

Project name and location:

# **CBJTC RENOVATE BARRACKS 3873 & 3875**

CBJTC-DPW  
Starke, Florida 32091

**Project No. 217085**

To be constructed for and the contract administered by:

**State of Florida  
Department of Military Affairs  
Construction and Facility Management Office  
2305 State Road 207  
St. Augustine, Florida 32086**



**18 JUNE 2019  
CONSTRUCTION SPECIFICATIONS**

Architectural / Engineering Team

Architect

**Ebert Norman Brady Architects**  
Mechanical / Electrical / Plumbing Engineer  
**Simes & Rosch, LLC**

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SECTION A  
REQUESTS FOR PROPOSALS

A-1 INVITATION TO BID

The "Invitation To Bid" form enclosed as Exhibit 1 shall be utilized for requesting proposals from all Bidders. The standard template for the Invitation to Bid (ITB) form shall be completed by the Contract Management Branch and distributed through the DMS Vendor Bid System (VBS), Florida Administrative Register (FAR) or local news media (newspaper), depending on the level of the project. The ITB shall contain all information needed for the site visit/pre-bid meeting, RFI's for addenda, submittal of bids and bid opening. Sources of information other than the DMA should not be relied upon.

A-2 FUNDING

The State of Florida's award, performance and obligation to pay under this contract is contingent upon availability of funding and an annual appropriation by the Legislature.

A-3 REQUIRED FORMS

The following are the forms required for use by this office. Project specific forms in Word .doc format are available by contacting the Contract Management Branch at [ng.fl.flarnng.list.cfmo-contracting@mail.mil](mailto:ng.fl.flarnng.list.cfmo-contracting@mail.mil). Use of other forms may cause rejection of bids or a delay in approval and payment of your invoices. Please do not use the forms attached as Exhibits, as these are samples only.

- Project Advertisement "Invitation To Bid" - Exhibit 1
- Insurance Form – Exhibit 2
- Contractor Qualifications Form FNG Form 5085 - Exhibit 3
- Proposal Form - Exhibit 4
- List of Subcontractors - Exhibit 5
- Agreement Between Owner & Contractor - Exhibit 6
- Performance Bond - Exhibit 7
- Labor and Material Bond - Exhibit 8
- Final Receipt of Payment & Release of All Liens & Claims - Exhibit 9
- Owners Certificate of Partial Pay Form 4012E - Exhibit 10
- Schedule of Contract Values - Exhibit 11
- Contractors Affidavit of Contract Completion - Exhibit 12
- A/E Certificate of Contract Completion - Exhibit 12a
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SECTION B  
INSTRUCTIONS TO BIDDERS

**B-1 SPECIFICATION TERMINOLOGY**

DEFINITION OF TERMS:

Whenever in these Instructions the following terms (or pronouns which replace these terms) are used, their intent and meaning shall be interpreted as follows:

OWNER

State of Florida, Department of Military Affairs  
2305 State Road 207  
St. Augustine, FL 32086

PROJECT MANAGER:

The authorized representative of the Owner charged with the construction management of the project for the Department of Military Affairs

CONTRACT MANAGER:

The authorized representative of the Owner charged with the contract management and administration of the project for the Department of Military Affairs.

ARCHITECT-ENGINEER/PROJECT REPRESENTATIVE:

The Design Professional (Architect-Engineer, Architect, Engineer or Other) commissioned by the Owner, acting directly or through a duly authorized representative.

BIDDER:

Any individual, firm, partnership or corporation submitting a proposal for the work contemplated.

SURETY:

The corporate body, which is bound with and for the Contractor, which is primarily liable, and which guarantees the faithful performance of the Agreement.

PROPOSAL:

A bid for the work contemplated, which the Bidder shall submit on approved forms (Exhibit 4).

AGREEMENT:

"Agreement" shall mean the document entitled "Agreement between Owner and Contractor."

CONTRACT LEVELS:

LEVEL 1:

Contracts where Agreement has a Contract Sum which does not exceed \$35,000

LEVEL 2:

Contracts where Agreement has a Contract Sum greater than \$35,000 but does not exceed \$65,000.

LEVEL 3:

Contracts where Agreement has a Contract Sum greater than \$65,000 but does not exceed \$200,000.

LEVEL 4:

Contracts where Agreement has a Contract Sum greater than \$200,000 but does not exceed \$500,000.

LEVEL 5:

Contracts where Agreements Contract Sum exceeds \$500,000.

**THRESHOLD BUILDING:**

Threshold Building means any building which is greater than three stories or 50 feet in height, or which has an assembly occupancy classification that exceeds 5,000 square feet in area and an occupant content of greater than 500 persons.

**SUBSTANTIAL COMPLETION:**

The term "Substantial Completion" shall mean that the project under this contract is sufficiently completed in accordance with the

Contract Documents, so that the Owner can occupy or utilize the work or designated portions thereof for the use for which it is intended, as expressed in the Contract Documents. The term "Substantial Completion" shall not mean the inclusion of such minor alterations and patching as the Final Inspection shall disclose.

**B-2 BIDDER'S QUALIFICATION REQUIREMENTS AND PROCEDURES**

Each Bidder and each subcontractor whose field or area is governed by Chapter 399, 455, 489 or 633 of the Florida Statutes for licensure must hold a valid current license as required by the Statute. If the Bidder is a corporation, he must also be properly registered with the State of Florida, Department of State, Division of Corporations.

Bidder qualification requirements and procedures are established by Department rule (Rule 60D-5, Florida Administrative Code) and by the bidding conditions and Specifications. Failure of the Bidder to strictly meet and follow all such requirements and procedures may result in bid rejection or disqualification for contract award. For the Bidder's convenience, the provisions of Rule 60D-5.004 Bidder's Qualification Requirements and Procedures are set forth below.

**60D-5-004 Bidder's Qualification Requirements and Procedures.**

There are two steps in qualifying to perform construction of State projects: A.) Prequalification to submit a bid, and B.) Prequalification for award of the contract. However, the submission date of qualifications may change dependent upon the complexity of a project, funding time constraints or availability of personnel to perform qualification review and approval procedures. Contractor should verify at the Pre-Bid meeting the exact prequalification requirements and submission due dates.

Pre-qualifications with one agency will not automatically prequalify the contractor with other agencies. Pre-qualifications, unless otherwise stated in writing, shall be submitted on each project advertised by the Department. Qualification documents are not held on file for other projects.

A. Prequalification to submit a bid.

1. Prequalification requirements apply to all Bidders on Levels Four and Five contracts. Bidders must provide this information during the bidding of a specific project, unless otherwise advertised.

- a. Current State Contractor license certification or registration as required under Florida Statutes.
- b. Current Corporate Charter registration, if the potential Bidder is a domestic (Florida) corporation, or authority to transact business if the potential Bidder is a foreign (non-Florida) corporation, as may be required by Florida law.
- c. For projects that require (based on Agency discretion) a contractor with specific expertise and experience, the Agency may state additional prequalification requirements.
- d. A completed FNG 5085 Contractor Questionnaire. (See Exhibit 3)
- e. Proof of registration in [www.myfloridamarketplace.com](http://www.myfloridamarketplace.com) web site.

2. For projects that require a contractor with specific expertise and experience, the Agency may state additional prequalification requirements relating to demonstrated performance of similar work of similar size and complexity and the possession or availability of facilities or equipment needed for performance of the work in addition to prequalification requirements in accordance with conditions that will be established in the bidding documents.

3. In each instance where the bid documents set forth certain additional prequalification requirements each potential Bidder shall submit these prequalification data to the Agency as provided in the bid documents. The conditions may include a deadline date for submittal of additional prequalification data, which date will be earlier than the deadline for submission of bids. Bids are to be accepted only from those potential Bidders who have pre-qualified in accordance with this section and the terms of the bidding documents.

4. Each potential Bidder will be notified by the Agency to which it applied for prequalification of ineligibility to submit bids during the balance of the qualification period for a specific field or area of construction. A firm will be permitted to correct prequalification deficiencies if proof of correction is received 120 hours prior to the bid opening date and time. Any Bidder or potential Bidder that is determined to be ineligible because of failure to provide evidence of the minimum requirements will not be qualified to submit a bid and will be informed in writing of the deficiencies that must be corrected to be considered for future projects.

Each potential Bidder notified of its eligibility may submit a bid at the time and place designated in the bidding documents as long as the Bidder is qualified and eligible to perform the work required by the bidding documents.

#### B. Pre-qualifications for award of the contract

1. Requirements: Any Bidder that has submitted a bid on Levels Four and Five contracts must satisfy the following requirements as judged by the Agency in order to be eligible for award of the contract for construction.

- a. Satisfactory compliance with bid pre-qualification criteria.
- b. On projects where the bid total exceeds \$100,000, the Bidder must provide with the bid, a good faith deposit in the amount of 5% of the bid by way of a bid bond from a surety insurer authorized to do business in this State as surety or a certified check accompanying the bid, such requirement may be satisfied by the Bidder depositing in lieu of such certified check, a cashier's check, treasurer's check or bank draft of any national or state bank.
- c. On projects where the bid exceeds \$100,000, unless such requirement has been waived in accordance with Rule 60D-5.0041, the Bidder must provide with the bid, evidence of ability to provide the necessary performance and payment bonds for the project by providing a letter of intent to provide a 100% performance bond and a 100% labor and material payment bond from a surety company authorized to do business in the State of Florida by the Department of Insurance, and meeting the financial and performance rating required by the bidding documents. For contract amounts not exceeding \$500,000 the provisions of Section 287.0935 F.S. shall govern.
- d. Supervisor - On Level 5 projects, the Contractor must agree to provide field (on-site) supervision (through a named superintendent) for each of the general, concrete forming and placement, masonry, mechanical, plumbing, electrical and roofing trades. In addition, the Contractor shall assign and name a qualified employee to provide scheduling direction to the entire project. Supervisory employees (including field superintendents, foremen and schedulers at all levels) must have been employed in a supervisory (leadership) capacity of a substantially equivalent level on a similar project for at least two years within the last five years. The Contractor shall include a resume of experience for each of those employees identified by him to supervise each trade, and for scheduling, with its submittal of the experience questionnaire (item d above).
- e. Specific expertise and experience a contractor's staff must have to perform a project requiring unique or specialized capabilities.

2. The Agency will evaluate all data submitted within fourteen days of receipt and determine whether the firm is a qualified Bidder. Should the Bidder be judged unqualified, its bid will be rejected and the Bidder submitting the next low responsive bid will be given seven (7) working days to submit its qualification data. Additional qualification data may be requested.

#### **B-3 FAMILIARITY WITH LAWS**

The Bidder is required to be familiar with all Federal, State and local laws, ordinances, rules and regulations that in any manner affect the work. Ignorance on the part of the Bidder will in no way relieve him from responsibility.

#### **B-4 FLORIDA PRODUCTS AND LABOR**

The Contractor's attention is called to Section 255.04, Florida Statutes, which requires that on public building contracts Florida products and labor shall be used wherever price and quality are equal.

#### **B-5 TAXES**

Although the Owner is not subject to the Florida Sales and Use Tax, any Contractor who purchases materials and services, which will be used in the construction of State-owned buildings, will not be exempt from the tax on these materials and services as evidenced by the following excerpt from the Florida Statutes:

"The State, any county, municipality or political subdivision of this State is exempt from the sales tax, except this exemption shall not include sales of tangible personal property made to contractors employed either directly or as agents of any such government or political subdivision thereof when such tangible personal property goes into or becomes a part of public works owned by such government or political subdivision thereof."

The Owner is not subject to:

- A. Federal Excise Taxes on materials or appliances that are incorporated into and become a part of the completed improvement.
- B. Federal Tax on Transportation of Property.

In every case of a purchase of materials to be incorporated in the work, which are subject to Federal Excise Tax, the Owner will furnish to the Contractor the necessary Federal Excise Tax Exemption Certificate upon receipt of a copy of the supplier's invoice showing the item or items, the net price, and Federal Excise Tax separately.

The Bidder shall take these factors into consideration in preparing his proposal, including therein the cost of the State Sales Tax and Use Tax on materials, but excluding the cost of those taxes not applicable.

### **B-6 ALTERNATES**

If the Owner wishes to learn the relative or additional construction cost of an alternative method of construction, an alternative use or type of material or an increase or decrease in scope of the project, these items will be defined as alternates and will be specifically described by the contract documents. Alternates will be listed in the Proposal form in a manner that the Bidder shall be able to clearly indicate what sums he will add to (or deduct from) his Base Bid.

### **B-7 ADDENDA**

In case the Architect-Engineer finds it expedient to supplement, modify or interpret any portion of the Bidding Documents during the bidding period, such procedure will be accomplished by the issuance of written Addenda to the Bidding Documents. Addenda shall be made available to all prospective Bidders. It is the Bidders responsibility to ensure receipt of all issued addenda before bid due date. Failure to acknowledge addenda on the Exhibit 4 proposal form may be cause for rejection.

### **B-8 INTERPRETATION OF BIDDING DOCUMENTS**

No interpretation of the meaning of the Drawings, Specifications or other Bidding Documents and no correction of any apparent ambiguity, inconsistency or error therein will be made to any Bidder orally. Every request for such interpretation or correction shall be in writing and addressed to the Architect-Engineer (or the contact indicated in the bidding documents). All such interpretations and supplemental instruction will be in the form of written Addenda to the Bidding Documents, sent via E-Mail by the Architect-Engineer or posted on the VBS by a Contract Management Branch Official.

Only the interpretation or correction so given by the Architect-Engineer (or Owner appointed expert) in writing shall be binding, and prospective Bidders are advised that no other source is authorized to give information concerning, or to explain or interpret, the Bidding Documents. The DMA will not be responsible for information obtained through sources other than those used by the DMA for solicitations (Vendor Bid System or Florida Administrative Register) that may cause rejection of bids.

### **B-9 EXAMINATION OF BIDDING DOCUMENTS AND SITE OF WORK**

Bidders are required, before submitting their proposals, to visit the site of the proposed work and completely familiarize themselves with the nature and extent of the work and any local conditions that may in any manner affect the work to be performed and the equipment, materials and labor required. They are also required to examine carefully any Drawings, Specifications and other Bidding Documents to inform themselves thoroughly regarding any and all conditions and requirements that may in any manner affect the work. Only those contractors listed on the pre-bid /site visit meeting sign-in roster will be allowed to bid.

**B-10 BASIS FOR BIDDING - TRADE NAMES**

For clarity of description and as a standard of comparison, certain equipment, materials, etc., have been specified by at least two trade names or manufacturers. To ensure a uniform basis for bidding, the Bidder shall base his Proposal on the particular system, equipment or material specified. After the contract is let, other equipment materials, etc., as manufactured by other manufacturers may be accepted only if, in the opinion of the Architect-Engineer, same is equivalent in quality and workmanship and will perform its intended purpose satisfactorily.

**B-11 BID GUARANTEE**

On projects where the base bid and sum of all additive alternates exceeds \$100,000, bids shall be accompanied by a bid guarantee of not less than five (5) percent of the amount of the bid, which may be a certified check, a cashier's check, treasurer's check, bank draft or Bid Bond made payable to the Owner. If a bid bond is submitted, it must be signed by a Florida Licensed Resident Agent who holds a current Power of Attorney from the Surety Company issuing the Bond and the Power of Attorney must be attached to the Bid Bond. Such check or Bid Bond shall be submitted with the understanding that it shall guarantee that the Bidder will not withdraw his bid for a period of forty (40) days after the scheduled closing time for the receipt of bids; that if his bid is accepted, he will enter into a written contract with the Owner in accordance with the form of agreement included as a part of the Contract Documents, and that the required Performance Bond and Labor and Material Payment Bond will be given; and that in the event of the withdrawal of said bond within said period, or failure to enter into said Agreement and give said bonds within ten (10) calendar days after he has received notice of acceptance of his bid, the Bidder shall be liable to the Owner for the full amount of the bid guarantee as representing the damage to the Owner on account of the default of the Bidder in any particular hereof. The Bid Bonds or checks shall be returned to all except the apparent lowest two qualified Bidders after the formal opening of bids. The remaining Bid Bonds or checks will be returned to the two lowest Bidders after the Owner and the accepted Bidder have executed the Agreement and the Performance Bond and Labor and Material Payment Bond have been approved by the Owner. If the required Agreement and Bonds have not been executed within forty (40) calendar days after the date of the opening of the bids, then the Bid Bond or check of any Bidder will be returned upon his request, provided he has not been notified of the acceptance of his bid prior to the date of such request.

**B-12 SURETY COMPANIES ACCEPTABLE TO STATE**

To be acceptable to the State as Surety for Bid Bonds, Performance Bonds and Labor and Material Payment Bonds, a Surety Company shall comply with the following provisions:

- A. The Surety Company shall have a currently valid Certificate of Authority, issued by the State of Florida, Department of Insurance, authorizing it to write surety bonds in the State of Florida.
- B. The Surety Company shall have currently valid Certificate of Authority issued by the United States Department of Treasury under Sections 9304 to 9308 of Title 31 of the United States Code.
- C. The Surety Company shall be in full compliance with the provisions of the Florida Insurance Code.
- D. The Surety Company shall have at least twice the minimum surplus and capital required by the Florida Insurance Code at the time the invitation to bid is issued.
- E. If the Contract Award Amount exceeds \$500,000, the Surety Company shall also comply with the following provisions:
  - 1. The Surety Company shall have at least the following minimum ratings in the latest issue of Best's Key Rating Guide.

Policy Required:

<u>Contract Amount</u>	<u>Holder's Rating</u>	<u>Financial Rating</u>
\$ Up to 1,000,000	A-	CLASS I
1,000,000 to 2,000,000	A-	CLASS II
2,000,000 to 5,000,000	A-	CLASS III
5,000,000 to 10,000,000	A-	CLASS IV
10,000,000 to 25,000,000	A-	CLASS V
25,000,000 to 50,000,000	A-	CLASS VI

2. The Surety Company shall not expose itself to any loss on any one risk in an amount exceeding ten (10) percent of its surplus to policyholders, provided:
  - a. Any risk or portion of any risk being reinsured shall be deducted in determining the limitation of the risk as prescribed in this section. These minimum requirements shall apply to the reinsuring carrier providing authorization or approval from the State of Florida, Department of Insurance requirements to do business in this state have been met.
  - b. In the case of the surety insurance company, in addition to the deduction for reinsurance, the amount assumed by any co-surety, the value of any security deposited, pledged or held subject to the consent of the surety and for the protection of the surety shall be deducted.

### **B-13 PREPARATION AND SUBMISSION OF BIDS**

Each Bidder shall copy the proposal form (Exhibit 4) on his own letterhead, indicate his bid prices thereon in proper spaces, for the Base Bid and for alternates on which he bids. Any erasure or other correction in the proposal may be explained or noted over the signature of the Bidder.

Proposals containing any conditions, omissions, unexplained erasures, alterations, items not called for or irregularities of any kind may be rejected by the Owner.

Each bid must give the full business name, federal ID number, address, telephone and fax of the Bidder and state whether it is an individual, corporation or partnership. The bid must be signed before submitting in duplicate in a sealed envelope. The envelope must be clearly marked on its face as follows:

**ATTN: SEALED BID - PROJECT NO.: 217085**  
**PROJECT NAME: CBJTC Renovate Barracks 3873 & 3875**  
**ATTN: CFMO Contract Management Branch**

The bid shall be submitted only prior to the time and the place specified in the Invitation to Bid or in accordance with any Addendum issued subsequent to the advertisement. Sealed bid envelopes submitted by mail or by delivery service must be delivered within a separate mail or delivery envelope, also marked "SEALED BID". Bids not delivered in sealed envelopes may be returned to the Bidder. All bids submitted by mail or delivery service need to be confirmed by Bidder with the CFMO Contract Management Branch.

### **B-14 LISTING OF SUBCONTRACTORS**

In order that the Owner may be assured that only qualified and competent subcontractors will be employed on the project, each Bidder shall submit in duplicate with his proposal a list of the subcontractors who will perform the work for each Division of the Specifications utilizing the "List of Subcontractors" form enclosed as Exhibit 5. The Bidder shall have determined to his own complete satisfaction that a listed subcontractor has been successfully engaged in this particular type of business for a reasonable length of time, has successfully completed installations comparable to that which is required by this Agreement and is qualified technically and financially to perform the work for which he is listed. Only one subcontractor shall be listed for each phase of work.

Any Bidder who lists a subcontractor not certified and/or registered by the State to perform the work of his trade if, such certification or registration is required for the trade, by Florida Laws, will be rejected as non-responsive.

No change shall be made in the List of Subcontractors, before or after the award of a contract, unless agreed to in writing by the Owner.

### **B-15 WITHDRAWAL OF BIDS**

Bids may be withdrawn on written, e-mail or facsimile request received from Bidders prior to the time fixed for opening. Negligence on the part of the Bidder in preparing the bid confers no right for withdrawal of the bid after it has been opened.

## **B-16 RECEIPT AND OPENING OF BIDS**

Bids will be opened publicly at the time and place stated in the Bidding Documents. An official time clock will be used to monitor the closing of the bids and to time-stamp bids as received. No responsibility will be attached to any officer for the premature opening of a bid not properly addressed and identified. At the time fixed for the opening of bids, the bids will be read aloud.

## **B-17 DISQUALIFICATION OF BIDS**

More than one bid from an individual, firm, partnership, corporation or association under the same or different names will not be considered. Reasonable grounds for believing that a Bidder is interested in more than one proposal for the same work will cause the rejection of all proposals in which such Bidders are believed to be interested.

Any or all proposals will be rejected if there is reason to believe that collusion exists among the Bidders and no participants in such collusion will be considered in future proposals for the same work.

The Owner reserves the right to accept or reject any or all proposals received and reserves the right to make an award with or without further discussion of the proposals submitted or accept minor informalities or irregularities in the best interest of the State of Florida, which are considered a matter of form and not substance, and the correction or waiver of which is not prejudicial to other proposers. Minor irregularities are defined as those that will not have an adverse effect on the Department's interest and will not affect the price of the proposal by giving a proposer an advantage or benefit not enjoyed by all other proposers. It is understood the proposal will become a part of the Department's official file, without obligation to the Department. Proposals may be rejected if found to be irregular or not in conformance with the requirements and instructions contained herein. A proposal may be found to be irregular or non-responsive by reasons that include but are not limited to failure to utilize or complete in their entirety prescribed forms, conditional proposals, incomplete proposals, ambiguous proposals, and improper, missing and/or undated signatures. Bids not complete with Bid Bonds, (when applicable), List of Subcontractors, or addenda not acknowledged will not be read aloud. The Official announces the deficiency causing the bid to be non-responsive and its disqualification thereby. The disqualified proposal will be impounded and not returned.

Falsification of any entry made on the contractor's bid proposal will be deemed a material bid deviation and will be grounds for rejection.

Any and all bid proposals may be rejected if determined to be non-responsive (does not conform in all material aspects to the invitation to bid or request for proposals) or non-responsible (firm is not deemed capable in all respects to perform fully the contract requirements and the integrity and reliability to assure good faith performance).

## **B-18 REJECTION OF BIDS**

The Owner reserves the right to reject any and all bids under any of the circumstances prescribed in Rule 60D-5.0071, Florida Administrative Code, and to negotiate the contract in accordance with Rules 60D-5.00, 60D-5.0082, and 60D-5.0091, Florida Administrative Code, if the low qualified bid exceeds the project construction budget.

