIUM SIDE WALL



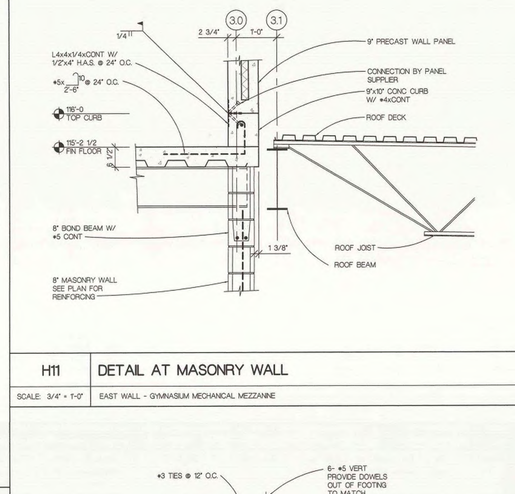
H1 WALL DETAIL AT STAIR

SCALE: 3/4" = 1'-0" GYMNASIUM MECHANICAL MEZZANINE



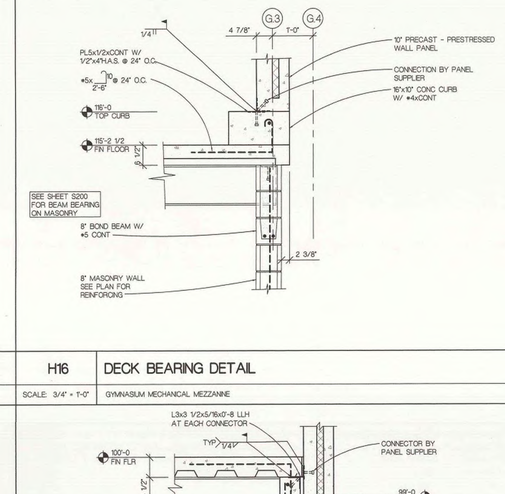
G7 DETAIL AT MASONRY WALL

SCALE: 3/4" = 1'-0" WEST WALL - GYMNASIUM MECHANICAL MEZZANINE



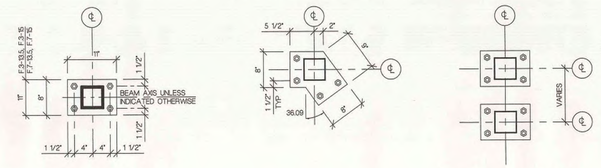
H11 DETAIL AT MASONRY WALL

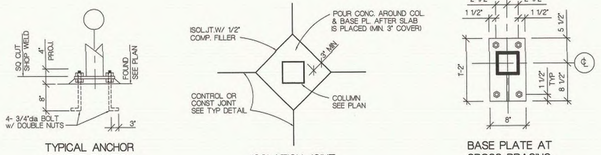
SCALE: 3/4" = 1'-0" EAST WALL - GYMNASIUM MECHANICAL MEZZANINE



H16 DECK BEARING DETAIL

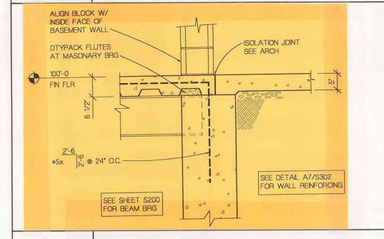
SCALE: 3/4" = 1'-0" GYMNASIUM MECHANICAL MEZZANINE





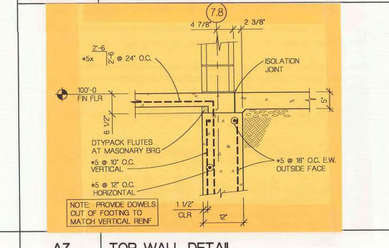
A1 BASE PLATE DETAILS

SCALE: 1" = 1'-0"



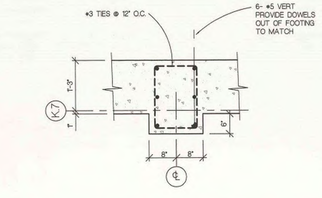
D7 TOP WALL DETAIL

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



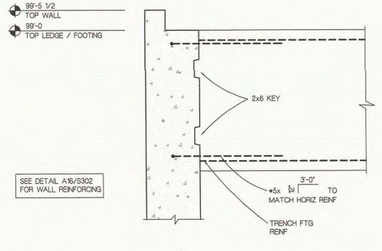
A7 TOP WALL DETAIL

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



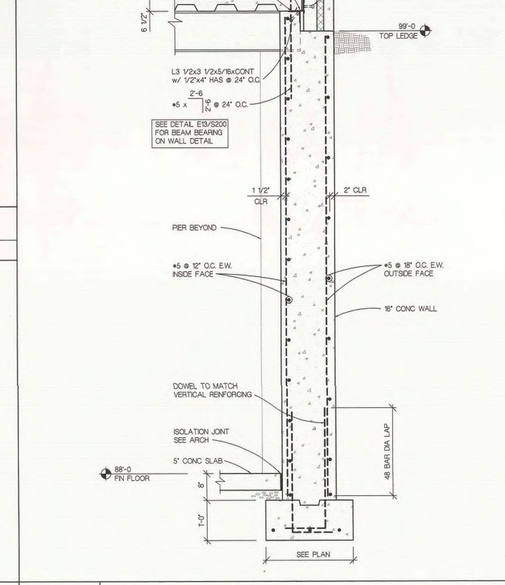
E11 PILASTER DETAIL

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



A11 FOOTING TO WALL CONNECTION

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



A16 BASEMENT WALL DETAIL

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

Lancaster Co. Juvenile Detention Facility

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E-6572
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DESIGN ARCH	ARCH. JOB NO.		
J.H, M.H, K.C	98056	S	302
PROJECT ARCH	ISSUED		
C.B, L.K	11/15/99		
INTERN ARCH	REVISION		
D.J	—		

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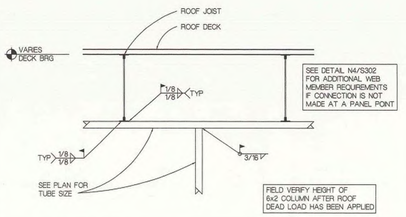
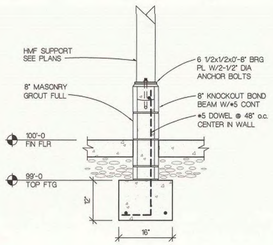


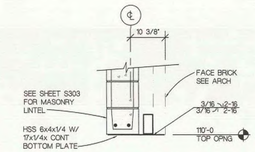
N1 HOLLOW METAL FRAME SUPPORT

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



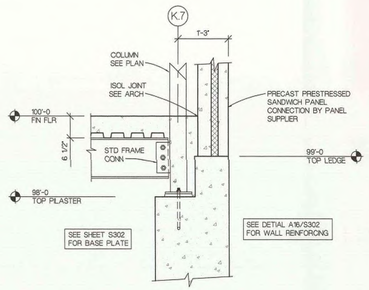
J1 STEM DETAIL AT HOLLOW METAL FRAME

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



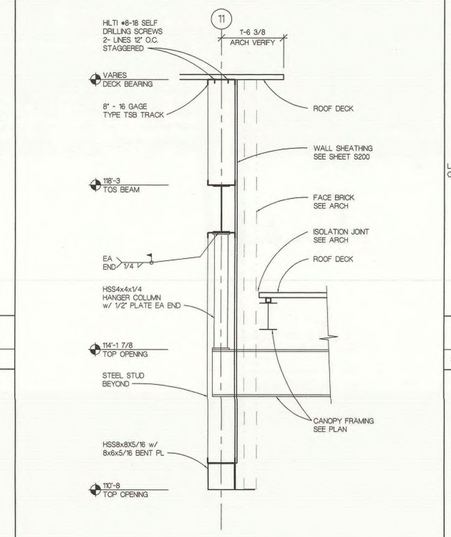
E1 LINTEL DETAIL

SCALE: 3/4" = 1'-0" OVERHEAD DOORS AT SALLYPORT



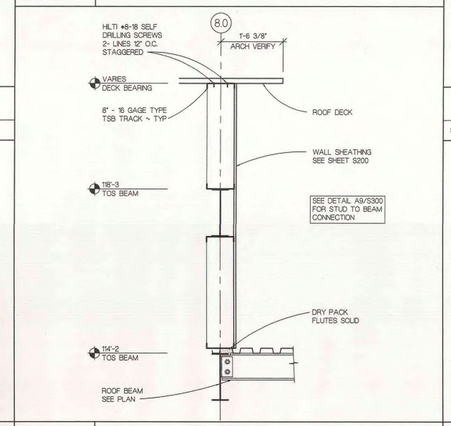
A1 BEAM CONNECTION DETAIL

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



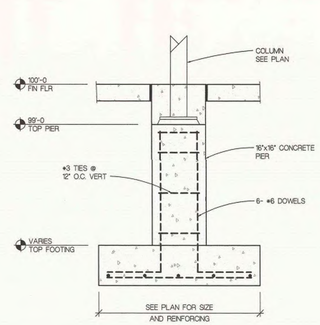
K5 DETAIL AT ENTRANCE CANOPY

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



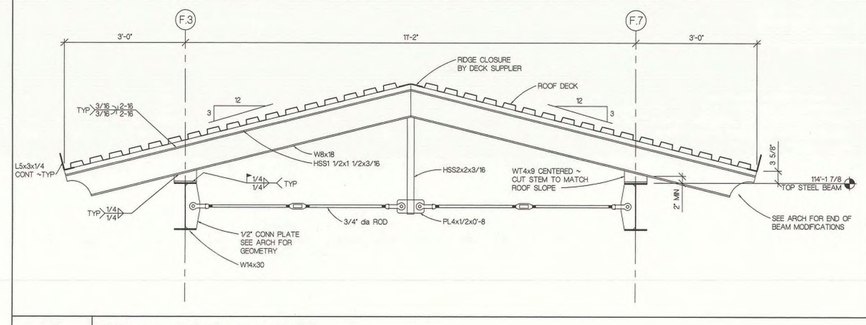
E5 DETAIL AT CLERESTORY

SCALE: 3/4" = 1'-0" WEST WALL OF ENTRANCE



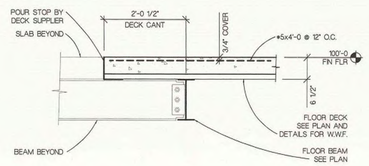
A5 CONCRETE PIER DETAIL

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



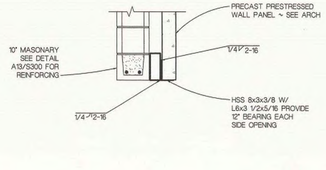
N9 SECTION AT ENTRANCE CANOPY

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



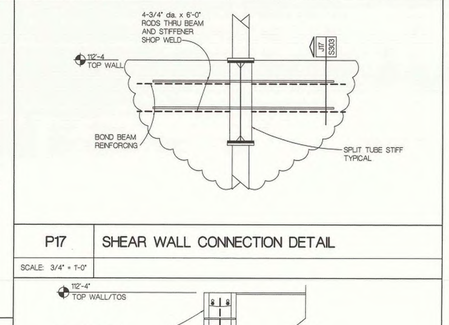
J9 FLOOR CANTILEVER DETAIL

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



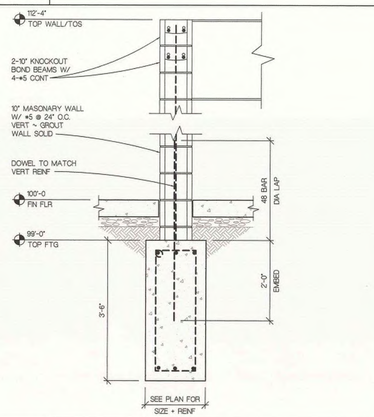
J13 LINTEL DETAIL

SCALE: 3/4" = 1'-0" OPENING AL4-NORTH END STAFF SECURE



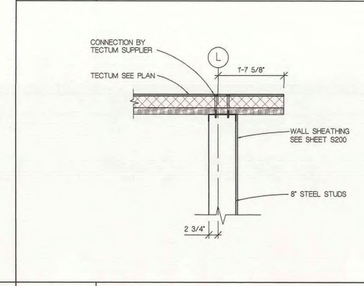
P17 SHEAR WALL CONNECTION DETAIL

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



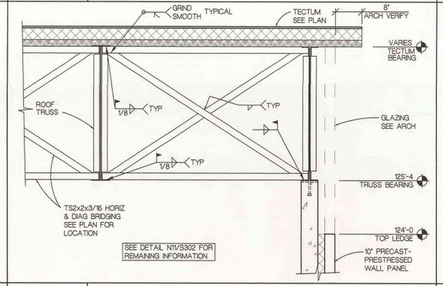
J17 SHEAR WALL DETAIL

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



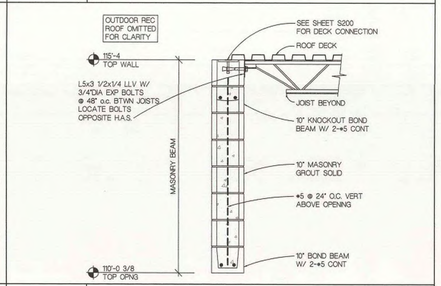
E9 END WALL DETAIL

SCALE: 3/4" = 1'-0" SOUTH WALL - STAFF SECURE



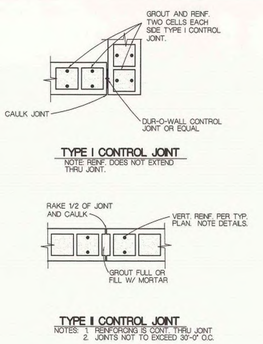
E13 BRIDGING DETAIL

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



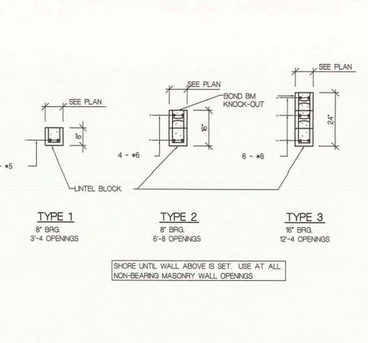
E17 MASONRY BEAM DETAIL

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



A13 MASONRY CONTROL JOINTS

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



A17 MASONRY LINTEL SCHEDULE

SCALE: 3/4" = 1'-0" NON-LOAD BEARING WALLS

Lancaster Co. Juvenile Detention Facility

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REGISTERED PROFESSIONAL ENGINEER ROY C. YOUKER E-9272 STATE OF NEBRASKA

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STRUC. ENGR. PROJ. NO. 99012

DESIGN ARCH. JH, MH, KC	ARCH. JOB NO. 98056	S	303
PROJECT ARCH CB, LK	ISSUE 11/15/99		
INTERN ARCH. DU	REVISION		

C:\1999\99012\dwgs\99012-s303.dwg Wed Nov 17 13:04:45 1999

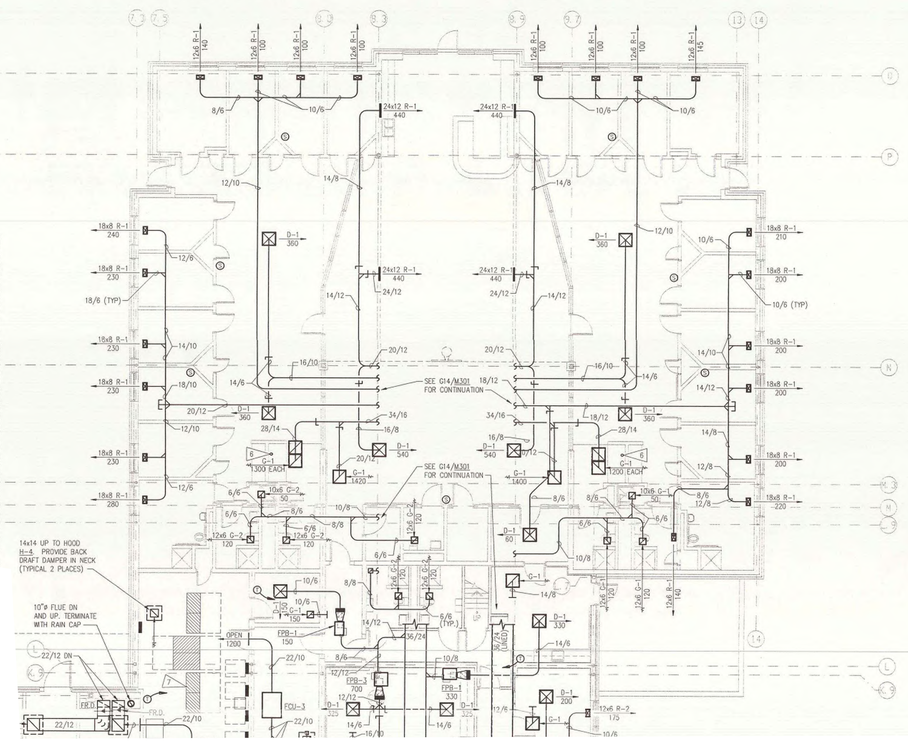
CEILING SUPPLY AIR DIFFUSER SIZING SCHEDULE			
MARK	NECK SIZE	CFM RANGE	REMARKS
D-1	6	0 – 125	(1) USE 24x24 PANELS FOR ALL LAY-IN CEILINGS AND FOR SURFACE MOUNT APPLICATION WHERE NECK SIZE IS 8" AND LARGER. (2) USE 12x12 PANEL FOR APPLICATIONS WHERE NECK SIZE IS 6".
	8	125 – 175	
	10	175 – 325	
	12	325 – 450	
	14	450 – 600	
	16	600 – 750	

1. ALL CEILING SUPPLY DIFFUSERS SHALL BE TYPE D-1 EXCEPT AS INDICATED ON THE PLANS.
2. SUPPLY AIR RUNNOUTS TO DIFFUSERS SHALL BE DIFFUSER NECK SIZE UNLESS OTHERWISE INDICATED.

CEILING RETURN/EXHAUST GRILLE SIZING SCHEDULE			
MARK	NECK SIZE	CFM RANGE	REMARKS
G-1	8x8	125 – 175	
	10x10	175 – 275	
	12x12	275 – 600	
	14x14	600 – 815	
	16x16	815 – 1050	
	18x18	1050 – 1350	
	20x20	1350 – 1660	
	22x22	1660 – 2000	

1. ALL CEILING EXHAUST OR RETURN GRILLES SHALL BE TYPE G-1 EXCEPT AS INDICATED ON THE PLANS.

FUTURE HOUSING UNIT



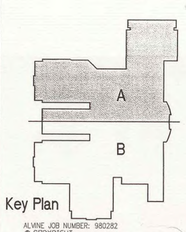
PROVIDE FLEXIBLE CONNECTION WHERE DUCTWORK CONNECTS TO RTU-1 ON SUPPLY AND RETURN AIR

FLAG NOTES

1. SEE G9/M301 FOR CONTINUATION OF DUCTWORK TO PENTHOUSE.
2. 8"x6" UP TO EF-3 ON ROOF. ALL DUCTWORK ASSOCIATED WITH DISHWASHER SHALL BE ALUMINUM WITH WATERTIGHT JOINTS. SLOPE HORIZONTAL DUCT TOWARDS DISHWASHER. ANY EXPOSED DUCTWORK ASSOCIATED WITH DISHWASHER SHALL BE STAINLESS STEEL.
3. 6"ø EXHAUST UP TO ROOF CAP. ROOF CAP PROVIDED WITH FAN.
4. 24x24 UP THRU ROOF TO INTAKE AIR HOOD H-2. 24x24 DOWN TO 8'-0" ABOVE FINISHED FLOOR.
5. 8"ø DRYER EXHAUST DUCT DOWN TO DRYER AND UP THRU ROOF. TERMINATE 3'-0" ABOVE ROOF WITH RAIN CAP. DRYER DUCT SHALL BE ALUMINUM.
6. 4"ø DRYER EXHAUST DUCT DOWN TO DRYER CONNECTION AND UP THRU ROOF. PROVIDE 180° GOOSENECK ABOVE ROOF AND BIRD SCREEN OVER END OF DUCTWORK. DRYER DUCT SHALL BE ALUMINUM.
7. ELECTRICAL GEAR. MAINTAIN ALL CODE REQUIRED CLEARANCES ABOVE AND IN FRONT.
8. PROVIDE BARS IN DUCTWORK AT WALL PENETRATION. SEE DETAIL 13/M400
9. 14x14 UP TO INTAKE AIR HOOD H-4. PROVIDE WITH 14x14 MOTORIZED DAMPER.

GENERAL NOTES

1. SEE DETAIL 1/M401 FOR DUCT FITTING DETAILS.
2. COORDINATE LOCATIONS OF ALL DIFFUSERS, REGISTERS, AND GRILLES WITH ARCHITECTURAL REFLECTED CEILING PLANS.



Key Plan

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Lancaster Co. Juvenile Detention Center

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JAMES L. KUEHL E-3167 PROFESSIONAL MECHANICAL/FIRE PROTECTION ENGINEER STATE OF NEBRASKA

First Level Plan - Area A Ductwork

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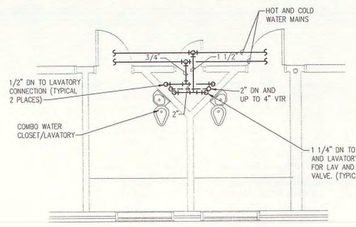
GDL	980282
PROJECT ENGINEER	ISSUED
JLK	11/15/99
DRAFTER	REVISION
SRP	

M 100

A1 FIRST LEVEL PLAN - AREA A - DUCTWORK

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

11-17-1999 11:43 B282m1.dwg sprellauer



PROVIDE ISOLATION VALVES AT EACH CONNECTION TO EACH FIXTURE. MOUNT ISOLATION VALVES MAXIMUM 5'-0" ABOVE FINISHED FLOOR

N1 TYPICAL ENLARGED MECHANICAL CHASE - PLUMBING

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

1MD2. Sheet M200 – First Level Plan – Area A Plumbing and Piping

a. See attached sketch MS-2 for relocation of new gas meter on exterior of building.

b. See attached sketch MS-3 for revisions to storm piping as it exits the building.

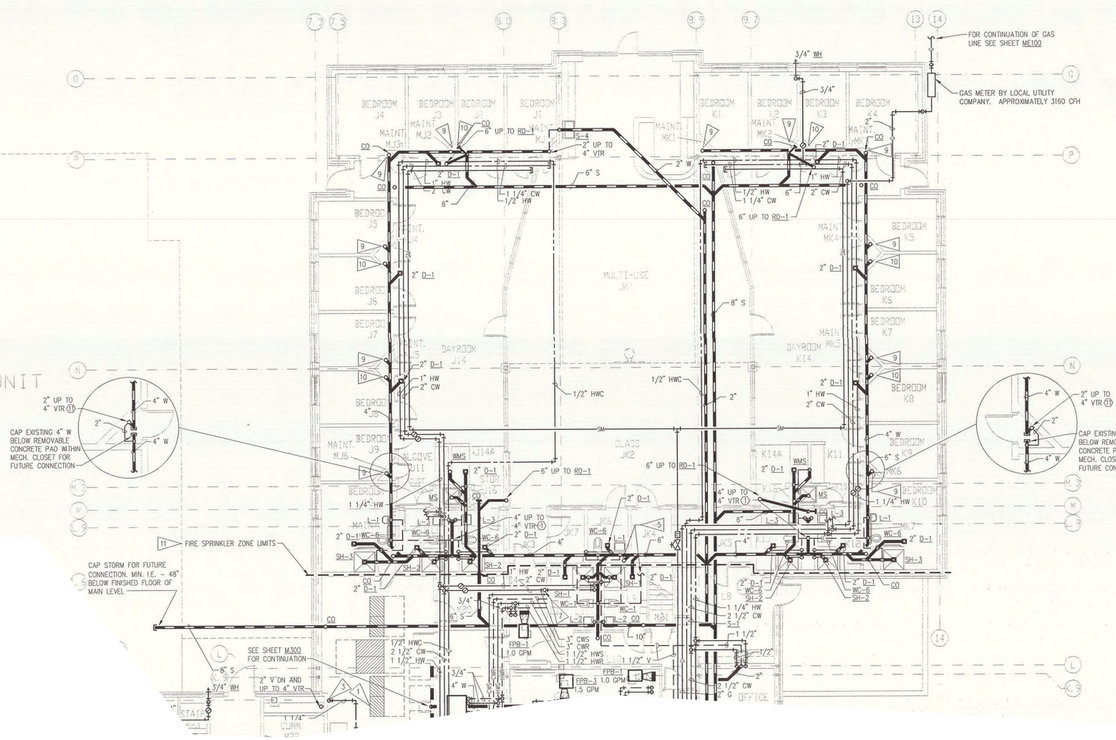
c. Exercise Room R4, relocate 4" waste piping along north wall east and rise up in the block wall between Exercise R4 and Vestibule S9.

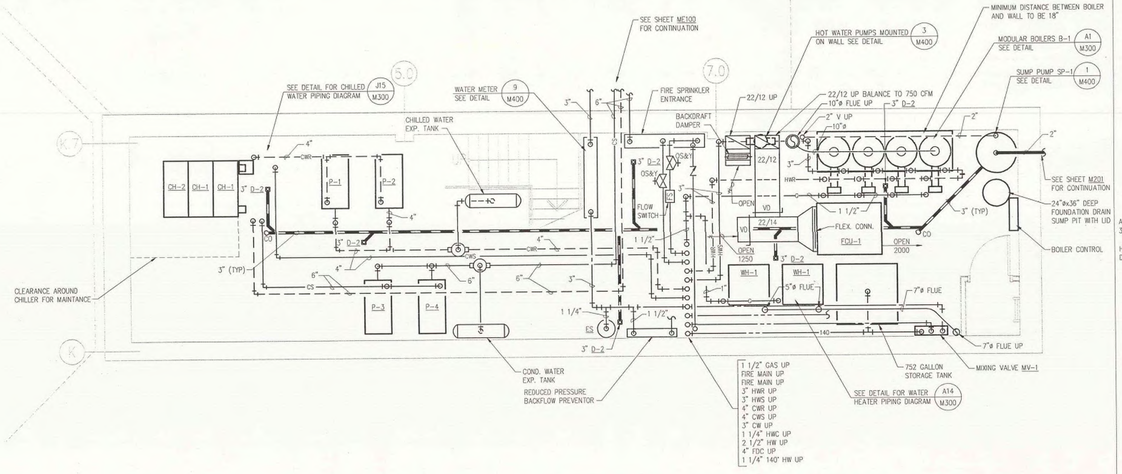
d. Custodian Room M15 and the Housing Pod connect hot and cold water piping for mop sink to hot and cold water piping in Chase MF-6.

Sheet M-200 – First Level Plan – Area A – Plumbing and Piping

a. Rooms J-12, J-13, K-12, and K-13: Change lavatory "L-3" to a type "L-1."

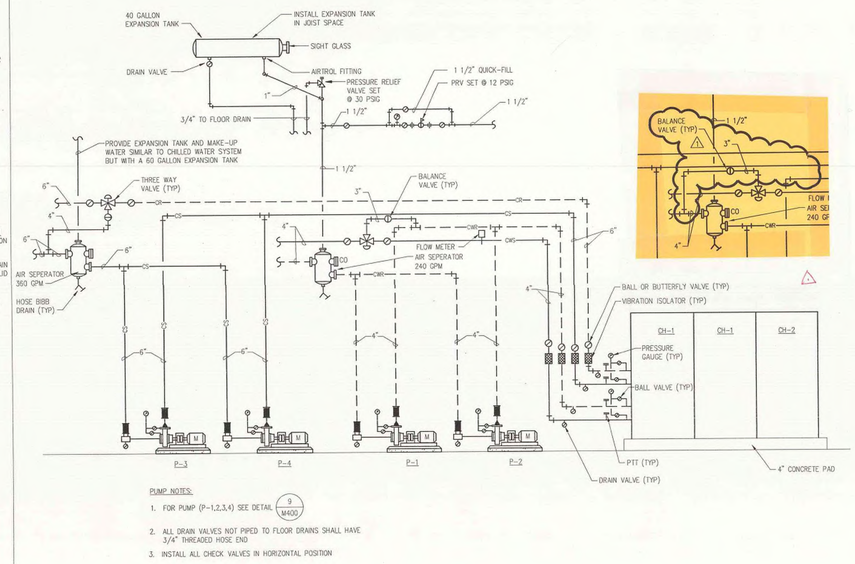
b. Room L-2, Administration: Delete the word "(typ)" at detail reference on FPB-3.


FUTURE HOUSING UNIT
FOR CONTINUATION OF GAS LINE SEE SHEET ME100
GAS METER BY LOCAL UTILITY COMPANY. APPROXIMATELY 3160 CFH
3/4" WH
2" UP TO 4" VTR
CAP EXISTING 4" W BELOW REMOVABLE CONCRETE PAD WITHIN MECH. CLOSET FOR FUTURE CONNECTION
FIRE SPRINKLER ZONE LIMITS
CAP STORM FOR FUTURE CONNECTION. MIN. I.E. = 48" BELOW FINISHED FLOOR OF MAIN LEVEL
SEE SHEET M300 FOR CONTINUATION
2" V DN AND UP TO 4" VTR
1 1/4" DUNN M35
STAIR
OFFICE
BEDROOM J4
BEDROOM J3
BEDROOM J2
BEDROOM J1
BEDROOM K1
BEDROOM K2
BEDROOM K3
BEDROOM K4
MAINT. MJ4
MAINT. MJ3
MAINT. MJ2
MAINT. MJ1
MAINT. MK1
MAINT. MK2
MAINT. MK3
MAINT. MK4
BEDROOM J5
BEDROOM J6
BEDROOM J7
BEDROOM J8
BEDROOM K5
BEDROOM K6
BEDROOM K7
BEDROOM K8
MULTI-USE JK1
MAINT. MJ5
MAINT. MJ6
MAINT. MJ7
MAINT. MJ8
MAINT. MK5
MAINT. MK6
MAINT. MK7
MAINT. MK8
DAYROOM J14
DAYROOM K14
CLASS JK2
ALCOVE J11
K14A
K11
K12
K13
J12
J13
J14A
WMS
MS
SH-1
SH-2
SH-3
WC-6
EPB-1 1.0 GPM
EPB-3 1.0 GPM
1 1/4" HW
1 1/2" CW
1/2" HWC
1 1/2" HWR
1 1/2" V
1 1/4" CW
1/2" HW
2" HW
2" CW
1" HW
2" D-1
6" UP TO RD-1
4" UP TO 4" VTR
2" UP TO 4" VTR
4" W
2" W
6" S
8" S
3/4" HW
3/4" W
1/2" HWC
1/2" HWR
1/2" CW
1/2" V
1 1/4" HW
2" S
3/4" S
1 1/2" S
1 1/2" HWS
1 1/2" CWS
1 1/2" HWR
1 1/2" CW
1 1/2" V
1 1/4" HW
1 1/2" CW
1 1/2" S
1/2" HWC
2 1/2" CW
1 1/2" HW
3/4" HWC
3/4" W
3/4" WH
2" S
2" CW
2" W
2" D-1
2" D-1 WC-6
2" D-1 SH-1
2" D-1 SH-2
2" D-1 SH-3
2" D-1 CO
2" D-1 WC-6
2" D-1 SH-2
2" D-1 SH-3
2" D-1 WC-6
2" D-1 SH-2
2" D-1 CO



J1 BASEMENT MECHANICAL ROOM ENLARGED PLAN

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

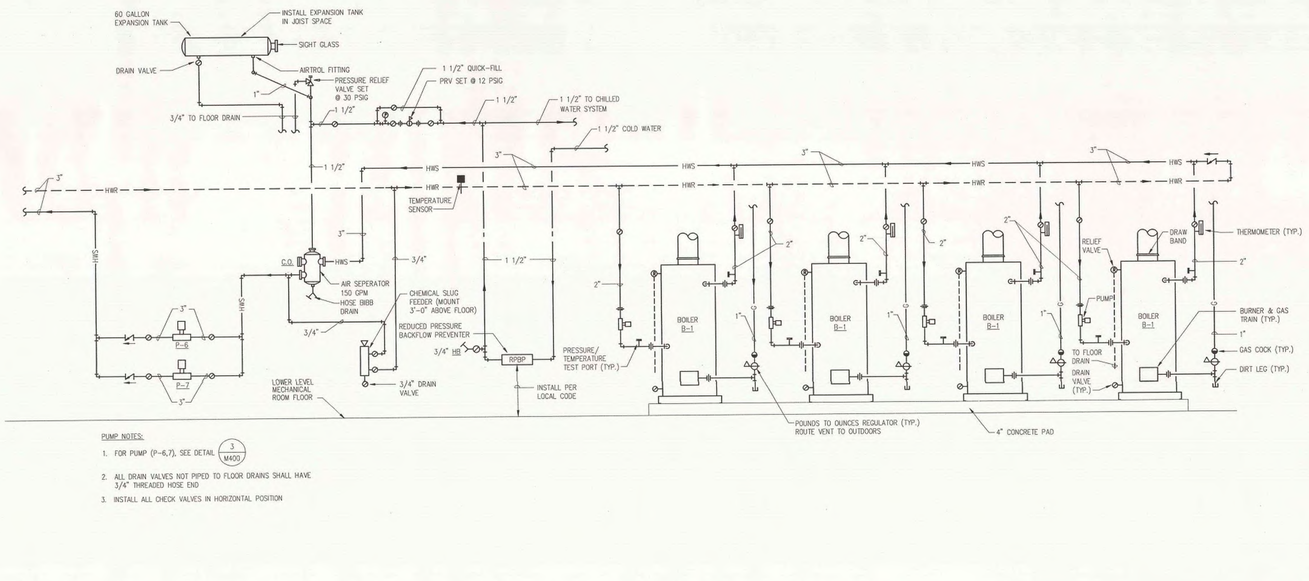


PUMP NOTES:

1. FOR PUMP (P-1,2,3,4) SEE DETAIL 6 M400
2. ALL DRAIN VALVES NOT PIPED TO FLOOR DRAINS SHALL HAVE 3/4" THREADED HOSE END
3. INSTALL ALL CHECK VALVES IN HORIZONTAL POSITION

J15 CHILLED WATER RISER DIAGRAM

NO SCALE

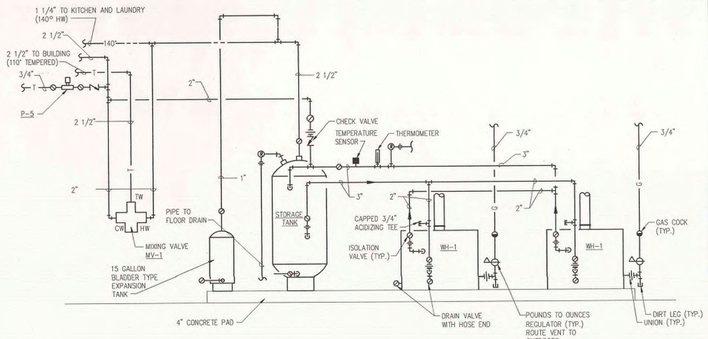


PUMP NOTES:

1. FOR PUMP (P-6,7), SEE DETAIL 3 M400
2. ALL DRAIN VALVES NOT PIPED TO FLOOR DRAINS SHALL HAVE 3/4" THREADED HOSE END
3. INSTALL ALL CHECK VALVES IN HORIZONTAL POSITION

A1 HEATING HOT WATER PIPING DIAGRAM

NO SCALE



A14 DOMESTIC HOT WATER PIPING DIAGRAM

NO SCALE

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JLK	11/15/99		
DRAFTER	REVISION		
SRP/ABC			

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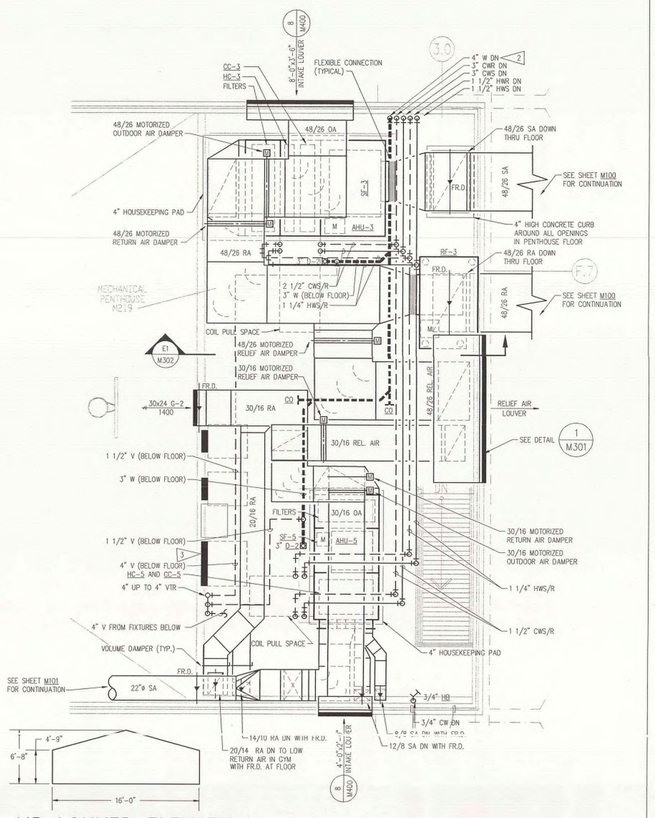
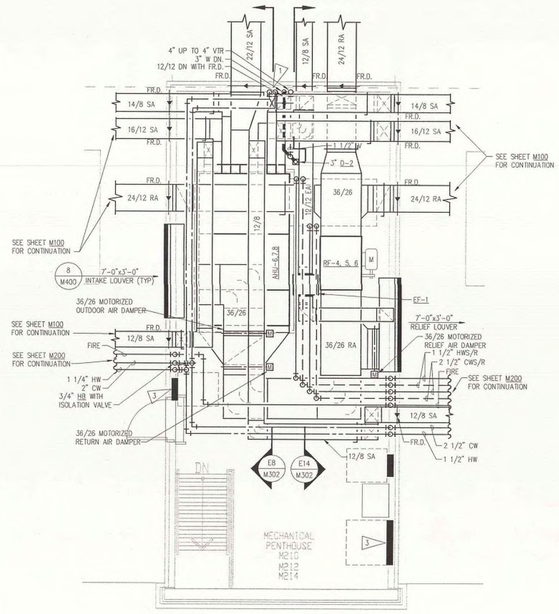


RELIEF AIR LOUVER ELEVATION

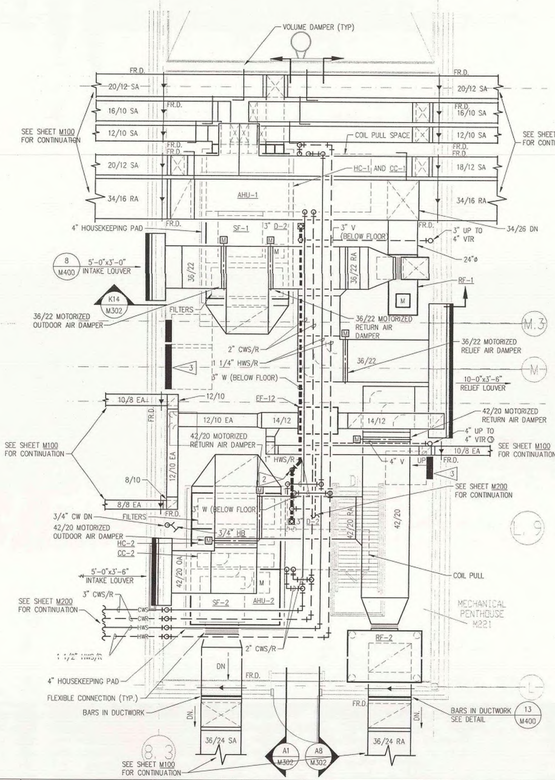
1 M301

NO SCALE

G1	ENLARGED PENTHOUSE PLAN - MECHANICAL
SCALE: 1/4" = 1'-0"	PENTHOUSE M219



G9	ENLARGED PENTHOUSE PLAN - MECHANICAL
SCALE: 1/4" = 1'-0"	PENTHOUSE M214 (PENTHOUSES M210 AND 212 ARE SIMILAR)



G14	ENLARGED PENTHOUSE PLAN - MECHANICAL
SCALE: 1/4" = 1'-0"	PENTHOUSE M221

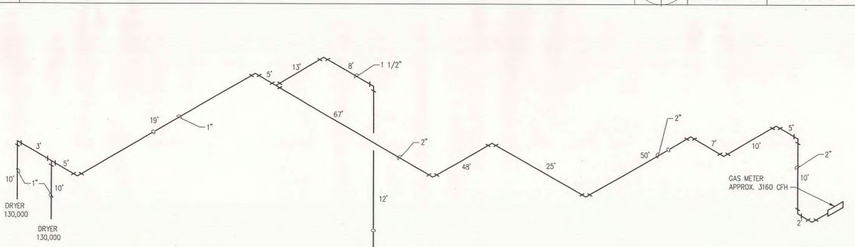
FLAG NOTES

1. ROUTE 2" CW AND 1" HW TO RESTROOM CHASE BELOW. SEE SHEET M200 FOR CONTINUATION.
2. 4" W DOWN. SEE SHEET M200 FOR CONTINUATION.
3. ELECTRICAL GEAR. MAINTAIN ALL CODE REQUIRED CLEARANCES ABOVE AND IN FRONT.

1MD5. Sheet M301 – Penthouse Plans – Mechanical

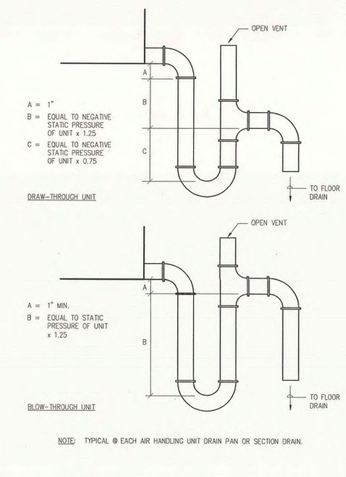
a. Enlarge plan G1, at AHU-3 revise the 48 x 26 motorized outside air damper into two dampers. The first being a 26 x 4 minimum outside air motorized damper, and the other portiion being a 44 x 26 maximum outside air motorized damper.

b. Plan G14 at AHU-2, change the 42 x 20 motorized outdoor air damper into two dampers. The first being a 20 x 4 minimum outside air motorized damper and the other portion being a 38 x 20 maximum outside air motorized damper.



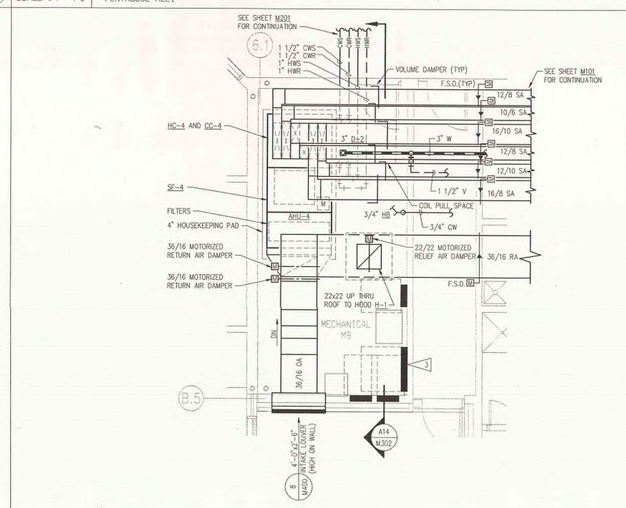
NATURAL GAS DIAGRAM

A1	
NO SCALE	



NOTE: TYPICAL @ EACH AIR HANDLING UNIT DRAIN PAN OR SECTION DRAIN.

A10	CONDENSATE DRAIN DETAIL
NO SCALE	



A14	ENLARGED MECHANICAL ROOM PLAN
SCALE: 1/4" = 1'-0"	MECHANICAL ROOM M9

ALVINE JOB NUMBER: 980282

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DESIGN ENGINEER	ARCH. JOB NO.
CDL	980282
PROJECT ENGINEER	ISSUED
JLK	11/15/99
DRAFTER	REVISION
SRP	

M 301

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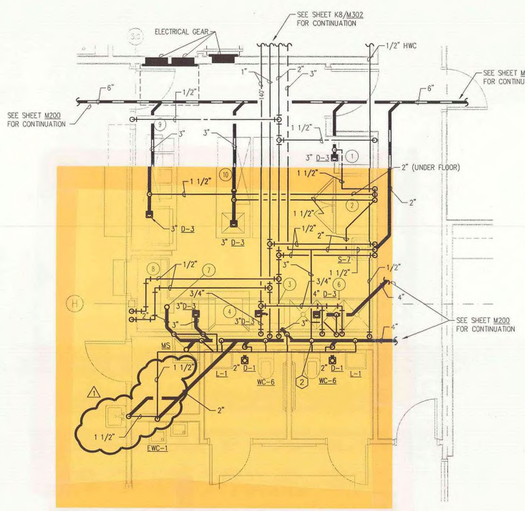


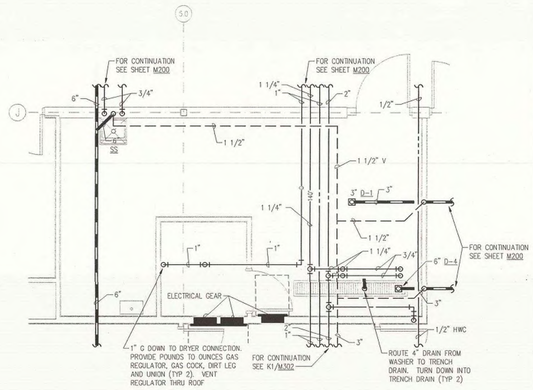
NOTES

1. ALL ROUGH-INS FOR FOOD SERVICE EQUIPMENT SHALL BE IN ACCORDANCE WITH APPROVED FOOD SERVICE EQUIPMENT ROUGH-IN SHOP DRAWINGS.
2. MECHANICAL SUBCONTRACTOR SHALL FURNISH AND INSTALL SHUT-OFF VALVES FOR WATER SUPPLY AT ALL EQUIPMENT ITEMS.
3. ROUGH-IN REQUIREMENT FOR ALL EQUIPMENT "N.I.C." SHALL BE VERIFIED WITH OWNER BEFORE INSTALLATION.
4. KITCHEN EQUIPMENT FURNISHED BY KITCHEN EQUIPMENT CONTRACTOR – PLUMBING CONTRACTOR TO ROUGH-IN AND MAKE FINAL CONNECTIONS TO ALL UTILITIES REQUIRED AND PROVIDE ALL PIPING, STOPS, VACUUM BREAKERS, AND WATER HAMMER ARRESTERS. PRESSURE REDUCING VALVES, TRAPS AND ALL FITTINGS NECESSARY FOR EQUIPMENT TO BE IN OPERATION ORDER. COORDINATE WITH KITCHEN EQUIPMENT CONTRACTOR AND SEE KITCHEN EQUIPMENT SPECIFICATIONS AND PLANS.

At Plan K1 see attached sketch MS-5 for addition of sink S-7 in Dining Room P13.

K1 ENLARGED KITCHEN PLAN - PIPING

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



Detail K8: The underground waste pipe connected to the Service Sink SS shall be to a 3" in lieu of 6" as shown.

L. In southwest corner of room, cold water line shown should be 1¼ " size. Add the designation for Eye Wash EW. Add a 1" hot water line from hot water main to be routed to eye wash. For location of eye wash, see Sheet LS-1.

K8 ENLARGED LAUNDRY ROOM PLAN - PIPING

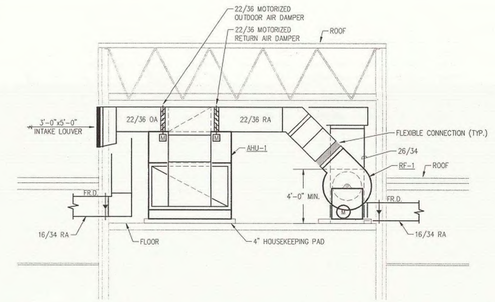
SCALE: 1/4" = 1'-0"

EQUIPMENT CONNECTION SCHEDULE

NO.	DESCRIPTION	DIST	C/W	GS	HW	WASTE	VENT	AIR	STEAM	COND	STEAM LOAD	EXH. CFM	REMARKS
1	ICE MAKER	–	1/2"	–	–	1"	–	–	–	–	–	–	INDIRECT WASTE (1)
3	BOOSTER HEATER	–	–	–	3/4"	–	–	–	–	–	–	–	140° HW
4	WAREWASHER	–	–	–	3/4"	2"	–	–	–	–	–	–	180° HW FROM #3, INDIRECT WASTE (2)
6	CLEAN DISH TABLE	–	2-1/2"	–	2-1/2"	1 1/2"	–	–	–	–	–	–	TWO FAUCETS
7	DISPOSAL	–	–	–	–	2"	–	–	–	–	–	–	CW FROM ITEM 8
8	SOILED DISH TABLE	–	1/2"	–	1/2"	–	–	–	–	–	–	–	–
9	SERVING COUNTER	–	1/2"	–	–	1"	–	–	–	–	–	–	INDIRECT WASTE (1)
10	CABINET	–	1/2"	–	1/2"	1 1/2"	–	–	–	–	–	–	INDIRECT WASTE

REVISION 2-5-98

REMARKS:
1. PROVIDE BACKFLOW PREVENTER PER LINCOLN PLUMBING CODE.
2. PROVIDE PRESSURE REDUCING VALVE ON HOT WATER CONNECTION.



K14 SECTION

SCALE: 1/4" = 1'-0" PENTHOUSE M221 LOOKING NORTH

E1 SECTION

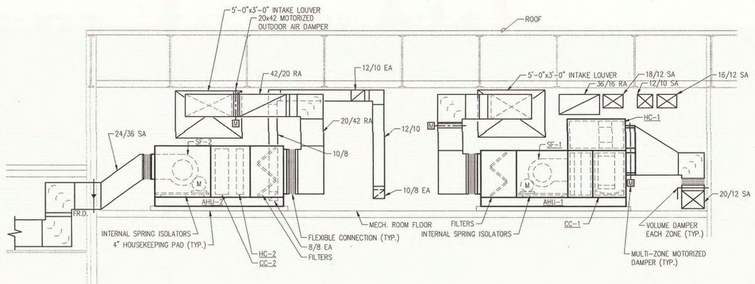
SCALE: 1/4" = 1'-0" PENTHOUSE M219 LOOKING NORTH

E8 SECTION

SCALE: 1/4" = 1'-0" PENTHOUSE M214

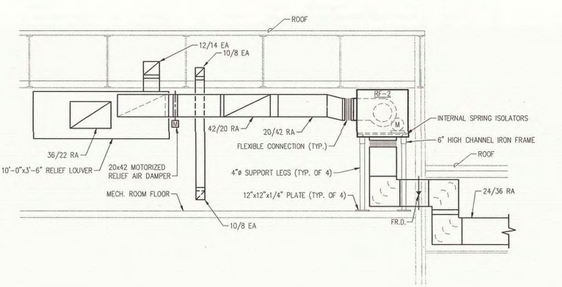
E14 SECTION

SCALE: 1/4" = 1'-0" PENTHOUSE M214



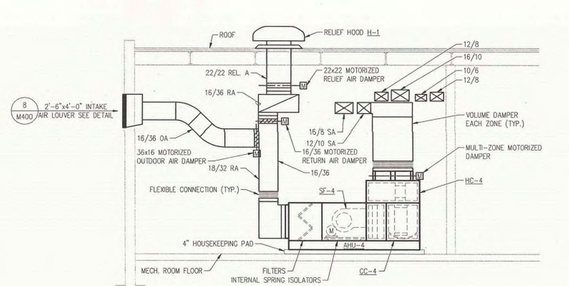
A1 SECTION

SCALE: 1/4" = 1'-0" PENTHOUSE M221 LOOKING WEST



A8 SECTION

SCALE: 1/4" = 1'-0" PENTHOUSE M221 LOOKING EAST



A14 SECTION

SCALE: 1/4" = 1'-0" MECHANICAL ROOM M9 LOOKING WEST

ALVINE JOB NUMBER: 980282
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GDL	980282
PROJECT ENGINEER	ISSUED
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SRP	

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AIR HANDLING UNIT SCHEDULE

	MARK	AHU-1	AHU-2	AHU-3	AHU-4	AHU-5	AHU-6	AHU-7	AHU-8
GENERAL DATA	SERVES	STAFF SECURE	OFFICES	EDUCATION	INTAKE	GYMNASIUM	HOUSING	HOUSING	HOUSING
	LOCATION	PENTHOUSE	PENTHOUSE	PENTHOUSE	MECH. ROOM	PENTHOUSE	M214	M210	M212
	TOTAL AIRFLOW (CFM)	8700	8500	13,000	3600	3500	7700	8500	7400
	MAXIMUM OUTSIDE AIRFLOW	8700	8500	13,000	3600	3500	7700	8500	7400
	MINIMUM OUTSIDE AIRFLOW	600	450	750	150	750	850	850	850
	OVERALL SIZE (LxWxH)(IN)	142x80x84	116x80x54	–	120x58x54	120x58x54	136x74xc78	142x80x84	136x74x78
	MAXIMUM WEIGHT (LBS)	4100	3300	4000	3000	3000	4200	4200	4200
	CONFIGURATION	MULTI-ZONE	DRAW THRU	DRAW THRU	MULTI-ZONE	MULTI-ZONE	MULTI-ZONE	MULTI-ZONE	MULTI-ZONE
	MANUFACTURER	McQUAY	McQUAY	McQUAY	McQUAY	McQUAY	McQUAY	McQUAY	McQUAY
	MODEL NUMBER	CAH-017	CAH-017	CAH-025	CAH-008	CAH-008	CAH-014	CAH-017	CAH-014
	REMARKS	–	–	–	–	–	–	–	–
SUPPLY FAN DATA	MARK	SF-1	SF-2	SF-3	SF-4	SF-5	SF-6	SF-7	SF-8
	FAN TYPE	AF	AF	AF	AF	AF	AF	AF	AF
	CLASS	–	–	2	–	–	–	–	–
	EXTERNAL SP (IN. W.C.)	1.1	1.7	1.7	1.1	1.2	1.1	1.1	1.1
	TOTAL SP (IN. W.C.)	2.5	3.3	3.3	2.5	2.6	2.5	2.5	2.5
	MINIMUM DIAMETER	19.69	19.69	24.0	13.22	13.22	16.19	19.69	16.19
	MAXIMUM FAN RPM	1900	1925	1600	2800	2850	2600	1800	2600
	MAXIMUM FAN BHP	6.0	7.3	10.0	3.0	3.2	7.5	6.2	7.5
	REMARKS	–	–	–	–	–	–	–	–
SUPPLY FAN MOTOR DATA	HP	7.5	10.0	15.0	5.0	5.0	10.0	7.5	10.0
	RPM	1750	1750	1750	1750	1750	1750	1750	1750
	VOLTS	460	460	460	460	460	460	460	460
	PHASE	3	3	3	3	3	3	3	3
	TYPE	HI EFF.	–	–	HI EFF.	HI EFF.	HI EFF.	HI EFF.	HI EFF.
	CONTROL DEVICE	–	VFD-1	VFD-3	–	–	–	–	–
	REMARKS	–	–	–	–	–	–	–	–
PRE-FILTER DATA	MARK	–	–	–	–	–	–	–	–
	TYPE	THROW AWAY	THROW AWAY	THROW AWAY	THROW AWAY	THROW AWAY	THROW AWAY	THROW AWAY	THROW AWAY
	THICKNESS	2"	2"	2"	2"	2"	2"	2"	2"
	MAX. FACE VELOCITY (FPM)	325	350	350	350	350	325	300	325
	MAX. INITIAL APD (IN. W.C.)	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
	EFFICIENCY (ASHRAE 52-76)	30	30	30	30	30	30	30	30
	QUANTITY	3	3	9	2	2	6	3	6
	SIZE	24x24	24x24	24x24	24x24	24x24	24x24	24x24	24x24
	QUANTITY	6	3	3	2	2	–	6	–
	SIZE	20x24	12x24	12x24	12x24	12x24	–	20x24	–
	QUANTITY	–	6	–	2	2	–	–	–
	SIZE	–	20x24	–	20x24	20x24	–	–	–

PUMP SCHEDULE

MARK		P-1	P-2	P-3	P-4	P-5	P-6	P-7	SP-1
SERVES		CHILLED WTR.	CHILLED WTR.	COND. WTR.	COND. WTR.	HWC	HEATING	HEATING	FLOOR DRAINS
LOCATION		BASEMENT	BASEMENT	BASEMENT	BASEMENT	BASEMENT	BASEMENT	BASEMENT	BASEMENT
TYPE		END SUCTION	END SUCTION	END SUCTION	END SUCTION	IN-LINE	IN-LINE	IN-LINE	DUPLEX
FLOW (GPM)		240	240	360	360	15	150	150	20
TOTAL HEAD (FEET)		65	65	120	120	10	80	80	35
SHUT-OFF HEAD (FEET)		75	75	140	140	12	64	64	–
NPSH AVAILABLE (FEET)		–	–	–	–	–	–	–	–
MIN. EFFICIENCY		75	75	72	72	–	63	63	–
FLUID		WATER	WATER	WATER	WATER	WATER	WATER	WATER	WATER
RPM		1750	1750	1750	1750	–	1750	1750	1750
MOTOR DATA	HP	7.5	7.5	20.0	20.0	1/6	7.5	7.5	1/3
	VOLTS	460	460	460	460	115	460	460	115
	PHASE	3	6	3	3	1	3	3	1
	TYPE	HI EFF.	HI EFF	HI EFF	HI EFF	–	HI EFF	HI EFF	–
	CONTROL DEVICE (BY OTHERS)	–	–	–	–	–	–	–	–
SUCTION SIZE (IN)		3	3	3	3	1	3	3	–
DISCHARGE SIZE (IN)		2.5	2.5	4	4	1	3	3	1.5
MAX. IMPELLER DIA. (IN)		8.5	8.5	11.625	11.625	–	8.0	8.0	–
MANUFACTURER		B&G	B&G	B&G	B&G	B&G	B&G	B&G	WEIL
MODEL NUMBER		(1)	(1)	(2)	(2)	(4)	(3)	(3)	(5)
REMARKS		–	–	–	–	–	–	–	–

REMARKS:
(1) SERIES 1510, MODEL 2 1/2 B.
(2) SERIES 1510, MODEL 3G.
(3) SERIES 80, MODEL 3x3x9 1/2.
(4) ALL BRONZE IN-LINE CIRCULATOR, SERIES HV.
(5) MODEL 1 1/2-110014 DUPLEX SYSTEM.