## **B-19 NOTICE AND PROTEST PROCEDURES**

### **A. Notification:**

1. Bid Solicitation: The Owner shall provide notice of its decision or intended decision concerning a bid solicitation as provided in the advertising for bids and distribution of bidding documents.
2. Contract Award: On contracts within Levels 2, 3, 4 & 5, the notice of a decision or intended decision on contract award or bid rejection shall be given by posting electronically on the My Florida Market Place (MFMP) Vendor Bid System (VBS), or by posting in the same manner in which the bid solicitation was announced by the Contract Management Branch of the DMA.

### **B. Protest:**

1. Any person who is affected adversely by the Owner's decision or intended decision shall file with the Owner a notice of protest in writing within 72 hours, excluding Saturday, Sunday and State legal holidays, after receipt of the bidding

documents if the protest is directed toward the bidding documents or after the notice of the Owner's decision or intended decision on contract award or bid rejection if the protest is directed toward contract award or bid rejection.

2. Thereafter a formal written protest by petition in compliance with Section 120.57(3), Florida Statutes, and Rule 28-110, Florida Administrative Code, must be filed with the Owner within ten (10) days after the date the notice of protest was filed.
3. Failure to file a timely notice of protest or failure to file a timely formal written protest petition shall constitute a waiver of protest proceedings. Any protest filed prior to posting of the bid tabulation or receipt of the notice of the agency decision or intended decision will be considered abandoned unless renewed within the time limit provided for protests.
4. The Agency and the Commission on Minority Economic and Business Development is hereby granted standing to protest, pursuant to s. 287.0945, in a timely manner, any contract award in competitive bidding for contractual services and construction contracts that fail to include minority business enterprise participation, if any responding Bidder has demonstrated the ability to achieve any level of participation, or any contract award for commodities where, a reasonable and economical opportunity to reserve a contract statewide or district level, for minority participation was not executed or, and agency failed to adopt applicable preference for minority participation. Any low Bidder with no participation may be presumed not in "good faith." All Bidders will be notified of the minority participation goal by addendum.

C. Owner Action:

1. Upon receipt of a notice of protest that has been timely filed, the Owner shall delay the contract award process until the subject of the protest is resolved by mutual agreement between the parties or by final Owner action, unless the Owner sets forth in writing particular facts and circumstances which require the continuation of the bid solicitation process or the contract award process without delay to avoid an immediate and serious danger to public health, safety, or welfare; provided, however, that if the petition is not filed within the time stated above, the contract award process may continue as if the notice of protest had not been filed.
2. Upon receipt of the formal written protest petition which has been timely filed, the Owner shall attempt to resolve the protest by mutual agreement between the parties within 7 days, excluding Saturday, Sunday and legal State holidays.
3. If the protest is not resolved by mutual agreement within said seven (7) days, and if no disputed issue of material fact is involved, the Owner may designate a Hearing Officer who shall conduct an informal proceeding pursuant to Section 120.57(2), Florida Statutes, and Rule 60Q-2.014, Florida Administrative Code. The qualifications of such designated Hearing Officer shall be: 1 a member in good standing of The Florida Bar; or 2. a person knowledgeable by virtue of practical experience of the procedures relating to soliciting and evaluating bids for state contracts. Notice of informal proceedings shall be given no less than three days prior to the proceeding. The proceeding may be held before the Owner.
4. If there is a disputed issue of material fact, the protest shall be referred to the Division of Administrative Hearings of Department of Administration, State of Florida, for proceedings under section 120.57(1).

**B-20 DETERMINATION OF SUCCESSFUL BIDDER**

- A. All projects except where competitive bidding is waived under the provisions of Rule 60D-5.008, Florida Administrative Code, will be publicly bid in accordance with the provisions herein. Award of contract will be made to the lowest responsive responsible Bidder, determined in accordance with the provisions herein and meeting the requirements of the bidding documents, that submits the lowest valid bid for the work. The lowest bid will be determined as follows:
  1. The lowest bid will be the bid from the responsive responsible Bidder that has submitted the lowest price for the base bid or the base bid plus the additive alternates or less the deductive alternates chosen by the Agency to be included in or excluded from the proposed contract, taken in numerical order listed in the bid documents. The order of the alternates may be selected by the Agency in any sequence so long as such acceptance out of order does not alter the designation of the low Bidder.
  2. On projects whose bidding documents provide for evaluation of the bids based on first cost and life cycle cost and performance criteria, the lowest bid will be the bid by the firm whose bid products are determined to yield the lowest total cost in accordance with the criteria set forth in the bidding documents.

**B-21 NOTICE TO SECURE PERMITS AND PAY FOR UTILITY CONNECTIONS; SCHEDULE OF VALUES;**



**NOTICE TO PROCEED TO MOBILIZE ON SITE AND TO PROCEED WITH CONSTRUCTION; TIME OF COMPLETION AND LIQUIDATED DAMAGES**

- A. The contract will be issued to the Contractor after all signatures have been acquired. At that time, the Contractor will be given a Notice to Secure Permits for required permits from all agencies with jurisdiction over the area in which the project is located; and to pay, at the Contractor's cost, the required connection fees from all agencies supplying utilities to the project.

The Contractor is allowed thirty (30) calendar days from the issuance of the Notice to Secure Permits to obtain the required permits and utility connections before construction can begin. Special permits, such as tree removal, Water Management District, Department of Environmental Regulation, septic tank, etc., may be necessary before construction can begin. If additional time is required, the Contractor will request approval of a time extension for good cause for the purpose of obtaining any permit required prior to commencing construction on the site.

The Contractor is obligated to obtain and pay for a building permit from the local authority for construction of this facility. In the case of plumbing, electrical, other internal system permits and connection permits, the Contractor is obligated to obtain such permits and pay such fees.

The Contractor shall determine the permits and fees required by any entity having jurisdiction over any part of the project and shall include the cost of all such permits in his bid proposal.

- B. The Contractor shall, within ten (10) calendar days from date of Notice to Secure Permits letter, submit to the Architect-Engineer and Project Manager, for review and approval, three copies of a Schedule of Contract Values which will reflect the estimated cost of each subdivision of work of each specification section, further detailed by subcontractor item, and utilizing the Construction Specification's Institute "Master Format Broad Scope Section Numbers". The value of each item shall include a true proportionate amount of the Contractor's overhead and profit. The sum of all such scheduled values shall equal the Contract Sum as evidenced by the Agreement.
- C. Upon paying for all required utility connections (not limited to but including telephone, data, electric, water and sewer) and securing the Building Permit, the Contractor shall provide a copy of any and all Permits required and receipts showing payments to the Architect-Engineer and the Owner. The Notice to Proceed to Mobilize on Site and to Proceed with Construction will then be issued by the Owner. The work to be performed under this contract shall be commenced within ten (10) calendar days after date of Notice to Proceed to Mobilize on Site and to Proceed with Construction, shall be substantially completed within -120- calendar days after the date of this Notice to Proceed, and shall be finally completed within -30- calendar days after the date of substantial completion. It is the Contractor's responsibility to ensure the Certificate of Occupancy from the authority having jurisdiction is provided to Owner prior to substantial completion.
- D. Inasmuch as failure to complete the project within the time fixed above will result in substantial injury to the Owner, and as damages arising from such failure cannot be calculated with any degree of certainty, it is hereby agreed that if the project is not substantially completed, according to the definition of "Substantial Completion" in Section B-1 hereinabove, or within such further time, if any, as in accordance with the provisions of the Contract Documents shall be allowed for such substantial completion, the Contractor shall pay to Owner as liquidated damages for such delay, and not as a penalty, any and all actual costs and/or losses incurred by the Owner, as the result of the delay, for each and every calendar day elapsing between the date fixed for substantial completion above and the date such substantial completion shall have been fully accomplished. Said liquidated damages shall be payable in addition to any other excess expenses or costs payable by the Contractor to the Owner under the provisions of AIA Article 14 of the General Conditions and shall not exclude the recovery of damages by the Owner under other provisions of the Contract Documents, except for Contractor's delay. This provision of liquidated damages for delay shall in no manner affect the Owner's right to terminate the contract as provided in Article 14 of the General Conditions or elsewhere in the Contract Documents. The Owner's exercise of the right to terminate shall not release the Contractor from his obligation to pay said liquidated damages in the amounts as provided for above.

The Owner is entitled to completion of the project within the time fixed above or within such further time, if any, as may be allowed in accordance with the provisions of the contract. In the event of termination of the contract by the Owner prior to completion as provided in Article 14.2 of the General Conditions or elsewhere in the Contract Documents, the Contractor shall be liable to the Owner for the expenses for additional managerial and administrative services provided in said Article 14 and also for the per diem liquidated damages as agreed to above.

1. For each day he is in arrears in his work at the time of said termination as determined by the Architect-Engineer, and
2. For each day of thirty (30) additional calendar days hereby stipulated and agreed to be the time it will require the Owner to affect another contract for completion of the project and for resumption of work thereon.

Provided, however, that the sum of 1 and 2 above shall not exceed the number of days beyond the original agreed completion date, or any extension thereof as herein provided, reasonably required for completion of the project.

It is further agreed that the Owner may deduct from the balance retained by the Owner, under the provisions above, the liquidated damages stipulated therein for delay or termination, as the case may be, or such portions thereof as the said retained balance will cover.

## **B-22 APPRENTICES**

If the Contractor employs apprentices on the project, the behavior of the Contractor and the Owner shall be governed by the provisions of Chapter 446, Florida Statutes, and by applicable standards and policies governing apprentice programs and agreements established by the Division of Workforce Development of the Department of Education, State of Florida. The Contractor will include a provision similar to the foregoing sentence in each subcontract.

The Contractor shall have the option of listing all available job vacancies with the local Job Service Florida office in order to take advantage of local pools of unemployed qualified construction personnel.

## **SECTION C**

### **CONDITIONS OF THE CONTRACT**

#### **C-1 PERFORMANCE BOND AND LABOR AND MATERIAL PAYMENT BOND**

On projects where the Contract Sum exceeds \$100,000, the Contractor shall furnish the Owner with a 100% Performance Bond and 100% Labor and Material Payment Bond written by a Surety Company acceptable to the Owner and authorized to do business in the State of Florida and signed by a Florida Licensed Resident Agent. Contractor is required to furnish replacement bonds in the event of cancellation of the original Performance Bond and Labor and Material Payment Bond. Form of bond shall be as shown on forms Exhibits 7 and 8.

The cost of all Performance Bonds and Labor and Material Payment Bonds shall be borne by the Contractor. The Bonds shall be accompanied by a duly authenticated or certified document, in duplicate, evidencing that the person executing the Bonds on behalf of the Surety had the authority to do so on that date of the Bond. In the usual case, conferring of that authority has occurred prior to the date of the Bond, and the document showing the date of appointment and enumeration of powers of the person executing the Bond is accompanied by a certification that the appointment and powers have not been revoked and remain in effect. The date of that certification shall be dated the same date as the Bonds and the Bonds shall be dated the same date as the Agreement. The Bonds must also be recorded in the same County of the project location.

#### **C-2 EXECUTION OF AGREEMENT AND BONDS**

##### **Agreement between Owner and Contractor**

The Contractor shall execute all required forms of the Agreement and return within ten (10) calendar days of their receipt. Failure to return all forms correctly executed within ten (10) calendar days of receipt, without written extension by the Owner otherwise, shall constitute an irregularity and deemed grounds, at the Owner's option, for rejection and forfeiture of the Bid Deposit or at the Owner's option, for the deduction on a day-for-day basis from the time allotted for completion of the work under Section B-21.

If the Contractor is a firm or company owned by an individual, the Agreement shall be executed in the name of the firm or company by the manual signature of the individual or sole proprietor.

If the Contractor is a partnership, the Agreement shall be executed in the name of the partnership by the manual signature of partner or partners.

If the Contractor is a corporation, the Agreement shall be executed in the name of the corporation and shall bear the corporate seal. It may be signed for the corporation by the president and attested by the corporate secretary; if signed for the corporation by any other officer than the president, the signature of such officer signing shall be attested by the secretary, and the executed Agreement shall be accompanied by a duly authenticated document bearing the seal of the corporation, quoting the section of the by-laws of the corporation authorizing the Board of Directors to designate such officer and copy of the resolution designating and authorizing him to execute on behalf of the corporation. That document must contain a statement that the authority is in effect on the date of the execution of the Agreement and may not be dated earlier than the date of the execution of the Agreement. The same officer may not execute the Agreement and authenticate the document of authority.

#### Performance Bond & Labor and Material Payment Bond

These bonds shall be executed on behalf of the Contractor in the same manner and by the same person who executed the Agreement. A Notice to Proceed will **not** be issued to the Contractor until all bonds have been received and approved by the Contract Management Branch.

#### C-3 CONTRACTOR'S INSURANCE

The Contractor shall not commence any work in connection with this Agreement until he has obtained certain types of the following types of insurance and such insurance has been approved by the Owner, nor shall the Contractor allow any subcontractor to commence work on his subcontract until all similar insurance required of the subcontractor has been so obtained and approved. All insurance policies shall be with insurers qualified and doing business in Florida through an authorized licensed Florida Resident Agent, and shall include:

##### Worker's Compensation Insurance

The Contractor shall take out and maintain during the life of this Agreement, Worker's Compensation Insurance for all of his employees connected with the work of this project and, in case any work is sublet, the Contractor shall require the subcontractor similarly to provide Worker's Compensation Insurance for all of the latter's employees unless such employees are covered by the protection afforded by the Contractor. Such insurance shall comply fully with the Florida Worker's compensation law. In case any class of employees engaged in hazardous work under this contract at the site of the project is not protected under the Worker's Compensation statute, the Contractor shall provide, and cause each subcontractor to provide, adequate insurance satisfactory to the Owner, for the protection of his employees not otherwise protected.

##### Contractor's Public Liability and Property Damage Insurance

The Contractor shall take out and maintain during the life of this Agreement Comprehensive General Liability and Comprehensive Automobile Liability Insurance as shall protect him from claims for damage for personal injury, including accidental death, as well as claims for property damages which may arise from operating under this Agreement whether such operations are by himself or by anyone directly or indirectly employed by him, and the amount of such insurance shall be the minimum limits as follows:

- (1) Contractor's Comprehensive General Liability Coverages, Bodily Injury & Property Damage:  
\$300,000.00 Each Occurrence, Combined Single Limit
- (2) Automobile Liability Coverages, Bodily Injury & Property Damage:  
\$100,000.00 Each Occurrence, Combined Single Limit

Insuring clause for both BODILY INJURY AND PROPERTY DAMAGE shall be amended to provide coverage on an OCCURRENCE BASIS.

##### Subcontractor's Public Liability and Property Damage Insurance

The Contractor shall require each of his subcontractors to procure and maintain during the life of this subcontract, insurance of the type specified above or insure the activities of his subcontractors in his policy, as specified above.

##### Owner's and Contractor's Protective Liability Insurance

The Contractor shall procure and furnish an Owner's and Contractor's Protective Liability Insurance Policy with the following minimum limits:

- (1) Bodily Injury & Property Damage Liability:  
\$300,000.00 Each Occurrence, Combined Single Limit

"XCU" (Explosion, Collapse, Underground Damage)

The Contractor's Liability Policy shall include and provide "XCU" coverage for those classifications in which they are applicable.

Broad Form Property Damage Coverage, Products and Completed Operations Coverages

The Contractor's Liability Policy shall include and provide for Broad Form Property Damage Coverage, Products and Completed Operations Coverage.

Contractual Liability-Work Contracts

The Contractor's Liability Policy shall include Contractual Liability Coverage designed to protect the Contractor for contractual liabilities assumed by the Contractor in the performance of this Contract.

Indemnification Rider

To the fullest extent permitted by law, the Contractor's Liability Policy shall indemnify and hold harmless the Owner from and against claims, damages, losses and expenses, including but not limited to attorneys fees arising out of or resulting from negligent performance of the work, provided that such claim, damage, loss or expense is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the work itself) including loss of use resulting therefrom, caused in whole or in part by negligent acts or omissions of the Contractor, a subcontractor, anyone directly or indirectly employed by them or anyone for whose acts they may be liable, regardless of whether or not such claim, damage, loss or expense is caused in part by the Owner. Such obligation shall not be construed to negate, abridge, or reduce other rights or obligations of indemnity, which would otherwise exist as to the Owner.

Builder's Risk Coverage

The Contractor shall secure and maintain during the life of this Contract a "Builder's Risk Policy", All Risks Form, and issued on a completed valued basis. Installation Floaters and other Inland Marine Forms may be utilized where applicable and are in the best interest of the State of Florida.

Asbestos-Abatement Contractors Liability Insurance Pollution Endorsement

The asbestos-abatement Contractor shall procure a pollution endorsement to his public liability insurance, against claim or claims expenses arising from the abatement project, as required by Section 255.56 of the Florida Statutes. The coverage by the endorsement may be of the Claims-Made type.

Loss Deductible Clause

The State of Florida shall be exempt from, and in no way be liable for any sums of money, which may represent a deductible in any insurance policy. The payment of such deductible shall be the sole responsibility of the General Contractor and/or subcontractor providing such insurance.

Certificate of Insurance

The Owner shall be furnished proof of coverage of the above required insurance. Said proof shall be submitted on a form approved by the Department of Insurance (See Exhibit 2). Said certificate of insurance forms shall be completed, signed by the authorized licensed Florida Resident Agent and returned to the office of the Owner. These certificates shall be dated and show:

- (1) The name of the insured contractor, the specific job by name and number, the name of the insurer, the number of the policy, its effective date, and its termination date.
- (2) Statement that the Insured will mail notice to the Owner at least thirty (30) calendar days prior to any material changes in provisions or cancellation of the policy.
- (3) Certificate of Insurance shall be in the form as approved by Insurance Standards Office (ISO) and such Certificate shall clearly state all the coverage's required in this Section.
- (4) Certificate of Insurance shall state that the Owner and Agent are listed as additional insured on all appropriate policies.
- (5) Copy of the endorsement or additional insured rider to the General Liability Policy.

#### **C-4 PROGRESS SCHEDULE FOR PROJECTS WITH CONSTRUCTION COST BELOW \$2,000,000.00**

Within twenty (20) calendar days after the date of the Owner's issuance of a Notice to Proceed, the Contractor shall prepare and submit to the Architect-Engineer a construction schedule in quadruplicate graphically depicting the activities contemplated to occur as a necessary incident to performance of the work required to complete the Project, showing the sequence in which the Contractor proposes for each such activity to occur and the duration (dates of commencement and completion, respectively) of each such activity.

At least once each month, the Architect-Engineer will determine whether the construction schedule developed and submitted by the Contractor meets the requirements stated above and whether the progress of the work complies with the Contractor's schedule. The Contractor shall provide an up-dated schedule with each request for partial payment. Failure of the Contractor to develop and submit a construction schedule as aforesaid shall be sufficient grounds for the Architect-Engineer to find the Contractor in substantial default and certify to the Owner that sufficient cause exists to terminate the contract or to withhold any payment.

Following development and submittal of the construction schedule as aforesaid, the Contractor shall, at the end of each calendar month occurring thereafter during the period of time required to finally complete the subject project, or at such earlier intervals as circumstances may require, update and/or revise the construction schedule to show the actual progress of the work performed and the occurrence of all events which have affected the progress of performance of the work already performed or will affect the progress of performance of the work yet to be performed in contrast with the planned progress of performance of such work, as depicted on the original construction schedule and all updates and/or revisions thereto as reflected in the updated and/or revised construction schedule last submitted prior to submittal of each such monthly update and revision. Each such update and/or revision to the construction schedule shall be submitted to the Architect-Engineer in duplicate. Failure of the Contractor to update, revise and submit the Construction Schedule as aforesaid shall be sufficient grounds for the Architect-Engineer to find the Contractor in substantial default and certify to the Owner that sufficient cause exists to terminate the Contract or to withhold payment to the Contractor until a schedule or schedule update acceptable to the Architect-Engineer is submitted.

The Contractor shall have the option of scheduling a substantial completion date occurring earlier than the date established by the Contract Documents for substantial completion; provided, however, in such event, such earlier substantial completion date will be recognized by the Owner only as a matter of convenience to the Contractor and shall not change the date for substantial completion established by the Contract Documents or be otherwise binding on the Owner or anyone under the Owner's control; and provided further, however, in such event, should events occur during performance of the work necessary to complete the subject project which would justify the granting to the Contractor of an extension of the Contract Time pursuant to the provisions of Article 8 of the AIA General Conditions which form a part of the Contract Documents, the Contractor shall be entitled to receive only such an extension of Contract Time as is determined by the Architect-Engineer to be due the Contractor as follows:

- (1) In the event the currently approved Contractor's schedule indicates completion ahead of the contractually established date for substantial completion, the time extension to the contract shall only be determined, when the total time directly affecting the critical path of the schedule is added to the end date of the schedule thereby making a new end date beyond the contractual completion date. The time extension will only be for the time between the currently approved contractual completion date and the new schedule end date.
- (2) In the event the currently approved Contractor's schedule indicates completion at or after the contractually established date for substantial completion, the time extension shall only be added to the contractually established date for the substantial completion and shall be determined by the Architect-Engineer as the portion of delay time directly affecting the critical path of the current approved contract schedule.

#### **C-5 CONSTRUCTION SCHEDULE AND REQUIREMENTS FOR OVERTIME WORK FOR PROJECTS WITH CONSTRUCTION COSTS IN EXCESS OF \$2,000,000.00**

Within thirty (30) days after the date of the Owner's issuance of a Notice to Proceed, the Contractor shall prepare and submit to the Architect-Engineer a construction schedule in quadruplicate graphically depicting the activities contemplated to occur as a necessary incident to performance of the work required to complete the project, showing the sequence in which the Contractor proposes for each such activity to occur and the duration (dates of commencement and completion, respectively) of each such activity. An example of an acceptable form of such a construction schedule is contained in Appendix A of the Corps of Engineers' Regulation ER 1-1-11 entitled "Network Analysis System", a copy of which is available to the Contractor from the Architect/Engineer, upon request. Other forms of construction schedules, such as "Timeline", "Primavera", "Project

Workbench", or "Super Project", which provide the same kind of information and employ the same basic principles as illustrated in Appendix A of the Corps of Engineers' Regulation ER 1-1-11 will be acceptable to the Owner if used by the Contractor; provided, however, that the Architect-Engineer shall determine whether the construction schedule developed and submitted by the Contractor meets the requirements stated above and such determination shall be binding on the Contractor. Failure of the Contractor to develop and submit a construction schedule as aforesaid shall be sufficient grounds for the Architect-Engineer to find the Contractor in substantial default and certify to the Owner that sufficient cause exists to terminate the contract or to withhold any payment.

Following development and submittal of the construction schedule as aforesaid, the Contractor shall, at the end of each calendar month occurring thereafter during the period of time required to finally complete the subject project, or at such earlier intervals as circumstances may require, update and/or revise the construction schedule to show the actual progress of the work performed and the occurrence of all events which have affected the progress of performance of the work already performed or will affect the progress of the performance of the work yet to be performed in contrast with the planned progress of performance of such work, as depicted on the original construction schedule and all updates and/or revisions thereto as reflected in the updated and/or revised construction schedule last submitted prior to submittal of each such monthly update and revision. Each such update and/or revision to the construction schedule shall be submitted to the Architect/Engineer in duplicate. Failure of the Contractor to update, revise, and submit the construction schedule as aforesaid shall be sufficient grounds for the Architect-Engineer to find the Contractor in substantial default and certify to the Owner that sufficient cause exists to terminate the Contract or to withhold payment to the Contractor until a schedule or schedule update acceptable to the Architect-Engineer is submitted.

The Contractor shall have the option of scheduling a substantial completion date occurring earlier than the date established by the Contract Documents for substantial completion; provided, however, in such event, such earlier substantial completion date will be recognized by the Owner only as a matter of convenience to the Contractor and shall not change the date for substantial completion established by the Contract Documents or be otherwise binding on the Owner or anyone under the Owner's control; and provided further, however, in such event, should events occur during performance of the work necessary to complete the subject project which would justify the granting to the Contractor of an extension of the contract time pursuant to the provisions of Article 8 of the AIA General Conditions which form a part of the Contract Documents, the Contractor shall be entitled to receive only such an extension of contract time as is determined by the Architect-Engineer to be due the Contractor as follows:

- (1) In the event the currently approved Contractor's schedule indicates completion ahead of the contractually established date for substantial completion, the time extension to the contract shall only be determined, when the total time directly affecting the critical path of the schedule is added to the end date of the schedule thereby making a new end date beyond the contractual completion date. The time extension will only be or the time between the currently approved contractual completion date and the new schedule end date.
- (2) In the event the currently approved contractor's schedule indicates completion at or after the contractually established date for substantial completion, the time extension shall only be added to the contractually established date for substantial completion and shall be determined by the Architect-Engineer as the portion of delay time directly affecting the critical path of the current approved contract schedule.

#### **C-6 VERIFICATION OF OWNER'S SURVEY DATA**

Prior to commencing any excavation or grading, the Contractor shall satisfy himself as to the accuracy of all survey data as indicated in these plans and specifications and/or as provided by the Owner. Should the Contractor discover any inaccuracies, errors, or omissions in the survey data, he shall immediately notify the Architect-Engineer in order that proper adjustments can be anticipated and ordered. **Commencement by the Contractor of any excavation or grading shall be held as an acceptance of the survey data by him after which time the Contractor has no claim against the Owner resulting from alleged errors, omissions or inaccuracies of the said survey data.**

#### **C-7 CONSTRUCTION FACILITIES**

##### Sanitary Provisions

The Contractor shall provide and maintain in a neat and sanitary condition such accommodations for the use of his employees as may be necessary to comply with regulations of the County or the Department of Health and Rehabilitative Services. No nuisance will be permitted.

##### Temporary Wiring

The Contractor shall meet all safety requirements of the National Electric Code, Florida Department of Commerce, Bureau of

Worker's Compensation or local requirements. In addition, all wire shall be so sized that it is not over-loaded according to the National Electric Code, and any wire used shall be fused to adequately protect that wire according to the Code referred to.

The Contractor shall have an adequate number of outlets and each outlet shall be properly and clearly labeled with the maximum voltage and fuse protection.

Where temporary lighting is used, outlet shall consist of weatherproof socket insulated and provided with a locking type wire guard.

All devices shall be properly grounded.

#### Storage and Work Areas

Prior to the start of the operations the Contractor shall make arrangements with the Architect-Engineer's field representative and the Owner's representative for the assignment of storage and work areas. Storage site shall be established during the pre-construction meeting. During construction the Contractor shall maintain the areas in a neat condition.

#### Contractor's Field Offices

If project needs require, trailers may be used for field offices, but their use as living quarters for personnel shall be limited to one staff member such as a night watchman or a superintendent.

#### Underground Utilities

The Contractor shall meet all requirements of the United States Department of Labor Occupational Safety and Health Administration (OSHA) in the performance of work related to excavations for underground utilities, foundations and other subsurface work. The contractor shall conduct thorough training in OSHA standards and requirements on a continuing and regular basis throughout the execution of such work. Additional instructions regarding Construction Facilities are set forth in the Section entitled "Special Conditions".

### **C-8 PROJECT DRAWINGS-COPIES FURNISHED TO CONTRACTORS**

The Architect-Engineer will provide the Contractor with ten (10) sets of drawings and specifications upon contract award. The Architect-Engineer will also provide all CAD files necessary for completing As-Built drawings once the contract time has reached sixty (60) days prior to substantial completion of the project as indicated on the Notice To Proceed (plus any additional days granted by formal Change Order). If additional sets are required by the Contractor, they will be furnished upon request for the cost of printing and handling.

### **C-9 PROJECT DRAWINGS-CHANGES**

The Contractor shall immediately indicate plainly and conspicuously on the field set of drawings and at appropriate paragraphs in the Specifications Manual, all changes or corrections made by Addenda and Change Orders as they are issued.

### **C-10 INSPECTIONS - ALL PROJECTS**

All projects will require detailed code compliance inspections by the local authorities with jurisdiction over the area in which the project is located at the contractor's expense. The disciplines normally include, but are not necessarily limited to, structural, mechanical, electrical, plumbing and general building. The contractor shall make all permits, drawings, specifications, previous inspection reports, and change documents available to Code Inspectors. The contractor shall provide a copy of each inspection report to the Architect/Engineer in a timely fashion.

#### OTHER INSPECTIONS

1. The Department of Business and Professional Regulation has responsibility for elevator inspections.
2. The State Fire Marshal has responsibility for inspecting facilities in accordance with the Uniform Fire Safety Standards.
3. The Architect-Engineer will have responsibilities, relative to inspections.
4. The Owner and/or Using Agency representatives may also perform inspections at their discretion.

5. There may be other inspections required as specified elsewhere.

The Contractor has responsibilities relative to all types of inspections and is responsible for contacting all of the inspecting entities to determine his responsibilities. All of these inspecting entities have unique and separate responsibilities. One inspection from an entity will **not** substitute for an inspection from another entity.

### **C-11 SHOP DRAWINGS**

Shop drawings shall be submitted for manufactured or fabricated materials as called for in the separate specification sections. Drawings shall be fully identified by project name, project number, location, supplier's name, date, drawing number, specifications section reference, etc. The Contractor shall submit, with such promptness as to cause no delay in his work, or in that or any other Contractor, four (4) copies (in addition to those copies necessary for his own requirements) of all shop drawings, and schedules, required for the work of the various trades, to the Architect-Engineer for approval. Digital copies of submittals may be used for the review process in lieu of hard copies ONLY when approved by the Architect-Engineer and Owner. The Contractor shall make no deviation from the approved drawings, and the changes made thereto by the Architect-Engineer, if any.

It shall be the responsibility of the Contractor to properly schedule the submission of shop drawings for approval to allow adequate time for checking of drawings, manufacture and shipment of items to job site in sufficient time to prevent delay in Progress Schedule.

It shall also be the responsibility of the Contractor to coordinate the preparation of shop drawings of items, which will be furnished by more than one manufacturer but are designed to interface when installed. Shop drawings submitted to the Architect-Engineer for his approval shall first be checked and approved by the Contractor, the prima facie evidence of which shall be a "checked" stamp marked "Approved", or "Approved as Noted" on each copy of each shop drawing, placed thereon by the Contractor. Shop drawings received without the Contractor's "checked" stamp will be cause for immediate return without further

action. Each drawing correctly submitted will be checked by the Architect-Engineer and marked by him in one of the following ways:

- (1) Approved as drawn.
- (2) Approved as noted.
- (3) Returned for correction.
- (4) Not approved.

#### **Submission and Approval of Shop Drawing & Sample Schedule**

If and when required by the Architect-Engineer, the Contractor shall prepare and submit in triplicate to the Architect-Engineer a completely itemized Schedule of Shop Drawings, brochures and other descriptive literature, listing each and all such items as required under these specifications, which schedule shall indicate for each required item:

- (1) Identification as to pertinent Specification Division.
- (2) Item(s) involved.
- (3) Name of pertinent subcontractor or supplier and the name of pertinent manufacturer.
- (4) Schedule date of delivery of pertinent items to the project.

The subcontractors for all phases of the Contract shall submit through the General Contractor complete brochures covering all materials and/or equipment proposed for use in the execution of the work as required by their respective Divisions of the Specifications. These brochures shall be indexed and properly cross referenced to the plans and specifications for easy identification.

All shop drawings, setting drawings, material brochures, samples and/or color selection materials, which are required and are not included in the foregoing shall be submitted via the General Contractor. Insofar as is possible or practical, all shop drawings or descriptive literature of equipment for the mechanical or electrical trades shall be submitted in a complete brochure for each trade as soon as possible after Notice to Proceed is executed.

The Owner will not grant time extension based on delays due to improper scheduling of work; and the Owner, at his discretion,



may withhold progress payments until such time as these requirements are fully satisfied.

### **C-12 REFERENCE TO A.S.T.M. OR FEDERAL SPECIFICATIONS**

Where reference is made to the Standard Specifications of the American Society for Testing and Materials (A.S.T.M.): "United States Government Federal Specifications, or to other standard specifications of Associated Manufacturer's Organizations, or trades, in connection with the required quality of materials, methods, etc., then the applicable specifications shall be of the latest revised edition effective as of the date bids are opened by the Owner, unless otherwise expressly provided in the Contract Documents".

### **C-13 MANUFACTURER'S SPECIFICATIONS**

Where the name of a concern or manufacturer is mentioned on drawings or in specifications in reference to his required service or product, and no qualifications or specification of such is included, then the material gauges, details of manufacture, finish, etc., shall be in accordance with his standard practice, direction or specifications. The Contractor shall be responsible for any infringement of patents, royalties, or copyrights, which may be incurred thereby.

### **C-14 APPROVAL OF MATERIALS**

A list of all materials, equipment, etc., together with manufacturer's drawings and catalog information shall be submitted to the Architect-Engineer for approval prior to ordering material or equipment but not later than forty-five (45) calendar days after receipt of Notice to Proceed to Mobilize on Site and Proceed with Construction. Information submitted shall show the capacity, operating conditions and all engineering data and descriptive information necessary for comparison and to enable the Architect-Engineer to determine whether same meets specifications. The Architect-Engineer's approval will not relieve the Contractor of the responsibility for performance of any terms of the Agreement.

If the submittals reflect any changes from the plans or specifications, these changes should be clearly indicated by the Contractor.

### **C-15 SUBSTITUTIONS**

Substitutions for a specified system, product or material may be requested of the Architect-Engineer and the Architect-Engineer's written approval must be obtained before substitutions will be allowed. All requests for substitutions should be submitted within forty-five (45) days after award of Contract. Substitutions requested after this date may receive no consideration.

In making requests for substitutions the Contractor shall list the particular system, product, or material he wishes to substitute, the justification for such a request, and the amount he will add or deduct from the contract sum if the substitution is authorized by the Owner and approved by the Architect-Engineer.

If no addition or deduction to the Base Bid is allowed by the Contractor for such substitution, it shall be so stated on the request. Request submitted shall include any and all adjustments of that and any other work affected thereby.

### **C-16 CONSTRUCTION CLIMATE CONTROL**

It shall be the responsibility of the Contractor to provide at his expense, the power, fuel and equipment necessary to maintain climatic conditions and humidity when specified, required for work in progress, or required to protect materials, finishes, equipment or systems installed until the final acceptance of the project by the Owner.

### **C-17 AS-BUILT DRAWINGS**

During the progress of the work, the Contractor shall require the plumbing, air conditioning, heating, ventilating, elevator, and electrical subcontractors to record on their field sets of drawings the exact locations, as installed, of all conduit, pipe and duct lines whether concealed or exposed which were not installed exactly as shown on the contract drawings. The Contractor shall also record all drawing revisions that have been authorized by change order that affect wall or partition locations, door and window locations and other template changes. The exact routing of conduit runs shall be shown on these drawings.

Contractor will provide two (2) CD-ROMs containing As-Built Drawings. Each CD shall contain one (1) set using AutoCAD

2006 (or newer), by Autodesk and one (1) set in PDF format. Each drawing shall be noted "As Built" and shall bear the date, name, and contact information of the subcontractors that performed the work. As-Built drawings shall include only information describing the as-built condition of the project and be clear of all additional information, including lines, shading, clouds, etc, that were not constructed and are not required to depict the as-built condition of the project.

The Contractor shall review the completed As-Built drawings and ascertain that all data furnished on the drawings are accurate and truly represent the work as actually installed. When manholes, boxes, underground conduits, plumbing, hot or chilled water lines, inverts, etc. are involved as part of the work, the Contractor shall furnish true elevations and locations, all properly referenced by using the original bench mark used for the institution or for this project. The CD-ROMS shall be submitted to the Architect-Engineer when completed, together with two sets of black-line prints for certification and forwarding to the Owner, at the time of final completion.

### **C-18 GUARANTEES AND OPERATING INSTRUCTIONS**

If applicable, at Owner's option, the Contractor shall provide full cooperation to the Owner in the production of video tape instructions for the operation and maintenance of all HVAC, fire alarm, sprinkler, irrigation, computer and other systems essential to efficient utilization of the building grounds. The Contractor will perform the actual taping, editing and production of such instructional tapes. Cooperation of the on-site representative of the Contractor shall be the responsibility of the Contractor, whose representatives are to coordinate instructional activities with the Owner and its personnel or agents.

All work performed by the Contractor in completing the subject project shall be guaranteed by the Contractor against all defects resulting from the use of materials, equipment and workmanship for a period of one year from the date of Substantial Completion of the project.

If, within any guarantee period, repairs or changes are required in connection with the guarantee work, which in the opinion of the Architect-Engineer is rendered necessary as a result of the use of materials, equipment or workmanship which are defective or inferior or not in accordance with the terms of the Contract, the Contractor shall, promptly upon receipt of notice from the Owner and without expense to the Owner, proceed to:

***Place in satisfactory condition in every particular all of such guaranteed work, correct all defects therein and; make good all damages to the structure or site or equipment or contents thereof, which, in the opinion of the Architect-Engineer, is the result of the use of materials, equipment, or workmanship which are inferior, defective, or not in accordance with the terms of the Contract and; make good any work or materials or the equipment and contents of structures or site disturbed in fulfilling any such guarantee.***

If the Contractor, after receipt of any such written notice, fails within seventy-two (72) hours to commence at the job site with performance of the work necessary to remedy all defects in the work described in such notice so as to provide the Owner with the subject project completed in accordance with all requirements of the Contract Documents, or fails to complete the performance of such remedial work within a reasonable time after commencing same, the Owner shall be entitled to have such defective work remedied on the account of the Contractor and his Surety, in which event, the Contractor and his Surety shall be fully liable for all costs and expenses reasonably incurred by the Owner in having such defective work remedied.

The Contractor shall be responsible for collecting, identifying, indexing, and collating the following materials from the subcontractors, and will deliver two (2) copies and three (3) electronic disk copies of the finished document to the Architect-Engineer for checking of correctness no later than the date of substantial completion of the project. Each copy will be indexed and ordered per example provided in the contracting workbook. Each hard copy will be bound in white D-ring binders of appropriate size.

Complete equipment diagrams, operating instructions, maintenance manuals, parts lists, wiring diagrams, pneumatic and/or electrical control diagrams, test and balance reports, inspection reports, guarantees and warranties addressed to the State Agency for which the construction is being performed, as applicable, for each and every piece of Fixed Equipment furnished under this contract to be supplied in a ring binder, hard-cover book, properly indexed for ready reference. Also, specific information regarding manufacturer's name and address, nearest distributor and service representative's name, address, office and home phone numbers, make and model numbers, operating design and characteristics, etc., will be required. All information submitted shall be updated to reflect existing conditions.

Subsequent to the time of Substantial Completion and receipt of As-Builts, Operations and Maintenance Books but prior to the date of Final Acceptance, the Contractor and/or subcontractor shall provide a competent and experienced person (or persons) thoroughly familiar with the work for a reasonable period of time to instruct the State Agency personnel in operation and maintenance of equipment and control systems.

This instruction will include normal start-up, run, stop, and emergency operations, location and operation of all controls, alarms and alarm systems, etc. The instruction will include tracing the system in the field and on the diagrams in the instruction booklets so that operating personnel will be thoroughly familiar with both the system and the data supplied.

### **C-19 CLEANING**

Entire area within scope of this work shall be completely cleaned, including all window glass, hardware, plumbing fixtures, electrical fixtures, tile work, etc., and shall be kept clean for the completion of this job. Replace all broken or defective glass within these areas. At the point in time of Substantial Completion, air conditioning filters shall be replaced, and fixed grills, and permanent filters shall be cleaned. Copies of all records of recycling and waste disposal shall be submitted to the CFMO Environmental Office.

### **C-20 FINAL PAYMENT**

In accordance with FS 255.073 and FS 215.422, the Owner shall pay or cause to be paid to the Contractor, the entire unpaid balance of the then Contract Sum, less the amount of any sums which continue to be retained to satisfy the cost of performing any change in the Work which is the subject of any claim or dispute and which has not yet been satisfactorily performed by the Contractor, provided that the parties have not otherwise stipulated in the Certificate of Substantial Completion, and provided further that the Work has been satisfactorily completed, the Contractor's obligations under the Contract have been fully performed, and a final Certificate for Payment has been issued by the Architect-Engineer (See Section C-34, Progress Payments).

The Contractor's application for final payment shall be accompanied by the following:

- 1) Pay Request (3 copies with original signatures and original seals) noted as Final (Exhibit 10).
- 2) Final Schedule of Contract Values (Exhibit 11).
- 3) Consent of Surety to Make Final Payment (Signed & Sealed) (Exhibit 18)
- 4) Power of Attorney from Surety for Release of Final Payment (Signed, Sealed, and dated same as Consent of Surety) (Exhibit 19)
- 5) Contractor's Affidavit of Contract Completion (Exhibit 12)
- 6) A/E Certificate of Contract Completion (Exhibit 12a)
- 7) Final Release of Liens & Claims (Exhibit 9) from each subcontractor/supplier who has filed a Notice to Owner
- 8) Contractor's Guarantee of Construction for one (1) year from the date of Substantial Completion.
- 9) Copy of the Approval by the Architect-Engineer and the transmittal to the State of Florida, Department of Military Affairs of Manuals, Shop Drawings, As-Builts (2 sets CD-ROMS as specified in Section C-17 and 2 sets of Black-Line Prints), Brochures, Warranties, and list of subcontractors including telephone numbers and addresses.
- 10) Verification that State Agency personnel have been trained in the operation of their new equipment for each system; HVAC, Controls, Fire Alarm, etc. (i.e. submittal of Attendance Lists).
- 11) Fully executed Roof Warranty (if applicable) in the name of The State of Florida, Department of Military Affairs. Warranty must be executed by Contractor and manufacturer.
- 12) Other special warranties as required by specifications, in the name of the State of Florida, Department of Military Affairs.

### **C-21 PUBLIC NOTICE**

Immediately following receipt of Notice to Proceed to Mobilize on Site and Proceed with Construction as prescribed in Section B-21 hereinabove, the Contractor shall post a notice in the following form in a conspicuous place on the project site:

"Notice is hereby made to all those concerned and affected that (Contractor's Name) is performing (Project Number, Name and Location).

All parties furnishing labor, materials and/or equipment to said project are to provide notice of such in writing by certified mail to State of Florida, Department of Military Affairs, 2305 State Road 207, St. Augustine, Florida 32085 within twenty (20) calendar days of first providing such labor, materials and/or equipment."

#### **C-22 INCLUSION OF AIA DOCUMENT A-201**

The General Conditions of the Contract for Construction, American Institute of Architects Document A-201, 2007 Edition, as modified, shall apply to and form a part of this Section as if written in full herein.

#### **C-23 SCOPE**

The following Sections C-24 through C-32 set forth modifications and additions to the General Conditions described above.

#### **C-24 ARTICLE 2, OWNER**

Article 2.1.2 – NOT APPLICABLE

Article 2.2.1 – NOT APPLICABLE

#### **C-25 ARTICLE 3, CONTRACTOR**

Article 3.3.2 - Add the following: "Should the Architect-Engineer find any person(s) employed on the project incompetent, unfit or otherwise objectionable for his duties and so certifies the facts to the Contractor, the Contractor shall immediately cause the employee to be dismissed and said employee shall not be re-employed on this project without written consent of the Architect-Engineer."

Article 3.8.1 - Add the following: "If directed by the Architect-Engineer the Contractor shall solicit not less than three bids for the item(s), the cost of which is provided for by a specified allowance sum. The Contractor shall purchase the item(s) from one of the three Bidders as directed by the Architect-Engineer."

Article 3.10.1 – NOT APPLICABLE. Reference Sections C-4 and C-5 for progress scheduling.

Article 3.14.1 - Add the following: "All cutting, fitting and patching work shall blend in and be plumb and square. The quality of materials used shall be the same or surpass those used in the adjacent existing construction."

#### **C-26 ARTICLE 4 ARCHITECT**

Article 4.1.1 - Delete in its entirety and replace with the following: "The Architect-Engineer is the design professional identified in the Owner-Contractor Agreement. Throughout the contract documents, the Architect-Engineer is referred to as if singular in number and masculine in gender. The terms Architect and Architect-Engineer mean the Architect-Engineer or his authorized representative."

Article 4.2.5. Add the following: "The authorized representatives and agents of the Architect-Engineer, Owner, and the United States Federal Agencies providing monies in the form of grant-funds or loans and such other persons as the Owner may designate shall have access to and be permitted to inspect all work, materials, payrolls, records of personnel, invoices of materials, other relevant data and records wherever they are in preparation and progress. The Contractor shall provide proper facilities for such access, inspections and, when required, exact duplicate copies of the aforementioned data shall be furnished."

#### **C-27 ARTICLE 5, SUBCONTRACTORS**

Article 5.2.4 - Add the following: "The Contractor shall not remove or replace subcontractors listed in his bid subsequent to the lists being made public at the bid opening, except upon good cause shown and only when approved in writing by the Owner."

#### **C-28 ARTICLE 7, CHANGES IN THE WORK**

Omit all references to "Construction Change Directive".

## **C-29 ARTICLE 8, TIME**

Article 8.3.1 - Delete the words "or by delay authorized by the Owner pending mediation and arbitration."

Article 8.3.3 – NOT APPLICABLE

## **C-30 ARTICLE 9, PAYMENTS AND COMPLETION**

Article 9.3.1.1 – NOT APPLICABLE

Article 9.7 – NOT APPLICABLE. Reference Section C-36 for Progress Payments

Article 9.9.1 - Delete the words "provided such occupancy or use is consented to by the insurer as required under Section 11.3.1.5 and authorized by public authorities having jurisdiction over the Project."

## **C-31 ARTICLE 11, INSURANCE AND BONDS**

Articles 11.2 through 11.3 - Delete in their entirety and insert in their place:

Article 11.2.1, Owner's Liability Insurance - The Contractor shall be responsible for purchasing and maintaining an Owner's Protective Liability Insurance Policy with minimum limits as described in Section C-3 Contractor's Insurance.

Article 11.3.1, Property Insurance - The Contractor shall purchase and maintain property insurance upon the entire work at the site of the full insurable value thereof.

Article 11.3.2 - Any insured loss is to be adjusted with the Owner and made payable to the Owner as trustee for the insured, as their interests may appear.

Article 11.3.3 - If the Contractor requests in writing that insurance for special hazards are included in the property insurance policy, the Owner shall permit the Contractor to purchase such insurance, but the cost thereof shall be paid for by the Contractor.

Article 11.3.4 - The Owner and Contractor waive all rights against each other for damages caused by fire or other perils to the extent covered by insurance provided under Article 11.3.1, except such rights as they may have to the proceeds of such insurance held by the Contractor as trustee. The Contractor shall require similar waivers by subcontractors and sub-subcontractors.

Article 11.3.5 - If required in writing by any party in interest, the Contractor, as trustee shall, upon the occurrence of an insured loss, give bond for the proper performance of his duties. He shall deposit in a separate account any money so received, and he shall distribute it in accordance with such agreement as the parties in interest may reach. If after such loss no special agreement is made, replacement of damaged work shall be covered by an appropriate change order.

Article 11.3.6 - The Owner, as trustee shall have power to adjust and settle any loss with the insurers.