CHILLED WATER COOLING COIL SCHEDULE

MARK		CC-1	CC-2	CC-3	CC-4	CC-5	CC-6	CC-7	CC-8
SERVES		STAFF SECURE	OFFICES	EDUCATION	INTAKE	GYMNASIUM	HOUSING	HOUSING	HOUSING
LOCATION		AHU-1	AHU-2	AHU-3	AHU-4	AHU-5	AHU-6	AHU-7	AHU-8
AIRFLOW (CFM)		8700	8500	13,000	3600	3500	7700	8500	7400
MIN. ROWS		6	6	6	6	6	6	6	6
MAX. FINS PER INCH		10	10	10	10	10	10	10	10
APPROXIMATE SIZE (LxW)(IN)		61x33	67x36	73x54	45x24	45x24	61x33	73x36	61x33
MAX. FACE VELOCITY		510	510	515	500	500	550	500	530
ENTERING AIR	DB (F)	76	76	76	76	78	78	77	77
	WB (F)	64	64	64	64	66.3	65	64	64
CONDITIONS	BTU/LB	–	–	–	–	–	–	–	–
LEAVING AIR	DB (F)	55	55	55	55	55	55	55	55
	WB (F)	54	54	54	54	54	54	54	54
CONDITIONS	BTU/LB	–	–	–	–	–	–	–	–
TOTAL CAPACITY (MBH)		261.9	250.2	390.0	103.5	131.8	257.8	255.9	222.8
MAX. AIR PRESSURE DROP (IN. WG)		1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
LIQUID	EWT (F)	42	42	42	42	42	42	42	42
	LWT (F)	54	54	54	54	54	54	54	54
	GPM	43.0	42.0	65.0	17.2	22.0	43.0	43.0	37.0
	MAX. WPD (FEET)	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
MANUFACTURER		McQUAY	McQUAY	McQUAY	McQUAY	McQUAY	McQUAY	McQUAY	McQUAY
MODEL NUMBER		–	–	–	–	–	–	–	–
REMARKS		–	–	–	–	–	–	–	–

FAN COIL SCHEDULE

MARK		FCU-1	FCU-2	FCU-3
SERVES		COMB. AIR	ELECT. ROOM	COMM. ROOM
LOCATION		MECH. RM	–	–
CONFIGURATION		HORIZONTAL	HORIZONTAL	HORIZONTAL
MAX. OPERATING WEIGHT (LBS)		400	150	150
MAX. SIZE (LxWxH)		57x46x22	45x34x17	45x34x17
NOMINAL AIR FLOW (CFM)		2000	1200	1200
NOMINAL COOLING CAPACITY TOTAL (MBH)		–	37.0	37.0
NOMINAL HEATING CAPACITY TOTAL (MBH)		90.0	15.0	15.0
ENTERING AIR TEMP. COOLING (F)/(DB/WB)		–	80/67	80/67
ENTERING AIR TEMP. HEATING (F)		42	–	–
COOLING FLUID DATA	EWT (F)	–	42	42
	LWT (F)	–	54	54
	GPM	–	7.0	7.0
	MAX. WPD (FT)	–	10.0	10.0
HEATING FLUID DATA	EWT (F)	180	180	180
	LWT (F)	150	150	150
	GPM	6.0	1.0	1.0
	MAX. WPD (FT)	5.0	5.0	5.0
MOTOR DATA	HP	1.0	3/4	3/4
	VOLTS	208	208	208
	PHASE	3	3	3
	SPEEDS	1	1	1
MANUFACTURER		McQUAY	McQUAY	McQUAY
MODEL NUMBER		SCB-201B	SHB-121B	SHB-121B
REMARKS		(1)	(2)	(2)

REMARKS:
1. MOTOR SIZE BASED ON 1.25" TSP. PROVIDE WITH RETURN AIR DUCT COLLAR, STAMPED GRILLE DISCHARGE, FILTER, AND FILTER RACK.
2. MOTOR SIZE BASED ON 1.25" TSP. PROVIDE WITH RETURN AIR DUCT COLLAR, FILTER RACK, FILTER, AND DISCHARGE DUCT COLLAR.

HEAT PUMP ROOF TOP UNIT SCHEDULE

		RTU-1		
GENERAL DATA	SERVES	CONTROL		
	LOCATION	ROOF		
	OVERALL SIZE (LxWxH)(IN)	54x34x40		
	MAXIMUM WEIGHT (LBS)	450		
	CONFIGURATION	DOWN FLOW		
AIRFLOW DATA	TOTAL AIRFLOW (CFM)	800		
	TOTAL SP (IN. W.C.)	0.50		
	EXTERNAL SP (IN. W.C.)	0.25		
	RETURN FAN SP (IN. W.C.)	–		
	MAXIMUM OUTSIDE AIRFLOW	200		
	MINIMUM OUTSIDE AIRFLOW	50		
COOLING DATA	AMBIENT AIR TEMPERATURE (F)	105		
	MINIMUM NET EER (AR)	9.0		
	EAT DB/WB	80/67		
	MIN. NET TOTAL COOLING (MBH)	22.6		
	MIN. NET SENSIBLE COOLING (MBH)	16.9		
	NO. OF COMPRESSORS	1		
	MINIMUM STEPS OF UNLOADING	1		
HEATING DATA	HEATER CAPACITY (KW)	3.75		
	MINIMUM NO. STEPS	1		
FAN DATA	SUPPLY FAN	TYPE	CENTRIFUGAL	
		SIZE	9x9	
		HP	1/4	
	RETURN/ RELIEF FAN	TYPE	–	
		SIZE	–	
		HP	–	
	CONDENSER FAN	TYPE	PROPELLOR	
		SIZE	18	
		HP	1/5	
ELECTRICAL DATA	VOLTS		208	
	PHASE		1	
	MIN. CIRCUIT AMPACITY (MCA)		45	
MANUFACTURER			TRANE	
MODEL NUMBER			WCC024	
REMARKS			(1)	

REMARKS
(1) PROVIDE WITH 25% MANUAL FRESH AIR KIT, FILTER FRAME AND 2.5 SQ FT FILTER. SINGLE POINT POWER CONNECTION, SINGLE STAGE HEAT / COOLING, AUTO CHANGE OVER 7 DAY PROGRAMMABLE THERMOSTAT, LOW AMBIENT CONTROLS TO 0°F.

CHILLER SCHEDULE

MARK		CH-1	CH-2
SERVES		CW	CW
LOCATION		BASEMENT	BASEMENT
TYPE		MODULAR	MODULAR
MAXIMUM OPERATING WEIGHT (LBS)		1500	1500
MAXIMUM SIZE (LxWxH)(IN.)		–	–
NOMINAL TONS		50	30
REFRIGERANT		R-22	R-22
CHILLED WATER DATA	GPM	89	58
	ENTERING WATER TEMPERATURE (°F)	54	54
	LEAVING WATER TEMPERATURE (°F)	42	42
	MAXIMUM PRESSURE DROP (FT)	15	15
CONDENSER WATER DATA	GPM	135	87
	ENTERING WATER TEMPERATURE (°F)	85	85
	LEAVING WATER TEMPERATURE (°F)	95	95
	MAXIMUM PRESSURE DROP (FT)	15	15
MOTOR DATA	MAXIMUM UNIT KW	49.8	25.6
	VOLTS	460	460
	PHASE	3	3
	MAXIMUM AMPS	–	–
	MAXIMUM WIRE SIZING AMPS	–	–
	REMARKS	–	–
MANUFACTURER		MULTISTACK	MULTISTACK
MODEL NUMBER		MS50B	MS30S

2MD5. Sheet M-500 – Mechanical Schedules

a. Diffuser, Register, and Grille Schedule

i. Remarks No. 2, revise "5/16" round holes on 7/16" staggered centers" to read, "Maximum 7/32" round holes on 7/16" staggered centers."

ii. See attached Sketch MS-2 for Cabinet Unit Heater Schedule.

HOT WATER UNIT HEATER SCHEDULE

MARK		UH-1	UH-2
SERVES		SALLY PORT	VESTIBULE
LOCATION		MECH. RM	–
CONFIGURATION		HORIZONTAL	HORIZONTAL
MAXIMUM OPERATING WEIGHT (LBS)		75	100
MAXIMUM SIZE (LxWxH)(IN.)		23x20x30	44x24x18
HEATING CAPACITY (MBH)		40.0	30.0
AIR FLOW (CFM)		900	500
EXTERNAL SP (IN. W.C.)		0.0	0.30
LIQUID DATA	GPM	3.0	2.0
	ENTERING WATER TEMP. (F)	180	180
	LEAVING WATER TEMP. (F)	150	150
	MAX. WPD (FEET)	5.0	5.0
	GLYCOL %	0	0
MOTOR DATA	HP	1/20	1/4
	VOLTS	115	115
	PHASE	1	1
	–	–	–
	–	–	–
	REMARKS	–	–
MANUFACTURER		McQUAY	MCQUAY
MODEL NUMBER		UHH-044B	SCP-061
REMARKS		(1)	(2)

REMARKS
(1) CAPACITY BASED ON 40°F ENTERING AIR, AND 100°F LEAVING AIR.
(2) MOTOR SIZE BASED ON 1.0" TSP. PROVIDE WITH RETURN AIR DUCT COLLOR, FILTER, FILTER RACK, AND DISCHARGE AIR COLLAR.

DIFFUSER REGISTER AND GRILLE SCHEDULE

MARK	D-1	–	R-1	R-2	R-3	G-1	G-2	G-3
DESCRIPTION	LOUVERED	–	PERFORATED	ADJUSTABLE	ADJUSTABLE	PERFORATED	PERFORATED	FIXED
DEFLECTION	4-WAY	–		4-WAY	4-WAY	–	–	SINGLE
MAXIMUM STATIC PRESSURE (IN W.G.)	0.1	–	0.1	0.1	0.1	0.1	0.1	0.1
CONSTRUCTION MATERIAL	STEEL	–	STEEL	STEEL	STEEL	STEEL	ALUMINUM	STEEL
FINISH	WHITE	–	WHITE	WHITE	PRIMED	PRIMED	–	WHITE
FACE SIZE (IN)	SEE PLANS	–	SEE PLANS	SEE PLANS	SEE PLANS	24x24	SEE PLANS	SEE PLANS
MANUFACTURER	KRUEGER	–	KRUEGER	KRUEGER	KRUEGER	KRUEGER	KRUEGER	KRUEGER
MODEL NUMBER	1400	–	1380P	880H	4880H	6290	5138OP	580
ACCESSORIES	O.B.D.	–	O.B.D.	O.B.D.	O.B.D.	–	–	–
REMARKS (1)	–	–	(2)	–	(4)	–	(3)	–

REMARKS:
(1) CONTRACTOR SHALL VERIFY CEILING CONSTRUCTION PRIOR TO FURNISHING MATERIAL.
(2) 12 GAUGE STEEL, PERFORATED PLATE, 5/16" ROUND HOLES ON 7/16" STAGGERED CENTERS, #8x1 1/2" TORX MOUNTING SCREWS.
(3) 1/8" THICK PERFORATED PLATE, 5/16" ROUND HOLES ON 7/16" STAGGERED CENTERS, #8x1 1/2" TORX MOUNTING SCREWS.
(4) HEAVY DUTY, DOUBLE DEFLECTION, 14 GAUGE FRONT VANES SPACED 3/4" ON CENTER.

HOT WATER HEATING COIL SCHEDULE

MARK		HC-1	HC-2	HC-3	HC-4	HC-5	HC-6	HC-7	HC-8
SERVES		STAFF SECURE	OFFICES	EDUCATION	INTAKE	GYMNASIUM	HOUSING	HOUSING	HOUSING
LOCATION		AHU-1	AHU-2	AHU-3	AHU-4	AHU-5	AHU-6	AHU-7	AHU-8
AIRFLOW (CFM)		6100	8500	13,000	2520	2800	5100	5600	4900
MIN. ROWS		2	2	2	2	2	2	2	2
MAX. FINS PER INCH		10	10	10	10	10	10	10	10
APPROXIMATE SIZE		64x21	67x36	73x48	42x15	42x15	61x18	64x21	61x18
MAX. FACE VELOCITY		670	525	525	600	640	680	610	650
ENTERING AIR TEMP. DB (F)		60	50	50	66	50	60	60	60
LEAVING AIR TEMP. DB (F)		100	80	80	100	90	100	100	100
TOTAL CAPACITY (MBH)		260.0	91.8	140.4	92.5	121.0	220.3	242.0	211.7
MAX. AIR PRESSURE DROP (IN. WG)		0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
LIQUID	EWT (F)	180	180	180	180	180	180	180	180
	LWT (F)	150	150	150	150	150	150	150	150
	GPM	17.0	6.5	9.4	6.2	8.0	14.7	16.2	14.2
	MAX. WPD (FEET)	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
MANUFACTURER		McQUAY	McQUAY	McQUAY	McQUAY	McQUAY	McQUAY	McQUAY	McQUAY
MODEL NUMBER		–	–	–	–	–	–	–	–
REMARKS		–	–	–	–	–	–	–	–

MODULAR BOILER SCHEDULE

MARK		B-1
SERVES		HOT WATER
LOCATION		BASEMENT
CONFIGURATION		FIRETUBE
MAXIMUM OPERATING WEIGHT (LBS)		7700
MAXIMUM SIZE (LxWxH)(IN.)		116x54x70
NUMBER OF MODULES		4
OUTPUT PER MODULE (MBH)		500.0
FUEL		NAT. GAS
INPUT EACH MODULE (MBH)		600.0
VENT CONNECTION (IN.)		6
MOTOR DATA	BURNER HP (EA MODULE)	1/4
	PUMP HP (EA MODULE)	1/3
	VOLTS	120
	PHASE	1
	FLA PER MODULE	15.0
	CONTROL PANEL FLA	5.0
MANUFACTURER		L.E.S.
MODEL NUMBER		W-4-70
REMARKS		(1)

REMARKS:
(1) PROVIDE WITH POUNDS TO OUNCES GAS REGULATOR AND OUTLET STACK DAMPERS.

VARIABLE FREQUENCY DRIVE SCHEDULE

MARK		VFD-1	VFD-2	VFD-3	VFD-4
SERVES		SF-2	RF-2	SF-3	RF-3
LOCATION		PENTHOUSE	PENTHOUSE	PENTHOUSE	PENTHOUSE
ELECTRICAL DATA	MIN. DRIVE CAPACITY (AMPS)	21	14.2	27	21
	VOLTAGE	460	460	460	460
	PHASE	3	3	3	3
	CONNECTED MOTOR HP	10	7.5	15.0	10.0
	MOTOR TYPE	HI EFF.	HI EFF.	HI EFF.	HI EFF.
REMARKS		–	–	–	–

EXHAUST FAN SCHEDULE

MARK		EF-1	EF-2	EF-3	EF-4	EF-5	EF-6	EF-7	EF-8	EF-9	EF-10	EF-11	EF-12	EF-13
SERVES		EXHAUST	RESTROOMS	HOOD	RESTROOM	RESTROOM	CUST.	RESTROOM	RESTROOMS	RESTROOMS	SEG.	RESTROOMS	RESTROOMS	RESTROOMS
LOCATION		PENTHOUSE	CUST. M7	KITCHEN M6	TOILET EF5	TOILET R7	CUST. M18	TOILET P19	STORAGE P11	T12	T21	RECEPT. L32	PENTHOUSE	O35
TYPE		INLINE	ROOF	ROOF	INLINE	INLINE	CEILING	ROOF	ROOF	ROOF	ROOF	ROOF	INLINE	INLINE
CLASS		–	–	–	–	–	–	–	–	–	–	–	–	–
MAXIMUM WEIGHT (LBS)		75	50	50	30	30	40	50	50	50	50	100	100	30
AIRFLOW (CFM)		880	210	150	80	100	180	160	400	300	150	350	940	80
TOTAL SP (IN. W.C.)		0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.875	0.75
WHEEL TYPE		CENT.	CENT.	CENT.	CENT.	CENT.	CENT.	CENT.	CENT.	CENT.	CENT.	CENT.	CENT.	CENT.
MINIMUM WHEEL DIA.		–	8.5	7.5	–	–	–	7.5	8.5	8.5	7.5	8.5	–	–
MAXIMUM FAN RPM		1100	1500	1500	750	750	860	1500	1700	1700	1550	1500	1000	750
MAXIMUM FAN BHP		–	0.1	0.1	–	–	–	0.1	0.12	0.13	0.11	0.10	–	–
MAXIMUM SONE'S		7.0	8.0	7.0	4.0	4.0	5.0	7.0	9.0	9.0	7.0	9.0	7.0	4.0
MOTOR DATA	HP	470 W	1/4	1/4	100 W	127 W	166 W	1/4	1/4	1/4	1/4	1/4	600 W	100 W
	VOLTS	115	115	115	115	115	115	115	115	115	115	115	115	115
	PHASE	1	1	1	1	1	1	1	1	1	1	1	1	1
	TYPE	–	HI EFF	HI EFF	–	–	–	HI EFF	HI EFF	HI EFF	HI EFF	HI EFF	HI EFF	–
	–	–	–	–	–	–	–	–	–	–	–	–	–	–
ROOF/WALL OPENING SIZE		–	16x16	16x16	16x16	16x16	16x16	16x16	16x16	16x16	16x16	16x16	–	–
MANUFACTURER		ACME	ACME	ACME	ACME	ACME	ACME	ACME	ACME	ACME	ACME	ACME	ACME	ACME
MODEL NUMBER		VQL 1500	PV-085	PV-075	VQL150	VQL200	–	PV-075	PV-085	PV-085	PV-075	PV-085	VQL2000	VQL150
REMARKS		–	(1)	(1)	(3)	(2)	(2)	(1)	(1)	(1)	(1)	(1)	–	(3)

REMARKS
(1) PROVIDE WITH GRAVITY BACKDRAFT DAMPER AND FACTORY ROOF CURB.
(2) PROVIDE WITH ACME MODEL 813 WALL CAP.
(2) PROVIDE WITH ACME MODEL 611 ROOF CAP.

HOOD SCHEDULE

MARK	H-1	H-2	H-3	H-4
SERVES	AHU-4	DRYERS	COMB. AIR	–
LOCATION	ROOF	ROOF	ROOF	ROOF
TYPE	RELIEF	INTAKE	INTAKE	RELIEF
MAX. WEIGHT (LBS)	–	–	–	–
AIR FLOW (CFM)	3600	1600	800	1200
TOTAL SP (IN. W.C.)	0.25	0.10	0.10	0.10
ROOF OPENING SIZE (IN)	22x22	24x24	22x22	14x14
WALL OPENING SIZE	–	–	–	–
MANUFACTURER	ACME	ACME	ACME	ACME
MODEL NUMBER	EV	IV	IV	EV
REMARKS	(1)	(1)	(1)	(1,2)

REMARKS:
(1) PROVIDE WITH FACTORY ROOF CURB AND BIRD SCREEN.
(2) PROVIDE GRAVITY BACKDRAFT DAMPER IN NECK.

GAS WATER HEATER SCHEDULE

MARK	WH-1	
SERVES	–	
LOCATION	BASEMENT	
MAX. OPERATING WEIGHT (LBS)	600	
MAX. SIZE (LxWxH)(IN)	24x36x36	
STORAGE CAPACITY (GAL.)	(1)	
RECOVERY (GPH @ 100° F. RISE)	260	
FUEL	NAT. GAS	
PRESSURE	–	
INPUT (MBH)	250.0	
MIN. EFFICIENCY (%)	88	
FLUE SIZE (IN.)	5	
ELECTRICAL DATA (VOLTS/PH/AMPS)	LOCHINVAR	
MODEL NUMBER	PRO250PM	
REMARKS	120/1/13	
REMARKS	(1)(2)	

REMARKS:
(1) PROVIDE WITH LOCK-TEMP TV-7524, 752 GALLON STORAGE TANK, 54"x54"x107" TALL.
(2) PROVIDE WITH POUNDS TO OUNCES GAS REGULATOR.

RETURN FAN SCHEDULE

MARK		RF-1	RF-2	RF-3	RF-4	RF-5	RF-6
SERVES		AHU-1	AHU-2	AHU-3	AHU-6	AHU-7	AHU-8
LOCATION		PENTHOUSE	PENTHOUSE	PENTHOUSE	PENTHOUSE	PENTHOUSE	PENTHOUSE
TYPE		CENTRIFUGAL	CABINET	CABINET	IN-LINE	IN-LINE	IN-LINE
CLASS		2	–	1	–	–	–
MAXIMUM WEIGHT (LBS)		600	–	–	–	–	–
AIRFLOW (CFM)		8700	8500	13,000	7700	8500	7400
TOTAL SP (IN. W.C.)		1.0	1.0	1.0	1.0	1.0	1.0
WHEEL TYPE		BI	FC	FC	BI	BI	BI
MINIMUM WHEEL DIA.		27	18	20.0	30.0	30.0	30.0
MAXIMUM FAN RPM		850	700	700	750	800	750
MAXIMUM FAN BHP		2.6	3.7	7.5	2.6	3.5	2.6
MAXIMUM SONES		–	–	–	30	30	30
MOTOR DATA	HP	5.0	7.5	10.0	5.0	5.0	5.0
	VOLTS	460	460	460	460	460	460
	PHASE	3	3	3	3	3	3
	TYPE	HI EFF.	–	–	HI EFF.	HI EFF	HI EFF
	CONTROL DEVICE (BY OTHERS)	–	VFD-2	VFD-4	–	–	–
ROOF/WALL OPENING SIZE		–	–	–	–	–	–
MANUFACTURER		BARRY BLOWER	McQUAY	McQUAY	BARRY BLOWER	BARRY BLOWER	BARRY BLOWER
MODEL NUMBER		RPK-027A	CAH-012	CAH-021	BSI-300A	BSI-300A	BSI-300A
REMARKS		(1)	–	–	(2)	(2)	(2)

REMARKS:
(1) PROVIDE WITH BELT GUARD, AND VIBRATION RAILS WITH SPRING ISOLATORS.
(2) PROVIDE WITH MOTOR POWER INSULATED HOUSING AND VIBRATION ISOLATORS.

FAN POWERED TERMINAL UNIT SCHEDULE

MARK		FPB-1	FPB-2	FPB-3	FPB-4	FPB-5	FPB-6
CFM	RANGE:	200 – 350	350 – 500	500 – 1000	1000 – 1300	1300 – 1500	1500 – 1990
	MIN (1)	90	90	100	130	150	200
MAX. SIZE (LxWxH)(IN)		24x24x15	24x24x15	30x32x18	30x32x18	30x32x18	26x46x16
MAX. WEIGHT (LBS)		90	90	105	105	115	160
MAX. S.P. IN W.G. (2)		0.50	0.50	0.50	0.50	0.50	0.50
N.C. @ MAX. S.P. (3)		47	46	55	50	52	51
INLET DIA. IN INCHES		6	8	10	12	14	16
INLET DUCT IN INCHES		8	10	12	14	16	18
HTG. COIL MBH (4)		19.0	24.3	48.6	63.2	72.0	97.2
HTG COIL GPM		–	–	–	–	–	–
HTG. COIL MAX. WPD (FT.)		1.0	1.0	4.0	5.0	20.0	5.0
MIN FAN TSP (5)		0.50	0.50	0.50	0.50	0.50	0.50
MOTOR DATA	HP	1/10	1/4	1/4	1/2	3/4	2 @ 1/2
	VOLTS	115	115	115	115	115	115
	PHASE	1	1	1	1	1	1
MANUFACTURER		KRUEGER	KRUEGER	KRUEGER	KRUEGER	KRUEGER	KRUEGER
MODEL NUMBER		QFC-2	QFC-3	QFC-4	QFC-5	QFC-6	QFC-7
REMARKS		5,6,7	5,6,7	5,6,7	5,6,7,8	5,6,7,8	5,6,7,8

NOTES:
(1) MAXIMUM CFM TO SPACE, MINIMUM PRIMARY CFM = 10% OF BOX CFM.
(2) MAXIMUM STATIC PRESSURE REQUIRED AT PRIMARY AIR INLET FOR MAXIMUM SCHEDULED CFM. MINIMUM AVAILABLE FAN DISCHARGE STATIC PRESSURE = .25" W.C. (MIN) DOWN

Sheet E-100 – First Level Plan – Area A – Lighting

a. Toilets F-11, F-12, F-13, and E-14: Delete the ceiling mounted motion detector, indicator light over the door, and Flag Note 7 from each toilet. In each toilet, provide a single-pole switch adjacent to the door to control the room lighting. In Mechanical Chase MEP-1, between the toilets, provide a Bryant 5228 porcelain lamp holder, controlled by single-pole switch and duplex ground fault interrupter receptacle. Connect all together and connect to the toilet receptacle circuit.

b. Toilets P-2 and P-3: Delete the ceiling mounted motion detector, indicator light over door, and Flag Note No. 7 reference. Provide a single-pole switch at the door to control the room lights.

c. Toilets J-12 and J-13: Delete the ceiling mounted motion detector, indicator light over door, and Flag Note No. 7 reference. Provide a single-pole switch at the door to control the room lights.

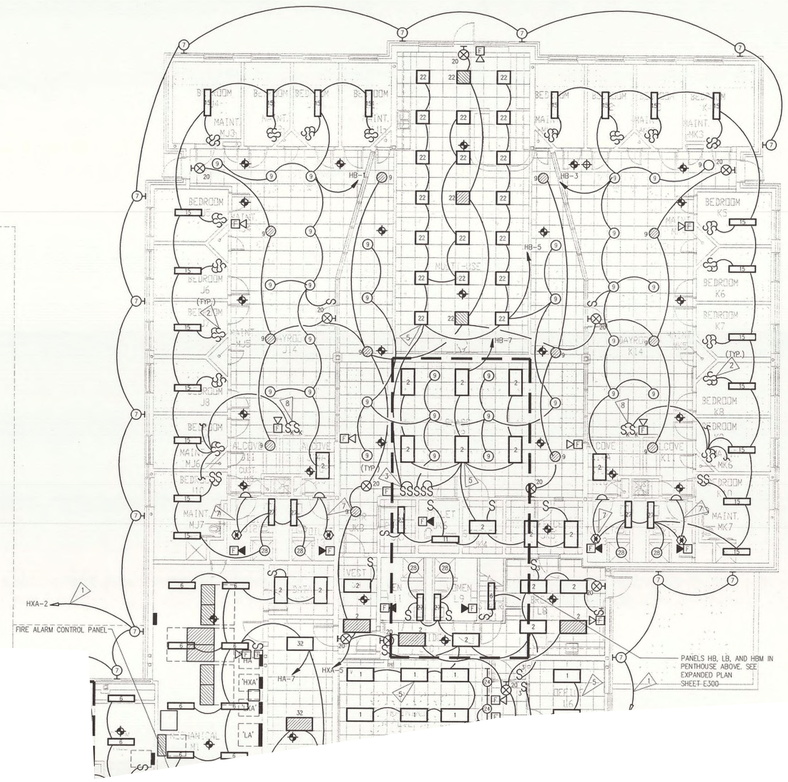
d. Toilets K-12 and K13: Delete the ceiling mounted motion detector, indicator light over door, and Flag Note No. 7 reference. Provide a single-pole switch at the door to control the room lights.

e. Flag Notes: Flag Note 7 information is deleted and "Not used" is inserted in lieu thereof.

f. Rooms E-12 and F-10: The resident bedroom night light switches referenced by Flag Note 8 in each room are to be relocated to Multi-Use Room EF1 behind the control desk.

g. General comment: All fire alarm horns and fire alarm mini-horn symbols are revised to fire alarm combination speaker strobes. Combination speakers strobes are to be provided as specified throughout the building wherever a fire alarm combination horn/strobe is indicated.

FUTURE HOUSING UNIT

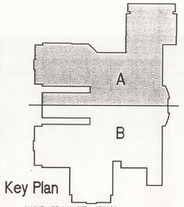


FLAG NOTES

1. HOMERUN THROUGH EXTERIOR LIGHTING CONTACTOR SEE DETAIL 1/E500
2. FOR RESIDENT ROOM LIGHT SWITCH CONTROL WIRING, SEE DETAIL 2/E500
3. SEE LIGHT SWITCH BANK ENGRAVING DETAIL 3/E500
4. FIXTURE TYPE 14 PROVIDED WITH DIMMING BALLAST. PROVIDE FLUORESCENT WALL BOX DIMMER COMPATIBLE WITH BALLAST.
5. SPLIT WIRE FIXTURE WITH CENTER LAMP CONTROLLED BY SWITCH NEAREST THE DOOR AND OUTER LAMPS CONTROLLED BY SECOND SWITCH.
6. LOWER CASE LETTERS INDICATE FIXTURES CONTROLLED BY THE SWITCH WITH THE CORRESPONDING LETTER, WITHIN THE SAME ROOM. CONNECT SWITCHES ACCORDINGLY.
7. PROVIDE CEILING MOUNTED MOTION SENSOR WATT STOPPER MODEL #CI-200 AND WIRE TO CONTROL TOILET LIGHTS AND OCCUPIED LIGHT OVER DOOR. SEE DETAIL 10/E500
8. RESIDENT KEY SWITCH OVER-RIDE. SEE DETAIL 1/E500 AND 2/E500

GENERAL NOTES

INSTALL GREEN INSULATED GROUND WIRE WITH ALL LIGHTING, RECEPTACLE AND EQUIPMENT BRANCH CIRCUITS



Key Plan

ALVINE JOB NUMBER: 980282

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Lancaster Co. Juvenile Detention Center

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FIRST FLOOR PLAN LIGHTING PLAN - AREA A

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DESIGN ENGINEER	ARCH. JOB NO.
CAB	980282
PROJECT ENGINEER	ISSUED
CJW	11/15/99
DRAFTER	REVISION
JMM	

E 100

E1 LIGHTING
SCALE: 1/8" = 1'-0" DETAILED DESCRIPTION

2ED4. Sheet E-200 – First Level Plan – Area A – Power

a. Vestibule EF-7: Unit heater UH-3, fractional horse power is added on south wall. Connect to receptacle on north wall.

b. Resource Room P-1: One (1) duplex receptacle is added on north wall directly opposite clock and receptacle.

c. Room P-13: Connect receptacle to the receptacle on opposite wall in Room P-13.

d. Classroom P-6: One (1) duplex receptacle is added at south wall between two (2) receptacles already shown. Connect to same circuit.

e. Classroom P-7: One (1) duplex receptacle is added to north wall between receptacles already shown. Connect to same circuit.

f. Control Room S-1: Three (3) duplex receptacles are added at east wall. Connect receptacles alternately to Circuits UPS-1, 3, and 5 already indicated for the room.

g. Supply Room M-16: Five (5) duplex receptacles are added to the room. One (1) additional receptacle is added, centered, to each of the south, east, and west walls. Two (2) receptacles are added, evenly spaced, at the north wall. The receptacles are connected together and two (2) 120-volt, 20 amp circuits are provided to Panel LA. Provide three (3) outlets on one circuit and two (2) outlets on the other.

h. Mechanical Room M-1: Five (5) duplex receptacles are added to this room. Provide two (2) receptacles each on the east and west walls. Provide one (1) receptacle on the north wall. Provide two (2) 120-volt, 20 amp circuits to Panel LA.

i. Office L-4: One (1) duplex receptacle is added to west wall at northwest corner of room at 86" above the floor for TV outlet. Coordinate location with TV outlet and mounting bracket.

j. Conference Room L-5: One (1) duplex receptacle is added to the south wall at 86" above the floor for TV outlet. Locate outlet adjacent to TV outlet and mounting bracket.

k. Work Area L-15: One (1) duplex receptacle is added at 46" above the counter, centered on north wall between the two (2) receptacles already shown. Connect to same circuit.

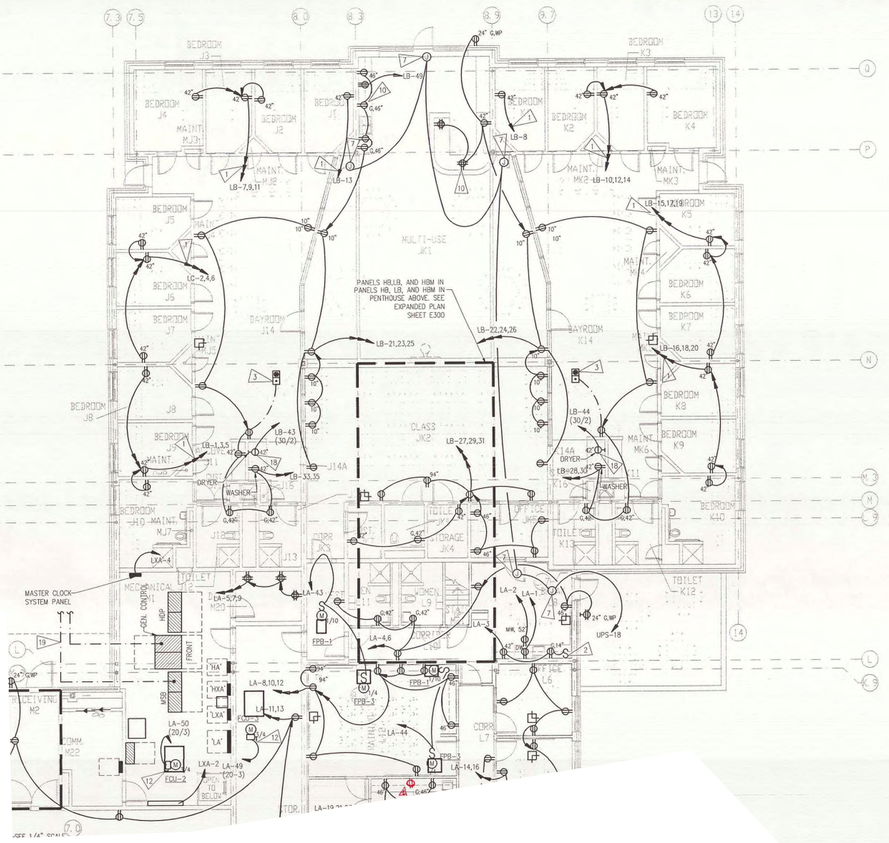
l. Training Room L-12: One combination power and data floor outlet is added to the center of the room. Provide telephone as indicated on the Telecommunications drawing. Connect receptacle to nearest wall receptacle circuit. One (1) duplex receptacle is added on south wall of Room L-12 at 86" for TV outlet. Locate receptacle adjacent to TV outlet and mounting bracket.

m. Alcove K-12: One (1) duplex receptacle is added over counter at 42" and connect to receptacle circuit passing through that area.

n. Roof: Four (4) duplex G.F.I. receptacles and one (1) 20 amp 120 volt circuit to Panel LA are added. Locate outlets within 25' of mechanical equipment on roof.

FUTURE HOUSING UNIT

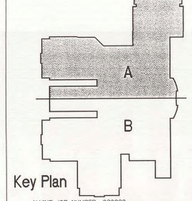
Floor outlet locations, as referenced on Electrical Plans to be located on the architectural drawings, are shown in Attachment #04. (See A100 back suite)



FLAG NOTES

1. HOMERUN TO GFI CIRCUIT BREAKER IN PANEL.
2. CONNECT DISPOSAL. PROVIDE SWITCH ABOVE COUNTER GANGED WITH RECEPTACLE.
3. SEE ARCHITECTURAL PLANS FOR DIMENSIONED LOCATIONS OF ALL FLOOR OUTLETS. VERIFY LOCATIONS WITH ARCHITECT PRIOR TO INSTALLATION.
4. SWITCH WITH PILOT LIGHT. ENGRAVE "EXHAUST FAN".
5. ELECTRIC WATER COOLER. LOCATE PLUG SO THAT CORD IS CONCEALED.
6. CONNECT EF-3 TO DISHWASHER DRY CONTACT TO OPERATE WITH DISHWASHER.
7. 120V-1ø, +,- 30 VA POWER FOR DOOR SECURITY EQUIP. VERIFY EXACT ROUGH-IN REQUIREMENTS WITH SECURITY SYSTEM PLANS AND DETAILS.
8. 120V-1ø, +,- 300VA UPS POWER TO 4-PLEX RECEPTACLE BELOW COUNTER FOR SECURITY SYSTEM PC. VERIFY EXACT WITH SECURITY PLANS AND DETAILS PRIOR TO ROUGH-IN.
9. SEE ARCHITECTURAL ELEVATIONS FOR ROUGH-IN LOCATION OF THESE DEVICES.
10. DEVICES MOUNTED ABOVE COUNTER. SEE ARCHITECTURAL ELEVATIONS AND DETAILS.
11. TV OUTLET AND RECEPTACLE MOUNTED 12" ABOVE TOP OF UPPER CABINET. SEE ARCHITECTURAL ELEVATION P13/A500 FOR LOCATION.
12. 208V 3 POLE, 30A DISCONECT FUSED AT 15A.
13. PROVIDE 120V CIRCUIT TO SMOKE DAMPER. SEE DETAIL 8/E500
14. CONNECT FAN POWERED BOX. UNIT MOUNTED DISCONNECT FURNISHED WITH EQUIPMENT, WIRED BY ELECTRICAL CONTRACTOR. (TYPICAL ALL FAN POWERED BOXES.)
15. 208V 2 POLE,60A DISCONNECT FUSED AT 50A.
16. PROVIDE 120V FLEX CONNECTION TO METAL DETECTOR.
17. CONNECT ELECTRIC DOOR OPERATOR. WIRE TO PUSH PLATE SWITCHES IN DOOR FRAME. (2 EACH DOOR)
18. ELECTRIC DRYER. PROVIDE 30A 4 POLE RECEPTACLE. 2#10, 1#10 NEUT. GND-3/4"C. TO PANEL. PROVIDE CORDSET FOR DRYER.
19. NORMAL AND EMERGENCY SERVICE POWER FEEDERS OUT TO GENERATOR AND PADMOUNT TRANSFORMER. SEE SITE PLAN SHEET ME100 AND POWER RISER SHEET E400 FOR ADDITIONAL INFORMATION.
20. GENERATOR REMOTE ANNUNCIATOR.
21. INSTALL J BOX WITH 120V. FLEX CONNECTION TO SECURITY PANEL.
22. COORDINATE THE EXACT PLACEMENT OF ALL DEVICES IN THE SECURITY DATA ROOM WITH THE SECURITY DRAWINGS PRIOR TO ROUGH-IN.
23. INSTALL J BOX WITH FLEX CONNECTION TO CAMERA POWER SUPPLY.
24. RECEPTACLE FLUSH MOUNTED IN CEILING FOR SECURITY MONITORS. SEE SECURITY DRAWINGS FOR LOCATION DETAILS.

INSTALL GREEN INSULATED GROUND WIRE WITH ALL LIGHTING, RECEPTACLE AND EQUIPMENT BRANCH CIRCUITS.



Key Plan

ALVINE JOB NUMBER: 980282

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FIRST FLOOR PLAN POWER PLAN – AREA A

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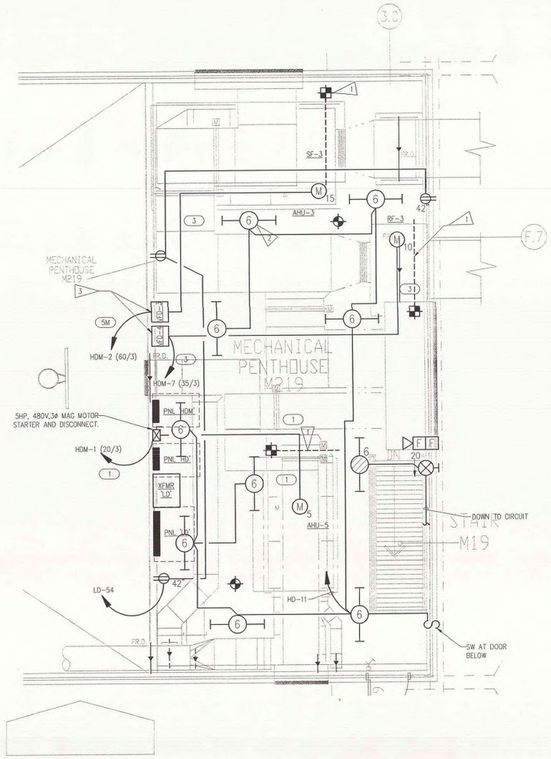
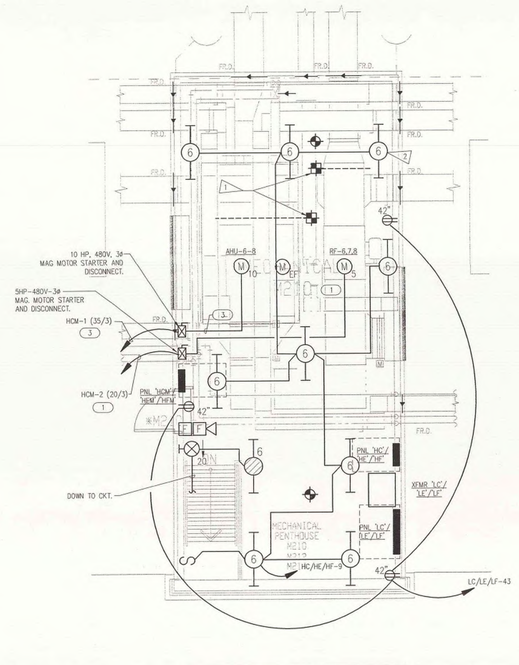
PROJECT ENGINEER	ISSUED
CJW	11/15/99
DRAFTER	REVISION
JMM	

E 200

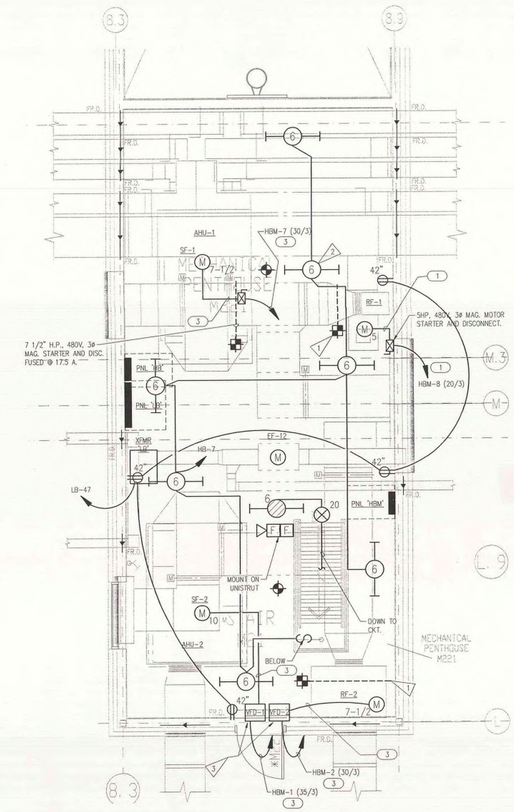
A1 POWER

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





NOTE: THIS PLAN IS TYPICAL FOR THREE (3) PENTHOUSE AREAS



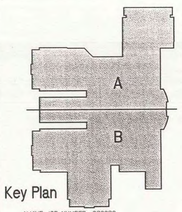
FLAG NOTES

1. PROVIDE DUCT MOUNTED SMOKE DETECTOR AND SHUT DOWN RELAY. CONNECT TO FIRE ALARM SYSTEM AND STARTER CONTROL CIRCUIT FOR AUTOMATIC SHUTDOWN.
2. LOCATE LIGHT FIXTURES TO MISS DUCTWORK AND PIPING.
3. VARIABLE FREQUENCY DRIVE. FURNISHED BY MECHANICAL, WIRED BY ELECTRICAL.
4. CONNECT SMOKE DAMPER. SEE DETAIL 8/E500 FOR REQUIREMENTS.

Sheet E-300 – Partial Plans and Details

a. General comment: All combination fire alarm horn/strobes are revised to combination speaker/strobes. Combination speaker strobes are to be provided throughout the building as specified.

INSTALL GREEN INSULATED GROUND WIRE WITH ALL LIGHTING, RECEPTACLE AND EQUIPMENT BRANCH CIRCUITS



Key Plan

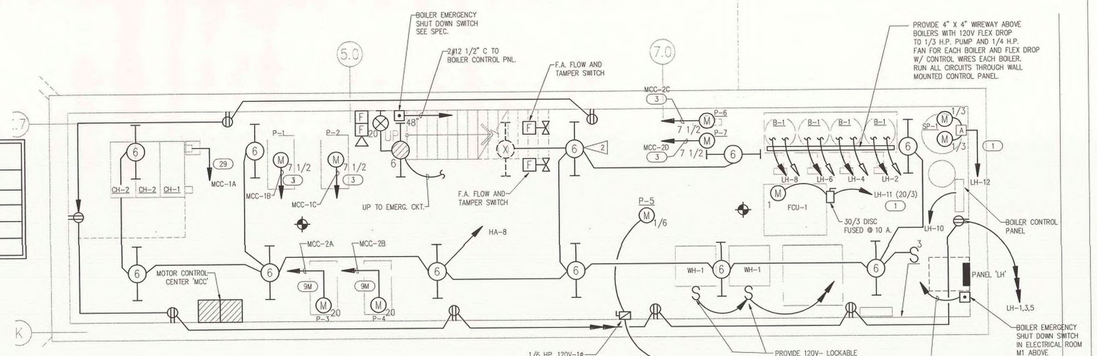
G1	ENLARGED PENTHOUSE PLAN - ELECTRICAL
SCALE: 1/4" = 1'-0"	PENTHOUSE M219

G8	ENLARGED PENTHOUSE PLAN - ELECTRICAL
SCALE: 1/4" = 1'-0"	PENTHOUSE M210, M212 & M214

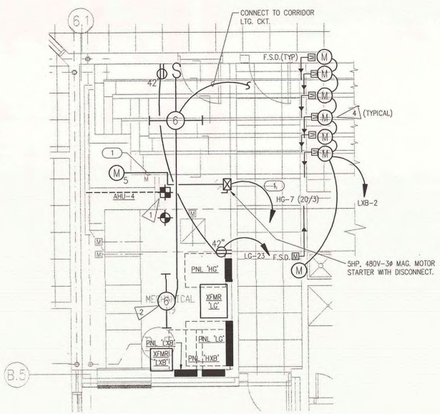
G14	ENLARGED PENTHOUSE PLAN - ELECTRICAL
SCALE: 1/4" = 1'-0"	PENTHOUSE M221

FEEDER SCHEDULE

MARK	NOMINAL SIZE	WIRE AND CONDUIT
(1)	20 A	3-#12, #12 GND – 1/2"C.
(3)	30 A	3-#10, #10 GND – 3/4"C.
(5M)	40 A	3-#8, #8 GND – 1"C.
(29)	250 A	3-250 KCMIL, #4 GND – 2-1/2"C.



A1	ENLARGED BASEMENT MECHANICAL ROOM PLAN - ELECTRICAL
SCALE: 1/4" = 1'-0"	MECHANICAL ROOM M01



A14	ENLARGED MECHANICAL ROOM PLAN - ELECTRICAL
SCALE: 1/4" = 1'-0"	MECHANICAL ROOM M9

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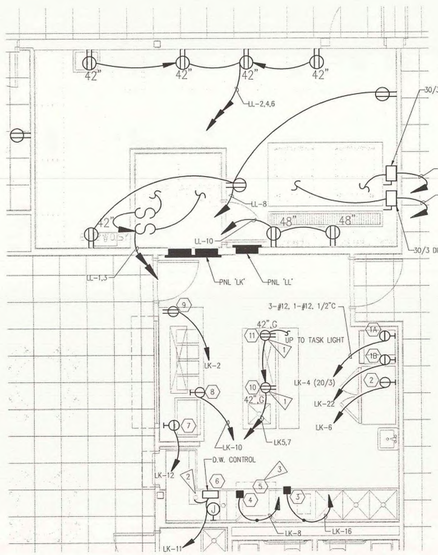
DRAFTER	REVISION		
JMM	—		



H1	ENLARGED LAUNDRY AND KITCHEN PLAN - POWER
SCALE: 1/4" = 1'-0"	PENTHOUSE M5 & M6

KITCHEN EQUIPMENT CONNECTION SCHEDULE

MARK	ITEM	VOLTAGE	PH	HP (KW)	AMPS	BREAKER	CONNECTION	RECEPTACLE CONFIGURATION	MOUNTING HEIGHT	WIRE	GROUND WIRE	CONDUIT	REMARKS
1A	ICE MAKER	120	1	1.8 KW	15	20/1	PLUG	5-20R	5'-6" AFF	2#12	1#12	1/2"	
1B	ICE MAKER	208	3	2	5.8	20/3	PLUG	18-20R	5'-6" AFF	3#12	1#12	1/2"	
2	REFRIGERATOR	120	1	1/3	9.6	20/1	PLUG	5-20R	6'-6"	2#12	1#12	1/2"	
3	BOOSTER HEATER	208	3	12.0 KW	33	50/3	HARD		1'-6"	3#6	1#6	3/4"	
4	WARE WASHER	208	3	1	23.9	30/3	HARD		5'-0"	3#10	1#10	3/4"	
5	VENTILATOR	120	1	1/10	1	20/1	HARD			2#12	1#12	1/2"	EXIST CKT
6	DISPOSER	208	3	2	3.3	20/3	HARD		12" AFF	3#12	1#12	1/2"	
7	SERVING COUNTER	208	1	3.4 KW	16.3	25/2	PLUG	6-30R	6" AFF	2#10	1#10	1/2"	
8	SERVING COUNTER	120	1	1/5	2.3	20/1	PLUG	5-20R	6" AFF	2#12	1#12	1/2"	
9	SERVING COUNTER	120	1	1.8 KW	15	20	PLUG	5-20R	6" AFF	2#12	1#12	1/2"	
10	CABINET	120	1	1.8 KW	15	20	PLUG	5-20R	6" AFF	2#12	1#12	1/2"	
11	CABINET	120	1	1.8 KW	15	20	PLUG	5-20R	6" AFF	2#12	1#12	1/2"	

KITCHEN EQUIPMENT NOTES:

1. PROVIDE CORD SETS FOR ALL CORD EQUIPMENT IF NOT PROVIDED WITH THE EQUIPMENT.
2. VERIFY ALL EQUIPMENT ROUGH-IN REQUIREMENTS AND MOUNTING HEIGHTS WITH EQUIPMENT SUPPLIER PRIOR TO INSTALLATION.
3. MAKE FINAL CONNECTION TO ALL KITCHEN EQUIPMENT.
4. COORDINATE ALL NEMA SPECIAL PURPOSE OUTLETS WITH EQUIPMENT SUPPLIER.
5. PROVIDE LIQUID-TIGHT STEEL FLEXIBLE CONDUIT FOR ALL DIRECT CONNECTIONS TO EQUIPMENT.
6. PROVIDE LAMPS FOR LIGHTS FURNISHED WITH EQUIPMENT.
7. ALL ROUGH-INS FOR FOOD SERVICE EQUIPMENT SHALL BE IN ACCORDANCE WITH APPROVED FOOD SERVICE EQUIPMENT ROUGH-IN DRAWINGS.
8. ROUGH-IN REQUIREMENTS FOR ALL EQUIPMENT N.I.C. SHALL BE VERIFIED BEFORE INSTALLATION.

H9	KITCHEN EQUIPMENT SCHEDULE
SCALE: NONE	

ELECTRICAL SYMBOLS

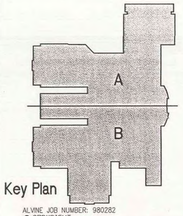
SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
	FLUORESCENT FIXTURE – NUMBER INDICATES FIXTURE NUMBER IN SCHEDULE	EX	EMERGENCY BATTERY LIGHT–NUMBER INDICATES FIXTURE NUMBER IN SCHEDULE
	RECESSED DOWNLIGHT FIXTURE		CEILING MOUNTED EXIT LIGHT WITH DIRECTIONAL ARROW – NUMBER
	RECESSED DOWNLIGHT FIXTURE ON EMERGENCY CIRCUIT OF WITH BATTERY PACK		INDICATES FIXTURE NUMBER IN SCHEDULE
	FLUORESCENT STRIP LIGHT – NUMBER INDICATES FIXTURE NUMBER IN SCHEDULE		WALL OR END MOUNTED EXIT LIGHT WITH DIRECTIONAL ARROW – NUMBER
	BRACKET FLUORESCENT FIXTURE – NUMBER INDICATES FIXTURE NUMBER IN SCHEDULE		INDICATES FIXTURE NUMBER IN SCHEDULE
	CEILING FIXTURE – NUMBER INDICATES FIXTURE NUMBER IN SCHEDULE		POLE LUMINAIRE(S) – NUMBER INDICATES FIXTURE NUMBER IN SCHEDULE
	BRACKET FIXTURE – NUMBER INDICATES FIXTURE NUMBER IN SCHEDULE		BOLLARD LUMINAIRE – NUMBER INDICATES FIXTURE NUMBER IN SCHEDULE
	TRACK MOUNTED FIXTURE – NUMBER INDICATES FIXTURE NUMBER IN SCHEDULE		CEILING FAN – NUMBER INDICATES FIXTURE NUMBER IN SCHEDULE. NOTE: NUMBER OF BLADES IS IN SCHEDULE
S	SINGLE POLE SWITCH		MOMENTARY CONTACT SWITCH
	DOUBLE POLE SWITCH		MANUAL DIMMER OR FAN SPEED CONTROL (NUMBER INDICATES WATTAGE: "S"–500W, "D"–1000W, "T"–1500W, "F"–2000W, "F"–FAN SPEED CONT.)
	3 – WAY SWITCH		CEILING MOUNTED MOTION SENSOR/SWITCH
	4 – WAY SWITCH		WALL MOUNTED MOTION SENSOR/SWITCH
	DOOR SWITCH		ISOLATED GROUND DOUBLE DUPLEX RECEPTACLE
	DUPLEX RECEPTACLE		DOUBLE DUPLEX RECEPTACLE
	DUPLEX RECEPTACLE – GFCI TYPE		SINGLE RECEPTACLE
	ISOLATED GROUND DUPLEX RECEPTACLE		DRYER RECEPTACLE: NEMA 14-30 (125/250V 30A)
	HIGH ABUSE DUPLEX RECEPTACLE		RANGE RECEPTACLE: NEMA 14-50 (125/250V 50A)
	SAFETY TYPE DUPLEX RECEPTACLE		WELDER RECEPTACLE: NEMA 6-50 (250V 50A)
	RED DUPLEX RECEPTACLE		SPECIAL PURPOSE RECEPTACLE – TYPE AS NOTED
	DUPLEX RECEPTACLE – SPLIT WIRED		WEATHERPROOF MOUNTED DUPLEX RECEPTACLE
	CEILING MOUNTED DUPLEX RECEPTACLE		MULTI-OUTLET ASSEMBLY – LENGTH AS INDICATED
	FLOOR DUPLEX RECEPTACLE		WALL MOUNTED JUNCTION BOX
	LIGHTING PANEL		JUNCTION BOX ("F" INDICATES FLOOR, "C" INDICATES CEILING)
	DISTRIBUTION PANEL, SWITCHBOARD OR MOTOR CONTROL CENTER		PHOTOCELL
	BRANCH CIRCUIT – EXPOSED		CONDUIT SEAL
	BRANCH CIRCUIT CONCEALED IN CEILING OR WALL		CIRCUIT DOWN
	BRANCH CIRCUIT CONCEALED IN FLOOR		CIRCUIT UP
	HOMERUN TO PANEL (NUMBER OF #'AWNG INDICATES NUMBER OF CIRCUITS)		CONDUIT STUB-OUT
	SPECIAL PURPOSE HOMERUN AS INDICATED		CIRCUIT BREAK
	MOTOR – HORSEPOWER AS INDICATED		SINGLE PHASE MAGNETIC MOTOR STARTER
	SAFETY SWITCH – FUSED (SAME) (OTHERWISE NOTED)		THREE PHASE MAGNETIC MOTOR STARTER
	SINGLE POLE MANUAL MOTOR STARTER WITH THERMAL O.L. AND PILOT LIGHT		COMBINATION MAGNETIC STARTER/DISCONNECT
	SWITCH & FUSE – SEE DETAIL		MOTOR CONTROL/PUSHBUTTON STATION
	SWITCH & FUSETAP		RELAY
	COMMUNICATIONS OUTLET ("A"–INDICATES LOCATION OR STATION NUMBER, "M"–INDICATES MOUNTING HEIGHT, "C"–INDICATES NUMBER OF CABLES)		FLOOR COMMUNICATIONS OUTLET ("A"–INDICATES LOCATION OR STATION NUMBER, "C"–INDICATES NUMBER OF CABLES)
	SPECIAL SURFACE COMMUNICATIONS OUTLET ("A"–INDICATES LOCATION OR STATION NUMBER, "M"–INDICATES MOUNTING HEIGHT, "C"–INDICATES NUMBER OF CABLES)		CEILING COMMUNICATIONS OUTLET ("A"–INDICATES LOCATION OR STATION NUMBER, "C"–INDICATES NUMBER OF CABLES)
	COMBINATION FLOOR OUTLET – POWER & COMMUNICATIONS ("A"–INDICATES LOCATION OR STATION NUMBER, "C"–INDICATES NUMBER OF CABLES)		TELEPHONE TERMINAL CABINET
	CONDUIT SLEEVE WITH BUSHINGS		RUNG-TYPE CABLE TRAY – CENTER HUNG ("W"– INDICATES WIDTH IN INCHES)
	TELEVISION/VIDEO OUTLET		RUNG-TYPE CABLE TRAY – WALL MOUNTED ("W"– INDICATES WIDTH IN INCHES)
	LADDER-TYPE CABLE TRAY ("W"– INDICATES WIDTH IN INCHES)		CABLE SUPPORT HANGERS
XXX	CABLE PROTECTOR ("XXX"–INDICATES NUMBER OF PROTECTORS)		FASTENERS
X	CROSS-CONNECT FIELD		DISTRIBUTION RINGS
	MECHANICAL TERMINATION OF CABLE		SPLICE
	FIBER OPTIC CABLE ("#"–INDICATES NUMBER OF STRANDS, "L"–LENGTH OF CABLE)		NEW CABLE
	HORIZONTAL CABLE (UTP) ("#"–INDICATES NUMBER OF PAIRS, "S"–#AWG GAUGE SIZE, "C"– CATEGORY NO.)		CABLE SLACK ("X" – DENOTES SLACK LENGTH)
	BACKBONE CABLE (UTP) ("#"–INDICATES NUMBER OF PAIRS, "S"–#AWG GAUGE SIZE, "L"–LENGTH OF CABLE)		CONDUIT BANK – SECTION VIEW (QUANTITY, SIZE AND TYPE INDICATED ON PLANS)
	FIRE ALARM AUTOMATIC SMOKE DETECTOR		CONCRETE ENCASED CONDUIT BANK – SECTION VIEW (QUANTITY, SIZE AND TYPE INDICATED ON PLANS)
	FIRE ALARM AUTOMATIC SMOKE DETECTOR WITH SOUNDER BASE		CEILING FIRE ALARM LIGHT – NUMBER INDICATES LIGHT LEVEL IN CANDELA
	FIRE ALARM AUTOMATIC HEAT DETECTOR		WALL FIRE ALARM LIGHT – NUMBER INDICATES LIGHT LEVEL IN CANDELA
	SAMPLING TUBE TYPE SMOKE DETECTOR		CEILING FIRE ALARM SPEAKER & LIGHT COMBINATION – NUMBER INDICATES LIGHT LEVEL IN CANDELA
	FIRE ALARM MANUAL STATION		WALL FIRE ALARM SPEAKER & LIGHT COMBINATION – NUMBER INDICATES LIGHT LEVEL IN CANDELA
	FIRE SPRINKLER FLOW & TAMPER SWITCH		FIRE ALARM BELL
	FIRE ALARM BELL & LIGHT COMBINATION – NUMBER INDICATES LIGHT LEVEL IN CANDELA		FIRE ALARM HORN & LIGHT COMBINATION – NUMBER INDICATES LIGHT LEVEL IN CANDELA
	FIRE ALARM MAGNETIC DOOR HOLDER		FIRE ALARM CONTROL PANEL
	FIRE ALARM HORN & LIGHT COMBINATION – NUMBER INDICATES LIGHT LEVEL IN CANDELA		FIRE ALARM ANNUNCIATOR PANEL
	FIRE ALARM MINI-HORN & LIGHT COMBINATION – NUMBER INDICATES LIGHT LEVEL IN CANDELA		COMBINATION FIRE/SMOKE DAMPER
	CEILING FIRE ALARM HORN & LIGHT COMBINATION – NUMBER INDICATES LIGHT LEVEL IN CANDELA		SMOKE DAMPER
	CEILING FIRE ALARM MINI-HORN & LIGHT COMBINATION – NUMBER INDICATES LIGHT LEVEL IN CANDELA		FIRE FIGHTER'S TELEPHONE JACK
	CEILING SPEAKER		VOLUME CONTROL
	WALL SPEAKER		CALL IN SWITCH
	WALL MICROPHONE OUTLET		INTERCOM OUTLET
	FLOOR MICROPHONE OUTLET		INTERCOM CONTROL PANEL
	WALL CLOCK HANGER OUTLET		DOUBLE FACE CLOCK
	WALL MOUNTED CLOCK		COMBINATION CLOCK / SPEAKER UNIT
	CEILING MOUNTED SECURITY MOTION DETECTOR		VIDEO CAMERA ("M" INDICATES WALL MOUNTED)
	WALL MOUNTED SECURITY MOTION DETECTOR		SECURITY KEYPAD
	DOOR CONTACT		SECURITY CONTROL PANEL
	THERMOSTAT		CHIME
	ADJUSTMENT		BELL
	BUZZER		PUSH BUTTON
	PNEUMATIC – ELECTRIC SWITCH		FLOAT SWITCH
	ELECTRIC – PNEUMATIC SWITCH		PRESSURE SWITCH
	ELECTRIC SOLENOID VALVE		DAMPER SWITCH
	ALTERNATOR		
	NURSE CALL DUTY STATION		NURSE CALL CARDIAC ALERT STATION
	NURSE CALL STAFF STATION		NURSE CALL CORRIDOR LIGHT
	NURSE CALL MASTER STATION		COMBINATION NURSE CALL EMERGENCY CORRIDOR LIGHT
	NURSE CALL BEDSIDE STATION		NURSE CALL EMERGENCY CORRIDOR LIGHT
	NURSE CALL EMERGENCY STATION		NURSE CALL CORRIDOR PANEL
EP	SUBSCRIPT "EP" APPLIED TO ANY SYMBOL INDICATES EXPLOSION PROOF CLASS, GROUP & DIVISION AS NOTED	RT	SUBSCRIPT "RT" APPLIED TO ANY SYMBOL INDICATES WARRIGHT HOWL TRI-PHONE SYSTEM
WP	SUBSCRIPT "WP" APPLIED TO ANY SYMBOL INDICATES WEATHERPROOF NEMA TYPE 4 OR EQUIVALENT	PD	SUBSCRIPT "PD" ADDED TO ANY FLOOR OUTLET INDICATES PEDESTAL MOUNTED
E	SUBSCRIPT "E" ADDED TO ANY SYMBOL INDICATES EXISTING	P	SUBSCRIPT "P" ADDED TO ANY SYMBOL INDICATES PILOT LIGHT
K	SUBSCRIPT "K" ADDED TO ANY SYMBOL INDICATES KEY OVERRIDES		