Article 11.3.7 - If the Owner finds it necessary to occupy or use a portion or portions of the work prior to Substantial Completion thereof, such occupancy shall not commence prior to a time mutually agreed to by the Owner and Contractor and to which the insurance company or companies providing the property insurance once have consented by endorsement to the policy or policies. This insurance shall not be cancelled or lapsed on account of such partial occupancy. Consent of the Contractor and the insurance company or companies to such occupancy or use shall not be unreasonably withheld.

Article 11.3.8 - Loss of Use Insurance - The Owner, at his option, may purchase and maintain such insurance as will insure him against loss of use of his property due to fire or other hazards, however caused.

## **C-32 ARTICLE 13, MISCELLANEOUS PROVISIONS**

Article 13.5.1 - Delete in last sentence: "The Owner shall bear costs of (1) tests, inspections or approvals that do not become requirements until after bids are received or negotiations concluded.", and add;

"The Architect-Engineer shall designate the tests which shall be made, and the Contractor shall not obligate the Owner for tests without the Architect-Engineer's approval.

### Testing Costs Paid for by the Contractor

Certain tests of materials, equipment and systems are required as part of the contract and shall be paid for by the Contractor. These are specifically named in the technical specifications and the types of tests are as follows:

- 1) Where tests are required by the technical specifications for materials, methods or equipment, the Contractor shall pay the cost of initial tests to prove qualities and determine conformance with specification requirements, e.g., mill tests on cement and steel; load testing of piling; sieve analysis and calorimetric tests on sand; strength tests for determining proportions of materials or concrete, moisture content and sound transmission tests of concrete blocks, etc;
- 2) If substitute materials or equipment are proposed by the Contractor, he shall pay the cost of all tests which may be necessary to satisfy the Architect-Engineer that specification requirements are satisfied;
- 3) If materials or workmanship are used which fail to meet specification requirements the Contractor shall pay the costs of all coring or other tests deemed necessary by the Architect-Engineer to determine the safety or suitability of the material or element;
- 4) The Contractor shall pay for all testing costs, including but not limited to; power, fuel, equipment and systems for proper operation such as electrical, plumbing, heating ventilation, air conditioning, elevator, dumbwaiters and conveyors, etc.

### Testing Costs Borne by the Owner

All other tests performed at the direction of the Architect-Engineer or the Owner shall be paid for by the Owner, except to the extent that the costs of performing such tests are otherwise chargeable to the Contractor under provisions of the Contract Documents.”

Article 13.6 – NOT APPLICABLE

Article 13.7 – NOT APPLICABLE

## **C-33 CHANGES IN THE WORK, DELAYS & EXTENSIONS OF TIME, CLAIMS**

### CHANGES IN THE WORK

During the course of the Contractor's performance of the work necessary to complete the subject Project, certain events may occur which have the effect of changing the conditions under which the work is to be performed as specified and described in the Bidding Documents, and/or the nature and extent of the work as specified and described in the Bidding Documents. The occurrence of such events may cause the Contractor to incur greater or less cost and expense to perform the work required to complete the subject Project than planned to be incurred in the Contractor's successful bid, in which event the Contractor or the Owner shall respectively be entitled to either an increase or decrease in the Contract Sum, whichever is the case, to the extent such greater or less cost and expense results, and in which event the party entitled to the benefit of any such adjustment to the Contract Sum shall, within twenty-one (21) calendar days from the first occurrence of such event(s), present written demand on a Proposed Change Order Summary Form (Exhibit 16) therefore on the other party through the Owner. Should the Contractor and Owner be unable to settle and dispose of such demand within thirty (30) calendar days from the date any such claim is presented, upon terms and conditions mutually agreeable to the Contractor and the Owner, then such demand shall be referred to the Owner for determination, which determination shall be final and binding upon the Contractor, unless appealed in accordance with applicable provisions of the Contract Documents, and if the Owner, upon considering any such demand, determines that the Contract Sum should be increased or decreased, the determination of the amount of any such increase or decrease in the Contract Sum shall be governed and controlled by strict adherence to the following described guidelines and limitations, and neither the Contractor or the Owner shall be entitled to receive any monetary consideration beyond that which is authorized herein below.

All adjustments to the Contract Sum resulting from a change in the work shall be determined by the measure of actual or estimated as the case may be, out-of-pocket costs and expenses incurred or spared by the Contractor for labor, materials, equipment, and equipment rental, plus overhead and profit thereon, for performing the changed work.

- A. Labor costs shall be inclusive of all direct job site cost for estimation, laying out, mechanics' wages and laborers' wages, together with all payroll taxes, payroll assessments, and insurance premiums paid for such labor.
- B. All material costs, equipment costs and equipment rental costs shall be trade discount rates, plus State Sales Tax, where applicable.
- C. Overhead and profit shall be inclusive of all project management, project administration, superintendence, project coordination, project scheduling and other administrative support functions and services, whether performed on the job site or off the job site and general support equipment. Overhead and profit shall be determined as follows:
  - 1. Overhead and profit shall be calculated at the rate of 15% of the Contractor's labor, material, equipment and equipment rental costs, incurred or spared, as measured under the preceding paragraphs for changes in the work performed by the officers, employees or subsidiaries of the Contractor.
  - 2. Overhead and profit shall be calculated at the rate of 7 1/2 percent of the Contractor's sub-contractors' actual labor, material, equipment and equipment rental costs, incurred or spared, as measured under the preceding paragraphs, plus 15% of all such costs, as overhead and profit to the Contractor's subcontractors, for all changes in the work performed by the officers, employees or subsidiaries of the Contractor's sub-contractors.
- D. In addition to the foregoing, all adjustments to the Contract Sum resulting from a change in the work shall include all out-of-pocket expenses, incurred or spared, in performing the changes in the work for:
  - 1. Paying the premiums required to obtain Performance Bonds and Labor and Material Payment Bonds called for by the Contract Documents;
  - 2. Paying the fee(s) required for licenses or permits called for by changes in the work;
  - 3. Paying for delivery of materials or equipment to the job site;
  - 4. Paying for storage of materials or equipment before use thereof in performing changes in the work, and
  - 5. Paying for testing required by the changes in the work.
- E. In the event Contractor demands an adjustment in the Contract Sum, such demand shall be accompanied by paid receipts or other such written evidence satisfactory to the Owner itemizing the costs and expenses incurred as a result of the event(s) constituting the changes in the work on a Proposed Change Order Summary Form (Exhibit 16).

DELAYS & EXTENSIONS OF TIME

Article 8.3.3 of the AIA General Conditions is not applicable and Contractor's remedies for delays in the progress of the Work, or for changes in the Work, shall be limited to those provided in this Section. The contractor's exclusive remedy for delays in performance of the contract caused by events beyond its control shall be a claim for equitable adjustment in the contract time; provided, however, inasmuch as the parties expressly agree that overhead cost incurred by Contractor for delays in performing the work cannot be determined with any degree of certainty, it is hereby agreed that in the event the Contractor is delayed in the progress of the Work after Notice to Proceed to Mobilize on Site and to Proceed with Construction for causes beyond its control and attributable only to acts or omissions of Owner, Contractor shall be entitled to compensation for overhead cost and profit either (a) as a fixed percentage of the actual cost of the change in the Work, if the delay results from a change in the Work, as calculated in Section C, "Conditions of the Contract", or (b) if the delay results from other than a change in the Work, at an amount for each day of delay calculated by dividing an amount equal to a percentage of the original contract sum determined on the graph enclosed as Exhibit 13 by the number of calendar days of the original contract time.

In the event of a change in the Work, Contractor's claim for adjustments in contract sum are limited exclusively to its actual costs for such changes plus fixed percentages for overhead, additional profit and bond costs, as specified in herein.

The forgoing remedies for delays and changes in the Work are to the exclusion of, and thus eliminate, the total cost concept [(that is, computing Contractor's additional costs for changes in Work or the costs of a delay in the progress of the Work by

comparing Contractor's total actual costs with its original estimate, see McDevitt & Street Company v. Department of Management Services State of Florida, 377 So.2d 191, (Fla. 1st-DCA 1979)] as the method of determining Contractor's costs associated with a change in the Work or with delay in the progress of the Work.  
No provision of this contract shall be construed as a waiver of sovereign immunity by the Owner.

### CLAIMS AND DISPUTES

A Claim is a demand or assertion by one of the parties seeking, as a matter of right, adjustment or interpretation of Contract terms, payment of money and extension of time or other relief with respect to the terms of the Contract. The term "Claim" also includes other disputes and matters in question between the Owner and Contractor arising out of or relating to the Contract. Claims must be made by written notice. The responsibility to substantiate Claims shall rest with the party making the claim.

No provision of the Contract Documents makes or is intended to make provision for recovery by Contractor of damages for delay or for breach of contract. All claims, disputes or controversies under this contract shall be determined and settled as provided in Section C-39 hereinafter. No claim for breach of contract shall be submitted, determined or settled under Section C-39 hereinafter.

A. TIME LIMITS ON CLAIMS -- Claims by either party must be made within 21 days after occurrence of the event giving rise to such Claim or within 21 days after the claimant first recognizes the condition giving rise to the Claim, whichever is later. Claims must be made by written notice. An additional Claim made after the initial Claim has been implemented by Change Order will not be considered unless submitted in a timely manner.

B. CONTINUING CONTRACT PERFORMANCE --Pending final resolution of a Claim unless otherwise agreed in writing the Contractor shall proceed diligently with performance of the Contract and the Owner shall continue to make payments in accordance with the Contract Documents.

### C-34 PROGRESS PAYMENTS

A. Contractor should note that the Client Agency is the Agency that will occupy and use the project upon substantial completion, and that all or a portion of the funding for this project may have been appropriated by the State Legislature or furnished by Federal Grant to the Client Agency and that payment to the Contractor may be made by the Client Agency based on approval of each payment by the Owner.

Thirty (30) calendar days shall be allowed for the Owner's inspection and approval of the goods and services for which any Application for Payment is made.

The Owner will at intervals pay or cause to be paid to the Contractor as follows:

#### PAYMENTS TO CONTRACTOR

Pursuant to FS 255.073 and FS 215.422

B. Progress Payments against Contract Sum:

Based upon Application for Payment submitted to the Architect-Engineer by the Contractor and Certificates of Payment issued by the Architect-Engineer and accepted by the Owner, the Owner shall make progress payments to the Contractor against the account of the Contract Sum in accordance with the following:

Upon Owner's receipt and acceptance of a certificate of payment, the Owner has five (5) working days to inspect and approve the goods and services, unless otherwise specified herein. The Owner has twenty (20) days to deliver an approved request for payment to the Department of Financial Services. The twenty (20) days are measured from the latter of the date the invoice is received or the goods or services are received, inspected and approved.

The Owner shall pay, or cause to be paid to the Contractor, 90% of the portion of the contract sum properly allocable to labor, materials and equipment incorporated into the work, and 90% of that portion of the contract sum properly allocable to materials and equipment suitably stored at the site or at a bonded warehouse agreed upon in writing by all parties, less the aggregate of previous payments. Ten percent (10%) retainage is held by Owner until work has been completed and all final documentation has been delivered satisfactorily to Project Manager.



If a payment is not available within forty (40) days; a separate interest penalty as established pursuant to Section 215.422, Florida Statutes, shall be due and payable, in addition to the invoice amount, to the Vendor. Interest penalties of less than one (1) dollar shall not be enforced unless the Vendor requests payment. Invoices which have to be returned to a Vendor because of Vendor preparation errors shall result in a delay in the payment. The invoice payment requirements do not start until a properly completed invoice is provided to the Department.

1. The Contractor shall promptly pay each Subcontractor in accordance with Section 287.0585, Florida Statutes, upon receipt of payment from the Owner out of the amount paid to the Contractor on account of such Subcontractor's Work, the amount to which said Subcontractor is entitled, reflecting the percentage actually retained, if any, from payments to the Contractor on account of such Subcontractor's work.
2. The Architect-Engineer may, on request at his discretion, furnish to a Subcontractor, if practical, information regarding the percentages of completion of the amount applied for by the Contractor and the action taken thereon by the Architect-Engineer on account of Work done by such Subcontractor.
3. Neither the Owner nor the Architect-Engineer shall have any obligation to pay or to see to the payment of any monies to any Subcontractor except as may otherwise be required by law.
4. No Certificate for a progress payment, nor any progress payment, nor any partial or entire use of occupancy of the project by the Owner, shall constitute an acceptance of any work not in accordance with the Contract Documents.

C. The Contractor shall request such compensation by submitting:

1. A properly completed Application for Progress Payment on the form FNG 4012E (Exhibit 10).
2. A properly completed Contractor's Minority Business Enterprises Status Report of Partial Payment (Exhibit 15). This form must be submitted even if no minorities were utilized.
3. A Schedule of Contract Values for FNG 4015E (Exhibit 11) as described below.

The Contractor shall, within ten (10) calendar days from date of Notice to Secure Permits letter, submit to the Architect-Engineer and Project Manager for review and approval three copies of a Schedule of Contract Values which will reflect the estimated cost of each subdivision of work of each specification section, further detailed by subcontractor item, and utilizing the Construction Specification's Institute "Master Format Broad Scope Section Numbers". The value of each

item shall include a true proportionate amount of the Contractor's overhead and profit. The sum of all such scheduled values shall equal the Contract Sum as evidenced by the Agreement.

The approved Schedule of Contract Values will accompany and support the Contractor's periodic Applications for Payment and shall indicate the value of suitably stored material as well as labor performed, and materials incorporated into the work for each subdivision of the schedule during the period for which the requisition is prepared.

The Schedule of Contract Values form enclosed as Exhibit 11 will be utilized to present this and other pertinent information which will facilitate the checking and processing by the Owner's representatives of the Contractor's Application for Payment.

4. Waiver and Release of Lien Upon Progress Payment from each subcontractor, dated and notarized.

#### **C-35 EXCLUSION OF OWNER FROM LIABILITY**

Notwithstanding any other provision of the Contract Documents, should the Contractor sustain loss or be damaged by act or omission of a separate Contractor, the Owner shall not be liable for any such loss or damage and the Contractor shall not be entitled to obtain any monetary relief from the Owner to compensate for any such loss or damage, but shall be limited to such recovery as is otherwise available at law from persons and/or entities other than the Owner.

#### **C-36 DUTIES OF ARCHITECT-ENGINEER'S REPRESENTATIVE (If one is authorized by the Owner)**

A. The Duties of the Architect-Engineer's Representative(s) shall include but not be limited to the following:

1. Assist the Contractor in obtaining interpretation of the Contract Documents from the Architect-Engineer.
2. Conduct daily on-site observations for determining conformance to the Contract Documents in regard to work, materials, equipment, etc.
3. Request additional details and/or information from the Architect-Engineer when needed by the Contractor.
4. Evaluate suggestions and/or modifications submitted by the Contractor and transmit these to the Architect-Engineer with recommendations.
5. Anticipate problems, which may create delays and problems in construction and report these to the Contractor and Architect-Engineer for solution.
6. Maintain official relationship only with the General Contractor Job Superintendent(s) and communicate problems to him regardless of which sub-contractor(s) work is involved.
7. Attend all required construction conferences and participate actively in discussions of the project.
8. When authorized by the Architect-Engineer conduct tests and inspections as required by the Contract Documents and record results of such tests and inspections.
9. Maintain a daily log of project activity including but not limited to: hours on the job site, weather conditions, daily construction activity, number of men in each trade on the site, general observations, written and verbal directives to Contractor and visits of governmental officials.
10. If, upon inspections or observations, work is found not to be in accordance with Contract Documents, advise the Architect-Engineer verbally and in writing. Consult with the Architect-Engineer for further directions if the Contractor does not correct work as directed by the Architect-Engineer.
11. Check that tests and inspections to be performed by others, in addition to those performed by Architect-Engineer's Representatives and/or the Architect-Engineer, are actually performed; in accordance with the Contract Documents.
12. When requested, accompany all State and or Federal officials on inspections of construction and record the inspection in the log.
13. Cooperate with Owner's Project Director or Inspectors and provide them with all requested information about the project.
14. Maintain in an orderly manner, files of correspondence, reports of job conferences, shop drawings and samples, copies of contract documents, change orders, addenda, supplementary drawings, and job log.
15. Review requisitions for payment submitted by the Contractor and transmit to the Architect-Engineer with recommendations.
16. Participate in the inspections of construction with the Architect-Engineer and Owner's Project Director at regular intervals and at Substantial Completion and provide Architect-Engineer with information as to work which is not complete, defective, or not in accordance with Contract Documents.
17. Refer all communications from State Agencies to the Owner's Project Director and to the Architect-Engineer.
18. Copy the Owner's Project Manager on all correspondence related to the project.
19. Review plans, specifications and shop drawings on a regular basis. Be alert to errors and omissions on the Contract Documents and construction problems before they occur and advise the Architect-Engineer when discovered.
20. Advise Contractor and Architect-Engineer of work being performed with unapproved shop drawings or without shop drawings when such shop drawings are required by specifications.

21. Check materials and equipment delivered to the job site against specifications, approved samples, shop drawings and related correspondence. If in conflict, advise Contractor and/or Architect-Engineer.
22. Check that Contractor is maintaining a record of notated drawings of As-Built conditions, when As-Built drawings are specified to be provided.
23. When necessary, act as liaison between the Contractor and the State Agency who will occupy the project in the coordination of the State Agency's requirements to the Contractor(s) schedule.

B. The Architect-Engineer's Representative is **not** authorized to do the following:

1. Authorize deviations from the Contract Documents (unless approved by Architect-Engineer).
2. Expedite the work for the Contractor(s).
3. Advise the Contractor on building techniques or scheduling.
4. Approve Shop Drawings.
5. Issue Certificate for Payment.
6. Approve substitutions.
7. Interpret the Contract Documents except when obviously clear.

C. The Architect-Engineer's Representative should **not**:

1. Get involved in disputes or problems between subcontractor and subcontractor.
2. Get involved in disputes or problems between General Contractor and subcontractor.
3. Offer gratuitous advice to Contractor or subcontractors on how to perform the work whether solicited from Contractors or not.
4. Communicate with State Agency's representative in any official way except as noted in Item A-23 above.
5. Make vague and unclear log entries as to the acceptability of the Contractor's work. If log entries are deemed unacceptable and not corrected properly and in a timely way, the condition should be entered into the job log clearly as a statement made with follow-up written communication to the Architect-Engineer.
6. Order a work stoppage except in extreme emergencies or except under conditions authorized by the Architect-Engineer only.

**C-37 DUTIES OF THE OWNER'S STATE CONSTRUCTION REPRESENTATIVE (If one is authorized by the Owner)**

**NOTE: This Representative is NOT a State Building Code Inspector**

A. The duties of the Owner's State Construction Representative shall include but not be limited to the following:

1. Be present at the site at all times when construction is being performed and conduct daily on-site observations for determining conformance to the Contract Documents in regard to work, materials, equipment, etc.
2. Anticipate problems, which may create delays and problems in construction, and report these to the Owner's Project Director for solution.
3. Attend all construction conferences.
4. When authorized by the Owner's Project Director, conduct inspections as required by the Contract Documents and

record results of such inspections.

5. Maintain a daily log of project activity including but not limited to: hours on the job site, weather conditions, daily construction activity, number of men in each trade on the site, general observations, written and verbal directives to the Contractor and visits of governmental officials and the Architect-Engineer.
  6. If, upon inspection or observations, work is believed not to be in accordance with Contract Documents, advise the Owner's Project Director verbally and in writing.
  7. Check that tests and inspections to be performed by others, in addition to those performed by Architect-Engineer's Representative and/or the Architect Engineer, are actually performed in accordance with the Contract Documents.
  8. When requested, accompany all State and/or Federal officials on inspections of construction and record the inspection in the log.
  9. Cooperate with the Owner's Project Director and provide them with all requested information about the project that he can provide or direct them to the Architect-Engineer for assistance where appropriate.
  10. Maintain in an orderly manner, files of correspondence, reports of job conferences, shop drawings and samples, copies of contract documents, change orders, addenda, supplementary drawings and job log.
  11. Review requisitions for payment submitted by the Contractor via the Architect-Engineer and transmit to the Owner's Project Director with recommendations.
  12. Participate in the inspections of construction with the Owner's Project Director at regular intervals and at substantial completion and provide the Owner's Project Director with information as to work which he feels is not complete, defective, or not in accordance with Contract Documents.
  13. Refer all communications from State Agency that will occupy the project to the Owner's Project Director.
  14. Copy the Owner's Project Director on all correspondence related to the Project.
  15. Review plans, specifications and shop drawings on a regular basis. Be alert to errors and omissions on the Contract Documents and construction problems before they occur and advise the Owner's Project Director when he feels problems exist.
  16. Advise the Owner's Project Director when he observes work being performed with unapproved shop drawings or without shop drawings when such shop drawings are required by specifications.
  17. Check materials and equipment delivered to the job site against specifications, approved samples, shop drawings and related correspondence. If believed to be in conflict, advise the Owner's Project Director.
  18. Check that Contractor is maintaining record notated drawings of as-built conditions, when as-built drawings are specified to be provided.
- B. The Owner's State Construction Representative is not authorized to do the following:
1. Authorize deviations from the Contract Documents.
  2. Expedite the work for the Contractor.
  3. Advise the Contractor on building techniques or scheduling.
  4. Approve Shop Drawings.
  5. Issued Certificate for Payment.
  6. Approve Substitutions.

7. Interpret the Contract Documents for the Contractor.

C. The Owner's State Construction Representative should **not**:

1. Get involved in disputes or problems between subcontractor and subcontractor.
2. Get involved in disputes or problems between General Contractor and subcontractor.
3. Offer gratuitous advice to Contractor and subcontractors on how to perform the work whether solicited from Contractors or not.
4. Communicate with State Agency's representative in any official way.
5. Make vague and unclear log entries as to the acceptability of the Contractor's work. If log entries are deemed unacceptable and not corrected properly and in a timely way, the conditions should be entered into the job log clearly as a statement made with follow-up written communications to the Owner's Project Director.
6. Order a work stoppage except in extreme emergencies affecting Life Safety.

### **C-38 PROHIBITED MATERIALS - ASBESTOS**

Per Section 255.40, Florida Statutes, the use of asbestos or asbestos-based fiber materials is prohibited in any buildings, construction of which is commenced after September 30, 1983, which is financed with public funds or is constructed for the express purpose of being leased to any governmental entity.

### **C-39 CLAIMS AND DISPUTES**

The provisions of Chapter 28-106, Florida Administrative Code to the extent not inconsistent with this Article are referred to and adopted by reference and shall govern procedures for claims.

Under the terms of this Agreement, the Contractor shall not have any right to compensation other than, or in addition to, that provided by this Agreement, to satisfy any claim for costs, liabilities or debts of any kind whatever resulting from any act or omission attributable to the Owner unless the Contractor has provided notice as required by Section C-35 and unless the claim therefore is delivered to the Owner. All such claims shall be set forth in a petition stating:

1. Name and business address of the claimant,
2. A concise statement of the ultimate facts, including the statement of all disputed issues of material fact, upon which the claim is based.
3. A concise statement of the provisions of the contract together with any federal, state and local laws, ordinances or code requirements or customary practices and usages in the industry asserted to be applicable to the questions presented by the claim and a demand for the specific relief believed to be due the claimant, and
4. The date of the occurrence of the event giving rise to the claim and the date and manner of Contractor's compliance with the notice requirements of Section C-33.

Within thirty (30) calendar days from the date any such claim is received, the Owner shall deliver to the Contractor its written determination on the claim. Unless the Owner's determination is agreed to by the Contractor and a consent order adopting the determination is entered within thirty (30) days of receipt of the Owner's determination, the Owner shall designate a hearing officer who shall conduct a proceeding in accordance with Chapter 28-106, F.A.C.

The Contractor shall carry on the Work and maintain the progress schedule during any administrative proceeding unless otherwise agreed by the Contractor and the Owner in writing.

The venue for all civil and administrative actions against the department shall be in Leon County, unless otherwise agreed by the parties.

#### **C-40 INTEREST PROVISIONS**

Any monies not paid when due to either party under this Agreement shall not bear interest except as may be required by Section 215.422, Florida Statutes.

#### **C-41 HARMONY**

Contractor is advised and hereby agrees that he will exert every reasonable and diligent effort to assure that all labor employed by Contractor and his subcontractors for work on the project shall work in harmony with and be compatible with all other labor being used by building and construction contractors now or hereafter on the site of the project.

Contractor further agrees that this provision will be included in all subcontracts of the subcontractor as well as in the Contractor's own contract; provided, however, that this provision shall not be interpreted or enforced so as to deny or abridge, on account of membership or non-membership in any labor union or labor organization, the right of any person to work as guaranteed by Article 1, Section 6 of the Florida Constitution.

#### **C-42 CONTRACTOR'S REPRESENTATION**

The Contractor represents and warrants that the information provided by the Contractor on Owner's Form DBC-5085 "Experience Questionnaire and Contractor's Financial Statement" (Exhibit 3), which was submitted by the Contractor to qualify for award of this contract, and is hereby made a part of this Agreement by reference, is true, accurate and correct. The Contractor understands and agrees that materially inaccurate information may result in termination of this contract at the Owner's option.

#### **C-43 CONTRACTOR'S WORK FORCE**

The Contractor agrees to perform no less than 15% of the project construction work utilizing his own employees. The percentage shall be calculated on the basis of the cost of materials and labor utilized by the prime Contractor's own forces in relation to the original contract amount.

#### **C-44 CONTRACTOR'S SUPERVISION OF PROJECT**

The Contractor must provide, as a minimum, field (on-site) supervision (through a named superintendent) of each of the general, concrete forming and placement, masonry, mechanical, plumbing, electrical and roofing trades, either through the use of his employees, or in the instance of mechanical, plumbing and electrical trades through the use of employees of the subcontractor as shown in Items 55 and 56 of the Documents entitled "Experience Questionnaire and Contractor's Financial Statement", and Item (2)(b)11 Supervisor, as required in Rule 60D-5.004 displayed in Paragraph B-2 of the Specifications. These Documents by reference form part of this Agreement. The Contractor shall not change or deviate from these principal and supervisory personnel without the written consent of the Owner.

#### **C-45 TERMINATION FOR CAUSE OR MUTUAL AGREEMENT**

This Agreement may be terminated by either party upon seven (7) days' notice by mutual agreement or should one party fail substantially to perform in accordance with its terms through no fault of the other. Also, this Agreement may be unilaterally terminated by the Owner for refusal by the Contractor to allow public access to all documents, papers, letters, or other material subject to the provisions of Chapter 119, Florida Statutes, and made or received by the Contractor in conjunction with this Agreement. In the event of termination, due to the fault of others than the Contractor, the Contractor shall be paid for services performed to termination date, including reimbursements then due plus terminal expense.

#### **C-46 TERMINATION FOR CONVENIENCE**

The performance of work under this contract may be terminated by the Owner in accordance with this clause in whole, or from time to time in part, whenever the Owner shall determine that such termination is in the best interest of the Owner. Upon termination, the Contractor shall be entitled to payment and profit for work completed to the time of termination only. The percentage of completion shall be determined by the Architect-Engineer, based upon the approved Schedule of Values.

#### **C-47 CONTRACTOR PAYMENT RIGHTS**

If a payment is not available within forty (40) days of receipt of an approved pay request, a separate interest penalty as established pursuant to Section 215.422, Florida Statutes, shall be due and payable, in addition to the invoice amount, to the Vendor. Interest penalties of less than one (1) dollar shall not be enforced unless the Vendor requests payment. Pay Requests which have to be returned to a Contractor because of Contractor preparation errors will result in a delay in the payment. The Pay Request payment requirements do not start until a properly completed Pay Request is provided to the Owner and has been approved and stamped as received.

#### **C-48 PUBLIC ENTITY CRIME INFORMATION STATEMENT**

A person or affiliate who has been placed on the convicted vendor list following a conviction for a public entity crime may not submit a bid on a contract to provide any goods or services to a public entity, may not submit a bid on a contract with a public entity for the construction or repair of a public building or public work, may not submit bids on leases of real property to a public entity, may not be awarded or perform work as a contractor, supplier, subcontractor, or consultant under a contract with any public entity, and may not transact business with any public entity in excess of the threshold amount provided in Section 287.017, for Category Two for a period of 36 months from the date of being placed on the convicted vendor list.

#### **C-49 DISCRIMINATION, DENIAL OR REVOCATION FOR THE RIGHT TO TRANSACT BUSINESS WITH PUBLIC ENTITIES**

An entity or affiliate who has been placed on the discriminatory vendor list may not submit a bid on a contract to provide any goods or services to a public entity, may not submit a bid on a contract with a public entity for the construction or repair of a public building or public work, may not submit bids on leases of real property to a public entity, may not be awarded or perform work as a contractor, supplier, subcontractor, or consultant under a contract with any public entity, and may not transact business with any public entity.

#### **C-50 UNAUTHORIZED ALIENS**

The Department shall consider the employment by any contractor of unauthorized aliens a violation of section 274(e) of the Immigration and Nationalization Act. Such violation shall be cause for unilateral cancellation of this contract.

Unauthorized Aliens Checks Through E-Verify System:

*Pursuant to the State of Florida, Office of the Governor, Executive Order Number 11-02 entered on January 4, 2011, Contractor will utilize the U.S. Department of Homeland Security's E-Verify system to verify the employment eligibility of: (a) all persons employed during the term of the Contract by Contractor to perform employment duties within Florida within 3 business days after the date of hire; and (b) all persons (including subcontractors) assigned by Contractor to perform work pursuant to the Contract with the Department within 90 calendar days after the date the Contract is executed or within 30 days after such persons are assigned to perform work pursuant to the Contract, whichever is later.*

#### **C-51 ELECTRONIC MAIL CAPABILITIES**

The Contractor must have electronic mail capabilities through the World Wide Web. It is the intention of the Department of Military Affairs to use electronic communication for all projects whenever possible. The Contractor shall provide their electronic mail address and the name of a contact person responsible for their electronic communications.

#### **C-52 ASSIGNMENT**

For and in recognition of good and valuable consideration, receipt of which is hereby acknowledged, the Contractor hereby conveys, sells, assigns and transfers to the State of Florida all rights, title and interest in and to all causes to action it may now or hereafter acquire under the antitrust laws of the United States and the State of Florida for price fixing, relating to the particular goods or services purchased or acquired by the State of Florida pursuant to this Agreement.

#### **C-53 BUILDINGS PLANS EXEMPTION POLICY**

Pursuant to Section 119.071(3)(b), Florida Statutes, all building plans, blueprints, schematic drawings, and diagrams, including draft, preliminary, and final formats, which depict the internal layout and structural elements of a building, arena, stadium, water treatment facility, or other structure owned or operated by an agency are exempt from inspection or disclosure

under Florida's Sunshine laws. The Architect-Engineer/Contractor agrees to protect and ensure the confidentiality of such documents under its custody or control in conformance with the requirements of Section 119.071(3), Florida Statutes, and all applicable laws. At a minimum, all such documents shall be prominently marked, directly or on an attached cover page, with the following statement: "***All plans contained herein are confidential and exempt from public inspection or disclosure pursuant to Section 119.071(3)(b), Florida Statutes.***" Any violation of this paragraph or Chapter 119, Florida Statutes, may result in immediate termination of the contract by Owner.

#### **C-54 CONTRACTOR ENVIRONMENTAL AWARENESS TRAINING**

Contractor supervisors and all subcontractor supervisors managing projects at FLARNG facilities and properties must show completion of the Contractor Environmental Awareness Training prior to beginning any work. The training is completed by logging into <http://flarng.ecatts.com> and registering as a contractor or subcontractor using the new user login password: flarng (all lowercase). Once the training is complete a certificate of completion can be printed as proof of completion. These certificates and the FLARNGs' Environmental Policy must be posted at the work site for all supervisors working onsite. It will be the responsibility of the contractor and subcontractor to ensure that all construction personnel working onsite have been made aware of the FLARNGs' Environmental Policy.

#### **SECTION D**

#### **SPECIAL CONDITIONS**

#### **D-1 ARCHITECT ENGINEER'S FIELD OFFICE**

~~If required by Project constraints, Contractor shall provide and maintain a watertight office at the project for the exclusive use of the Architect Engineer and his representatives, not less than 12' x 12' in size, one room with at least one window in each exterior wall and an independent outside entrance door fitted with hardware and lock, artificial light, a bench with one drawer, a blueprint rack, a heater and a window air conditioner. This office and equipment shall become the property of the Contractor upon completion of the contract.~~

#### **D-2 VOICE/DATA/FAX**

~~If required by Project constraints, voice/data/fax capability shall be installed in the Architect Engineer's field office, at the contractor's expense, and it shall remain until the full completion of the project. Charges for long distance calls shall be paid for by the person making the calls. All other charges in connection with the telephone shall be paid for by the Contractor.~~

#### **D-3 WATER**

Water necessary for construction of the building and testing its plumbing and mechanical systems shall be furnished by the Contractor. He shall make all connections, install a meter, take out and pay for all permits necessary, do all piping and clear away all evidence of same after the job is completed; as well as pay for usage of water.

#### **D-4 ELECTRICITY**

All electricity for light and power necessary for the construction of the building and testing of its electrical and mechanical systems shall be paid for by the Contractor. He shall make all necessary arrangements for this service and perform the work required at contractor expenses; as well as pay for usage of electricity.

#### **D-5 PROJECT SIGN**

A sign shall be erected at the site by the Contractor and shall consist of 4' X 8' X 3/4" exterior grade plywood mounted on 4" x 4" wood posts (pressure treated.), located in a prominent location approved by the Architect-Engineer and Owner. Sign shall conform to the design as illustrated on enclosed Exhibit 14.

#### **D-6 PRE-CONSTRUCTION CONFERENCE**

Prior to starting construction, the Owner's Contract Manager will arrange a meeting with the Project Manager, Architect-Engineer, Occupant Representative that will occupy the project, General Contractor, Federal Representatives if involved, Bureau of Apprenticeship and other interested parties. The purpose of this meeting shall be to discuss requirements and responsibilities of the various parties involved with the objective of expeditious handling of the construction contract. The Owner's Contract



Manager will chair this meeting.

**D-7 SITE SECURITY**

The Contractor shall pay for and be responsible to secure the site and the project against theft, vandalism, fire, and for public safety at all times (24 hours per day) from Notice to Proceed until Substantial Completion.

**D-8 FLORIDA STATUTE 119.0701, FREEDOM OF INFORMATION ACT**

**IF THE CONTRACTOR HAS QUESTIONS REGARDING THE APPLICATION OF CHAPTER 119, FLORIDA STATUTES, TO THE CONTRACTOR'S DUTY TO PROVIDE PUBLIC RECORDS RELATING TO THIS CONTRACT, CONTACT THE CUSTODIAN OF PUBLIC RECORDS AT: DEPARTMENT OF MILITARY AFFAIRS, CONSTRUCTION & FACILITY MANAGEMENT OFFICE, CONTRACT MANAGEMENT BRANCH, 2305 STATE ROAD 207, ST. AUGUSTINE, FL 32086, (904) 827-8544 OR (904) 823-0256, OR E-MAIL: [NG.FL.FLARNG.LIST.CFMO-CONTRACTING@MAIL.MIL](mailto:NG.FL.FLARNG.LIST.CFMO-CONTRACTING@MAIL.MIL)**

**EXHIBIT 1**  
**INVITATION TO BID**

DATE: \_\_\_\_\_

COMPANY NAME: \_\_\_\_\_

EMAIL ADDRESS: \_\_\_\_\_

E-MAIL CONTACT: \_\_\_\_\_

POC TELEPHONE NO.: \_\_\_\_\_

PROPOSALS ARE REQUESTED FROM QUALIFIED LICENSED GENERAL/BUILDING CONTRACTORS BY THE State of Florida, Department of Military Affairs HEREINAFTER REFERRED TO AS OWNER, FOR CONSTRUCTION OF:

PROJECT NUMBER: \_\_\_\_\_

PROJECT NAME & LOCATION: \_\_\_\_\_

POTENTIAL RESPONDENTS TO THE SOLICITATION ARE ENCOURAGED TO CAREFULLY REVIEW ALL THE MATERIALS CONTAINED HEREIN AND PREPARE RESPONSES ACCORDINGLY.

FOR: (Project Description) \_\_\_\_\_

Building must meet Florida Building Code, State Fire Marshall, local Authorities Having Jurisdiction and Area Water Management requirements, and any other permits and fees required by other county, local or state authorities.

Regulatory permitting to include the preparation, submittal, payment and review coordination of the Water Management District, Environmental Resource Permit (including permit fees), Florida Department of Environmental Protection (FDEP) Notice of Intent (including filing fees), Clay County Review Permit Fee.

Prior to contract award, the Department reserves the right to perform or have performed, an on-site review of the proposer's facilities and qualifications. This review will serve to verify data and representations submitted by the proposer and may be used to determine whether the proposer has an adequate, qualified, and experienced staff, and can provide overall management facilities. The review may also serve to verify whether the proposer has financial capability adequate to meet the contract requirements. Should the Department determine that the bid/proposal has material misrepresentations or that the size or nature of the proposer's facilities or the number of experienced personnel (including technical staff) are not adequate to ensure satisfactory contract performance, the Department has the right to reject the bid/proposal).

The respondent shall warrant that it has not employed or retained any company or person, other than a bona fide employee working solely for the respondent to solicit or secure the award for this project and that it has not paid or agreed to pay any person, company corporation, individual or firm other than a bona fide employee working solely for the respondent any fee, commission, percentage, gift or other consideration contingent upon or resulting from the award.

The respondent shall warrant that it presently has no interest and shall not acquire any interest which would conflict in any manner or degree with the performance of services required.

The respondent will comply with all applicable federal, state and local rules and regulations in providing services to the Department under this solicitation if awarded.

**PUBLIC ENTITY CRIME INFORMATION STATEMENT:** A person or affiliate who has been placed on the convicted vendor list following a conviction for a public entity crime may not submit a bid on a contract to provide any goods or services to a public entity, may not submit a bid on a contract with a public entity for the construction or repair of a public building or public work, may not submit bids on leases of real property to a public entity, may not be awarded or perform work as a contractor, supplier, subcontractor, or consultant under a contract with any public entity, and may not transact business with any

public entity

in excess of the threshold amount provided in Section 287.017, for Category Two for a period of 36 months from the date of being placed on the convicted vendor list.

The STATE OF FLORIDA requires all Contractors to implement a drug free workplace program as defined in 287.087, Florida Statutes.

**DISCRIMINATION; DENIAL OR REVOCATION FOR THE RIGHT TO TRANSACT BUSINESS WITH PUBLIC ENTITIES:** An entity or affiliate who has been placed on the discriminatory vendor list may not submit a bid on a contract to provide any goods or services to a public entity, may not submit a bid on a contract with a public entity for the construction or repair of a public building or public work, may not submit bids on leases of real property to a public entity, may not be awarded or perform work as a contractor, supplier, subcontractor, or consultant under a contract with any public entity, and may not transact business with any public entity.

**BID SECURITY:** Bids/Proposals in total excess of \$100,000.00, the bidder must provide with bid, a good faith deposit in the amount of 5% of the bid by way of a bid bond from a surety insurer authorized to do business in the STATE OF FLORIDA as surety or a certified check or cashier's check accompanying the bid.

**PERFORMANCE BOND AND LABOR AND MATERIAL PAYMENT BOND'S** are required from any persons or parties entering into a formal contract with the STATE OF FLORIDA for contracts in total excess of \$100,000.00 for construction, additions, renovations, repairs, or demolition of any public building pursuant to Florida Statute 255.05(1)(a).

**CONTRACTOR INSURANCE:** The contractor must provide the owner with proof of insurance within 10 days of contract award. NO work may commence in connection with the contract until he has obtained all insurance as specified in the Non-Technical Specifications Level III, Section C-4 or the Non-Technical Specifications Level IV & V, Section C-3 and such insurance has been approved by the Owner, nor shall the contractor allow any subcontractor to commence work on his subcontract until all similar insurance required of the subcontractor has been so obtained and approved by owner. All insurance policies shall be with insurers qualified and doing business in Florida through an authorized licensed Florida Resident Agent. The insurance requirements shall be completed in a timely manner in order not to delay the construction schedule.

**All questions regarding this procurement will be accepted in writing via facsimile or email to** Department of Military Affairs - CFMO, Attention: Contracting Branch: Facsimile: (904) 823-0189 or Email Address: [cfmocontracting@ng.army.mil](mailto:cfmocontracting@ng.army.mil).

Any questions from proposers concerning this solicitation shall be submitted in writing, identifying the submitter, to the Contracting Branch listed above at the address specified above by email or by facsimile no later than the date specified below. E-mail inquiries are preferred; however, a hard copy or facsimile is acceptable.

**INFORMATION WILL NOT BE AVAILABLE BY TELEPHONE.** All information received through any oral communication shall not be binding on the Department of Military Affairs and shall not be relied upon by a Bidder.

Pursuant to Section 287.057(26), Florida Statutes, Respondents to this solicitation of persons acting on their behalf may not contact, between the release of the solicitation and the end of the 72-hour period following the agency posting the notice of intended award, excluding Saturdays, Sundays, and state holidays, any employee or officer of the executive or legislative branch concerning any aspect of this solicitation, except in writing to the procurement officer or as provided in the solicitation documents. Violation of this provision may be grounds for rejecting a response.

All questions and answers/changes to the solicitation will be provided in Addenda Form and posted on the DMS Vendor Bid System (VBS). It is the prospective contractor's responsibility to check periodically for any information updates, to the solicitation, which is posted to the VBS. The Department of Military Affairs bears no responsibility for any delays, or resulting impacts, associated with a prospective contractor's failure to obtain information made available through the DMS Vendor Bid System.

**CONFLICT OF INTEREST:** This solicitation is subject to chapter 112 of the Florida Statutes. Respondents shall disclose with their response the name of any officer, director, employee or other agent who is also an employee of the State. Respondents shall also disclose the name of any State employee who owns, directly or indirectly an interest of five percent (5%) or more in the respondent or its affiliates.

**MANDATORY SITE VISIT AND PRE-BID MEETING:**

**DATE AND TIME: Local Time**

**PLACE: (Facility address/location)**

**All General Contractors interested in bidding on this project are required to attend this pre-bid meeting. Subcontractor participation is highly encouraged. No later dates for site visits will be scheduled.**

**SEALED BIDS WILL BE RECEIVED, PUBLICLY OPENED AND READ ALOUD ON:**

**DATE AND TIME: local time**

**PLACE: Robert F. Ensslin, Jr, National Guard Armory, 2305 State Road 207, St. Augustine, Florida 32086. (Drill Hall Floor)**

**MARK ENVELOPES: SEALED BID-DO NOT OPEN for Project Number/Name \_\_\_\_\_, \_\_\_\_\_, Department of Military Affairs, Robert F. Ensslin National Guard Armory, 2305 State Road 207, Room 421, St. Augustine, Florida 32086, Attn: Contracting Department.**

**BIDS/RESPONSES TRANSMITTED ELECTRONICALLY WILL NOT BE CONSIDERED. BIDS/RESPONSES RECEIVED AT THE LOCATION DESIGNATED AFTER THE EXACT TIME SPECIFIED FOR RECEIPT WILL NOT BE CONSIDERED.**

**Bids submitted via courier or mail must be delivered to the above address, please do not send Sealed Bids to the project location or any other Department of Military Affairs location. The Department of Military Affairs will not assume receipt of any sealed bid unless delivered to the address and room listed in this solicitation.**

**BID/PROPOSAL:** All responses must be submitted in a sealed package and shall be clearly marked on the outside of package with the above information. Department of Military Affairs is not responsible for the opening of any solicitation package which is not properly marked. Bids will be time stamped on the official time clock upon delivery. It is the respondent's responsibility to assure its response is submitted in the place and time indicated in this solicitation. Also, all responses must be in full accordance with the requirements of the Drawings, Specifications, Bidding Conditions and Contractual Conditions, and Non-Technical Specifications, which have been prepared by the Engineer as listed, and may be obtained as follows:

**ARCHITECT-ENGINEER: POC Name**

**TELEPHONE: \_\_\_\_\_ Fax \_\_\_\_\_**

**EMAIL ADDRESS: (POC email address)**

**Make all checks or money orders payable to: \_\_\_\_\_. No credit cards are accepted.**

**FULL SETS of drawings and specifications may be purchased by payment of the printing and handling cost at the rate of \$ \_\_\_\_\_.00 per set, or \$ \_\_\_\_\_ for CD, NON-REFUNDABLE, or may be available for purchase upon request at the Pre-Bid Meeting.**

**Note:**

1. General Contractors are limited to 2 sets only.
2. Only Full Sets of documents will be issued.
3. Shipping Costs for Documents is not included in the above deposit price.
4. Documents will not be available in electronic format.

**FINAL QUESTIONS FROM BIDDERS: Local Time**

Any questions from proposers concerning this solicitation shall be submitted in writing, identifying the submitter, to the contacts listed by email or fax only.

**Questions submitted after this date will not be answered. All technical questions regarding this procurement will be accepted via email ONLY to \_\_\_\_\_. All questions will be answered in addendum form. Addenda will be sent to all parties on A/E plan holders list and Pre-Bid Meeting Sign-In sheet as well as published in the Vendor Bid System.**

**CONTRACT AWARD:** Contract award will be given to the lowest responsive and responsible bidder. The lowest bid will be the bid from the responsive bidder that has submitted the lowest price for the base bid or the base bid plus the additive alternates or less the deductive alternates chosen by the Agency to be included in or excluded from the proposed contract, taken in numerical order listed in the bid documents. The order of the alternates may be selected by the Agency in any sequence so long as such acceptance out of order does not alter the designation of the low bidder. Failure to file a protest within the time prescribed in Section 120.57(3), Florida Statutes, shall constitute a waiver of proceedings under Chapter 120, Florida Statutes. If no protest is filed, the contract will be awarded to the qualified, responsible and responsive low bidder in accordance with Chapter 60D-5 by the Owner.

**INABILITY TO POST ELECTRONICALLY:** If the Department is unable to post (due to technical difficulties) as defined above, the Department will notify all proposers via the Point of Contact and electronic address provided to the Department by the proposer at the Mandatory Pre-Bid meeting. Notice will be posted as defined above once the technical difficulties have been rectified; however, the official posting time will be that time at which the last proposer was electronically notified.

**MINORITY PROGRAM:** Minority Business Enterprises (MBE) are encouraged to participate in this Invitation to Bid. Utilization of MBE participation is highly encouraged from all Bidders. MBE's must be certified by the Office of Supplier Diversity.

**CLARIFICATIONS/REVISIONS:** Before award, the Owner reserves the right to seek clarifications or request any information deemed necessary for proper evaluation of submissions from all respondents deemed eligible before Contract award. Failure to provide requested information may result in rejection of the response.

The Department reserves the right to accept or reject any or all proposals received and reserves the right to make an award with or without further discussion of the proposals submitted or accept minor informalities or irregularities in the best interest of the State of Florida, which are considered a matter of form and not substance, and the correction or waiver of which is not prejudicial to other proposers. Minor irregularities are defined as those that will not have an adverse effect on the Department's interest and will not affect the price of the proposal by giving a proposer an advantage or benefit not enjoyed by all other proposers. It is understood the proposal will become a part of the Department's official file, without obligation to the Department. Proposals may be rejected if found to be irregular or not in conformance with the requirements and instructions contained herein. A proposal may be found to be irregular or non-responsive by reasons that include but are not limited to failure to utilize or complete in their entirety prescribed forms, conditional proposals, incomplete proposals, ambiguous proposals, and improper, missing and/or undated signatures.