FLAG NOTES

1. MOUNT IN CABINET BACKSPLASH
2. INTEGRAL WATER TIGHT DISCONNECT/CONTROL PANEL FOR DISPOSAL SHALL BE FURNISHED BY FOOD SERVICE EQUIPMENT SUBCONTRACTOR, INSTALLED AND CONNECTED BY ELECTRICAL CONTRACTOR.
3. WIRE VENTILATOR THROUGH WAREWASHER CONTROLS SO BOTH UNITS ENERGIZE SIMULTANEOUSLY.

GENERAL NOTES

INSTALL GREEN INSULATED GROUND WIRE WITH ALL LIGHTING, RECEPTACLE AND EQUIPMENT BRANCH CIRCUITS.



Key Plan

ALVINE JOB NUMBER: 980282

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CAB	980282
PROJECT ENGINEER	ISSUED
CJW	11/5/99
DRAFTER	REVISION
JMM	——— ———

E 301

SWITCHBOARD SCHEDULE

SWBD "MSB"
- 480Y/277V, 3ø, 4W WITH GROUND BAR
- 1200A MAIN BREAKER
- W/GROUND FAULT PROT.
- BREAKER DISTRIBUTION
- 25K AIC

SECTION NO. 1
- UTILITY MAIN CIRCUIT BREAKER
- OWNER METERING
- FRONT AND REAR ACCESSIBLE W/HINGED DOORS

DESIGNATION	CIRCUIT NUMBER	NAMEPLATE DESIGNATION	ACTIVE	SPARE	SPACE	REMARKS/FEEDER
SECTION NO. 2 • BRANCH BREAKER • FRONT AND REAR ACCESSIBLE W/HINGED DOOR	1	SPARE		100/3		
	2	SURGE SURPRESSOR	60/3			
	3	GENERATOR CONTROL BOARD	60/3			
	4	"MCC"	600/3			
	5	SPARE		400/3		
	6	SPARE		200/3		
	7	SPACE			400/3	
	8	SPACE			400/3	
	9	SPACE			400/3	
	10	SPACE			400/3	
	11	SPACE			400/3	
	12	SPACE			400/3	

DISTRIBUTION PANEL SCHEDULE

DESIGNATION	CIRCUIT NUMBER	NAMEPLATE DESIGNATION	ACTIVE	SPARE	SPACE	REMARKS
LDP • 208Y/120V, 3ø, 4W WITH GROUND BAR • 500A MAIN BREAKER • BREAKER DISTRIBUTION • 22KAIC SERIES RATED	1	PNL LA	225/3			
	2	PNL LK	225/3			
	3	PNL LL	100/3			
	4	PNL LH	100/3			
	5	SPARE		225/3		
	6	SPARE		225/3		
	7	SPARE		100/3		
	8	SPARE		100/3		
	9	SURGE ARRESTOR		20/3		
	10	SPACE			100/3	
	11	SPACE			100/3	
	12	SPACE			100/3	
HDP • 480Y/277V, 3ø, 4W WITH GROUND BAR • 800 A MAIN LUG ONLY • BREAKER DISTRIBUTION • 18KAIC	1	PNL HA	100/3			
	2	PNL HB	225/3			
	3	PNL HC	225/3			
	4	PNL HD	225/3			
	5	PNL HE	225/3			
	6	PNL HF	225/3			
	7	PNL HG	225/3			
	8	PNL HXA	100/3			
	9	PNL HXB	100/3			
	10	TRANS "LDP"	225/3			
	11	PNL HBM	100/3			
	12	PNL HCM	100/3			
	13	PNL HDM	100/3			
	14	PNL HEM	100/3			
	15	PNL HFM	100/3			
	16	SPARE		200/3		
	17	SPARE		200/3		
	18	SPARE		100/3		
	19	SPARE		100/3		
	20	SPACE			200/3	
	21	SPACE			200/3	
	22	SPACE			200/3	

MOTOR CONTROL CENTER SCHEDULE

DESIGNATION	CIRCUIT NUMBER	NAMEPLATE DESIGNATION	ACTIVE	SPARE	SPACE	3ø MAG STARTER HP	3ø MAG STARTER SPARE	3ø MAG STARTER SPACE	REMARKS
'MCC' • 480V, 3ø, 3W WITH GROUND BAR • 600 A MLO • 25 K AIC	1A	CHILLER	250/3						
	1B	PUMP P-1	MCP			7 1/2			
	1C	PUMP P-2	MCP			7 1/2			
SECTION 1	1D	SPARE	MCP				5 HP		
	1E	SPARE	MCP				10 HP		
SECTION 2	2A	PUMP P-3	MCP			20			
	2B	PUMP P-4	MCP			20			
	2C	PUMP P-6	MCP			7 1/2			
	2D	PUMP P-7	MCP			7 1/2			
	2E	SPACE						25 HP	

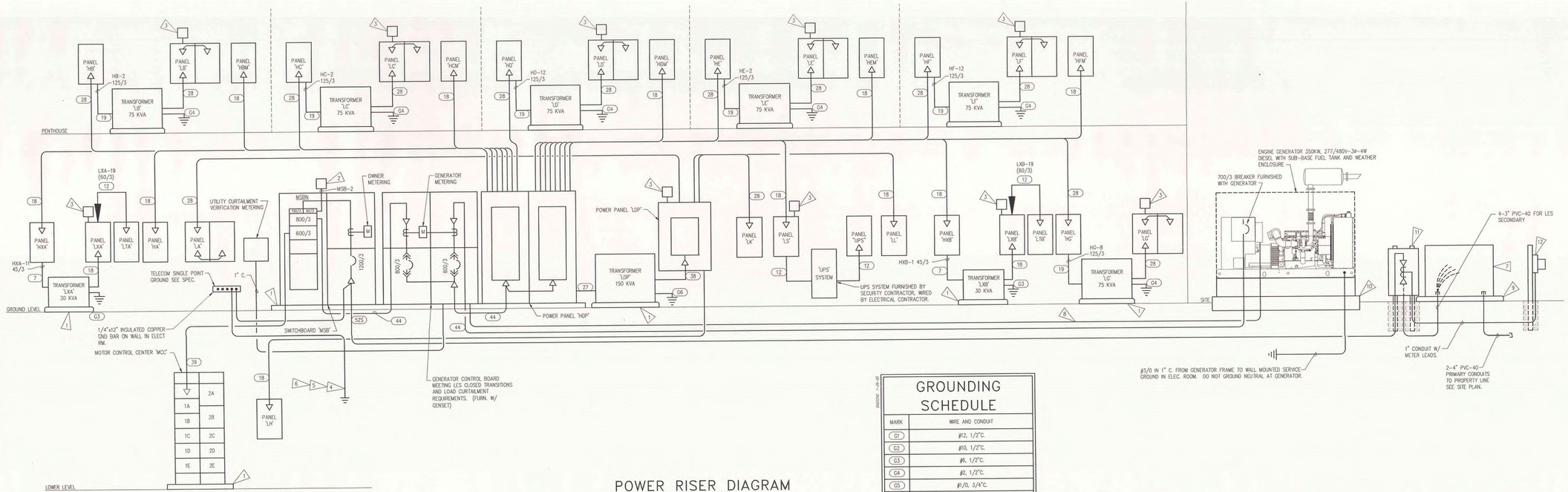
LOAD SUMMARY

LOAD	CONN.	D.F.	EMD
LIGHTING	100KW	1.0	100KW
RECEPTACLES	7.5KW	1.0	7.5KW
FANS	20KW	.80	16KW
CHILLERS	500KW	.75	475KW
PUMPS	350KW	.80	280KW
ELECTRIC HEAT	50KW	1.0	50KW
SPARE	100KW	1	100KW
MISCELLANEOUS	50KW	.80	40KW
TOTAL	1178		1089

REQUIRED SERVICE: 1200 AMPS AT
480Y/277V VOLTS, 3 PHASE, 4 WIRE

FEEDER SCHEDULE

MARK	NOMINAL SIZE	WIRE AND CONDUIT
1	20 A	3-#12, #12 GND - 1/2"C.
3	30 A	3-#10, #10 GND - 3/4"C.
5M	40 A	3-#8, #8 GND - 1"C.
7	50 A	3-#6, #8 GND - 1"C.
11	70 A	3-#4, #8 GND - 1-1/4"C.
12	70 A	4-#4, #8 GND - 1-1/4"C.
12A	70 A	4-#4, #4 GND - 1-1/4"C.
17	100 A	3-#2, #8 GND - 1-1/4"C.
18	100 A	4-#2, #8 GND - 1-1/2"C.
18A	100 A	4-#2, #4 GND - 1-1/2"C.
19	125 A	3-#1, #4 GND - 1-1/2"C.
27	225 A	3-#4/0, #1 GND - 2"C.
28	225 A	4-#4/0, #4 GND - 2-1/2"C.
38	500 A	4-250 KCMIL, #2 GND IN EACH OF 2 - 3"C.
39	600 A	3-350 KCMIL, #1 GND IN EACH OF 2 - 3"C.
44	800 A	4-500 KCMIL, #1/0 GND IN EACH OF 2 - 4"C.
525	1200 A	4-400 KCMIL IN EACH OF 4 - 3"C.



POWER RISER DIAGRAM

SCALE: NONE

GROUNDING SCHEDULE

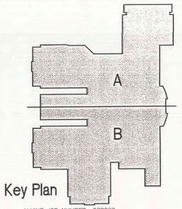
MARK	WIRE AND CONDUIT
G1	#12, 1/2"C.
G2	#10, 1/2"C.
G3	#6, 1/2"C.
G4	#2, 1/2"C.
G5	#1/0, 3/4"C.
G6	#2/0, 1"C.
G7	#3/0, 1"C.

FLAG NOTES

1. PROVIDE 3-1/2" THICK CONCRETE PAD WITH 3/4" CHAMFER ON EDGES NOT ABUTTING A PARTITION.
2. SERVICE RATED SURGE SUPPRESSOR - SEE SPEC. 480Y/277V, 3ø, 4W WITH MANUFACTURER'S RECOMMENDATIONS. CONNECT TO A 60/3 BREAKER USING 4-#6, #6 GND IN 3/4" PVC CONDUIT. CONDUCTORS SHALL BE AS SHORT AS POSSIBLE WITH A MINIMUM NUMBERS OF BENDS.
3. BRANCH PANEL RATED SURGE SUPPRESSOR - SEE SPEC. INSTALL IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS. CONNECT TO A 20/3 BREAKER USING 4-#10, #10 GND IN 3/4" PVC CONDUIT. CONDUCTORS SHALL BE AS SHORT AS POSSIBLE WITH A MINIMUM NUMBER OF BENDS.
4. PROVIDE #3/0 COPPER IN 1" PVC CONDUIT TO 20' OF #3/0 BARE COPPER CONCRETE ENCASED.
5. PROVIDE #3/0 COPPER IN 1" PVC CONDUIT TO STREET SIDE OF WATER METER. PROVIDE BONDING JUMPER ACROSS WATER METER.
6. PROVIDE #3/0 COPPER IN 1" PVC CONDUIT TO BUILDING STEEL.
7. PADMOUNT TRANSFORMER BY UTILITY COMPANY - 480Y/277V, 3ø, 4W.
8. PROVIDE CONTROL WIRES, GENERATOR HEATER, ETC. IN 3/4" GENERATOR CONDUIT BETWEEN CONTROLS AND GENERATOR CONTROL PANEL.
9. PAD BY CONTRACTOR. SEE DETAIL 4/E500
10. PAD BY CONTRACTOR. SEE DETAIL 10/E500
11. C/T CABINET AND PEDESTAL FURNISHED AND INSTALLED BY CONTRACTOR IN ACCORDANCE WITH L.E.S. REQUIREMENTS.
12. REMOTE METER & PEDESTAL FURNISHED AND INSTALLED BY CONTRACTOR.

GENERAL NOTES

INSTALL GREEN INSULATED GROUND WIRE WITH ALL LIGHTING, RECEPTACLE AND EQUIPMENT BRANCH CIRCUITS.



Key Plan

ALVINE JOB NUMBER: 980282

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Lancaster Co. Juvenile Detention Center

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PROFESSIONAL ELECTRICAL ENGINEER
CHARLES J. WERP
E-2238
STATE OF NEBRASKA

POWER RISER DIAGRAM AND SCHEDULES

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DESIGN ENGINEER	ARCH. JOB NO.		
CAB	980282	E	400
PROJECT ENGINEER	DATED		
CJW	11/15/99		
DRAFTER	REVISION		
JMM			

LIGHTING PANEL SCHEDULE

PANEL DESIGNATION	CIRCUIT NUMBERS	QUANTITY & SIZE BRANCHES ACTIVE	SPARE	SPACE	REMARKS
HA • 480Y/277V, 3ø, 4W WITH GROUND BAR • 100 A MLO • SURFACE MOUNTED • 30 POLES	1–30	9–20/1	9–20/1	12 POLES	
HB • 480Y/277V, 3ø, 4W WITH GROUND BAR • 225 A MLO • SURFACE MOUNTED • 30 POLES	1–30	4–20/1 1–125/3	11–20/1	15 POLES	SUBFEED BREAKER
HBM • 480Y/277V, 3ø, 4W WITH GROUND BAR • 100 A MLO • SURFACE MOUNTED • 30 POLES	1–30	2–30/3 1–20/3 1–35/3		18 POLES	
HC • 480Y/277V, 3ø, 4W WITH GROUND BAR • 225 A MLO • SURFACE MOUNTED • 42 POLES	1–30	5–20/1 1–125/3	10–20/1	15 POLES	SUBFEED BREAKER
HCM • 480Y/277V, 3ø, 4W WITH GROUND BAR • 100 A MLO • SURFACE MOUNTED • 30 POLES	1–30	1–20/1 1–35/3		24 POLES	
HD • 480Y/277V, 3ø, 4W WITH GROUND BAR • 225 A MLO • SURFACE MOUNTED • 42 POLES	1–30	11–20/1 1–125/3	10–20/1	9 POLES	SUBFEED BREAKER
HDM • 480Y/277V, 3ø, 4W WITH GROUND BAR • 100 A MLO • SURFACE MOUNTED • 30 POLES	1–30	2–20/3 1–35/3 1–60/3		18 POLES	
HE • 480Y/277V, 3ø, 4W WITH GROUND BAR • 225 A MLO • SURFACE MOUNTED • 42 POLES	1–30	4–20/1 1–125/3	11–20/1	15 POLES	SUBFEED BREAKER
HEM • 480Y/277V, 3ø, 4W WITH GROUND BAR • 100 A MLO • SURFACE MOUNTED • 30 POLES	1–30	1–20/3 1–35/3		24 POLES	
HF • 480Y/277V, 3ø, 4W WITH GROUND BAR • 225 A MLO • SURFACE MOUNTED • 42 POLES	1–30	5–20/1 1–125/3	8–20/1	17 POLES	SUBFEED BREAKER
HFM • 480Y/277V, 3ø, 4W WITH GROUND BAR • 100 A MLO • SURFACE MOUNTED • 30 POLES	1–30	1–20/3 1–35/3		24 POLES	
HG • 480Y/277V, 3ø, 4W WITH GROUND BAR • 225 A MLO • SURFACE MOUNTED • 42 POLES	1–30	6–20/1 1–125/3 1–20/3	8–20/1	13 POLES	SUBFEED BREAKER
HXA • 480Y/277V, 3ø, 4W WITH GROUND BAR • 100 A MLO • SURFACE MOUNTED • 30 POLES	1–30	10–20/1 1–45/3	6–20/1	11 POLES	
HXB • 480Y/277V, 3ø, 4W WITH GROUND BAR • 100 A MLO • SURFACE MOUNTED • 30 POLES	1–30	6–20/1 1–45/3	7–20/1	14 POLES	
LA • 208Y/120V, 3ø, 4W WITH GROUND BAR • 225 A MLO • SURFACE MOUNTED • 84 POLES	1–84	50–20/1 1–30/1 2–20/3 1–50/2	15–20/1	10 POLES	PROVIDE SUB-FEED LUGS FOR SECTION #2
LB • 208Y/120V, 3ø, 4W WITH GROUND BAR • 225 A MCB • SURFACE MOUNTED • 84 POLES	1–84	14–20/1 GFI 21–20/1 GFI 2–30/2 1–50/2 1–20/3	22–20/1 6–20/1 GFI	17 POLES	PROVIDE SUB-FEED LUGS FOR SECTION #2
LC • 208Y/120V, 3ø, 4W WITH GROUND BAR • 225 A MCB • SURFACE MOUNTED • 84 POLES	1–84	16–20/1 21–20/1 GFI 1–20/3	22–20/1 6–20/1 GFI	16 POLES	PROVIDE SUB-FEED LUGS FOR SECTION #2
LD • 208Y/120V, 3ø, 4W WITH GROUND BAR • 225 A MCB • SURFACE MOUNTED • 84 POLES	1–84	52–20/1 1–30/2 1–20/3	18–20/1	9 POLES	PROVIDE SUB-FEED LUGS FOR SECTION #2

LIGHTING PANEL SCHEDULE

PANEL DESIGNATION	CIRCUIT NUMBERS	QUANTITY & SIZE BRANCHES ACTIVE	SPARE	SPACE	REMARKS
LE • 208Y/120V, 3ø, 4W WITH GROUND BAR • 225 A MCB • SURFACE MOUNTED • 60 POLES	1–60	15–20/1 1–20/3	25–20/1	17 POLES	PROVIDE SUB-FEED LUGS FOR SECTION #2
LF • 208Y/120V, 3ø, 4W WITH GROUND BAR • 225 A MCB • SURFACE MOUNTED • 60 POLES	1–60	12–20/1 1–20/3	20–20/1	23 POLES	PROVIDE SUB-FEED LUGS FOR SECTION #2
LG • 208Y/120V, 3ø, 4W WITH GROUND BAR • 225 A MCB • SURFACE MOUNTED • 60 POLES	1–60	27–20/1 1–20/3	15–20/1	15 POLES	PROVIDE SUB-FEED LUGS FOR SECTION #2
LH • 208Y/120V, 3ø, 4W WITH GROUND BAR • 100 A MLO • SURFACE MOUNTED • 30 POLES	1–30	10–20/1 1–20/3	11–20/1	16 POLES	
LK • 208Y/120V, 3ø, 4W WITH GROUND BAR • 225 A MCB • SURFACE MOUNTED • 42 POLES	1–42	10–20/1 1–50/3 2–20/3 1–25/2 1–30/3	10–20/1	8 POLES	SHUNT TRIP MAIN BREAKER W/ 120V CONTROL
LL • 208Y/120V, 3ø, 4W WITH GROUND BAR • 225 A MLO • SURFACE MOUNTED • 42 POLES	1–42	6–20/1 2–30/3	4–20/1	26 POLES	
LS • 208Y/120V, 3ø, 4W WITH GROUND BAR • 100 A MLO • SURFACE MOUNTED • 30 POLES	1–30	4–20/1 1–70/3 1–20/3	6–20/1	14 POLES	
LXA • 208Y/120V, 3ø, 4W WITH GROUND BAR • 100 A MCB • SURFACE MOUNTED • 30 POLES	1–30	4–20/1 1–60/3 1–20/3	14–20/1	6 POLES	
LXB • 208Y/120V, 3ø, 4W WITH GROUND BAR • 100 A MCB • SURFACE MOUNTED • 30 POLES	1–30	4–20/1 1–60/3 1–20/3	14–20/1	6 POLES	
UPS • 208Y/120V, 3ø, 4W WITH GROUND BAR • 70A MCB • SURFACE MOUNTED • 30 POLES	1–30	20–20/1	4–20/1	6 POLES	
LTA • 208Y/120V, 3ø, 4W WITH GROUND BAR • 60A MLO • SURFACE MOUNTED • 12 POLES • LOAD CENTER	1–12	6–20/1	6–20/1		TELCO CLOSET
LTB • 208Y/120V, 3ø, 4W WITH GROUND BAR • 60A MLO • SURFACE MOUNTED • 12 POLES • LOAD CENTER	1–12	6–20/1	6–20/1		TELCO CLOSET

LIGHTING FIXTURE SCHEDULE

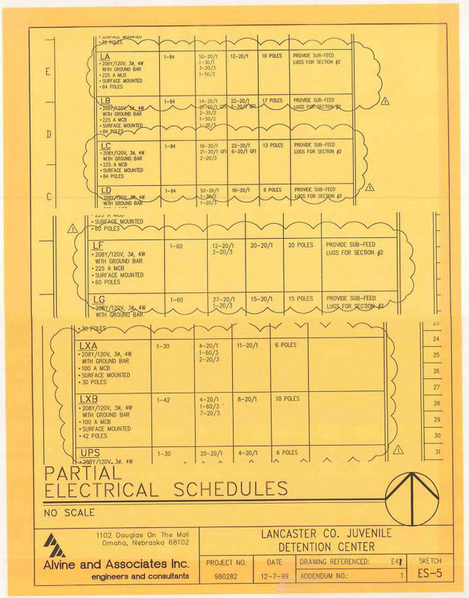
FIXT NO.	MANUFACTURER	CATALOG NO. (NOTE 1)	LAMP DATA QUANTITY & SIZE	TYPE	VOLTS	MOUNTING	DESCRIPTION	REMARKS
1	WILLIAMS	BLG-S-24-3320C-N38-0 -277-DUAL BALLASTS	3-F32 T8	F	277	RECESS GRID	5" GRID PARABOLIC	PRISMATIC LENSE OVERLAY
2	SEE SPEC	SEE SPEC	3-F32 T8	F	277	RECESS GRID	2' X 4' GRID TROFFER	NOTE 2
3	SEE SPEC	SEE SPEC	3-F32 T8	F	277	RECESSED GYPSUM BD.	2' X 4' FLANGE TROFFER	NOTE 2
4	HALO	L4006	1-50 PAR 20	I	120	SURFACE CEILING	TRACK LIGHT	NOTE 3
5	NOT USED							
6	LITHONIA	AF102321205SB	2-F32 T8	F	277	PENDANT	4' INDUSTRIAL	CHAIN HANG W/ PLUG & CORD SET
7	HYDREL	HP.3A4142TPH	1-100W	HPS	277	RECESSED WALL	SECURITY LIGHT	COORDINATE MTG HT W/ ARCH
8	SEE SPEC	SEE SPEC	2-F32 T8	F	277	RECESSED FLANGE	1X4 2 TUBE TROFFER	
9	PRESCOLITE	CF8626-372-HPF	2-26W DTT	F	277	FLUSH CEILING	DOWN LIGHT	
10	KENALL	SSA-4-2-32-EB-1-277-6-1-WL	2-F32 T8	F	277	SURFACE CEILING	14'X4' 2 TUBE MAX. SEC.	
11	KENALL	CC-0-2-32-EB-1-277-6-1-WL	2-F32 T8	F	277	CORNER WALL/CEILING	4' 2 TUBE MAX. SEC.	WET LOCATION
13	METALUX	AV123JDR120EB82GL	2-F32 T8	F	277	SURFACE CEILING	4' 2 TUBE SURFACE WRAP	
14	SEE SPEC	SEE SPEC.	3-F32 T8 W/ DIMMING BALLAST	F	277	RECESSED FLANGE	2X4 3 TUBE PARABOLIC	18 CELL
15	KENALL	SSB-4-1-3-32-EB-1-277-6-1-TN	3-F32 T8, 1 PL7	F	277	RECESS GRID	2' X 4' TROFFER	WITH SILVER PARACUBE LENSE
16	KENALL	SSB-4-0-3-32-EB-1-277-6-1-TN	3-F32 T8, 1 PL7	F	277	SURFACE CEILING	17" X 4' MEDIUM SECURITY	W/NIGHT LIGHT
17	HOLOPHANE	EGP-250MH-20-L-F2	1-250W MH COATED	MH	277	SURFACE CEILING	17" X 4' MAX. SECURITY	W/NITE LT
18	NOT USED					PENDANT	GYM FIXTURE	NOTE 4
19	KENALL	MR17FL-P-MB-32P -2-277-SA	2-32WPL	F	277	SURFACE WALL	LIGHT WELL SCONCE	
20	FAIL-SAFE	XLD UNIV. SRWDUALTWT	INCLUDED	LED	277	UNIVERSAL	EXIT LIGHT	1 FACE
21	FAIL-SAFE	XLD UNIV. DRWDUALTWT	INCLUDED	LED	277	UNIVERSAL	EXIT LIGHT	2 FACE
22	SEE SPEC.	SEE SPEC.	2-40W BIAX	F	277	RECESS GRID	2' X 2' TROFFER	NOTE 2.
23	SEE SPEC.	SEE SPEC.	2-F32T8	F	277	RECESS GRID	1' X 4' TROFFER	NOTE 2.
24	ALKCO		2-F32T8	F	120	UNDER CABINET	TASK LIGHT	
25	KENALL	SSD-4-0-2-26D-EB-1-277-4-1-WL	2-15W	F	120	SURFACE CEILING	1' X 1' MAX. SECURITY	WET LOCATION
26	SEE SPECIFICATIONS	SEE SPECIFICATIONS	4-F32 T8	F	277	SURFACE CEILING	2' X 4' SURFACE TROFFER	
27	KENALL	SH6-48-2-32-EB-277-156	2-F32 T8	F	277	SURFACE WALL	OVER MIRROR	
28	KENALL	H1212L-C-26Q-2-277-SA	2-26WPL	F	277	SURFACE CEILING	SHOWER LIGHT	WET LOCATION
29	NOT USED							
30	SEE SPECIFICATIONS	SEE SPECIFICATIONS	3-F32 T8	F	277	RECESS GRID	2' X 4' TROFFER	NOTE 2.
31	NOT USED							
32	SEE SPECIFICATIONS	SEE SPECIFICATIONS	2-F32 T8	F	277	RECESS GRID	2' X 4' TROFFER	NOTE 2.

SITE LIGHTING FIXTURE SCHEDULE

A	KIM	1A-AR3-250MH-277-BL-P-LS-PRA30-61898/BL-P	250W	MH	277	1 HEAD PER POLE	BLACK FINISH	30' POLE
B	KIM	2B-AR3-250MH-277-BL-P-LS-PRA30-61898/BL-P	250W	MH	277	2 HEAD PER POLE	BLACK FINISH	30' POLE
C	KIM	CFL-70MH277/BL-P	1-70W	MH	277	GROUND FLOOD	BLACK FINISH	
D	KIM	CL3/100MH/SP/F/CM34	1-100W	MH	277	GROUND FLOOD	FLAG SPOT	

NOTES:

1. CONTRACTOR TO VERIFY LIGHT FIXTURE CATALOG NUMBERS & INSTALLATION REQUIREMENTS PRIOR TO ORDERING.
2. PROVIDE WITH 1/8" LEXAN LENSE WITH 1/8" PRISMATIC LENSE OVERLAY. (DUAL LENSE TROFFER)
3. PROVIDE MATCHING TRACK IN LENGTHS AS INDICATED ON THE DRAWINGS. TRACK TO BE COMPLIERE WITH ALL BOXES, CANOPIES, CONNECTORS AND FITTINGS.
4. PROVIDE WITH POWER HOOK ASSEMBLY AND SAFETY CHAINS.



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1102 Douglas On The Mall
Omaha, Nebraska 68102

LANCASTER CO. JUVENILE DETENTION CENTER

PROJECT NO.:	DATE	DRAWING REFERENCED:	EXH	SKETCH
980282	12-7-99	ADDENDUM NO.:	1	ES-5

Sheet E-401 – Electrical Schedules

a. Lighting Fixture Schedule, Light Fixture No. 25: Fixture lamp data is revised to 2-26 watt PL fluorescents.

b. The following lighting fixture manufacturers are considered to be approved substitutes for those specified provided all original design material specifications and performance of the existing specified fixtures are met.

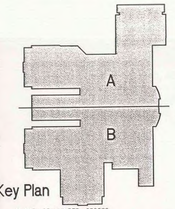
Fixture Type	Alternate Manufacturer
1	Metalux, KW/2, Lithonia
2	
3	
4	Capri, Lithonia
5	
6	Metalux, Daybrite
7	Fail Safe, McPhilben, Kenall
8	
9	Halo, Indy, Lithonia
10	Fail Safe, CD Lighting, Holcor
11	Fail Safe, CD Lighting, Holcor
12	CD Lighting, Lithonia
13	
14	
15	Fail Safe, CD Lighting, Holcor
16	Fail Safe, CD Lighting, Holcor
17	Daybrite, Lithonia
18	
19	Fail Safe, Holcor
20	CD Lighting, Lithonia, Kenall
21	CD Lighting, Lithonia, Kenall
22	
23	
24	Fail Safe, KW/2, Kenall

Fixture Type	Alternate Manufacturer
25	CD Lighting, Lithonia, Holcor
26	
27	CD Lighting, Lithonia, Holcor
28	CD Lighting, Lithonia, Holcor
29	
30	
31	
32	
A	McGraw, Gardco
B	McGraw, Gardco
C	Devine, Gardco, Hydrell
D	C.A.L., Lumec, Hydrell

FLAG NOTES

GENERAL NOTES

INSTALL GREEN INSULATED GROUND WIRE WITH ALL LIGHTING, RECEPTACLE AND EQUIPMENT BRANCH CIRCUITS



Key Plan

ALVINE JOB NUMBER: 980282

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Lancaster Co. Juvenile Detention Center

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DESIGN ENGINEER	ALVINE JOB NO.
CAB	980282
PROJECT ENGINEER	ISSUED
CJW	11/5/99
DRAFTER	REVISION
JMM	

E 401

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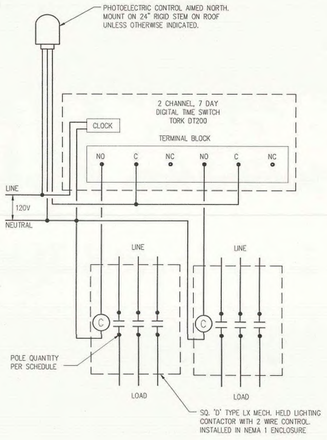
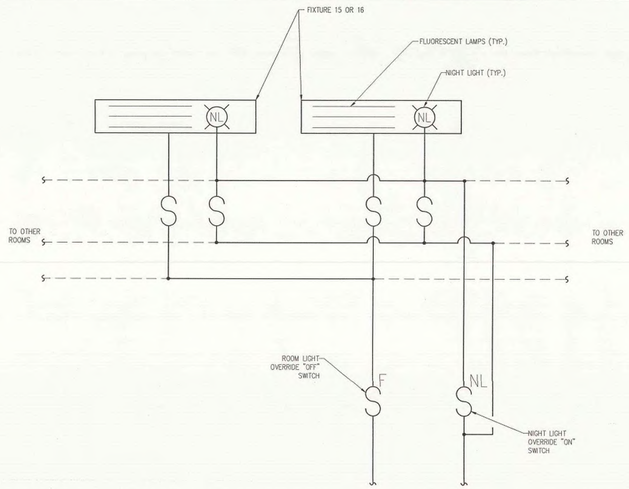


PHOTOELECTRIC CONTROL AND TIME SWITCH DETAIL

1 E500

NO SCALE

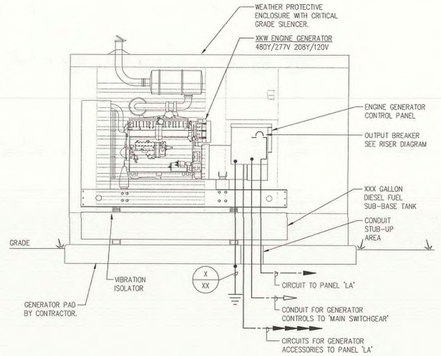


RESIDENT ROOM LIGHT SWITCHING DETAIL

2 E500

SPCSWDC 8-18-95

NO SCALE

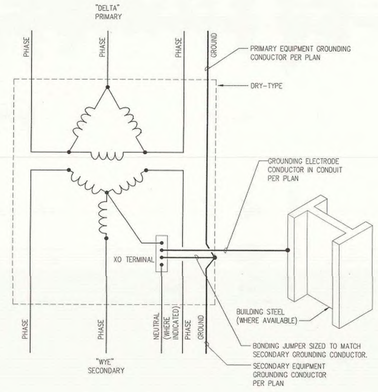


GENERATOR CONNECTION DETAIL

6 E500

DGENCON 4-10-98

NO SCALE

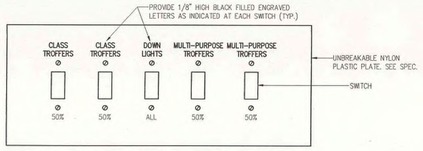


DRY-TYPE TRANSFORMER GROUNDING DETAIL

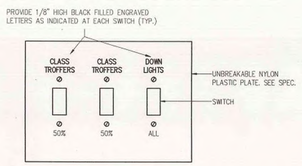
8 E500

DRYTRDC 4-21-98

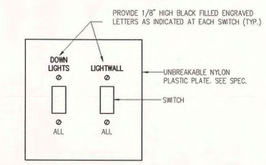
NO SCALE



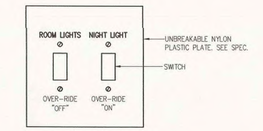
STAFF SECURE-MULTIUSE



TYPICAL POD-MULTIUSE



TYPICAL POD-DAYROOM



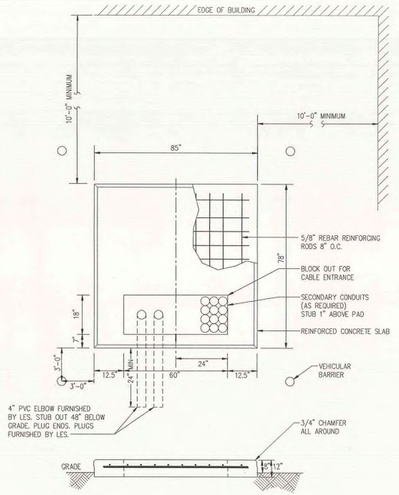
RESIDENT LIGHTING OVER-RIDE SWITCH

SWITCHBANK ELEVATIONS ENARAVINA DETAILS

3 E500

SSWELAE 2-2-98

NO SCALE



NOTES:

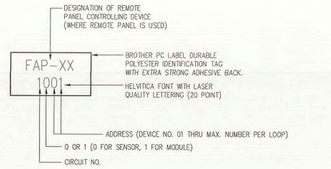
1. MINIMUM COMPACTION UNDER PAD SHALL BE 90% OF MAXIMUM DENSITY OF THE MATERIAL AS DETERMINED BY ASTM STANDARD METHOD D698-78. FROZEN BACKFILL SHALL NOT BE USED.
2. MINIMUM OF 3500 PSI, 28 DAY TEST CONCRETE.
3. FINISH GRADE TO SLOPE AWAY FROM TRANSFORMER PAD AND BUILDING.
4. TOP OF FOUNDATION SHALL BE SMOOTH, LEVEL AND CLEARED OF ALL FRAMING MATERIAL AFTER CONCRETE HARDENS.
5. PAD MUST BE LOCATED A MINIMUM OF 3' FROM ANY GAS METER AND A MINIMUM OF 10' FROM ANY FUEL TANK.
6. VEHICULAR BARRIER(S) SHALL BE 5" ø GALVANIZED STEEL PIPE, 3'-6" ABOVE GRADE MINIMUM. PROVIDE 12" ø CONCRETE BASE TO 4'-6" BELOW GRADE MINIMUM.

LES TRANSFORMER PAD

4 E500

DSESSD 2-6-98

NO SCALE

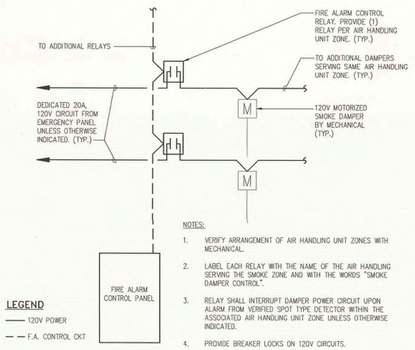


DETECTOR LOCATION MARKER

7 E500

SFDMARK 2-2-98

NO SCALE



LEGEND

— 120V POWER

– – F.A. CONTROL CKT

NOTES:

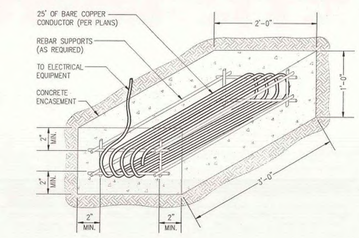
1. VERIFY ARRANGEMENT OF AIR HANDLING UNIT ZONES WITH MECHANICAL.
2. LABEL EACH RELAY WITH THE NAME OF THE AIR HANDLING SERVING THE SMOKE ZONE AND WITH THE WORDS "SMOKE DAMPER CONTROL".
3. RELAY SHALL INTERRUPT DAMPER POWER CIRCUIT UPON ALARM FROM VERIFIED SPOT TYPE DETECTOR WITHIN THE ASSOCIATED AIR HANDLING UNIT ZONE UNLESS OTHERWISE INDICATED.
4. PROVIDE BREAKER LOCKS ON 120V CIRCUITS.

SMOKE DAMPER CONNECTION

8 E500

DSMKDAMP 12-23-97

NO SCALE



CONCRETE ENCASED GROUNDING ELECTRODE DETAIL

9 E500

DCONELEC 1-19-98

NO SCALE

RESIDENT TOILET WIRING DETAIL

10 E500

NO SCALE

INSTALL GREEN INSULATED GROUND WIRE WITH ALL LIGHTING, RECEPTACLE AND EQUIPMENT BRANCH CIRCUITS.

ALVINE JOB NUMBER: 980282

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Sheet E-500 – Electrical Details

a. Delete the detail title for resident toilet wiring Detail No. 10.

Lancaster Co. Juvenile Detention Center

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ELECTRICAL DETAILS

DESIGN ENGINEER	ABCR JOB NO.
CAB	980282
PROJECT ENGINEER	ISSUED
CJW	10/15/99
DRAFTER	REVISION
JMM	

E 500

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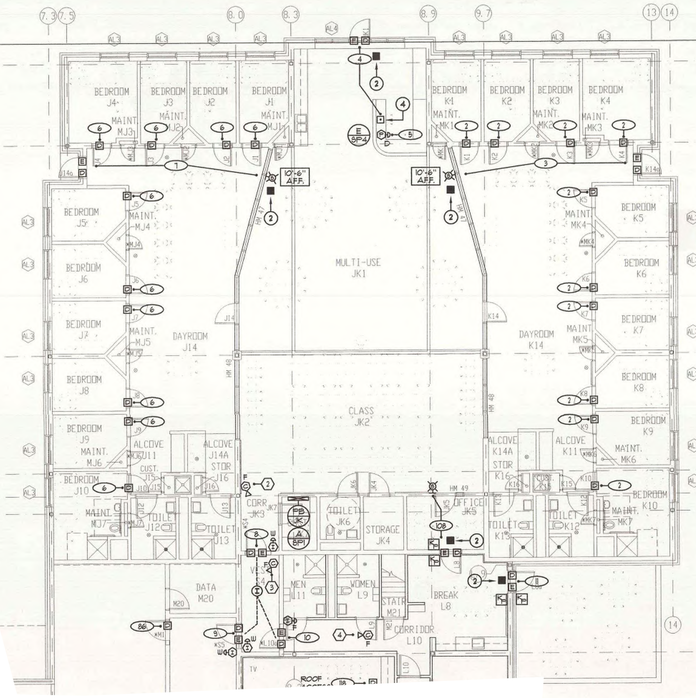
NORTH

PARTIAL FLOOR PLAN - NORTH - SECURITY SYSTEM LAYOUT

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



Refer to Sheet SP2. Maintenance and Delivery Gate Control - North. Revise the reference note to the site plan from C101 to C100, note 16700.A

FUTURE HOUSING UNIT

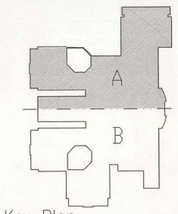
SHEET NOTES:

1. PROVIDE ROUGH-IN FOR FUTURE CAMERA INCLUDING CONDUIT, BOXES AND CABLING TO VSS/ER. PROVIDE BLANK COVERPLATES.
2. KEYPAD AND/OR DOOR LOCK POWER SUPPLY AND CONTROLLER MOUNTED ABOVE CEILING.
3. DURESS ALARM TO BE FED FROM FLOOR BOX PROVIDED BY DIV. 16. SEE ELECTRICAL DRAWING.
4. REMOTE PUSHBUTTON CONTROL STATION BELOW COUNTER. VERIFY EXACT LOCATION WITH ARCH. / OWNER PRIOR TO ROUGH-IN.

Sheet SP2

1. Delete security control point 40. Apply the same symbols as shown for point 40 to new security control points 127 (doors E13, E14, F11 and F12)
2. Delete security control point 45 duress alarm.
3. Add security control point 130 at door location V2 with electric lock, door position switch, intercom station in corridor S5 and call button station in Visiting V2.
4. Security control point 23 revise intercom station to call button station in Visiting V2.
5. Security control point 20 add a pushbutton release for door (note 4) to the Lobby 25 reception desk below counter. Provide 24VR-1/2"C to keypad/door lock power supply at door location. This new switch shall parallel operation of switch in Waiting L1.
6. Provide a new annunciator panel CP-S to be located on the counter of the control desk of Multi-use room JK1. The new annunciator shall be manufactured in compliance with specification 16702 and be manufactured by the same manufacturer of panel CP-I shown on sheet SP4. This new panel shall include the following:
   - A red LED representing each bedroom door location grouped into two groups for security control points 2 and 6. The red LED shall alarm by flashing and sounding an associated tone in response to door opening. The flashing red shall turn solid red when acknowledged which will also silence the tone. See description of acknowledge and reset switches below.
   - An individual maintained square pushbutton switch with yellow LED for each door alarm. LED to activate/deactivate the door alarm LED. The LED on the pushbutton shall illuminate when depressed in the "deactivate" door alarm position.
   - Three momentary contact square pushbutton switches, one for acknowledge, one for reset of the door alarms and a panel lamp test.
   - A sonalert mounted below panel.
   - Nomenclature shall be on the panel identifying the various LED locations, silence, reset and lamp test similar to panel CP-I as shown on sheet SP4. Layout will be approved during shop drawing review.
   - All door monitoring, acknowledge and reset functions are to be controlled via inputs and outputs of the PLC's of DC/A.
   - The new panel shall be mounted in a desktop turret as per detail C/SP4.
   - From the new panel location provide 96#18-1 ½"C. to panel DC/A (PLC's).

Refer to sheets SP2 and SP3. Delete all guardtour reader stations as shown. Add a guardtour reader station at each bedroom of dayrooms A12, B10, B13, C10, D12, E12, F10, J14 and K14, the segregation rooms of dayroom T21 and Holding rooms T16 and T17. (Total of 85). Reader station shall mount on door frame at 48" AFF. Verify location with Owner.



Key Plan

Lancaster Co. Juvenile Detention Facility

SINCLAIR HILLE & Associates Inc
Architects

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PARTIAL FLOOR PLAN – NORTH SECURITY SYSTEM LAYOUT

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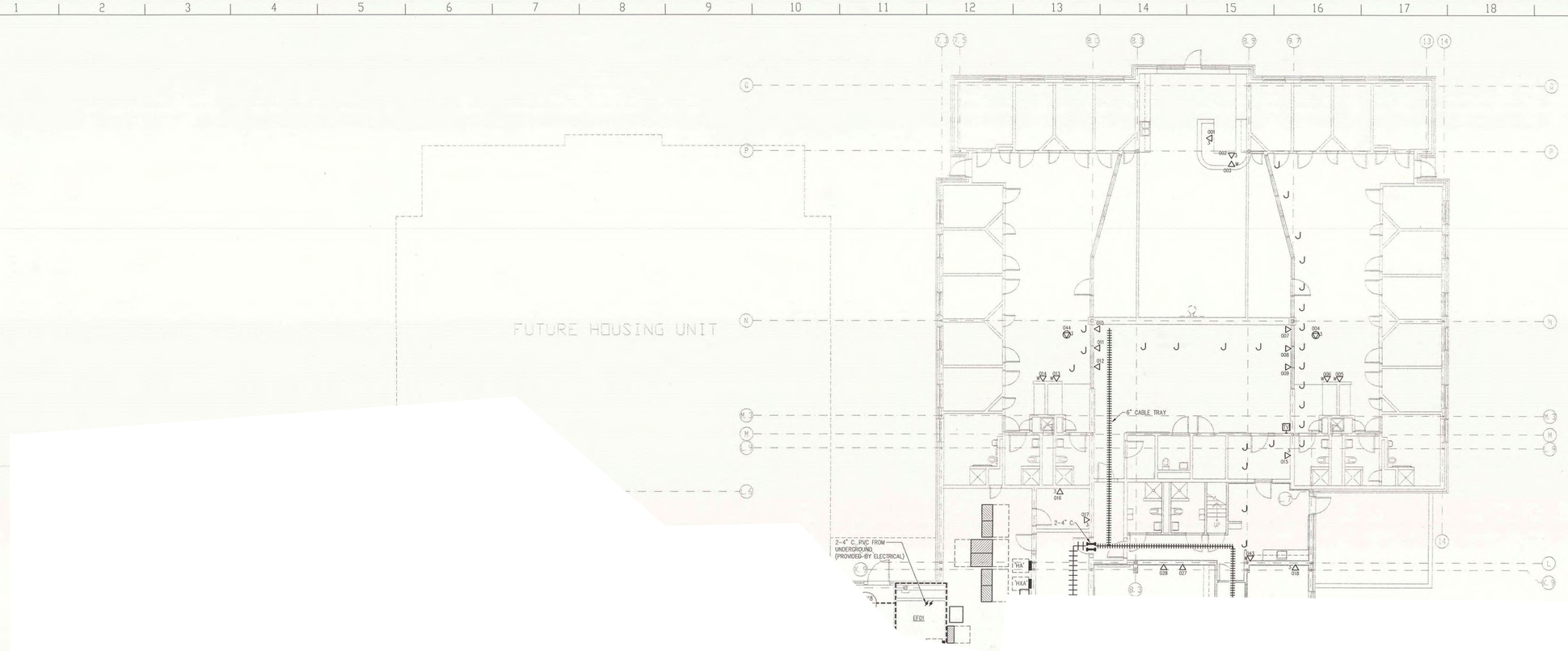
DESIGN ARCH. JH, MH, KG	ARCH. JOB NO. 98065	SP	2
PROJECT ARCH. CB, LK	ISSUED 11/15/99		
INTERN ARCH. DU	REVISION —— ——		

SP2 | PARTIAL FLOOR PLAN – NORTH – SECURITY SYSTEM LAYOUT

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

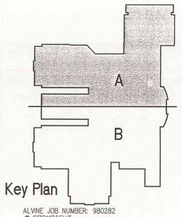


FLAG NOTES

1. COORDINATE MOUNTING LOCATION WITH ELECTRONICS SECURITY CONSULTANT (TYP. 2)

GENERAL NOTES

1. COMMUNICATION OUTLET NUMBER RANGE: 001 - 074



Key Plan

ALVINE JOB NUMBER: 980282

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Lancaster Co. Juvenile Detention Center

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E-2238
REGISTERED
NEBRASKA

First Level Plan - Area A Telecommunications

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DESIGN ENGINEER: DCS	ARCH. JOB NO.: 980282	T	100
PROJECT ENGINEER: CJW	ISSUED: 11/15/99		
DRAFTER: CRD	REVISION:		

A1 FIRST LEVEL PLAN - AREA A - TELECOMMUNICATIONS

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

ADDENDUM #4

Issue Date: 11/17/2017

Lancaster County Bid # 17-282
FOR

Lancaster County Emergency Management Agency Renovation / Relocation

Addenda are instruments issued by the Purchasing Department prior to the date for receipt of offers which will modify or interpret the specification document by addition, deletion, clarifications, or correction. Please acknowledge receipt of this addendum in the space provided in the Attribute Section.

Be advised of the following changes to the specifications and bidding documents:

GENERAL QUESTIONS AND CLARIFICATIONS

ADD 4-1. Section 013100 "Project Management and Coordination".

Question: *Section 013100.1.8.A states that no BIM or CAD files will be made available. The fire sprinkler contractors usually rely on these. Please confirm if CAD drawings are available, if there is a cost or if CAD drawings will not be available under any circumstances.*

Response: CAD drawings will not be available under any circumstances. Trades are welcome to utilize the PDF bid drawings as backgrounds for preparation of shop drawings if necessary.

ADD 4-2. Working Hours.

Question: *Working hours are listed from 7:00am to 5:00pm Monday thru Friday. Standard demolition equipment will be employed on the demolition as required. We assume this standard noise is anticipated by the building occupants and is acceptable during normal working hours. Please confirm.*

Response: Yes, this is anticipated and acceptable during normal working hours.

ADD 4-3. Existing GWB Ceilings and Bulkheads.

Question: *Are the gypsum board ceilings and bulkheads in the clerestory area to be removed?*

Response: Demolition of existing ceilings and bulkheads is only required if it is necessary to complete the work shown in the construction documents. To our knowledge, these GWB finishes are not providing any fire rating. All ratings of existing roofing and structural members are accommodated through spray-applied fireproofing materials.

ADD 4-4. New Clerestory Walls.

Question: *Are the new walls in the clerestory area to be constructed to the bottom of the roof trusses, at approximately 23'-6" AFF?*

Response: As indicated on the wall types shown on A4/G100, the framing for these walls is intended to extend to the bottom of structure. The bottom of structure is in the neighborhood of 23'-6" AFF +/- north of Grid N.

Wall types generally indicate framing to structure with GWB and sound insulation stopping at 6" above finished ceiling. The design intent is for these framing assemblies to be adequately supported and or braced to accommodate deflections of L/360. If Contractor has other means to achieve that without extending the framing up to the 23'-6" AFF elevation, that would acceptable. The south and east walls of Conference 103, south wall of Vestibule 100 and north wall of Office 102 however will still need to extend the full height.

ADD 4-5. Section A13/A300.

Question: *On the east wall, there is one opening that has insulated studwall construction behind the aluminum storefront. Is this the only location where this occurs?*

Response: No. This assembly should occur at all (9) nine window locations that fall in front of the new storm shelter assembly. There are (2) windows on the north wall to Conference 122, (1) window on the north wall to Data 121 and (6) windows on the east wall to EOC 118.

CLARIFICATION: Perimeter insulation is not necessary in the conditions shown on the project.

BID EXTENSION: **The bid has been extended to Wednesday November 29, 2017 at 12:00pm.**

MODIFICATIONS TO THE DRAWINGS

ADD 4-6. Refer to the Master Keynote List on the Cover, keynote 088000.A; Modify the keynote to read as follows: (This modification shall apply to all locations where keynote is found)

088000.A (IG-1) – 1" INSULATING-LAMINATED GLAZING

ADD 4-7. Refer to Sheet A100; The following modifications have been made: This sheet has been revised and replaced as part of this addendum.

- Wall types at the east and south wall of Conference 103 have been changed.
- Wall type at the north wall of Office 102 has been changed.
- Wall types at the south wall of Conference 122 have been changed.
- Wall type at the south wall of Electrical 120 has been changed.
- Sheet Note 15 has been added.
- Note 15 has been added to (9) locations on the plan.

ADD 4-8. Refer to Sheet S300; Detail E8 has been modified to provide additional direction relative to support of the existing CMU wall assembly during construction as well as after installation of new storm wall. Sheet S300 has been revised and replaced as part of this addendum.

ADD 4-9. Refer to Sheet E200; For all raised floor areas (118, 121, 122), NEC article 300 wiring methods shall be used below the floor in these areas.

ADD 4-10. Refer to Sheet E200; Provide three (3) 3" conduits from above accessible ceiling in Copy 106 to above accessible ceiling in Conference 122 for low voltage cabling.

ADD 4-11. Refer to Sheet E400; Electrical Riser Diagram:

- Change "Data 121" label to be "Elec 120".
- Contractor may use 225A enclosed circuit breaker in lieu of 400/3/225/N1 disconnect in ELEC 120.
- Change '225-4T' designation to be '225-4' between 400/3/225/N1 disconnect and ATS-EM.

MODIFICATIONS TO THE SPECIFICATIONS

ADD 4-12. Refer to Section 075216, Article 2.8, Paragraph F.1.c; Modify this to read as follows:

c. National Gypsum Company; Gold Bond eXP Extended Exposure Sheathing or Dexcel FA Glass Mat Roof Board.

ADD 4-13. Refer to Section 087100 "Door Hardware", Hardware Set 1.0; Make the following modifications:

- Position switch is to be "By Security System Supplier"
- Motion sensor is to be "By Security System Supplier"

ADD 4-14. Refer to Section 087100 "Door Hardware", Hardware Set 4.0; Make the following modifications:

- Position switch is to be "By Security System Supplier"
- Motion sensor is to be "By Security System Supplier"

ADD 4-15. Refer to Section 087100 "Door Hardware", Hardware Set 6.0; Make the following modifications:

- Position switch is to be "By Security System Supplier"
- Change the quantity of position switches to "2"

ADD 4-16. Refer to Section 087100 "Door Hardware", Hardware Sets 11.0, 13.0 and 14.0; Make the following modifications:

- Eliminate the Perimeter Seal/Stop from these sets.

ADD 4-17. Refer to Section 088000 "Glazing", Article 2.4, Paragraph D. Delete this paragraph in its entirety. There is no ceramic-coated spandrel glass on the project.

ADD 4-18. Refer to Section 088000 "Glazing", Articles 2.5, 2.6, 2.7 and 2.8; Change the number of these articles to 2.6, 2.7, 2.8 and 2.9 respectively. We will be adding a new article 2.5 in front of these originally issued articles.

ADD 4-19. Refer to Section 088000 "Glazing". Add Article 2.5 LAMINATED GLASS as follows:

2.5 LAMINATED GLASS

A. Laminated Glass: ASTM C 1172. Use materials that have a proven record of no tendency to bubble, discolor, or lose physical and mechanical properties after fabrication and installation.

1. Construction: Laminate glass with polyvinyl butyral interlayer to comply with interlayer manufacturer's written instructions.
2. Interlayer Thickness: Provide thickness not less than that indicated and as needed to comply with requirements.
3. Interlayer Color: Clear unless otherwise indicated.