The State of Florida, Department of Military Affairs, objects to and shall not consider any additional terms or conditions submitted by a respondent, including any appearing in documents attached as part of a respondent's response. In submitting its response, a respondent agrees that any additional terms or conditions; whether submitted intentionally or inadvertently, shall have no force or effect. Failure to comply with terms and conditions, including those specifying information that must be submitted with a response, shall be grounds for rejecting a response.

The State of Florida, through the Department of Management Services, has instituted MyFloridaMarketPlace, a statewide e-procurement system. Pursuant to rule 60A-1.032(1), Florida Administrative Code, this contract shall be exempt from the one percent (1%) transaction fee. Prior to entering into a contract with the State of Florida, Department of Military Affairs, the selected contractor must be registered with the Florida Department of Management Services (DMS) MyFloridaMarketPlace Vendor Registration System. Information about the registration process is available, and registration must be completed at the MyFloridaMarketPlace website (link available under BUSINESS at ([www.myflorida.com](http://www.myflorida.com))). Prospective contractors who do not have Internet access may request assistance from the MyFloridaMarketPlace Customer Service at (866) 352-3776.

The Level 3 Non-Technical Specifications are considered to be applicable to this solicitation and award of contract when

made and are made a part hereof.

The State of Florida's performance and obligation to pay under this contract is contingent upon availability of funding and an annual appropriation by the Legislature.

For the purposes of this solicitation, the terms proposer, respondent, offerer and contractor/vendor are used interchangeably and mean a person(s) or firm(s) submitting a response to this solicitation, including joint ventures.

The employment of unauthorized aliens by any contractor/vendor is considered a violation of Section 274A(e) of the Immigration and Nationality Act. If a contractor/vendor employs unauthorized aliens, such violation shall be cause for rejection of bid/unilateral cancellation of a contract if awarded.

Order Number 11-02: E-verify System: Department of Homeland Security:

*Pursuant to the State of Florida, Office of the Governor, Executive Order Number 11-02 entered on January 4, 2011, Contractors will utilize the U.S. Department of Homeland Security's E-Verify system to verify the employment eligibility of: (a) all persons employed during the term of the Contract by Contractor to perform employment duties within Florida within 3 business days after the date of hire; and (b) all persons (including subcontractors) assigned by Contractor to perform work pursuant to the Contract with the Department within 90 calendar days after the date the Contract is executed or within 30 days after such persons are assigned to perform work pursuant to the Contract, whichever is later.*

Department of Financial Services has (DFS) scheduled several webinars for vendors to educate them on the time-sensitive actions they need to take before October 2011 in order to receive further payments from the state. Take advantage of an upcoming DFS Electronic W-9 webinar. State of Florida vendors must register and complete an electronic Substitute Form W-9 in preparation for the 3 percent Federal withholding law that takes effect January 1, 2012. The Internal Revenue Service (IRS) receives and validates the information vendors provide on the Form W-9. Vendors must submit valid information to DFS prior to October 2011 or vendors will not receive further payments from the state. Learn more and register for a webinar at <http://www.myfloridacfo.com/aadir/SubstituteFormW9.htm>

NO VERBAL STATEMENTS MADE BY ANY STATE OF FLORIDA EMPLOYEE OR AGENCY REPRESENTATIVE WILL OPERATE TO SUPERSEDE INFORMATION PUBLISHED IN THIS SOLICITATION. ONLY WRITTEN ADDENDUMS ISSUED BY THE DEPARTMENT OF MILITARY AFFAIRS CONSTRUCTION AND FACILITY MANAGEMENT OFFICE OR ITS REPRESENTATIVES WILL OPERATE TO ALTER OR OTHERWISE AMEND THIS SOLICITATION.

EXHIBIT 2

<b>ACORD CERTIFICATE OF LIABILITY INSURANCE</b>	DATE (MM/DD/YY) <b>Current Date</b>
---	--

PRODUCER <b>ABC Insurance</b> <b>6789 Surety Street</b> <b>City, State Zip</b>	THIS CERTIFICATE ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW.  <p style="text-align: center;"><b>INSURERS AFFORDING COVERAGE</b></p> INSURER A: <b>Worldwide Insurance Co.</b> INSURER B: INSURER C: INSURER D: INSURER E:
INSURED <b>Def Contractors</b> <b>12345 Building Way</b> <b>Anytown, FL 30000</b>	

**COVERAGES SAMPLE COPY / SAMPLE COPY / SAMPLE COPY**

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. AGGREGATE LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

INS LTR	TYPE OF INSURANCE	POLICY NUMBER	POLICY EFFECTIVE DATE (MM/DD/YY)	POLICY EXP DATE (MM/DD/YY)	LIMITS														
	GENERAL LIABILITY <input checked="" type="checkbox"/> COMMERCIAL GENERAL LIABILITY <input type="checkbox"/> CLAIMS MADE <input checked="" type="checkbox"/> OCCUR <input checked="" type="checkbox"/> Blanket Additional Insured <input checked="" type="checkbox"/> Contractual Liability GEN'L AGGREGATE LIMIT APPLIES PER: <input type="checkbox"/> POLICY <input checked="" type="checkbox"/> PROJECT <input type="checkbox"/> LOC				<table border="1" style="width:100%; border-collapse: collapse;"> <tr><td>EACH OCCURRENCE</td><td style="text-align: right;"><b>\$ 1,000,000</b></td></tr> <tr><td>FIRE DAMAGE (any 1 fire)</td><td style="text-align: right;"><b>\$ 300,000</b></td></tr> <tr><td>MED EXP (any 1 person)</td><td style="text-align: right;"><b>\$ 10,000</b></td></tr> <tr><td>PERSONAL &amp; ADV INJURY</td><td style="text-align: right;"><b>\$ 1,000,000</b></td></tr> <tr><td>GENERAL AGGREGATE</td><td style="text-align: right;"><b>\$ 2,000,000</b></td></tr> <tr><td>PRODUCTS - COMP/OP AGG</td><td style="text-align: right;"><b>\$ 2,000,000</b></td></tr> <tr><td>DAMAGE TO PREMISES (ea occur)</td><td></td></tr> </table>	EACH OCCURRENCE	<b>\$ 1,000,000</b>	FIRE DAMAGE (any 1 fire)	<b>\$ 300,000</b>	MED EXP (any 1 person)	<b>\$ 10,000</b>	PERSONAL & ADV INJURY	<b>\$ 1,000,000</b>	GENERAL AGGREGATE	<b>\$ 2,000,000</b>	PRODUCTS - COMP/OP AGG	<b>\$ 2,000,000</b>	DAMAGE TO PREMISES (ea occur)	
EACH OCCURRENCE	<b>\$ 1,000,000</b>																		
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PRODUCTS - COMP/OP AGG	<b>\$ 2,000,000</b>																		
DAMAGE TO PREMISES (ea occur)																			
	AUTOMOBILE LIABILITY <input checked="" type="checkbox"/> ANY AUTO <input type="checkbox"/> ALL OWNED AUTOS <input type="checkbox"/> SCHEDULED AUTOS <input checked="" type="checkbox"/> HIRED AUTOS <input checked="" type="checkbox"/> NON OWNED AUTOS <input type="checkbox"/> _____ <input type="checkbox"/> _____				<table border="1" style="width:100%; border-collapse: collapse;"> <tr><td>COMBINED SINGLE LIMIT (Ea Accident)</td><td style="text-align: right;"><b>\$ 100,000</b></td></tr> <tr><td>BODILY INJURY (per person)</td><td style="text-align: right;"><b>\$</b></td></tr> <tr><td>BODILY INJURY (per accident)</td><td style="text-align: right;"><b>\$</b></td></tr> <tr><td>PROPERTY DAMAGE (Per accident)</td><td style="text-align: right;"><b>\$</b></td></tr> </table>	COMBINED SINGLE LIMIT (Ea Accident)	<b>\$ 100,000</b>	BODILY INJURY (per person)	<b>\$</b>	BODILY INJURY (per accident)	<b>\$</b>	PROPERTY DAMAGE (Per accident)	<b>\$</b>						
COMBINED SINGLE LIMIT (Ea Accident)	<b>\$ 100,000</b>																		
BODILY INJURY (per person)	<b>\$</b>																		
BODILY INJURY (per accident)	<b>\$</b>																		
PROPERTY DAMAGE (Per accident)	<b>\$</b>																		
	GARAGE LIABILITY <input type="checkbox"/> ANY AUTO <input type="checkbox"/> _____				<table border="1" style="width:100%; border-collapse: collapse;"> <tr><td>AUTO ONLY - EA ACCIDENT</td><td style="text-align: right;"><b>\$</b></td></tr> <tr><td>OTHER THAN AUTO ONLY</td><td style="text-align: right;">EA ACC \$</td></tr> <tr><td></td><td style="text-align: right;">AGG \$</td></tr> </table>	AUTO ONLY - EA ACCIDENT	<b>\$</b>	OTHER THAN AUTO ONLY	EA ACC \$		AGG \$								
AUTO ONLY - EA ACCIDENT	<b>\$</b>																		
OTHER THAN AUTO ONLY	EA ACC \$																		
	AGG \$																		
	EXCESS/UMBRELLA LIABILITY <input checked="" type="checkbox"/> OCCUR <input type="checkbox"/> CLAIMS MADE  <input type="checkbox"/> DEDUCTIBLE <input type="checkbox"/> RETENTION \$ _____				<table border="1" style="width:100%; border-collapse: collapse;"> <tr><td>EACH OCCURRENCE</td><td style="text-align: right;"><b>\$1,000,000</b></td></tr> <tr><td>AGGREGATE</td><td style="text-align: right;"><b>\$1,000,000</b></td></tr> <tr><td></td><td style="text-align: right;"><b>\$</b></td></tr> <tr><td></td><td style="text-align: right;"><b>\$</b></td></tr> <tr><td></td><td style="text-align: right;"><b>\$</b></td></tr> </table>	EACH OCCURRENCE	<b>\$1,000,000</b>	AGGREGATE	<b>\$1,000,000</b>		<b>\$</b>		<b>\$</b>		<b>\$</b>				
EACH OCCURRENCE	<b>\$1,000,000</b>																		
AGGREGATE	<b>\$1,000,000</b>																		
	<b>\$</b>																		
	<b>\$</b>																		
	<b>\$</b>																		
	WORKER'S COMPENSATION AND EMPLOYER'S LIABILITY ANY PROPRIETOR/PARTNER/EXECUTIVE OFFICER/MEMBER EXCLUDED? If yes, describe under SPECIAL CONDITIONS below OTHER <b>Owners and Contractors Protective Liability</b>				<input checked="" type="checkbox"/> WC Statutory Limits <input type="checkbox"/> Other E.L. EACH ACCIDENT <b>\$ As Law Req's</b>  E.L. DISEASE -EA EMPLOYEE <b>\$ As Law Req's</b>  E.L. DISEASE -POLICY LIMIT <b>\$ As Law Req's</b>														
					<b>\$1,000,000 each occurrence</b> <b>\$2,000,000 per aggregate</b>														

DESCRIPTION OF OPERATIONS/LOCATIONS/VEHICLES/EXCLUSIONS ADDED BY ENDORSEMENT/SPECIAL PROVISIONS:  
**CFMO Project # \_\_\_\_\_ for \_\_\_\_\_ (Project Name)**  
**State of Florida, Department of Military Affairs is named as additional insured. All policies include a waiver of Subrogation in favor of the additional insured.**

CERTIFICATE HOLDER State of Florida Department of Military Affairs Construction & Facility Management Office 2305 State Road 207 St. Augustine, Florida 32086	CANCELLATION SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, THE ISSUING INSURER WILL ENDEAVOR TO MAIL _____ DAYS WRITTEN NOTICE TO THE CERTIFICATE HOLDER NAMED TO THE LEFT, BUT FAILURE TO DO SO SHALL IMPOSE NO OBLIGATION OR LIABILITY OF ANY KIND UPON THE INSURER, ITS AGENTS OR REPRESENTATIVES. AUTHORIZED REPRESENTATIVE <b>ALFRED JONES</b>
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### EXHIBIT 3

#### OWNER'S INSTRUCTIONS FOR EXPERIENCE QUESTIONNAIRE AND CONTRACTOR'S FINANCIAL STATEMENT

The information listed in the Experience Questionnaire and Contractor's Financial Statement Forms is required to be filed with soliciting agencies prior to award of any contract. In order to expedite the processing of contracts, please complete the enclosed forms in accordance with these instructions.

The bidder is required to complete all the attached forms. If the bidder is a Joint Venture, then each Corporation, Partnership or Individual that is a party to the Joint Venture must complete, individually, each form.

All references to "fiscal year" in this questionnaire will mean the fiscal year of the bidder filing this form.

#### Heading

Project Title - Indicate title of project as shown in the specifications.

Location - Project location as shown in the specifications.

#### Sections 1 & 2

Trades or Trades Being Bid

Insert in box(es) on Page 1 the code number(s) listed below which represent the trade(s) for which you are qualified to bid:

<u>Trade</u>	<u>Code Number</u>
Building Construction	1
Electrical	2
Elevator	3
Food Service	4
Heating, Ventilating & Air Conditioning	5
Laboratory Equipment	6
Landscaping	7
Plumbing	8
Power Plants (Boilers, Equipment & Piping)	9
Refrigeration	10
Roofing	11
Sanitary (Sewage Treatment Plants, Pumping Stations, etc.)	12
Other _____	13

#### Sections 3-53

Complete in accordance with form. NOTE: SECTION "A" Financial Statement - Do not attach current company financial statement if dated over 90 days from date of this submittal. See letter "Attesting to liquid assets" Section number 64 (complete only if needed). \*In accordance with Florida Administrative Code (FAC) 60D-5.004 Bidder's Qualification Requirements and Procedures, Paragraph (2)(a)4(b)1e, "The value of liquid assets must be no less than one-twentieth of the amount of the base bid".

Liquid assets shall include cash, stocks, bonds, pre-paid expenses and receivables, but shall not include the value of the equipment."

#### Section 54

Under "c", list previous business name or names and the number of years you have done business under these names within the past 10 years.

#### Section 55

From your present payroll indicate the number of individuals in each category in the "Current" column.

Estimate the maximum and minimum number of employees over the previous 3 fiscal years in each category.

#### Sections 56-64

Complete in accordance with form.



Section 63

- 1) In Section 62, Column C insert "S" if a subcontractor or "P" if a prime contractor. The balance of section to be completed in accordance with form.
- 2) Billings for 3 fiscal years - insert year and amount.
- 3) Work in progress at the end of the past 3 fiscal years - same as above.

Section 64. Complete in accordance with form.

If additional space is required, please attach supplementary pages.  
DBC-5085 CFMO Revised April 2010

ADDITIONAL QUALIFICATION REQUIREMENTS  
The following must be included with packet

1. Copy of Florida State Contractor License.
2. Corporate Charter Number. See Item #7
3. Proof of Contractor's active office within 300 road miles of project. (Map Quest or like)
4. Contractor agreement to perform no less than 15% of project work itself, on company letterhead.
5. Resumes of experience for Project Manager and Project Superintendent.
6. At least three references with current contact name/numbers of projects completed within last 5 years.

**EXHIBIT 3 CONTINUED**  
**OWNER'S**  
**EXPERIENCE QUESTIONNAIRE**  
**AND**  
**CONTRACTOR'S FINANCIAL STATEMENT**

Project Title \_\_\_\_\_

Location \_\_\_\_\_

Insert code number of trade or trades for which you are qualified to bid on the basis of previous experience in accordance with attached detailed instructions, each in its respective box below:

1.

2.

3. Is your organization currently pre-qualified with any governmental agency? \_\_\_\_\_ If so, please list.

4. Have you, in the previous five years, been denied a contract award on which you submitted the low bid in competitive bidding, or been refused prequalification?

If so, please list and describe \_\_\_\_\_

5. Have you, in the previous five years, ever not been able to achieve substantial or final completion within the number of contract specified calendar days?

If so, please list, provide Owner's POC with phone number, and describe project and problems encountered \_\_\_\_\_

6. Submitted by \_\_\_\_\_

Address \_\_\_\_\_

Date \_\_\_\_\_

7. (Check below)

A Corporation

A Co-partnership

An Individual

A Joint Venture

( ) Corporate Charter Number

( )

( )

( )

The contractor acknowledges that this Experience Questionnaire and Financial Statement is made for the express purpose of introducing the Owner to whom it is submitted to award a contract to the contractor. Further, the contractor acknowledges that the agency may at its discretion, by which means the Owner may choose, determine the truth and accuracy of all statements made by the contractor herein.

EXHIBIT 3 CONTINUED

SECTION "A". FINANCIAL STATEMENT  
Reflecting financial position as of close of most recent operating year

As of \_\_\_\_\_  
(Date)

ASSETS

8. CASH\* \$ \_\_\_\_\_

ACCOUNTS RECEIVABLE

9. From Government Contracts Completed \_\_\_\_\_

10. From Non-Government Contracts Completed \_\_\_\_\_

11. Claims included in 8 and 9 not yet approved or in litigation \$ \_\_\_\_\_

12. From Government Contracts in Process \_\_\_\_\_

13. From Non-Government Contracts in Process \_\_\_\_\_

14. Claims included in 11 and 12 not yet approved or in litigation \_\_\_\_\_

15. Retainage included in 11 and 12 \_\_\_\_\_

16. Other\*\* (list) \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_

NOTES RECEIVABLE

17. Due within 90 days\*\* \_\_\_\_\_

18. Due after 90 days\*\* \_\_\_\_\_

INVESTMENTS

19. Listed securities - present market value \_\_\_\_\_

20. Unlisted securities - present value \_\_\_\_\_

BID DEPOSITS

21. Recoverable within 90 days \_\_\_\_\_

22. Recoverable after 90 days \_\_\_\_\_

ACCRUED INTEREST

23. Receivable on notes \_\_\_\_\_

24. Receivable on Investments \_\_\_\_\_

25. Other (list) \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_

26. REAL ESTATE (BOOK VALUE OR MARKET, WHICHEVER IS LESS) \_\_\_\_\_

27. INVENTORIES (NOT INCLUDED IN RECEIVABLE BILLING AND AT PRESENT VALUE) \_\_\_\_\_

28. EQUIPMENT-NET BOOK VALUE (SUPPLY LIST BY COST, DEPRECIATION, NET BOOK VALUE) \_\_\_\_\_

OTHER ASSETS

29. Contract Costs in excess of Billings \$ \_\_\_\_\_

30. Cash Surrender Value of Life Insurance \_\_\_\_\_

31. Receivables from Officers and Employees \_\_\_\_\_

32. Other (list) \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**EXHIBIT 3 CONTINUED**

33. TOTAL ASSETS \$ \_\_\_\_\_  
\*Do not include deposits for bids or other Guarantees  
\*\*Do not include receivables from officers and employees

ACCOUNTS PAYABLE

34. Due within 1 year \_\_\_\_\_  
35. Due after 1 year \_\_\_\_\_

NOTES PAYABLE

36. Due within 1 year \_\_\_\_\_  
37. Due after 1 year \_\_\_\_\_  
38. Officers and Employees \_\_\_\_\_

39. TAXES PAYABLE \_\_\_\_\_

40. ACCRUED AND ACTUAL PAYROLL PAYABLE \_\_\_\_\_

41. MORTGAGES PAYABLE \_\_\_\_\_

OTHER LIABILITIES

42. Federal Income Tax Provision \_\_\_\_\_  
43. Deferred Income \_\_\_\_\_  
44. Other (list) \_\_\_\_\_  
\_\_\_\_\_

NET WORTH

45. (If individual proprietorship or partnership) \_\_\_\_\_

CAPITAL STOCK

46. Common Issued and Outstanding \_\_\_\_\_  
47. Preferred Issued and Outstanding \_\_\_\_\_  
48. Treasury Stock \$ \_\_\_\_\_

CAPITAL SURPLUS

49. Earned Surplus Prior Years \_\_\_\_\_  
50. Earned Surplus Current Year \_\_\_\_\_

51. TOTAL LIABILITIES AND NET WORTH \$ \_\_\_\_\_

NOTE: IF ADDITIONAL SPACE IS REQUIRED, PLEASE NOTE AND ATTACH SCHEDULE TO STATEMENT

52. Dated this \_\_\_\_\_ of \_\_\_\_\_, \_\_\_\_\_  
                  day                                       month                                       year

\_\_\_\_\_  
Name of Organization

By: \_\_\_\_\_  
                  Title

FEIN: \_\_\_\_\_

**EXHIBIT 3 CONTINUED**

**SECTION 'B'. EXPERIENCE QUESTIONNAIRE**

53. If a Corporation, answer this:

Date of incorporation \_\_\_\_\_

In what State \_\_\_\_\_

Name of Officers:

President \_\_\_\_\_

Vice President \_\_\_\_\_

Vice President \_\_\_\_\_

Secretary \_\_\_\_\_

Treasure \_\_\_\_\_

If a Partnership or Individual Proprietorship, answer this:

Date of organization \_\_\_\_\_

If a partnership, state whether partnership is general, limited association \_\_\_\_\_

Name and Address of Partners:

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

54. a. How many years has your organization been in the construction business? \_\_\_\_\_

b. How many years under your present business name? \_\_\_\_\_

c. How many years under previous business name? (List other names)

\_\_\_\_\_

\_\_\_\_\_

**SUBSIDIARY OR AFFILIATED COMPANIES  
IN WHICH PRINCIPALS HAVE FINANCIAL INTEREST**

**NAME AND ADDRESS OF SUBSIDIARY  
OR AFFILIATED COMPANIES**

**EXPLAIN IN DETAIL THE  
PRINCIPAL'S INTEREST IN THIS  
COMPANY AND NATURE OF BUSINESS**

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**EXHIBIT 3 CONTINUED**

NUMBER OF FULL TIME PERSONNEL WITHIN YOUR ORGANIZATION

	<u>Current</u>	<u>Maximum</u>	<u>Minimum</u>
55. a. Clerical Personnel	_____	_____	_____
b. Engineers & Architects	_____	_____	_____
c. Supervisors, Foremen, or Superintendents	_____	_____	_____
d. Skilled Employees including Technicians	_____	_____	_____
e. Unskilled Employees	_____	_____	_____
f. Estimators	_____	_____	_____
g. Total number of full-time personnel	_____	_____	_____

56. WHAT IS THE CONSTRUCTION EXPERIENCE OF THE PRINCIPALS AND SUPERVISORY PERSONNEL OF YOUR ORGANIZATION? (Asterisk any personnel likely to be assigned to project being bid.)

PRINCIPAL'S NAME	TITLE	YEARS OF CONSTRUCTION EXPERIENCE	IN WHAT CAPACITY AND WITH WHOM
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

57. SUPERVISORY PERSONNEL	TITLE	YEARS OF CONSTRUCTION EXPERIENCE	IN WHAT CAPACITY AND WITH WHOM
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

58. Within the previous three fiscal years has your organization or predecessor organizations ever failed to complete a project? If so, state name of organization and reason thereof.

---



---

59. Within the previous three fiscal years has your organization been involved in litigation? \_\_\_\_\_. If so, please list and explain nature and current status.

---

**EXHIBIT 3 Continued**

60. List all contracts completed by your organization in the previous 3 fiscal years. (If more than 10, list the 10 most recently completed.)  
 Projects MUST be listed in spaces below. Additional information may be attached if desired.

Name of Owner	A Name, Location & Description of Project	B Type of Work	Name of Design Architect and/or Design Engineer	C. Original Contract Price	Completion Dates:		
				D. Final Contract Price	E. Original	F. Revised	G. Actual

**EXHIBIT 3 CONTINUED**

With reference to all contracts completed by your organization in the previous fiscal years, as listed on Page 6, answer the following questions:

61. Explain differences in original contract price and in completion dates, if any.

62. Were there any liquidated damages, penalties, liens, defaults or cancellations imposed or filed against your organization?

If so, list the name and location of the project, as shown in Column A, explain.



**EXHIBIT 3 CONTINUED**

**STATUS OF UNCOMPLETED CONTRACTS**

As of \_\_\_\_\_  
(DATE)

63. Give full information about all of your present contracts. In Column C insert "S" if a subcontractor or "P" if a prime contractor, whether in progress or awarded but not yet begun; and regardless of with whom contracted.

A	B	C	D	E
Project Description Location & Owner	Design Architect And/OR Design Engineer	Total Amount of Your Contract (Or Subcontract)	Amount In Column C Sublet To Others	Uncompleted Amount of Contract
Total				

**COMPLETE THE FOLLOWING:**

Net Total Billings for Previous 3 Fiscal years:

Average Backlog for Previous 3 Fiscal Years: (Estimated total value of uncompleted work on outstanding contract)

Year	Dollar Amount
_____	\$ _____
_____	\$ _____
_____	\$ _____

Year	Dollar Amount
_____	\$ _____
_____	\$ _____
_____	\$ _____

COMPANY LETTERHEAD

64. Attesting to liquid assets.

DATE

RE: PROJECT TITLE AND NUMBER

"I hereby certify that the liquid assets of this firm have not decreased by more than ten percent in the time that has passed between the closing period of the financial statement attached, and the date on which our submittal was provided"

-S-

CORPORATE OFFICER'S SIGNATURE

EXHIBIT 4

PROPOSAL FORM

SUBMIT ORIGINAL PROPOSAL FORM IN DUPLICATE ON CONTRACTOR'S LETTERHEAD AND INCLUDE BUSINESS NAME, ADDRESS, FEDERAL ID NUMBER, TELEPHONE, FACSIMILE AND SIGNATURE

Note: NO conditional, incomplete, unsigned, undated, ambiguous, or improper bids/proposals will be accepted.

DATE: \_\_\_\_\_

TIME: \_\_\_\_\_

TO: State of Florida, Department of Military Affairs  
Attention: Construction & Facility Management Office (Contract Management Branch)  
2305 State Road 207  
Saint Augustine, Florida 32086

Gentlemen:

The undersigned, hereinafter called "Bidder" having visited the site of the proposed project and familiarized himself with the local conditions, nature, and extent of the work, and having examined carefully any drawings or specifications, the Form of Agreement, and other Contract Documents with the Bond Requirements, therein, proposes to furnish all labor, materials, equipment, and other items, facilities, and services for the proper execution and completion of Project Number \_\_\_\_\_, \_\_\_\_\_, in full accordance with any drawings and specifications prepared by \_\_\_\_\_, in full accordance with the advertisement for bids, Instruction to Bidders, Agreement, and all other documents relating thereto on file in the Construction & Facility Management Office (CFMO) and if awarded the contract, to complete the said work within the time limit specified for the following bid price:

Base Bid: \$ \_\_\_\_\_

With foregoing as a Base Bid, the following costs of alternate proposals are submitted in accordance with the drawings and specifications.

Add/Alt 1 \_\_\_\_\_ Price \_\_\_\_\_  
Add/Alt 2 \_\_\_\_\_ Price \_\_\_\_\_  
Add/Alt 3 \_\_\_\_\_ Price \_\_\_\_\_

Enclosed is certified check, cashier's check, treasurer's check, bank draft, or Bid Bond in the amount of not less than five percent of the Bid, payable to the Owner as a guarantee for the purpose set out in Instructions to Bidders. (If the bid amount is equal to or less than \$100,000 this sentence should be left out).

MARK ENVELOPES: ATTN: SEALED BID for Project Number \_\_\_\_\_,

ADDRESSED TO: Department of Military Affairs, ATTN: CFMO-Contract Management Branch,  
2305 State Road 207, St. Augustine, Florida 32086

The Bidder hereby agrees that:

a. The above proposal shall remain in full force and effect for a period of 40 calendar days after the time of the opening of this proposal and that the Bidder will not revoke or cancel this proposal or withdraw from the competition within the said 40 calendar days.

b. In the event the contract is awarded to this Bidder, he will abide by and fulfill all requirements as specified in the Non-Technical Specifications provided with the Invitation to Bid.

c. In the event the contract is awarded to this Bidder, he will enter into a formal written Agreement with the Owner in accordance with the accepted bid within 10 calendar days after said contract is submitted to him and, (if requirement is not deleted per Section C-2 of the Conditions of the Contract), will furnish to the Owner a Contract Performance Bond and a Labor and Material Payment Bond with good and sufficient sureties, satisfactory to the Owner, in the amount of 100% of the accepted bid, the form of which is shown by Exhibits 7 and 8 of the Conditions of the Contract and terms of which shall fully comply with Section 255.05, Florida Statutes. The Bidder further agrees that in the event of the Bidder's default or breach of any of the agreements of this proposal, the said bid deposit shall be forfeited as liquidated damages.

d. In the event the contract is awarded to this Bidder, he will not commence any work in connection with the contract until he has obtained all insurance as specified in the Non-Technical Specifications, and such insurance has been approved by the Owner, nor shall the contractor allow any subcontractor to commence work on his subcontract until all similar insurance required of the subcontractor has been so obtained and approved by Owner. All insurance policies shall be with insurers qualified to do business in Florida through an authorized licensed Florida Resident Agent. The insurance requirements shall be completed in a timely manner in order not to delay the construction schedule.

e. In the event the contract is awarded to this Bidder, he will (if requested by Owner) complete and submit a preliminary and final Bid Breakout Form supplied by the Department of Military Affairs, Construction & Facility Management Office.

Acknowledgement is hereby made that this proposal includes required permit fees as directed in the Non-Technical Specifications.

Acknowledgement is hereby made of receipt of the following addenda issued during the bidding period.

Addendum No. _____	Dated _____
Addendum No. _____	Dated _____
Addendum No. _____	Dated _____

Florida Construction Industries Licensing Board Certification.

\_\_\_\_\_  
(Name of Holder)

\_\_\_\_\_  
(Certificate No.)

In witness whereof, the Bidder has hereunto set his signature and affixed his seal this \_\_\_\_\_ day of \_\_\_\_\_  
(Month) (Year)

(SEAL)

By: \_\_\_\_\_

Address: \_\_\_\_\_

Title: \_\_\_\_\_

\_\_\_\_\_

Company: \_\_\_\_\_

Telephone No.: \_\_\_\_\_

Tax ID No.: \_\_\_\_\_

Facsimile No.: \_\_\_\_\_

E-mail: \_\_\_\_\_

**EXHIBIT 5**  
**LIST OF SUBCONTRACTORS**

(To be submitted in duplicate on the Bidder's letterhead and attached to Contractor's proposal.)

**DATE:** \_\_\_\_\_

**THIS LIST IS ATTACHED TO, AND IS AN INTEGRAL PART OF THE BID SUBMITTED BY:**

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**FOR THE CONSTRUCTION OF: PROJECT NUMBER:**

**PROJECT NAME & LOCATION:** \_\_\_\_\_

THE UNDERSIGNED, HEREINAFTER CALLED "BIDDER", LISTS BELOW THE NAME OF EACH SUBCONTRACTOR WHO WILL PERFORM THE PHASES OF THE WORK INDICATED. FAILURE OF THE BIDDER TO SUPPLY SUFFICIENT INFORMATION TO ALLOW VERIFICATION OF THE CORPORATE AND DISCIPLINE LICENSE STATUS OF THE SUBCONTRACTOR MAY DEEM THE BID AS BEING NON-RESPONSIVE.

<b><u>SUBCONTRACT</u></b>	<b><u>NAME OF SUBCONTRACTOR</u></b>	
1.	_____ (Name)	
	_____ (Telephone No.)	_____ (Federal Identification No.)
2.	_____ (Name)	
	_____ (Telephone No.)	_____ (Federal Identification No.)
3.	_____ (Name)	
	_____ (Telephone No.)	_____ (Federal Identification No.)
4.	_____ (Name)	
	_____ (Telephone No.)	_____ (Federal Identification No.)
5.	_____ (Name)	
	_____ (Telephone No.)	_____ (Federal Identification No.)

By \_\_\_\_\_  
(Signature)

EXHIBIT 6

AGREEMENT BETWEEN OWNER AND CONTRACTOR

This Agreement between Owner and Contractor made this \_\_\_ day of \_\_\_ in the year Two Thousand Eleven.

MCCA Number: 0
Project Number 0 Project Location: 0
Project Name: 0
AMSCO: 0 FUNDING: 0

BY AND BETWEEN: The Department of Military Affairs (DMA), 2305 State Road 207, St. Augustine, FL 32086, hereinafter called the OWNER, and

Contractor Name: 0
Address: 0
POC: 0 FEIN: 0
Phone/Fax: 0 Email: 0

hereinafter called the CONTRACTOR. The Owner and Contractor agree as set forth below:

ARTICLE 1. THE CONTRACT DOCUMENTS - The Contract Documents consist of the Agreement, the Contractor's proposal, conditions of the Contract (General, Supplementary and other conditions), Specifications, Drawings, all Addenda issued prior to execution of the Agreement, the Non-Technical Specifications as provided, and all Modifications to the above, issued subsequent thereto. These form the Contract, and all are as fully a part of the Contract as if attached to this Agreement or repeated herein. An enumeration of the specifications, drawings, and addenda is as follows:

Specifications and Drawings prepared By: 0
Address: 0
POC: 0 Phone/Fax 0
Email: 0

Addenda:

In the event of conflict in the provisions of said Contract Documents, the provisions of the basic Agreement which immediately precedes the signatures of the Parties shall control over the Specifications, the General Conditions and Supplementary General Conditions; and the Supplementary General Conditions shall control over the General conditions of said Standard Form A201 of the American Institute of Architects.

ARTICLE 2. THE WORK - The Contractor shall perform all work required by the Contract Documents for items as specified in the Scope of Work. No alteration of the original scope shall be accepted in the Bidder's proposal unless approved in writing by the DMA.

ARTICLE 3. CONTRACT SUM - The Owner shall pay the Contractor for the performance of the work, subject to additions and deductions by Change Order as provided in the Conditions of the Contract, in current funds, the

Contract Sum: 0
Contract Amount: \$0.00
Days in Contract: 0

ARTICLE 4. FUNDING - The State of Florida's performance and obligation to pay under this contract is contingent upon availability of funding and an annual appropriation by the State Legislature.

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

CONTRACTOR APPROVED:
By
Corporate President's Signature Date Signed
ATTEST:
By
Corporate Secretary's Signature Date Signed
AS WITNESSED:
By
Witness' Signature Date Signed
CORPORATE SEAL:
OWNER APPROVED:
By
Owner's Signature Date Signed
AS WITNESSED:
By
Witness' Signature Date Signed
APPROVED AS TO FORM AND LEGALITY
By
Office of the General Counsel Date Signed

**EXHIBIT 7**

---

PERFORMANCE BOND  
THIS BOND IS ISSUED SIMULTANEOUSLY WITH LABOR AND MATERIAL  
PAYMENT BOND IN FAVOR OF THE OWNER CONDITIONED ON THE FULL AND FAITHFUL  
PERFORMANCE OF THE CONTRACT

---

KNOW ALL MEN BY THESE PRESENT THAT:

as Principal, hereinafter called Contractor, and,

as Surety, hereinafter called Surety, are held and firmly bound unto the (State Agency's Name) as Obligee, hereinafter called Owner, in the amount of

for the payment whereof Contractor and each individual named Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS,

Contractor has by written agreement, dated \_\_\_\_\_, entered into a contract with the Owner for \_\_\_\_\_, Project Number \_\_\_\_\_ in accordance with Drawings and Specifications prepared by \_\_\_\_\_ which contract is by reference made a part hereof, and is hereinafter referred to as the Contract.

NOW, THEREFORE, THE CONDITION OF THIS OBLIGATION is such that, if Contractor shall promptly and faithfully perform said Contract and all obligations thereunder, then this obligation shall be null and void; otherwise it shall remain in full force and effect.

The Surety hereby waives notice of any alteration or extension of time made by the Owner.

Whenever Contractor shall be, and declared by Owner to be in default under the Contract, the Owner having performed Owner's obligations thereunder, the surety may promptly remedy the default, in accordance with Section 255.05, Florida Statutes, or shall promptly

- 1) Complete the Contract in accordance with its terms and conditions, or 2) Obtain a bid or bids for completing the Contract in accordance with its terms and conditions, and upon determination by Surety of the lowest responsible bidder or, if the Owner elects, upon determination by the Owner and the Surety jointly of the lowest responsible bidder, arrange for a Contract between such bidder and Owner, and make available as work progresses (even though there should be a default or a succession of defaults under the Contract or Contracts of completion arranged under this paragraph) sufficient funds to pay the cost of completion less the balance of the Contract price; but not exceeding, including other costs and damages for which the Surety may be liable hereunder, the amount set forth in the first paragraph hereof. The term "balance of the Contract price", as used in this paragraph, shall mean the total amount payable by Owner to Contractor under the Contract and any amendments thereto, less the amount properly paid by Owner to Contractor.

No right of action shall accrue on this bond to or for the use of any person or corporation other than the Owner named herein or the heirs, executors, administrators or successors of the Owner. The time within which the Owner can institute an action on this bond against the Surety or Contractor or shall be determined by the pertinent Florida Statutes.

SIGNED AND SEALED THIS (Date)

\_\_\_\_\_  
(Signature of Witness)

\_\_\_\_\_  
(Signature of Contractor) (Seal)

\_\_\_\_\_  
(Signature of Witness)

\_\_\_\_\_  
(Signature of Attorney-In-Fact) (Seal)

\_\_\_\_\_  
(Type Name)

\_\_\_\_\_  
(Signature of Witness)

\_\_\_\_\_  
(Signature of Florida Resident Agent) (Seal)

\_\_\_\_\_  
(Type Name & Social Security Number)

**Power of Attorney attached hereto.**



## EXHIBIT 7 CONTINUED

### NOTES CONCERNING SURETY AND EXECUTION

#### A. SURETY COMPANY REQUIREMENTS

To be acceptable to the Owner, A Surety Company shall comply with all of the requirements of Article B-12 of the Conditions of the Contract.

#### B. EXECUTION OF BOND

1. Enter the Surety Company's name and address on each copy of the Bond in the space provided.
2. Enter the date shown on page 1 of the Agreement in the space provided on each copy of the Bond.
3. Enter the date of execution on each copy of the Bond in the space provided. This date must be the same as the date shown on the Agreement.
4. Have each copy of the Bond signed by the same person that signed the Agreement on behalf of the Contractor. Type in that person's name and title in the place provided on each copy of the Bond and have one other individual witness that person's signature on each copy of the Bond. Also, have the Contractor's Corporate Seal affixed to each copy of the Bond beside that person's signature (No Facsimiles are acceptable).
5. Have each copy of the Bond signed by the person authorized to sign on behalf of the Surety Company. Type in that person's name in the place provided on each copy of the Bond and have one other individual witness that person's signature on each copy of the Bond. Also, have the Surety Company's Corporate Seal affixed to each copy of the Bond beside that person's signature (No Facsimiles are acceptable).
6. Have each copy of the Bond signed by a Florida Resident Agent (Reference Chapters 624.425 and 624.426 of the Florida Statutes). Type in that person's name and Social Security number in the place provided on each copy of the Bond and have one other individual witness that person's signature on each copy of the Bond. This may be the same person indicated in B.5 above, if this person is a Florida Resident Agent and is also authorized to sign on behalf of the Surety Company as Attorney-In-Fact.
7. Each copy of the Bond must have a Power of Attorney attached indicating that the person in B.5 above is authorized to sign on behalf of the Surety Company.
8. Each copy of the Power of Attorney must have the Surety Company's Corporate Seal and a Notary Seal either manually affixed or they may utilize facsimile reproductions of the same.
9. If the date of execution of the Power of Attorney is not the same as the date shown on the Agreement, then the Power of Attorney must be certified to still be in effect on the date shown on page 1 of the Agreement.
10. If the Bond is being backed by the Small Business Administration, then a certified true and correct copy of the Surety Bond Guarantee Agreement, SBA Form 990, must be attached to each copy of the Bond.

**EXHIBIT 8**

---

LABOR AND MATERIAL PAYMENT BOND  
THIS BOND IS ISSUED SIMULTANEOUSLY WITH PERFORMANCE BOND IN FAVOR OF THE  
OWNER CONDITIONED ON THE FULL AND FAITHFUL PERFORMANCE OF THE CONTRACT

---

KNOW ALL MEN BY THESE PRESENTS: that

as Principal, hereinafter called Contractor, and,

as Surety, hereinafter called Surety, are held and firmly bound unto the (State Agency's Name) as Obligee, hereinafter called Owner, for the use and benefit of claimants as hereinbelow defined, in the amount of

for the payment whereof Contractor and each individual named Surety bind themselves, their heirs, administrators, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS,

Contractor has by written agreement dated \_\_\_\_\_, entered into a contract with Owner for \_\_\_\_\_, Project Number \_\_\_\_\_ in accordance with drawings and Specifications prepared by \_\_\_\_\_ which contract is by reference made a part hereof, and is hereinafter referred to as the Contract.

THE CONDITIONS OF THIS BOND ARE AS FOLLOWS:

1. Contractor shall promptly make all payments owing when due to all persons who are defined in Section 713.01, Florida Statutes, whose claims derive directly or indirectly from the prosecution of the work provided for in the contract, then this bond is void; otherwise, it remains in full force and effect.
2. Each said claimant shall have a right of action against the Contractor and Surety for the amount due him. No such action shall subject the Obligee to any cost, expense, loss or damage, and Contractor shall promptly pay Obligee for the full measure of all cost, expense, loss, damage, and attorneys fees sustained by Obligee as a result of any default by Contractor under the contract.
3. Pursuant to Section 255.05, Florida Statutes, a claimant, except a laborer, who is not in privity with the Contractor and who has not received payment for his labor, materials, equipment or supplies shall, within forty five (45) days after beginning to furnish labor, materials, equipment or supplies for the prosecution of the work furnish the Contractor with a notice that he intends to look to the bond for protection. A claimant who is not in privity with the Contractor and who has not received payment for his labor, materials, equipment or supplies shall, within ninety (90) days after completing performance of the labor or after completing delivery of the materials, equipment or supplies, deliver to the Contractor and to the Surety written notice of the performance of the labor or delivery of the materials, equipment or supplies and of the nonpayment. No action for the labor, materials, equipment or supplies may be instituted against the Contractor or the Surety after one year from the date performance of the labor is completed or delivery of the materials, equipment or supplies is completed.
4. An action against the Surety or the Contractor or both, may be brought in the county in which the public building or public work is being constructed or repaired or in any other place authorized by the provisions of Chapter 47, Florida Statutes.
5. The amount of this bond shall be changed only to the extent that the Contract Sum is changed in accord with applicable provisions of the Contract for Construction.
6. Neither any change in or under the contract documents, nor any compliance or noncompliance with any formalities provided in the contract or the change shall relieve the Surety of its obligations under this bond.
7. This bond incorporates by reference all the requirements of Section 255.05, Florida Statutes, including, but not limited to, all notice and time limitation provisions therein. This bond shall be construed and deemed a statutory bond issued pursuant to Section 255.05, Florida Statutes, and not a common law bond.

SIGNED AND SEALED THIS (Date)

\_\_\_\_\_  
(Signature of Witness)

\_\_\_\_\_  
(Signature of Contractor) (Seal)

\_\_\_\_\_  
(Signature of Witness)

\_\_\_\_\_  
(Signature of Attorney-In-Fact) (Seal)

\_\_\_\_\_  
(Type Name)

\_\_\_\_\_  
(Signature of Witness)

\_\_\_\_\_  
(Signature of Florida Resident Agent) (Seal)

\_\_\_\_\_  
(Type Name & Social Security Number)

**Power of Attorney attached hereto.**

## EXHIBIT 8 CONTINUED

### NOTES CONCERNING SURETY AND EXECUTION

#### A. SURETY COMPANY REQUIREMENTS

To be acceptable to the Owner, A Surety Company shall comply with all of the requirements of Article B-12 of the Conditions of the Contract.

#### B. EXECUTION OF BOND

1. Enter the Surety Company's name and address on each copy of the Bond in the space provided.
2. Enter the date shown on page 1 of the Agreement in the space provided on each copy of the Bond.
3. Enter the date of execution on each copy of the Bond in the space provided. This date must be the same as the date shown on the Agreement.
4. Have each copy of the Bond signed by the same person that signed the Agreement on behalf of the Contractor. Type in that person's name and title in the place provided on each copy of the Bond and have one other individual witness that person's signature on each copy of the Bond. Also, have the Contractor's Corporate Seal affixed to each copy of the Bond beside that person's signature (No Facsimiles are acceptable).
5. Have each copy of the Bond signed by the person authorized to sign on behalf of the Surety Company. Type in that person's name in the place provided on each copy of the Bond and have one other individual witness that person's signature on each copy of the Bond. Also, have the Surety Company's Corporate Seal affixed to each copy of the Bond beside that person's signature (No Facsimiles are acceptable).
6. Have each copy of the Bond signed by a Florida Resident Agent (Reference Chapters 624.425 and 624.426 of the Florida Statutes). Type in that person's name and Social Security number in the place provided on each copy of the Bond and have one other individual witness that person's signature on each copy of the Bond. This may be the same person indicated in B.5 above, if this person is a Florida Resident Agent and is also authorized to sign on behalf of the Surety Company as Attorney-In-Fact.
7. Each copy of the Bond must have a Power of Attorney attached indicating that the person in B.5 above is authorized to sign on behalf of the Surety Company.
8. Each copy of the Power of Attorney must have the Surety Company's Corporate Seal and a Notary Seal either manually affixed or they may utilize facsimile reproductions of the same.
9. If the date of execution of the Power of Attorney is not the same as the date shown on the Agreement, then the Power of Attorney must be certified to still be in effect on the date shown on page 1 of the Agreement.
10. If the Bond is being backed by the Small Business Administration, then a certified true and correct copy of the Surety Bond Guarantee Agreement, SBA Form 990, must be attached to each copy of the Bond.

**EXHIBIT 9**

**WAIVER AND RELEASE OF LIEN UPON FINAL PAYMENT**

Contract Number:

Date of Contract Award:

Project No.:

Project Title:

The Undersigned lienor, in consideration of the sum of \$ \_\_\_\_\_, hereby waives and releases its lien and right to claim a lien for labor, services, or material furnished to \_\_\_\_\_ (contractor or sub-contractor) \_\_\_\_\_ and/or \_\_\_\_\_ (Owner or contractor) \_\_\_\_\_ on the Job as described below:

Project Title  
Project Location

**IN WITNESS WHEREOF, this release has been executed this \_\_\_\_\_ day of \_\_\_\_\_ 20 \_\_\_\_.**

Company Name: \_\_\_\_\_

BY: \_\_\_\_\_

TITLE: \_\_\_\_\_

\_\_\_\_\_  
(First Witness Signature)

\_\_\_\_\_  
(Second Witness Signature)

CERTIFICATE

I, \_\_\_\_\_, certify that I am the \_\_\_\_\_ of the \_\_\_\_\_ (Type Name of Certifier below) \_\_\_\_\_ (Position) corporation named as contractor in the foregoing release; that \_\_\_\_\_ (Contractor above) who signed said release on behalf of the contractor was then \_\_\_\_\_ of said corporation; that \_\_\_\_\_ (Title) said release was duly signed for and in behalf of said corporation by authority of its governing body and is within the scope of its corporate powers.