ADD 4-20. Refer to Section 088000 "Glazing", Article 3.8. Replace this article with the following:

3.8 INSULATING-LAMINATED-GLASS SCHEDULE

A. Glass Type IG-1 (**088000.A**): Tinted, insulating laminated glass.

1. Basis-of-Design Product: Insulite Glass Company match to existing building.
2. Overall Unit Thickness: 1-1/8 inch.
3. Minimum Thickness of Outdoor Lite: 3/16 inch (5 mm).
4. Outdoor Lite: Tinted heat-strengthened float glass.
5. Tint Color: Gray.
6. Interspace Content: Air.
7. Indoor Lite: Clear laminated glass with two plies of fully tempered float glass.

a. Minimum Thickness of Each Glass Ply: 1/4 inch (6 mm).
b. Interlayer Thickness: 0.060 inch.

ADD 4-21. Refer to Section 096813 "Tile Carpeting" Paragraph 2.3.A.2; Change the collection to StaticSmart ESD carpet tile.

ADD 4-22. Refer to Section 096813 "Tile Carpeting" Paragraph 2.3.C; modify to read as follows:

C. Installation Method: Quarter Turn. Apply adhesive by Julie Industries, conductive ESD releasable adhesive (refer to Static Smart installation guide)

ADD 4-23. Refer to Section 096900 "Access Flooring", Paragraph 2.1.A.2; Change the ultimate loads from 2000 lbf to 1800 lbf.

ADD 4-24. Refer to Section 096900 "Access Flooring", Paragraph 2.1.A.5; Change the pedestal axial load test from 6000 lbf to 5000 lbf.

ADD 4-25. Refer to Section 096900 "Access Flooring", Paragraph 2.2.A.1.a.2; add "Tec Crete 1250 Product" after Haworth, Inc.

ADD 4-26. Refer to Section 096900 "Access Flooring", Paragraph 2.2.B.6; change the floor finish to read as follows:

Floor Finish: Tile carpeting system. Carpet tile as specified in Section 096813 (CPT-3)

ADD 4-27. Refer to Section 096900 "Access Flooring", Paragraph 2.4.A; Delete this paragraph in its entirety.

ADD 4-28. Refer to Section 096900 "Access Flooring", Paragraph 3.3.B; Modify the paragraph to read as follows:

Adhesive Attachment of Pedestals: Attach pedestals to subfloor with Sealbond 95 adhesive to achieve specified overturning moment load of 1000 in/lbs.

ADD 4-29. Refer to Section 263213 "Packaged Engine Generators", Article 2.17, Paragraph B; Add the following:

10. Automatic transfer switches shall be delayed neutral transition type.

ARCHITECTURAL PRIOR APPROVALS / SUBSTITUTIONS

ADD 4-30. The manufacturers listed herein will be considered approved for bidding. However, the proposed substitution must meet the intent of the specifications and will be subject to shop submittal approval during construction. Burden of Proof is on Proposer. Bidders shall bear all responsibility for coordinating and performing related changes in the Work necessitated by such substitution and include such costs in the Bid:

Specification Section	Manufacturer / Proposed Product
a. 075216 – Styrene-Butadiene-Styrene (SBS)	National Gypsum / Dexcel FA

MECHANICAL PRIOR APPROVALS / SUBSTITUTIONS

ADD 4-31. The manufacturers listed herein will be considered approved for bidding. However, the proposed substitution must meet the intent of the specifications and will be subject to shop submittal approval during construction. Burden of Proof is on Proposer. Bidders shall bear all responsibility for coordinating and performing related changes in the Work necessitated by such substitution and include such costs in the Bid:

Proposed Equipment	Manufacturer
a. 230960 – Variable Frequency Drives	Emerson
b. 238126 – Split-System Air-Conditioning Units	Trane
c. 238127 – Variable Refrigerant Flow System	Trane

ELECTRICAL PRIOR APPROVALS / SUBSTITUTIONS

ADD 4-32. The manufacturers listed herein will be considered approved for bidding. However, the proposed substitution must meet the intent of the specifications and will be subject to shop submittal approval during construction. Burden of Proof is on Proposer. Bidders shall bear all responsibility for coordinating and performing related changes in the Work necessitated by such substitution and include such costs in the Bid:

Proposed Equipment / Fixture	Manufacturer
a. 263213 – Packaged Engine Generators	MTU Generac
b. 271500 – Communication Cabling Systems	Leviton/Berktek

ATTACHMENTS

- Revised Sheet A100 (1 page)
- Revised Sheet S300 (1 page)

End of Addendum #4

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KEYNOTE LEGEND

033000.F	1'-0" WIDE CONCRETE SITE WALL – REFER TO STRUCTURAL FOR REINFORCING REQUIREMENTS
061053.A2	PROVIDE BLOCKING IN WALL AS REQUIRED FOR MOUNTING OF OWNER PROVIDED TELEVISION MOUNT
061053.A3	PROVIDE BLOCKING IN WALL AS REQUIRED FOR MOUNTING OF OWNER PROVIDED VISUAL DISPLAY BOARD – COORDINATE EXTENT OF BLOCKING WITH OWNER PRIOR TO INSTALLATION OF GWB – REFER TO SHEET A900 FOR ANTICIPATED CONFIGURATION AND EXTENT OF VISUAL DISPLAY BOARDS FOR COORDINATION OF BLOCKING REQUIREMENTS AND ITEMS INTENDED TO BE INSTALLED BY THE CONTRACTOR
061053.A4	PROVIDE BLOCKING IN WALL AS REQUIRED FOR MOUNTING OF OWNER PROVIDED FIXED PROJECTION SCREEN – COORDINATE EXTENT OF BLOCKING WITH OWNER PRIOR TO INSTALLATION OF GWB – REFER TO SHEET A900
062023.C	ADJUSTABLE SHELVING – PROVIDE 8'-0" LONG SURFACE MOUNTED ADJUSTABLE SHELVING STANDARDS AT 24" O.C. WITH BOTTOM MOUNTED AT 2'-0" AFF FOR SUPPORT OF 24" DEEP WOOD SHELVING – PROVIDE (6) ROWS OF SHELVING WITH ASSOCIATED SUPPORT BRACKETS – SHELVING TO BE FABRICATED FROM 5/8" THICK MDF WITH A 1x2 POPLAR EDGE AT FACE AND ENDS – PAINT SHELVING – PROVIDE SOLID BLOCKING IN WALL AS REQUIRED FOR PROPER ANCHORAGE OF SHELVING STANDARDS
081113.C	THRESHOLD
088000.A	(IG-1) – 1" INSULATING-LAMINATED GLAZING
102800.A	TOILET TISSUE DISPENSER – TYPICAL AT ALL TOILETS
102800.B	GRAB BAR – 42" LENGTH
102800.B2	GRAB BAR – 36" LENGTH
102800.C	FRAMELESS MIRROR – 18x36
102800.D	SOAP DISPENSER – PROVIDED AND INSTALLED BY OWNER
102800.E	WALL MOUNTED PAPER TOWEL DISPENSER
102800.F	WASTE RECEPTACLE – PROVIDED AND INSTALLED BY OWNER
102800.G	SHOWER CURTAIN ROD AND CURTAIN
102800.H	TOWEL BAR – 24" LENGTH
102800.J	ROBE HOOK
102800.K	FOLD-UP SHOWER SEAT
102800.L	MOP AND BROOM HOLDER RACK
123661.A	1/2" THICK SOLID SURFACE WINDOW SILL WITH 3/8" OVERHANG FROM FACE OF WALL TYPICAL – RADIUS EXPOSED EDGE (SS-1)
224000.A	BOTTLE FILLING STATION – REFER TO MECHANICAL
224000.B	MOP SERVICE BASIN – REFER TO MECHANICAL
224000.C	FLOOR DRAIN – REFER TO MECHANICAL
260500.A	IN-FLOOR ELECTRICAL DEVICE

SHEET A100 SHEET SPECIFIC NOTES

NOTE 1 CMU INFILL REQUIRED WHERE EXISTING STRUCTURAL STEEL ROOF BEAM HAS BEEN REMOVED – INFILL 8" CMU UP TO ELEVATION 115'-4" TO MATCH ADJACENT EXISTING CONDITIONS.

NOTE 3 PROVIDE ONE GROMMET IN COUNTERTOP AT EACH KNEE SPACE (THREE TOTAL)

NOTE 4 CONTRACTOR SHALL PROVIDE AND INSTALL WOOD BLOCKING IN WALL AS REQUIRED FOR WALL MOUNTED TELEVISION. REFER TO SHEET A900 FOR TELEVISION INFORMATION. REFER TO ELECTRICAL FOR MOUNTING HEIGHTS

NOTE 5 ADA-COMPLIANT SHOWER ENCLOSURE WITH THREE GRAB BARS AND SHOWER CURTAIN ROD - REFER TO MECHANICAL. VERIFY FRAMING DIMENSIONS WITH SHOWER ENCLOSURE

NOTE 6 DASHED LINES REPRESENT ADA DOOR CLEAR FLOOR AREA (60" L x 48" W)

NOTE 7 DASHED LINES REPRESENT ADA DOOR CLEAR FLOOR AREA (48" L x 36" W)

NOTE 8 DASHED LINES REPRESENT ADA SHOWER COMPARTMENT CLEAR FLOOR AREA (60" L x 30" W)

NOTE 9 WIDTH OF THRESHOLD AS REQUIRED TO COVER INSULATION BELOW AND OVERLAP CONCRETE SLAB AT MECHANICAL 119

NOTE 10 CONTROL POINT FOR LAYOUT OF RAISED FLOOR ASSEMBLY

NOTE 11 REINSTALL SALVAGED CURTAINWALL FRAMING ASSEMBLY BACK INTO EXISTING OPENING.

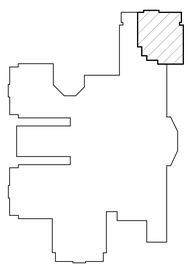
NOTE 12 RECONSTRUCT NEW PARTIAL HEIGHT, FULLY GROUTED CMU AND REINSTALL SALVAGED PRECAST VENEER AT SAME LOCATION WHERE REMOVED FOR ACCESS TO CONSTRUCTION OPERATIONS.

NOTE 13 PATCH EXISTING BRICK VENEER WHERE PARTIAL HEIGHT WALL WAS REMOVED DURING DEMOLITION WITH SALVAGED BRICK FROM DEMOLISHED WALL ASSEMBLY. TOOTH BRICK INTO EXISTING COURSING.

NOTE 14 EDGE OF MECHANICAL ROOM SLAB TO ALIGN WITH INSIDE FACE OF NEW CMU WALL.

NOTE 15 REFER TO A13/A300 FOR STUD INFILL BETWEEN NEW CMU STORM SHELTER WALL AND EXISTING STOREFRONT FRAMING.

VESTIBULE 100 · STORAGE 101 · CONFERENCE 103 · OFFICE 102 · CORRIDOR 105 · COPY 106 · OFFICE 104 · DAYROOM J14 · STORAGE 108 · OFFICE 107 · QUIET 110 · BREAK 109 · SHOWER 111 · LOCKERS 112 · WORKROOM 113 · CORRIDOR JK3 · CORRIDOR 114 · MEN 116 · WOMEN 117 · CUSTODIAL 115 · MECHANICAL M1 · COMM. M22 · DATA 121 · CONFERENCE 122 · MECHANICAL 119 · ELECTRICAL 120 · EMERGENCY OPERATIONS CENTER 118 · BREAK L8



PROJECT KEY PLAN

A1	FLOOR PLAN
SCALE:	1/4" = 1'-0"

DESIGN ARCHITECT: David E. Quade
PROJECT ARCHITEC: Dwight Ashley
DRAWN BY: DEQ
CHECKED BY: DEQ

REVISIONS	
ADD #4	11/17/2017

November 3, 2017

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11/17/2017 11:27:15 AM

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morrissey engineering inc
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T: 402 476 7331 F: 402 476 8341

Lancaster County
Emergency Management Relocation / Renovation

COUNTY BID #	17-282
SHA PROJECT #	17004

A100

Floor Plan

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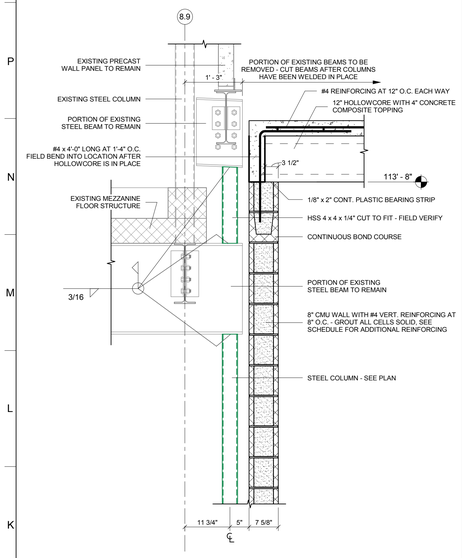
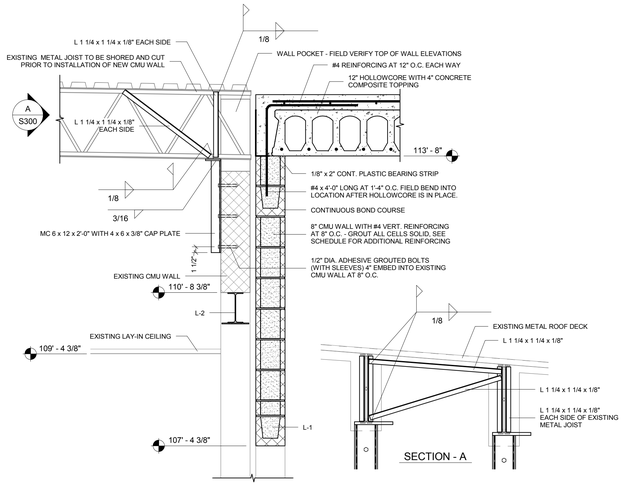


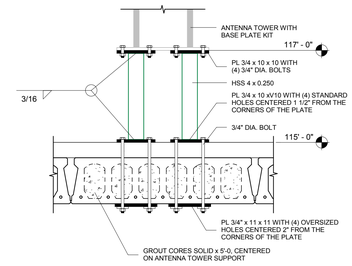
J1 EXISTING BEAM CONNECTION

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



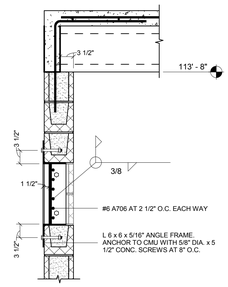
J4 12" HOLLOWCORE AT 8" CMU WALL

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



N9 ANTENNA SUPPORT DETAIL

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



J9 PENETRATION REINFORCING

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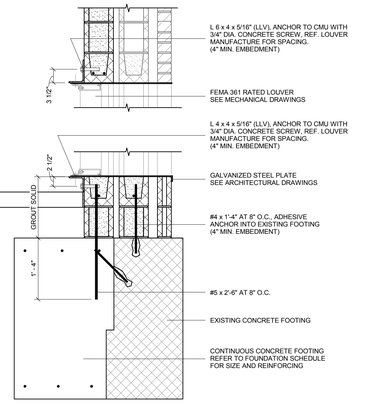
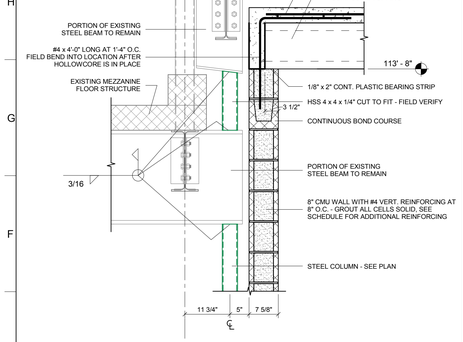


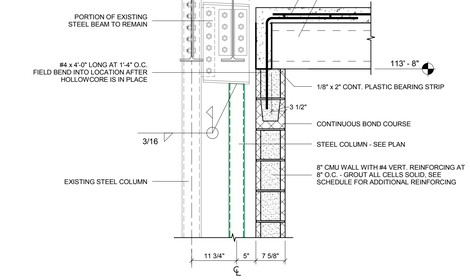
J12 LOUVER ATTACHEMENT AT SILL / HEAD

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



E1 EXISTING BEAM CONNECTION

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



E4 EXISTING BEAM CONNECTION

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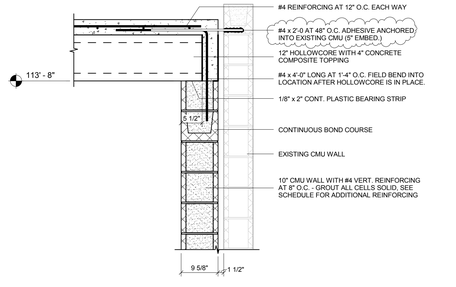
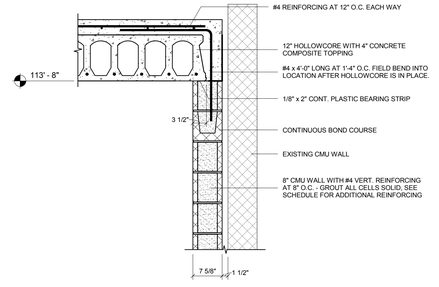


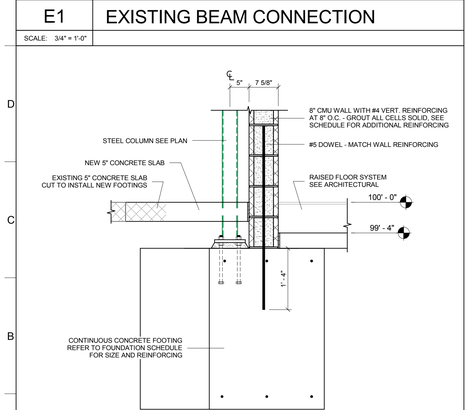
E8 12" HOLLOWCORE AT 10" CMU WALL

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



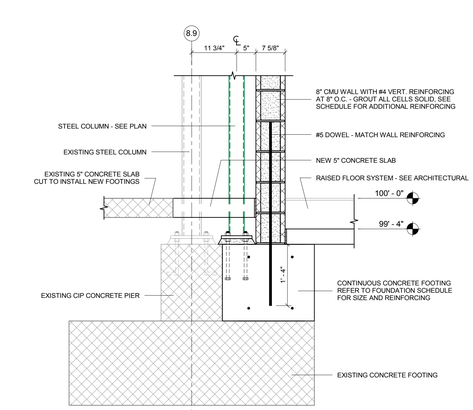
E12 12" HOLLOWCORE AT 8" CMU WALL

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



A1 CONCRETE FOOTING AT 8" CMU WALL

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



A4 CONCRETE FOOTING AT 8" CMU WALL

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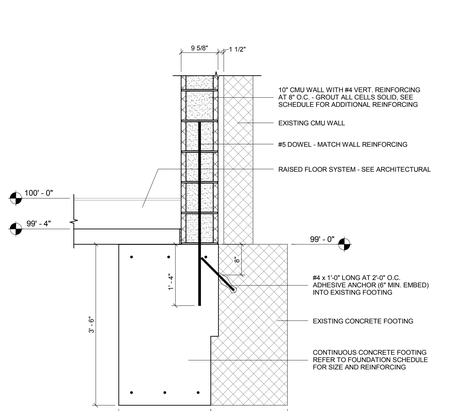
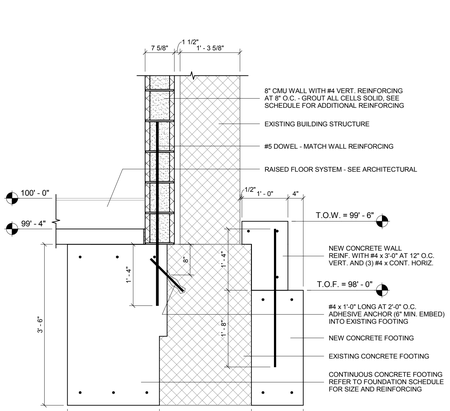


A8 CONCRETE FOOTING AT 10" CMU WALL

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



A12 CONCRETE FOOTING AT 8" CMU WALL

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

REVISIONS:	
ADD #4: 11/17/2017	

DESIGN ARCHITECT:
PROJECT ARCHITECT:
DRAWN BY:
ISSUED: November 3, 2017

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Lancaster County
Emergency Management Relocation / Renovation

SINCLAIR hille architects
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STRUCTURAL DETAILS

COUNTY BID #	17-282
SHA PROJECT #	17004

S300

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ADDENDUM #5

Issue Date: 11/27/2017

Lancaster County Bid # 17-282
FOR

Lancaster County Emergency Management Agency Renovation / Relocation

Addenda are instruments issued by the Purchasing Department prior to the date for receipt of offers which will modify or interpret the specification document by addition, deletion, clarifications, or correction. Please acknowledge receipt of this addendum in the space provided in the Attribute Section.

Be advised of the following changes to the specifications and bidding documents:

ELECTRICAL PRIOR APPROVALS / SUBSTITUTIONS

ADD 4-1. The following substitutions have NOT been approved for use on this Project:

a. 263213 – Packaged Engine Generators (natural gas) MTU

Reason: **The project is to utilize a diesel generator and NOT a natural gas generator. Under Addendum #4, MTU was approved as a substitution. That approval is still valid as it relates to a diesel generator. The natural gas generator however is NOT approved.**

ATTACHMENTS

- None

End of Addendum #5

INSURANCE CLAUSE FOR ALL CITY OF LINCOLN, LANCASTER COUNTY AND PUBLIC BUILDING COMMISSION CONTRACTS

Insurance coverage on this Contract will be required for the entities selected below
☐ City of Lincoln ☒ Lancaster County ☐ Public Building Commission

Vendors must provide coverage & documents related to the items with a check mark in Sections 1 – 1.9.
This includes proof of coverage and waivers as required below.
All Vendors must comply with Sections 2-8.

THE REQUIREMENTS HEREIN APPLY TO CONTRACTS TO BE ISSUED BY THE CITY OF LINCOLN, LANCASTER COUNTY, AND THE LINCOLN-LANCASTER COUNTY PUBLIC BUILDING COMMISSION. FOR PURPOSES OF CERTIFICATES, ENDORSEMENTS AND OTHER PROOF REQUIRED HEREIN, ONLY INCLUDE THE ENTITY ISSUING THE CONTRACT.

FAILURE OF THE APPROPRIATE ENTITY (CITY, COUNTY, OR PUBLIC BUILDING COMMISSION) TO OBJECT TO THE FORM OF THE CERTIFICATE OR ENDORSEMENT OR TO DEMAND SUCH PROOF AS IS REQUIRED HEREIN SHALL NOT CONSTITUTE A WAIVER OF ANY OF THE INSURANCE REQUIREMENTS SET FORTH BELOW.

Insurance; Coverage Information

The Contractor shall, prior to beginning work, provide proof of insurance coverage in a form satisfactory to the City/County/PBC, which shall not withhold approval unreasonably. The coverages and minimum levels required by this Contract are set forth below and shall be in effect for all times that work is being done pursuant to this Contract. No work on the Project or pursuant to this Contract shall begin until all insurance obligations herein are met to the satisfaction of the City/County/PBC, which shall not unreasonably withhold approval. Self-insurance shall not be permitted unless consent is given by the City/County/PBC prior to execution of the Contract and may require submission of financial information for analysis. Deductible levels shall be provided in writing from the Contractor's insurer and will be no more than $25,000 per occurrence or as may be approved by the City or County as appropriate. Said insurance shall be written on an **OCCURRENCE** basis, and shall be **PRIMARY, with any insurance coverage maintained by the City/County/PBC being secondary or excess.**

Certificates

The Contractor shall provide certificates of insurance and such other proof, such as endorsements, as may be acceptable to the City or County (as appropriate) evidencing compliance with these requirements. The Contractor shall provide a Certificate of Insurance demonstrating the coverage required herein and the necessary endorsements or other proof and waivers described herein and below before being permitted to begin the work or project pursuant to this Contract.

☒ **1. Commercial General Liability**

The Contractor shall provide proof of Commercial General Liability Insurance with a minimum limit of not less than $1,000,000 each occurrence and $2,000,000 aggregate. These minimum limits can be met by primary and umbrella liability policies. Coverage shall include: Premises-Operations, Products/ Completed Operations, Contractual, Broad Form Property Damage, and Personal Injury. Such coverage shall be endorsed for the general aggregate to be on a **PER PROJECT** basis, and the Contractor shall provide an additional insured endorsement acceptable to the City/County/PBC. The required insurance must include coverage for all projects and operations of Contractor or similar language that meets the approval of the City/County/PBC, which approval shall not be unreasonably withheld.

☒ **1.1 Additional Insured (Requires an Endorsement Form)**

All Contractors shall provide an Additional Insured Endorsement form or other proof showing the City/County/PBC as additional insured for commercial general liability, auto liability and such other coverages as may be required by the City/County/PBC. The form or other proof shall be as is acceptable to the City/County Attorney.

☒ **1.2 Automobile Liability**

The Contractor shall provide proof of Automobile Liability coverage, which shall include: Owned, Hired and Non-Owned. Bodily Injury and Property Damage Combined Single Limit shall be at least $1,000,000 Per Accident.

☐ **1.3 Garage Keepers / Garage Liability**

The Contractor shall provide garage insurance, if required. Coverage shall include Garage Liability and Garage Keepers on a Direct Primary Basis, including Auto Physical Damage, with limits of not less than $1,000,000 each accident Bodily Injury and Property Damage combined liability and Actual Cash Value auto physical damage. Coverage symbol(s) 30 and 21 shall be provided, where applicable.

☒ **1.4 Workers' Compensation; Employers' Liability**

The Contractor shall provide proof of workers' compensation insurance of not less than minimum statutory requirements under the laws of the State of Nebraska and any other applicable State. Employers' Liability coverage with limits of not less than $500,000 each accident or injury shall be included. The Contractor shall provide the City/County/PBC with an endorsement for waiver of subrogation or other proof of such waiver as may be acceptable to the City or County. The Contractor shall also be responsible for ensuring that all subcontractors have workers' compensation insurance for their employees before and during the time any work is done pursuant to this Contract.

☒ **1.5 Builder's Risk Insurance**

The Contractor shall purchase and maintain builder's risk property insurance for all sites upon which construction is occurring as provided by Contract and all storage sites where equipment, materials, and supplies of any kind purchased pursuant to the Contract are being held or stored unless the Contractor receives notice that the City/County/PBC has obtained a builder's risk policy for itself. Except to the extent recoverable by Contractor from another subcontractor, deductibles shall be the responsibility of the Contractor. This coverage is required whenever the work under contract involves construction or repair of a building structure or bridge.

☐ **1.5.1 Waiver of Builder's Risk Insurance Carrier's Subrogation Rights**

The Contractor and its subcontractor(s) waive all rights of action and subrogation that the insurance company providing the builder's risk policy may have against each of them and/or the City/County/PBC, Architect, and the officers, agents and employees of any of them, for all claims, damages, injuries and losses, to the extent covered by such property insurance. Such waiver of subrogation shall be effective for such persons even though such persons would otherwise have a duty of indemnification or contribution, contractual or otherwise, and even though such persons did not pay the insurance premium directly or indirectly, and whether or not such persons had an insurable interest in any property damaged. The Contractor or subcontractor shall provide proof of such waiver.

☐ **1.6 Pollution Liability**

Contractors shall provide proof of pollution liability insurance arising out of all operations of the Contractors and subcontractors, due to discharge, dispersal, release, or escape of contaminants or pollutants into or upon land, the atmosphere or any watercourse or body of water with bodily injury and property damage limits of not less than $1,000,000 per occurrence and $2,000,000 annual aggregate for:

1) Bodily injury, sickness, disease, mental anguish or shock sustained by any person, including death;

2) Property damage including physical injury to or destruction of tangible property including the resulting loss of use thereof, clean-up costs, and the loss of use of tangible property that has not been physically injured or destroyed;

3)Defense including loss adjustment costs, charges and expenses incurred in the investigation, adjustment or defense of claims for such compensatory damages;

4) Definition of pollution conditions shall include asbestos, lead, and mold so that these risks are covered if caused by Contractor/successful candidate's work or operations.

5) Coverage is required on an occurrence form.

☐ **1.7 Errors and Omissions; Professional Liability**

Errors and Omissions or Professional Liability insurance, as may be required, covering damages arising out of negligent acts, errors, or omissions committed by Contractor in the performance of this Contract, with a liability limit of not less than $1,000,000 each claim. Contractor shall maintain this policy for a minimum of two (2) years after completion of the work or shall arrange for a two year extended discovery (tail) provision if the policy is not renewed. The intent of this policy is to provide coverage for claims arising out of the performance of professional Services under this contract and caused by any error, omission, breach or negligent act, including infringement of intellectual property (except patent and trade secret) of the Contractor. This coverage is required whenever the Contractor or service provider is required to be certified, licensed or registered by a regulatory entity and/or where the provider's judgment in planning and design could result in economic loss to City/County/PBC.

☐ **1.8 Railroad Contractual Liability Insurance**

If work is to be performed within 50 feet of any railroad property and affecting any railroad bridge or trestle, tracks, road beds, tunnel, underpass or railroad crossing, the Contractor must provide proof acceptable to the City or County that any exception for such work in the Contractor's commercial general liability policy has been removed or deleted.

☐ **1.8.1 Railroad Protective Liability**

If work is to be performed within 50 feet of any railroad property and affecting any railroad bridge or trestle, tracks, road beds, tunnel, underpass or crossing or otherwise required by the Special Provisions or applicable requirements of an affected railroad, the Contractor shall provide Railroad Protective Liability Insurance naming the affected railroad/s as insured with minimum limits for bodily injury and property damage of $2,000,000 per occurrence, $6,000,000 aggregate, or such other limits as required in the Special Provisions or by the affected railroad. The original of the policy shall be furnished to the railroad and a certified copy of the same furnished to the City/County/PBC Purchasing Department prior to any related construction or entry upon railroad premises by the Contractor or for work related to the Contract.

☐ **1.9 Cyber Insurance**

The Contractor shall maintain network risk and cyber liability coverage (including coverage for unauthorized access, failure of security, breach of privacy perils, as well at notification costs and regulatory defense) in an amount of not less than $1,000,000. Such insurance shall be maintained in force at all times during the term of the Contract and for a period of two years thereafter for services completed during the term of the Contract.

2. Cancellation Notice

All Contractors shall include an endorsement to provide for at least thirty (30) days' firm written notice in the event of cancellation during the term of the Contract and during the period of any required continuing coverages. The Contractor shall provide, prior to expiration of the policies, certificates and endorsement forms evidencing renewal insurance coverages. The parties agree that the failure of City/County/PBC to object to the form of a certificate and/or additional insured endorsement or endorsement forms provided shall not constitute a waiver of this requirement.

3. Risk of Loss

Except to the extent covered by the builder's risk insurance, the Contractor shall have the sole responsibility for the proper storage and protection of, and assumes all risk of loss of, any subcontractor's Work and tools, materials, equipment, supplies, facilities, offices and other property at or off the Project site. The Contractor shall be solely responsible for ensuring each subcontractor shall take every reasonable precaution in the protection of all structures, streets, sidewalks, materials and work of other subcontractors. Contractor shall protect its Work from damage by the elements or by other trades working in the area.

4. Umbrella or Excess Liability

The Contractor may use an Umbrella, Excess Liability, or similar coverage to supplement the primary insurance stated above in order to meet or exceed the minimum coverage levels required by this Contract.

5. Minimum Scope of Insurance

All Liability Insurance policies shall be written on an "Occurrence" basis only. All insurance coverage are to be placed with insurers authorized to do business in the State of Nebraska and must be placed with an insurer that has an A.M. Best's Rating of no less than A:VII unless specific approval has been granted otherwise.

6. Indemnification

To the fullest extent permitted by law the Contractor shall indemnify, defend, and hold harmless the Owner, its elected officials, officers, employees, agents, consultants, and employees of any of them from and against claims, damages, losses and expenses, including but not limited to attorney fees, arising out of or resulting from performance of the Work, provided that such claim, damage, loss or expense is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible or intangible property, including the Work itself, but only to the extent caused by the negligent, wrongful, or intentional acts or omissions of the Contractor, a subcontractor, anyone directly or indirectly employed by them or anyone for whose acts they may be liable, regardless of whether or not such claim, damage, loss

or expense is caused in part by the negligence of a party indemnified hereunder. In the event the claim, damage, loss or expense is caused in part by the negligence of a party indemnified hereunder, the indemnification by the Contractor shall be prorated based on the extent of the liability of the party indemnified hereunder. Such obligation shall not be construed to negate, abridge, or reduce obligations of indemnity which would otherwise exist as to a party or person described in this Section. Nothing herein shall be construed to be a waiver of sovereign immunity by the Owner.

7. Reservation of Rights

The City/County/PBC reserves the right to require a higher limit of insurance or additional coverages when the City/County/PBC determines that a higher limit or additional coverage is required to protect the City/County/PBC or the interests of the public. Such changes in limits or coverages shall be eligible for a change order or amendment to the Contract.

8. Sovereign Immunity

Nothing contained in this clause or other clauses of this Contract shall be construed to waive the Sovereign Immunity of the City/County/PBC.

9. Further Contact

For further information or questions concerning coverage or acceptable forms, Contractors may contact the Purchasing Division or the department that issued the bid or the request for proposal.

For general questions regarding Insurance Requirements, please contact Risk Management for the City or County.

LANCASTER COUNTY

Employee Classification Act Requirements

WHEREAS, there is concern over the inappropriate competitive advantages in the public bidding process for local publicly funded construction and delivery service contracts resulting from the misclassification of individuals performing construction labor services as “independent contractors” rather than “employees”; such “independent contractors” are commonly referred to as “1099 workers” due to the IRS form they receive rather than a W-4 which an employee receives;

WHEREAS, this misclassification of such individuals as “independent contractors” rather than as “employees” eliminates any obligation to pay these individuals legally required minimum or overtime wages, to provide legally required workers’ compensation insurance, to make unemployment insurance payments, to pay legally required employment and payroll taxes, and to provide any other health, pension, or benefit such individuals would typically receive if properly classified as employees;

WHEREAS, this misclassification of individuals performing construction labor services for the contractor as “independent contractors” rather than “employees” is a violation of federal and state law, but is difficult to enforce once public construction or delivery service contracts have been bid, awarded, and entered into;

WHEREAS, the use of public funds to compensate contractors who unlawfully avoid their obligation to pay legally required minimum or overtime wages, to provide legally required workers’ compensation insurance, to make unemployment insurance payments, to pay legally required employment and payroll taxes, and to provide any other health, pension, or benefit is not in the public interest; and

WHEREAS, the Employee Classification Act, Neb. Rev. Stat. §§ 48-2901 to 48-2912 (effective July 15, 2010) provides that any contract entered into between a political subdivision and a contractor shall require that each contractor who performs construction or delivery service pursuant to the contract submit to the political subdivision an affidavit attesting that (1) each individual performing services for such contractor is properly classified under the Employee Classification Act, (2) such contractor has completed a federal I-9 immigration form and has

such form on file for each employee performing service, (3) such contractor has complied with Neb. Rev. Stat. § 4-114 requirements that the contractor register and use a federal immigration employment verification system to determine the work eligibility status of new employees physically performing services in the State of Nebraska, (4) such contractor has no reasonable basis to believe that any individual performing services for such contractor is an undocumented worker, and (5) as of the time of the contract, such contractor is not barred from contracting with the state or any political subdivision pursuant to § 48-2912 of the Employee Classification Act.

NOW, THEREFORE, Lancaster County adopts the following policy as to the bid and award of contracts to contractors for construction and delivery services with Lancaster County"

The Purchasing Agent shall immediately include in the County's notice to bidders for construction contracts that all contractors submitting bids in response to the notice shall affirmatively certify to the Purchasing Agent that all individuals hired to perform construction or delivery labor services for the contractor under the contract shall be properly classified as employees and not as independent contractors if the individual does not meet the requirements of an independent contractor under federal and state law (including the requirements of the State of Nebraska Employee Classification Act), and that the contractor will comply with all legal obligations with respect to these employees (including, but not limited to, minimum and overtime pay, workers' compensation, unemployment compensation, and payment of federal and state payroll taxes). The notice to bidders shall further provide that contractors may use affidavits required pursuant to the Employee Classification Act for this purpose, but that a failure to make the affirmative certification to the Purchasing Agent shall render the bidder ineligible for award of the contract.

The Purchasing Agent shall immediately include the following provisions in contracts for construction or delivery services:

(1) Contractor agrees that each individual performing services for the contractor shall be properly classified as an employee and not as an independent contractor if the individual does not meet the requirements of an independent contractor under the State of Nebraska's Employee Classification Act and that contractor shall comply with all legal obligations with respect to the employee (including, but not limited to, minimum and overtime pay, workers' compensation, unemployment compensation, and payment of federal and state payroll taxes).

(2) Contractor understands and agrees that failure to classify each individual hired to

perform services under the contract as an employee rather than as an independent contractor if the individual does not meet the requirements of an independent contractor under the State of Nebraska's Employee Classification Act and/or failure to comply with legal obligations with respect to the employee (including, but not limited to, minimum and overtime pay, workers' compensation, unemployment compensation, and payment of federal and state payroll taxes) shall be considered a breach of the contract and is a ground for rescission of the Contract by the County.

(3) Contractor additionally agrees to include the following provision in each subcontract entered into with a subcontractor as part of the contractor's contract with the County:

(a) Subcontractor agrees that each individual performing services for the subcontractor shall be properly classified as an employee and not as an independent contractor if the individual does not meet the requirements of an independent contractor under the State of Nebraska's Employee Classification Act and that subcontractor shall comply with all legal obligations with respect to the employee (including, but not limited to, minimum and overtime pay, workers' compensation, unemployment compensation, and payment of federal and state payroll taxes).

(b) Subcontractor understands and agrees that subcontractor's failure to properly classify individuals hired to perform services under the subcontract as employees and not as independent contractors if the individual does not meet the requirements of an independent contractor under the State of Nebraska's Employee Classification Act and/or failure to comply with legal obligation with respect to the employee (including, but not limited to, minimum and overtime pay, workers' compensation, unemployment compensation, and payment of federal and state payroll taxes) shall be considered a breach of the contract and is a ground for rescission of the subcontract with the contractor.

(4) Contractor agrees that if subcontractor fails to or is suspected of failing to properly classify each individual hired pursuant to the subcontract as an employee and not as an independent contractor if the individual does not meet the requirements of an independent contractor under the State of Nebraska's Employee Classification Act and/or fails to comply with legal obligations with respect to the subcontractor's employees, the contractor shall take appropriate corrective action including, but not limited to, reporting the suspected violation of

the State of Nebraska Employee Classification Act to the Nebraska Department of Labor or rescission of the subcontract by the contractor. Written notification of the corrective action shall be submitted to the Lincoln-Lancaster County Purchasing Department. Contractor understands and agrees that contractor's failure to take appropriate corrective action shall be considered a breach of the contractor's contract with the County and is a ground for rescission of the contract by the County.

(5) The County shall notify the Nebraska Department of Labor of any contractor or subcontractor it has determined is in breach of contract due to the terms of this order.

(6) Any contractor or subcontractor who shall have been determined by the Nebraska Department of Labor to have knowingly provided a false affidavit to the County under the State of Nebraska's Employee Classification Act shall be referred to the Purchasing Agent of the County who shall determine whether to declare such contractor or subcontractor an irresponsible bidder who shall be disqualified from receiving any business from the County for a stated period of time.

(7) This policy does not prohibit a contractor or subcontractor from hiring individuals to perform construction labor services as independent contractors, provided that the contractor's or subcontractor's use of such individuals as an independent contractor complies with the criteria found in subdivision 5 of Neb. Rev. Stat. § 48-604 and is otherwise valid under federal and state law and is not intended to circumvent lawful obligations under federal and state law or county contractual requirements.

INSTRUCTIONS TO BIDDERS

LANCASTER COUNTY, NEBRASKA
PURCHASING DIVISION
E-Bid

1. BIDDING PROCEDURE

1.1 Sealed bid, (formal and informal), subject to Instructions and General Conditions and any special conditions set forth herein, will be received in the office of the Purchasing Division, 440 So. 8th St., Lincoln, NE 68508, until the bid closing date and time indicated for furnishing Lancaster County, hereinafter referred to as "County", the materials, supplies, equipment or services shown in the electronic bid request.

1.2 Bidders shall use the electronic bid system for submitting bids and must complete all required fields. If you do not care to bid, please respond to the bid request and note your reason.

1.3 Identify the item you will furnish by brand or manufacturer's name and catalog numbers. Also furnish specifications and descriptive literature if not bidding the specific manufacturer or model as listed in the specifications.

1.4 Any person submitting a bid for a firm, corporation, or other organization must show evidence of his authority so to bind such firm, corporation, or organization.

1.5 Bids received after the time and date established for receiving bids will be rejected.

1.6 The Bidders and public are invited, but not required, to attend the formal opening of bids. At the opening, prices will be displayed electronically and/or read aloud to the public. The pricing is also available for immediate viewing on-line. No decisions related to an award of a contract or purchase order will be made at the opening.

2. BID SECURITY

2.1 Bid security, as a guarantee of good faith, in the form of a certified check, cashier's check, or Bidder's bond, may be required to be submitted with this bid document, as indicated on the bid.

2.1.1 Bid security, if required, shall be in the amount specified on the bid. The bid security must be scanned and attached to the "Response Attachments" section of your response or it can be faxed to the Purchasing office at 402-441-6513. The original bid security should then be sent or delivered to the office of the Purchasing Division, 440 S. 8th St., Ste. 200, Lincoln, NE 68508 within three (3) days of bid closing.

2.1.2 If bid security is not received in the Purchasing Division as stated above, the vendor may be determined to be non-responsive.

2.2 If alternate bids are submitted, only one bid security will be required, provided the bid security is based on the amount of the highest gross bid.

2.3 Such bid security will be returned to the unsuccessful Bidders when the award of bid is made.

2.4 Bid security will be returned to the successful Bidder(s) as follows:

2.4.1 For single order bids with specified quantities: upon the delivery of all equipment or merchandise, and upon final acceptance by the County.

2.4.2 For all other contracts: upon approval by the County of the executed contract and bonds.

2.5 County shall have the right to retain the bid security of Bidders to whom an award is being considered until either:

2.5.1 A contract has been executed and bonds have been furnished.

2.5.2 The specified time has elapsed so that the bids may be withdrawn.

2.5.3 All bids have been rejected.

2.6 Bid security will be forfeited to the County as full liquidated damages, but not as a penalty, for any of the following reasons, as pertains to this bidding document:

2.6.1 If the Bidder fails or refuses to enter into a contract on forms provided by the County, and/or if the Bidder fails to provide sufficient bonds or insurance within the time period as established in this bidding document.

3. BIDDER'S REPRESENTATION

3.1 Each Bidder by electronic signature and submitting a bid, represents that the Bidder has read and understands the bidding documents, the bid attributes, the bid attachments, and the bid has been submitted in accordance therewith.

3.2 Each Bidder for services further represents that the Bidder has examined and is familiar with the local conditions under which the work is to be done and has correlated the observations with the requirements of the bid documents.

4. INDEPENDENT PRICE DETERMINATION

4.1 By submitting this bid, the Bidder certifies that the prices in this bid have been arrived at independently, without consultation, communication or agreement, for the purpose of restricting competition, as to any matter relating to such prices with any other Bidder or with any competitor; unless otherwise required by law, the prices which have been quoted in this bid have not been knowingly disclosed by the Bidder prior to bid opening directly or indirectly to any other Bidder or to any competitor; no attempt has been made, or will be made, by the Bidder to induce any person or firm to submit, or not to submit, a bid for the purpose of restricting competition.

5. CLARIFICATION OF SPECIFICATION DOCUMENTS

5.1 Bidders shall promptly notify the Purchasing Agent or designee of any ambiguity, inconsistency or error which they may discover upon examination of the bidding documents.

5.2 Bidders desiring clarification or interpretation of the bidding documents for formal bids shall make a written request which must reach the Purchasing Agent or designee at least five (5) calendar days prior to the date and time for receipt of formal bids.

5.3 Changes made to the bidding documents will be issued electronically. All vendors registered for that bid will be notified of the addendum. Subsequent Bidders will only receive the bid with the addendum included.

5.4 Oral interpretations or changes to the bidding documents made in any manner other than written form, will not be binding on the County; and Bidders shall not rely upon such interpretations or changes.

6. ADDENDA

6.1 Addenda are instruments issued by the County prior to the date for receipt of bids which modify or interpret the bidding document by addition, deletion, clarification or correction.

6.2 Addenda notification will be made available to all registered vendors immediately via e-mail for inspection on-line.

6.3 No formal bid addendums will be issued later than forty-eight (48) hours prior to the date and time for receipt of formal bids, except an addendum withdrawing the invitation to bid, or an addendum which includes postponement of the bid.

7. ANTI-LOBBYING PROVISION

7.1 During the period between the advertised date and the contract award, Bidders, including their agents and representatives, shall not directly discuss or promote their bid with any member of the County Board or County staff except in the course of County-sponsored inquiries, briefings, interviews, or presentations, unless requested by the County.

8. BRAND NAMES

8.1 Wherever in the specifications or bid that brand names, manufacturer, trade name, or catalog numbers are specified, it is for the purpose of establishing a grade or quality of material only; and the term "or equal" is deemed to follow.

8.2 It is the Bidder's responsibility to identify any alternate items offered in the bid, and prove to the satisfaction of the County that said item is equal to, or better than, the product specified.

8.3 Bids for alternate items shall be stated in the appropriate space on the E-Bid form. Bidders MUST attach to its bid documents in the Vendor Attachment Section of the E-Bid, a statement identifying the manufacturer and brand name of each proposed alternate, plus a complete description of the alternate items including illustrations, performance test data and any other information necessary for an evaluation.

8.4 The Bidder must indicate any variances and explain by item number from the bidding document no matter how slight.

8.5 If variations are not stated in the bid, it will be assumed that the item being bid fully complies with the County's bidding documents.

9. DEMONSTRATIONS/SAMPLES

9.1 Bidders shall demonstrate the exact item(s) proposed within seven (7) calendar days from receipt of such request from the County.

9.2 Such demonstration can be at the County delivery location or a surrounding community.

9.3 If items are small and mailable, and the Bidder is proposing an alternate product, the Bidder shall supply a sample of the exact item. Samples will be returned at Bidder's expense after receipt by the County of acceptable goods. The Bidder must indicate how samples are to be returned.

10. DELIVERY (Non-Construction)

10.1 Each Bidder shall state on the bid the date upon which it can make delivery of all equipment or merchandise. Time required for delivery is hereby made an essential element of the bid.

10.2 The County reserves the right to cancel orders, or any part thereof, without obligation, if delivery is not made within the time(s) specified on the bid.

10.3 All bids shall be based upon **inside** delivery of the equipment or merchandise F.O.B. to the County at the location specified by the County, with all transportation charges paid.

10.4 At the time of delivery, a designated Lancaster County employee will sign the invoice/packing slip. The signature will only indicate that the order has been received and the items actually delivered agree with the delivery invoice. This signature does not indicate all items meet specifications, were received in good condition and/or that there is not possible hidden damage or shortages.

11. WARRANTIES, GUARANTEES AND MAINTENANCE

11.1 Copies of the following documents, if requested, shall accompany the bid proposal for all items being bid:

11.1.1 Manufacturer's warranties and/or guarantees.

11.1.2 Bidder's maintenance policies and associated costs.

11.2 As a minimum requirement of the County, the Bidder will guarantee in writing that any defective components discovered within a one (1) year period after the date of acceptance shall be replaced at no expense to the County. Replacement parts of defective components shall be shipped at no cost to the County. Shipping costs for defective parts required to be returned to the Bidder shall be paid by the Bidder.

12. ACCEPTANCE OF MATERIAL

12.1 All components used in the manufacture or construction of materials, supplies and equipment, and all finished materials, shall be new, the latest make/model, of the best quality, and the highest grade workmanship.

12.2 Material delivered under this bid shall remain the property of the Bidder until:

12.2.1 A physical inspection and actual usage of the material is made and found to be acceptable to the County; and

12.2.2 Material is determined to be in full compliance with the bidding documents and accepted bid.

12.3 In the event the delivered material is found to be defective or does not conform to the bidding documents and accepted bid, the County reserves the right to cancel the order upon written notice to the Bidder and return materials to the Bidder at Bidder's expense.

12.4 Awarded Bidder shall be required to furnish title to the material, free and clear of all liens and encumbrances, issued in the name of the Lancaster County, Nebraska, as required by the bidding documents or purchase orders.

12.5 Awarded Bidder's advertising decals, stickers or other signs shall not be affixed to equipment. Vehicle mud flaps shall be installed blank side out with no advertisements. Manufacturer's standard production forgings, stampings, nameplates and logos are acceptable.

13. BID EVALUATION AND AWARD

13.1 The electronic signature shall be considered an offer on the part of the Bidder. Such offer shall be deemed accepted upon issuance by the County of purchase orders, contract award notifications, or other contract documents appropriate to the work.

13.2 No bid shall be modified or withdrawn for a period of ninety (90) calendar days after the time and date established for receiving bids, and each Bidder so agrees in submitting the bid.

13.3 In case of a discrepancy between the unit prices and their extensions, the unit prices shall govern.

13.4 The bid will be awarded to the lowest responsive, responsible Bidder whose bid will be most advantageous to the County, and as the County deems will best serve the requirements and interests of the County.

13.5 The County reserves the right to accept or reject any or all bids; to request rebids; to award bids item-by-item, with or without alternates, by groups, or "lump sum"; to waive irregularities and technicalities in bids; such as shall best serve the requirements and interests of the County.

13.6 In order to determine if the Bidder has the experience, qualification, resources and necessary attributes to provide the quality workmanship, materials and management required by the plans and specifications, the Bidder may be required to complete and submit additional information as deemed necessary by the County. Failure to provide the information requested to make this determination may be grounds for a declaration of non-responsive with respect to the Bidder.

13.7 The County reserves the right to reject irregular bids that contain unauthorized additions, conditions, alternate bids, or irregularities that make the bid incomplete, indefinite or ambiguous.

13.8 Any governmental agency may piggyback on any contract entered into from this bid.

14. INDEMNIFICATION

14.1 The Bidder shall indemnify and hold harmless, to the fullest extent allowed by law, the County, its agents, officers, employees and representatives from and against all claims, demands, suits, actions, payments, liability, judgements and expenses (including court-ordered attorney's fees), arising out of or resulting from the performance of the contract that results in bodily injury, sickness, disease, death, civil rights liability, or injury to or destruction of tangible property, including the loss of use resulting therefrom, and that are caused in whole or in part by the Bidder, its employees, agents, any subcontractor, anyone directly or indirectly employed by them, or anyone for whose acts any of them may be liable. This section will not require the Bidder to indemnify or hold harmless the County for any losses, claims, damages and expenses arising out of or resulting from the sole negligence of the County, its agents, employees, or representatives.

14.2 In any and all claims against the County or any of its members, officers or employees by an employee of the Bidder, any subcontractor, anyone directly or indirectly employed by any of them or by anyone for whose acts made by any of them may be liable, the indemnification obligation under paragraph 14.1 shall not be limited in any way by any limitation of the amount or type of damages, compensation or benefits payable by or for the Bidder or any subcontractor under worker's compensation acts, disability benefit acts or other employee benefit acts.

15. TERMS OF PAYMENT

15.1 Unless stated otherwise, the County will begin processing payment within thirty (30) calendar days after all labor has been performed and all equipment or other merchandise has been delivered, and all such labor and equipment and other materials have met all contract specifications.

16. LAWS

16.1 The laws of the State of Nebraska shall govern the rights, obligations, and remedies of the parties under this bid and any contract reached as a result of this process.

16.2 Bidder agrees to abide by all applicable local, state and federal laws and regulations concerning the handling and disclosure of private and confidential information concerning individuals and corporations as to inventions, copyrights, patents and patent rights.

16.3 The Bidder agrees to hold the County harmless from any claims resulting from the Bidder's unlawful disclosure or use of private or confidential information.

17. EQUIPMENT TAX ASSESSMENT

17.1 Any bid for public improvement shall comply with Nebraska Revised Statutes 77-1323 and 77-1324. Indicating; every person, partnership, limited liability company, association or corporation furnishing labor or material in the repair, alteration, improvement, erection, or construction of any public improvement shall sign a certified statement which will accompany the contract. The certified statement shall state, stating that all equipment to be used on the project, except that acquired since the assessment date, has been assessed for taxation for the current year, giving the county where assessed.

18. AFFIRMATIVE ACTION

18.1 Each Bidder agrees that it will not discriminate against any employee or applicant for employment because of race, color, religion, sex, national origin, ancestry, disability, age, or marital status.

18.2 The successful Bidder will be required to comply with the provisions of the County's Affirmative Action Policy.

18.3 The Equal Opportunity Officer will determine compliance or non-compliance with the County's Affirmative Action Policy upon a complete and substantial review of successful Bidder's equal opportunity policies, procedures and practices.

18.4 The County provides equal opportunity for all Bidders and encourages minority businesses, women's businesses and locally owned business enterprises to participate in our bidding process.

19. INSURANCE

19.1 All Bidders shall take special notice of the insurance provisions required for all County contracts (see *Insurance Clause for All County Contracts*).

20. EXECUTION OF CONTRACT

20.1 Depending on the type of service provided, one of the following methods will be employed. The method applicable to this contract will be checked below:

___ a. **PURCHASE ORDER**, unless otherwise noted.

1. This contract shall consist of a Lancaster County Purchase Order.
2. A copy of the Bidder's bid response (or referenced bid number) attached and that the same, in all particulars, becomes the contract between the parties hereto: that both parties thereby accept and agree to the terms and conditions of said bid documents.

_X_ b. **CONTRACT,** unless otherwise noted.

1. County will furnish of the Contract to the successful Bidder who shall prepare attachments as required. Insurance as evidenced by a Certificate of Insurance (as required), surety bonds properly executed (as required), and Contract signed and dated.
2. The prepared documents shall be returned to the Purchasing Office within 10 days (unless otherwise noted).
3. The County will sign and date the Contract and submit the Contract to the County Board of Commissioners for approval and signature.
4. Upon approval and signature, the County will return one copy to the successful Bidder.

21. TAXES AND TAX EXEMPTION CERTIFICATE

21.1 The County is generally exempt from any taxes imposed by the State or Federal Government. A Tax Exemption Certificate will be provided as applicable.

22. E-VERIFY

22.1 In accordance with Neb. Rev. Stat. 4-108 through 4-114, the contractor agrees to register with and use a federal immigration verification system, to determine the work eligibility status of new employees performing services within the state of Nebraska. A federal immigration verification system means the electronic verification of the work authorization program of the Illegal Immigration Reform and Immigrant Responsibility Act of 1996, 8 U.S.C. 1324 a, otherwise known as the E-Verify Program, or an equivalent federal program designated by the United States Department of Homeland Security or other federal agency authorized to verify the work eligibility status of a newly hired employee pursuant to the Immigration Reform and Control Act of 1986. The Contractor shall not discriminate against any employee or applicant for employment to be employed in the performance of this section pursuant to the requirements of state law and 8 U.S.C.A 1324b. The contractor shall require any subcontractor to comply with the provisions of this section. For information on the E-Verify Program, go to www.uscis.gov/everify.

PROPRIETARY INFORMATION – City of Lincoln and/or Lancaster County, NE Issued 2/21/2017

In furtherance of Neb. Rev. Stat. §84-712 et seq., all proposals or responses received may be subject to a public records request. Responses to public records requests may include the entire proposal or response. Bidders must request that proprietary information be excluded from the posting. The bidder must identify the proprietary information, mark the proprietary information according to state law, and submit the proprietary information in a separate container or envelope marked conspicuously in black ink with the words "PROPRIETARY INFORMATION". The bidder must submit a detailed written showing that the release of the proprietary information would give a business advantage to named business competitor(s) and explain how the named business competitor(s) will gain an actual business advantage by disclosure of information. The mere assertion that information is proprietary or that a speculative business advantage might be gained is not sufficient. (See Attorney General Opinion No. 92068, April 27, 1992) THE BIDDER MAY NOT ASSERT THAT THE ENTIRE PROPOSAL IS PROPRIETARY. COST PROPOSALS WILL NOT BE CONSIDERED PROPRIETARY AND ARE A PUBLIC RECORD IN THE STATE OF NEBRASKA. The City and/or County will then determine, in its discretion, if the interests served by nondisclosure outweighs any public purpose served by disclosure. (See Neb. Rev. Stat. § 84-712.05(3)) The Bidder will be notified of the agency's decision. Absent a City and/or County determination that information is proprietary, the City and/or County will consider all information a public record subject to release regardless of any assertion that the information is proprietary. If the agency determines it is required to release proprietary information, the bidder will be informed. It will be the bidder's responsibility to defend the bidder's asserted interest in nondisclosure. To facilitate such public postings, with the exception of proprietary information, the City of Lincoln and/or Lancaster County reserves a royalty-free, nonexclusive, and irrevocable right to copy, reproduce, publish, post to a website, or otherwise use any contract, proposal, or response to this RFP for any purpose, and to authorize others to use the documents. Any individual or entity awarded a contract, or who submits a proposal or response to this bid/RFP, specifically waives any copyright or other protection the contract, proposal, or response to the bid/RFP may have; and, acknowledges that they have the ability and authority to enter into such waiver. This reservation and waiver is a prerequisite for submitting a proposal or response to this RFP, and award of a contract. Failure to agree to the reservation and waiver will result in the proposal or response to the bid/RFP being found nonresponsive and rejected. Any entity awarded a contract or submitting a proposal or response to the bid/RFP agrees not to sue, file a claim, or make a demand of any kind, and will indemnify and hold harmless the City and/or County and its employees, volunteers, agents, and its elected and appointed officials from and against any and all claims, liens, demands, damages, liability, actions, causes of action, losses, judgments, costs, and expenses of every nature, including investigation costs and expenses, settlement costs, and attorney fees and expenses, sustained or asserted against the City and/or County, arising out of, resulting from, or attributable to the releasing of the contract or the proposals and responses to the RFP, awards, and other documents in accordance with the state public records laws.

Advertise 2 times
Wednesday, November 1, 2017
Wednesday, November 8, 2017

City of Lincoln/Lancaster County
Purchasing Division
NOTICE TO BIDDERS

Sealed bids will be received by the Purchasing Agent of the City of Lincoln/Lancaster County, Nebraska BY ELECTRONIC BID PROCESS until: **12:00 pm, Tuesday, November 21, 2017** for providing the following:

Lancaster County Emergency Management
Relocation and Renovations
Bid No. 17-282

A pre-bid meeting will be held Wednesday, November 8, 2017 at 10:00 a.m., at the County Youth Service Center, Main Lobby, 1200 Radcliff, Lincoln, NE. All Interested bidders are strongly encouraged to attend.

Bidders must be registered on the City/County's E-Bid site in order to respond to the above Bid. To register go to: lincoln.ne.gov (type: e-bid - in search box, then click "Supplier Registration").

Questions concerning this bid process may be directed to City/County Purchasing at
(402) 441-8103 or purchasing@lincoln.ne.gov