Corporate Seal or

Notary Seal

\_\_\_\_\_

EXHIBIT 10

Department Of Military Affairs
Construction & Facility Management Office
CERTIFICATE OF PARTIAL PAYMENT

CFMO Transmittal No.:

Contractor Name: 0
Contractor Address: 0
POC / Telephone Number: 0
Facsimile Number: 0
State Project Number: 0
Federal Project Number: N/A

Pay Request No:
For Period Ending:
Project Name: 0
FEIN Number: 0
Notice to Proceed Date:
Substantial Completion Date:
Final Completion Date:

Table with columns: ADDITIONS \$, DEDUCTIONS \$, Change Orders approved, In previous months by Owner --, Subsequent Change Orders for this month, Number, Approved (Date), TOTALS, Net Change by Change Orders \$.

Table with columns: Original Contract Sum, Change Orders (Net), Contract Sum to Date, Completed To Date, Materials Stored, Total Completed & Stored, Total Retainage 10%, Total Earned Less Retainage, Less Previous Certificates, Less Material Purchased Directly By Owner, TOTAL THIS CERTIFICATE, Balance To Finish Incl. Retainage, Retainage REFUND Requested.

SHOW INDIVIDUAL MBE PAYMENTS SEPARATELY ON CONTRACTOR'S MINORITY BUSINESS ENTERPRISES STATUS REPORT OF PARTIAL PAYMENT

TOTAL AMOUNT PAID THIS CERTIFICATE TO MBE SUBCONTRACTORS \$0.00

CERTIFICATION BY THE CONTRACTOR: According to the best of my knowledge and belief, I certify that all items and amounts shown on the face of this application are true and correct...

Signature, Printed Name, Title, Date

CERTIFICATION BY THE ARCHITECT/ENGINEER: I certify that I have checked and verified this Partial Payment Application; that to the best of my knowledge and belief, the above application is a true and correct statement of the value of the work performed...

Signature, Printed Name, Company, Date

I certify by evidence of my signature below the above information is true and correct; the goods and services have been satisfactorily received and payment is now due. I understand that the office of the State Chief Financial Officer reserves the right to require additional documentation and/or to conduct periodic post-audits of any agreements.

APPROVED FOR PAYMENT - SERVICES RECEIVED

Project Manager: 0
Directorate: 0
Telephone Number: 0
Date:
Signature:
Amount Certified:

Contract Manager Name (Printed) 0 Telephone Number 0

Contract Manager Signature Date

**EXHIBIT 11- SCHEDULE OF CONTRACT VALUES FORM**

CONTRACTOR: \_\_\_\_\_

PAGE: \_\_\_\_\_ OF \_\_\_\_\_

PROJECT #: \_\_\_\_\_

PAY REQUEST NO.: \_\_\_\_\_ DATE: \_\_\_\_\_

PROJECT NAME: \_\_\_\_\_

PROJECT MGR: \_\_\_\_\_

LOCATION: \_\_\_\_\_

SCHEDULED SUB. COMPL. DATE: \_\_\_\_\_

TOTAL WORK COMPLETED THIS PERIOD AS OF DATE: \_\_\_\_\_

FUNDING TYPE:    FARP    TRUST FUND    FEDERAL    R-POM

A Item Number	B Description of Work	C Scheduled Value	D Work Completed		F Materials Stored (Not in D or E)	G		H Balance to Finish (C-G)	I Retainage (10%)
			Previous Application Columns D+E	This Period		Total Completed & Stored to Date (D+E+F)	Percentage Completed & Stored (G:C)		
<b>PAGE TOTAL:</b>		\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	N/A	0.00	0.00

**EXHIBIT 11 CONTINUED**

CONTRACTOR: \_\_\_\_\_

PROJECT #: \_\_\_\_\_

PROJECT NAME: \_\_\_\_\_

LOCATION: \_\_\_\_\_

TOTAL WORK COMPLETED THIS PERIOD AS OF DATE: \_\_\_\_\_

PAGE: \_\_\_\_\_ OF \_\_\_\_\_

PAY REQUEST NO.: \_\_\_\_\_ DATE: \_\_\_\_\_

PROJECT MGR: \_\_\_\_\_

SCHEDULED SUB. COMPL. DATE: \_\_\_\_\_

FUNDING TYPE: FARP TRUST FUND FEDERAL R-POM

A Item Number	B Description of Work	C Scheduled Value	D Work Completed		F Materials Stored (Not in D or E)	G		H Balance to Finish (C-G)	I Retainage (10%)
			Previous Application Columns D+E	This Period		Total Completed & Stored to Date (D+E+F)	Percentage Completed & Stored (G:C)		
<b>PAGE TOTAL:</b>		0.00	0.00	0.00	0.00	0.00	N/A	0.00	0.00
<b>GRAND TOTAL:</b>		\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	0.00	\$0.00	\$0.00

**EXHIBIT 12**  
**STATE OF FLORIDA**  
**Department of Military Affairs**  
**Construction & Facility Management Office**

**CONTRACTOR'S AFFIDAVIT OF CONTRACT COMPLETION**

PROJECT NO: \_\_\_\_\_ PROJECT MANAGER: \_\_\_\_\_

PROJECT NAME: \_\_\_\_\_

CONTRACTOR: \_\_\_\_\_

CONTRACT DATE: \_\_\_\_\_ CONTRACT AMOUNT: \_\_\_\_\_

**CONTRACTOR'S AFFIDAVIT**

I solemnly swear and affirm; that the work under the above named contract and all amendments thereto have been completed in accordance with the requirements of said contract; that all costs incurred for equipment, materials, labor, and services against the project have been paid; that no liens have been attached against the project; that no suits are pending by reason of work on the project under the contract; that all Workmen's Compensation claims are covered by Workmen's Compensation insurance as required by law; that all public liability claims are adequately covered by insurance, and that the Contractor shall save, protect, defend, indemnify, and hold the Owners harmless from and against any and all claims which arise as a direct or indirect result of any transaction, event or occurrence related to performance of the work completed under said contract.

Company: \_\_\_\_\_

Name: \_\_\_\_\_

Title: \_\_\_\_\_

Date: \_\_\_\_\_

STATE OF \_\_\_\_\_  
COUNTY OF \_\_\_\_\_

Company Seal

The foregoing instrument was acknowledged before me this (date), \_\_\_\_\_, by

\_\_\_\_\_ of \_\_\_\_\_

(name & title of officer or agent)

(name of corporation acknowledging)

a \_\_\_\_\_ Corporation, on behalf of the corporation. He/She is personally

(state/place incorporated)

known to me or has produced \_\_\_\_\_ as identification.

(type of identification)

\_\_\_\_\_  
(Signature of person taking acknowledgment)

\_\_\_\_\_  
(Name typed printed or stamped)

\_\_\_\_\_  
(Title or Vendor)



**EXHIBIT 12a**  
**A/E CERTIFICATE OF CONTRACT COMPLETION**

PROJECT NO: \_\_\_\_\_  
 PROJECT TITLE: \_\_\_\_\_  
 CONTRACTOR: \_\_\_\_\_  
 CONTRACT DATE: \_\_\_\_\_ DATE OF FINAL COMPLETION: \_\_\_\_\_

**CERTIFICATE OF ARCHITECT/ENGINEER**

I CERTIFY: That the work under the above contract has been satisfactorily completed on the date set forth in accordance with the terms of the contract; that the contractor has submitted his sworn affidavit as evidence that he has paid all labor, materials and other charges against the project in accordance with the terms of the contract.

A/E Firm Name: \_\_\_\_\_ Date \_\_\_\_\_  
 By \_\_\_\_\_

TO BE COMPLETED BY ARCHITECT/ENGINEER  
 THROUGH THE SUBSTANTIAL COMPLETION PHASE

	<u>DATE</u>	<u>DAYS</u>		
1. Notice to Proceed (N.T.P.)	_____	_____		
2. Time Specified in Original Contract for Substantial Completion (S.C.)	<u>XXXXXXX</u>	_____	Liquidated Damages to be completed by the Dept. of Military Affairs	
3. Extension Granted by Change Orders (Days Between Original Contract S.C. and Final Contract S.C.)	<u>XXXXXXX</u>	_____		
4. Total Days Allowable to Substantial Completion (Add Lines 2 and 3)	<u>XXXXXXX</u>	_____		
5. Project Substantially Completed as Certified by A/E (Total Days from N.T.P. through Date certified by A/E)	_____	_____		
6. Substantial Completion Overrun (Subtract Line 4 from 5 and Enter Overrun)	_____	_____	@\$	Per Day=\$

THROUGH THE FINAL COMPLETION PHASE

1. Time Specified in Contract, Between Substantial & Final Completion	<u>XXXXXXX</u>	_____		
2. Extensions Granted by Change Orders (Days Between S.C. & Final Completion)	<u>XXXXXXX</u>	_____		
3. Total Days Allowable Between Substantial & Final Completion (Add Lines 1 & 2)	<u>XXXXXXX</u>	_____		
4. Date Actually Completed and Total Days Between Actual S.C. & Date Certified by A/E as Actually being Finally Completed.	_____	_____		
5. Final Completion Overrun (Subtract Line 3 & 4 and Enter Overrun)	<u>XXXXXXX</u>	_____	@\$	Per Day=\$

TOTAL LIQUIDATED DAMAGES \$ \_\_\_\_\_

Project Director \_\_\_\_\_ Date \_\_\_\_\_  
 Project Development Manager \_\_\_\_\_ Date \_\_\_\_\_

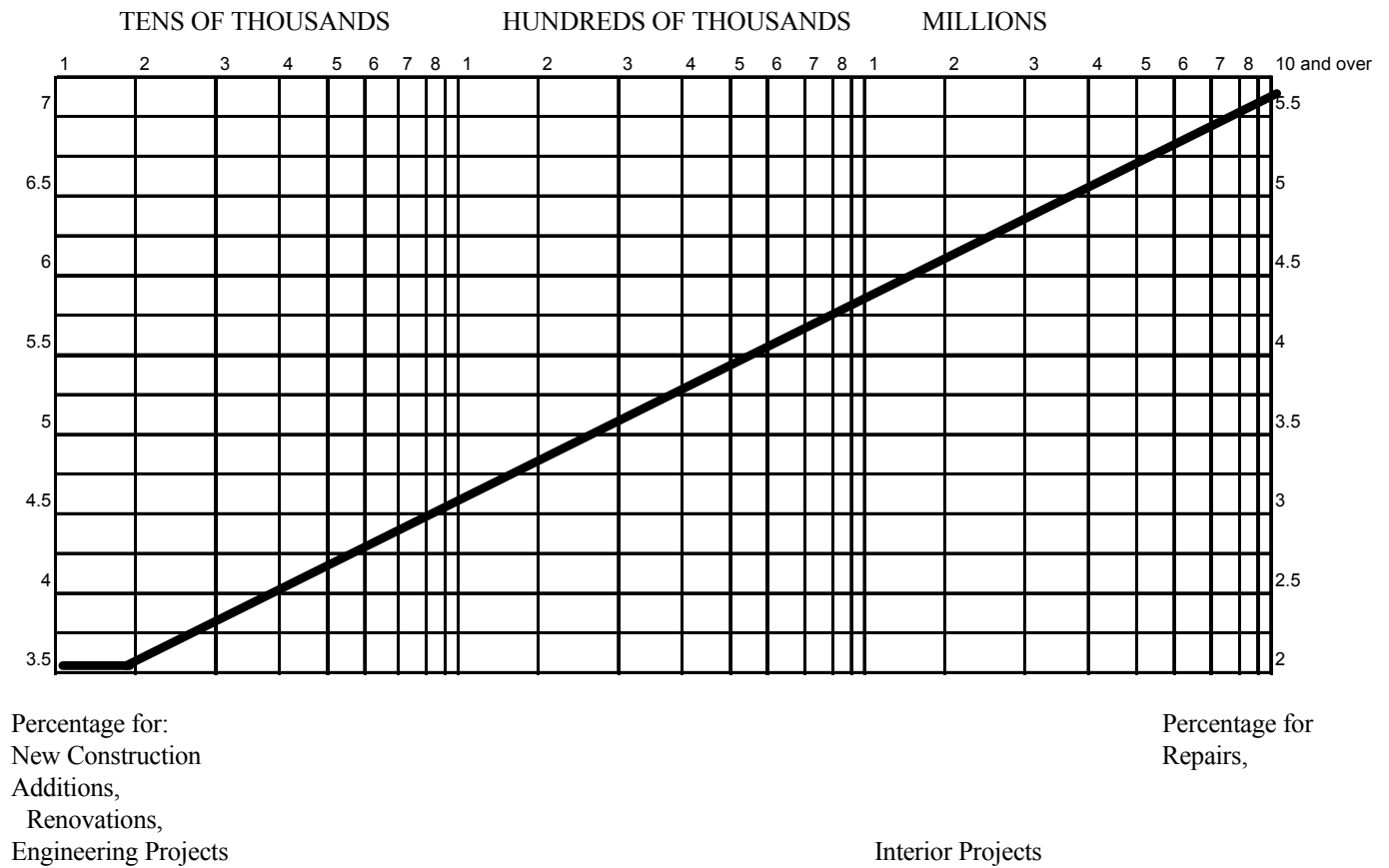
**EXHIBIT 13**

PERCENTAGE FACTOR TO BE USED IN SECTION C-35(6) OF THE CONSTRUCTION CONTRACT CONDITIONS

The following graph lists dollar amounts, percentages and types of construction. The proper percentage shall be used to determine compensation for (b), in Section C-33 on the "Conditions of the Contract", "Changes in the Work".

In order to select the proper percentage, the user should find the estimated construction amount on the top horizontal scale, drop to the sloped line, and read horizontally the applicable percentage on either the right hand or left hand vertical scale, depending on the type of construction project.

AMOUNT IN DOLLARS OF CONTRACT CONSTRUCTION COST



**EXHIBIT 14**

(PROJECT NUMBER)

(NAME OF PROJECT)

(NAME OF INSTITUTION)

STATE OF FLORIDA

BEING CONSTRUCTED BY  
FLORIDA DEPARTMENT OF MILITARY AFFAIRS

RICK SCOTT  
GOVERNOR

CONSTRUCTION AND FACILITY MANAGEMENT OFFICE  
COLONEL R. DWAYNE JARRIEL

FOR

FLORIDA DEPARTMENT OF MILITARY AFFAIRS

(NAME OF ARCHITECT-ENGINEER)

(NAME OF CONTRACTOR)

**EXHIBIT 15**

**CONTRACTOR'S Status Report of Minority & Disabled Veteran's Business Enterprise  
Report of Partial Payment**

**EXHIBIT 15**

Contractor's Name: \_\_\_\_\_ CFMO Project Name: \_\_\_\_\_  
 Address: \_\_\_\_\_ CFMO Project No.: \_\_\_\_\_  
 City, State and Zip: \_\_\_\_\_ Date: \_\_\_\_\_  
 Contract Amount: \$0.00 Draw Amount: \_\_\_\_\_  
 MBE Participation Amount: \_\_\_\_\_ MBE % \_\_\_\_\_ Draw Request #: \_\_\_\_\_  
 DV Participation Amount: \_\_\_\_\_ DV % \_\_\_\_\_

Minority Business Enterprise (MBE)								
Full Name of Minority Business Enterprise:	Description of Trade or Service	MBE Status	State Certified	MBE Contract Amount	Amount Paid to MBE This Draw	Total Paid This Contract To Date	Contract Balance	Project Type
		Hispanic Woman African American Asian/Other	MBE Yes/No	Amount	This Draw	To Date	Due	Local Government or State Project
TOTALS							\$	

\*\* Certified MBE: H - African American I - Hispanic J - Asian/Hawaiian K - Native American M - American Woman W - Servic Disabled Veteran Business Non-Certified MBE: N - African American O -Hispanic P - Asian/Hawaiian Q - Native American R - American Women Y - Service-Disabled Veteran Business

Service Disabled Veteran's (DV) Business Enterprise								
*Service Disabled Veteran's Business Enterprise	Description of Trade or Service	Certified DV Business (Yes or NO)	Non-Certified DV Business	DV Contract Amount	Amount Paid to DV This Draw	Total Paid on This Contract To Date	Contract Balance	Project Type
		MBE Yes/No	MBE Yes/No	Amount \$	This Draw	To Date	Due	Local Government or State Project
TOTALS							\$	

Include this form with DMA FNG 4013E

\*Include all subcontractors and material handlers.  
MBE Form dtd 4/2011

**EXHIBIT 16**

<b>Contractor Name</b> Address  POC Phone:              Fax:	<sup>1</sup> Proposed Change Order #: _____  <sup>2</sup> C/O Date: _____												
<sup>3</sup> C/O Title: _____  Project Name: _____  CFMO POC: <sup>A</sup> Address:    2305 State Road 207    St.   Augustine, FL 32086  Phone: Fax:            (904) 823-0189	Project No.: _____  Architect (A/E): _____  A/E POC: Address: _____  Phone: Fax: _____												
<table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th style="width:10%;"><u>Item</u></th> <th style="width:70%;"><u>Description</u></th> <th style="width:20%;"><u><sup>5</sup> Net Amount</u></th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">0001</td> <td> <sup>4</sup> Additional Charge For: (List credit allowances here--if applicable)  <div style="background-color: #e0ffff; height: 20px; width: 100%; margin-top: 5px;"></div>                       See attached subcontractor back-up documentation for reference <sup>B</sup> </td> <td style="background-color: #e0ffff;"></td> </tr> <tr> <td style="text-align: center;">0002</td> <td>General/Prime Contractors Overhead &amp; Profit</td> <td></td> </tr> <tr> <td colspan="2" style="text-align: right;"><b>TOTAL:</b></td> <td></td> </tr> </tbody> </table>		<u>Item</u>	<u>Description</u>	<u><sup>5</sup> Net Amount</u>	0001	<sup>4</sup> Additional Charge For: (List credit allowances here--if applicable) <div style="background-color: #e0ffff; height: 20px; width: 100%; margin-top: 5px;"></div> See attached subcontractor back-up documentation for reference <sup>B</sup>		0002	General/Prime Contractors Overhead & Profit		<b>TOTAL:</b>		
<u>Item</u>	<u>Description</u>	<u><sup>5</sup> Net Amount</u>											
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0002	General/Prime Contractors Overhead & Profit												
<b>TOTAL:</b>													
<sup>7</sup> Additional Days Requested by Contractor: _____ Days Approved by CFMO: _____													
<b>SIGNATURES:</b>													
Contractor Recommendation	<sup>8</sup> Title	<sup>9</sup> Date											
A/E Recommendation (if required by CFMO)	Title	Date											
CFMO Project Manager Approval	Title	Date											
<b>FUNDING:</b> RM Approval: _____	Source: _____												
Account: _____	Org Code: _____												

## EXHIBIT 16 CONTINUED

### INSTRUCTIONS FOR FNG FORM 4016-E

1. Enter Proposed Change Order Number (kept in sequential order by General/Prime Contractors).
2. Date Change Order is being submitted to A/E or CFMO for recommendation and approval.
3. Enter Title for Change Order (i.e., Unforeseen Conditions, Under Ground Stumps, Dishwasher Hood, etc.)
4. Below Additional Charge For: Describe the change being requested in summary, list the RFI number associated with change, list any credit allowances, and include any subcontractor mark-up.
5. Enter "NET" amount for Change Order Request.
6. Enter additional days general contractor is requesting to be granted for this change.
7. Type in Title of the authorized signer from General/Prime Contractor's company.
8. Enter date of General/Prime Contractors signature.
9. Forward this Change Order Request Summary to either the A/E or the CFMO Project Manager.

#### NOTES:

<sup>A</sup> Questions regarding this form can be directed to your CFMO Project Manager or the CFMO Business Management Section at (904) 823-0255 or (904) 823-0256.

<sup>B</sup> Attach all back-up documentation for this Change Order Request in an orderly and understandable format to ensure timely processing.

**Exhibit 17**

State of Florida / Department Of Military Affairs  
Construction & Facility Management Office

**ESTIMATED PAYMENT DRAW SCHEDULE**

(Form is to be completed by Contractor and submitted to CFMO Project Manager within 10 days of Pre-Construction Meeting date)

Contractor Name:	<u>0</u>	Funding Type:	<u>0</u>
Contractor Address:	<u>0</u>	Acctg or CAT Code:	<u>0</u>
City, State, Zip	<u>0</u>	Org Code:	<u>0</u>
Point of Contact:	<u>0</u>	MCCA Number:	<u>0</u>
Facsimile Number:	<u>0</u>	Contract Term:	<u>0</u>
		Contract Amount:	<u>\$0.00</u>
State Project Number:	<u>0</u>	Notice to Proceed Date:	<u>                    </u>
Federal Project Number:	<u>0</u>	Substantial Completion Date:	<u>                    </u>
CFMO Project Manager:	<u>0</u>	Final Completion Date:	<u>                    </u>

Draw #	Month	Year	Est. Monthly Draw Amount
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			
16			
17			
18			

Contractor Signature \_\_\_\_\_ Printed Name, Title \_\_\_\_\_ Date \_\_\_\_\_

DATE STAMPED RECEIVED:



ROUTING

CFMO Proj. Mgr. \_\_\_\_\_  
 Resource Mgmt. \_\_\_\_\_  
 USPFO \_\_\_\_\_  
 SQM \_\_\_\_\_

FNG Form 4020, OCT 06

EXHIBIT 18  
SAMPLE

**CONSENT OF SURETY  
TO FINAL PAYMENT**

Conforms with the American Institute of  
Architects, AIA Document G707

BOND NO. \_\_\_\_\_

OWNER	<input type="checkbox"/>
ARCHITECT	<input type="checkbox"/>
CONTRACTOR	<input type="checkbox"/>
SURETY	<input checked="" type="checkbox"/>
OTHER	<input type="checkbox"/>

TO OWNER:	STATE OF FLORIDA	ARCHITECT'S PROJECT NO.:
<i>(Name and address)</i>	DEPARTMENT OF MILITARY AFFAIRS	
	CONSTRUCTION & FACILITY MANAGEMENT	
	OFFICE	CONTRACT FOR:
	P. O. Box 1008	
	St. Augustine, FL 32085-1008	
PROJECT:		CONTRACT DATED:
<i>(Name and address)</i>		

In accordance with the provisions of the Contract between the Owner and the Contractor as indicated above, the  
*(Insert name and address of Surety)*

HARTFORD FIRE INSURANCE COMPANY  
Hartford Plaza  
Hartford, CT 06115

on bond of  
*(Insert name and address of Contractor)*

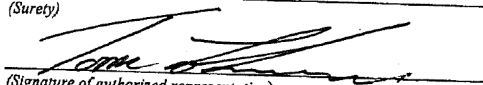
, SURETY,

hereby approves of the final payment to the Contractor, and agrees that final payment to the Contractor shall not relieve the Surety of any  
of its obligations to

*(Insert name and address of Owner)* STATE OF FLORIDA  
DEPARTMENT OF MILITARY AFFAIRS  
CONSTRUCTION & FACILITY MANAGEMENT  
OFFICE  
P. O. Box 1008  
St. Augustine, FL 32085-1008

, OWNER,

IN WITNESS WHEREOF, the Surety has hereunto set its hand on this date: April 7, 2011  
*(Insert in writing the month followed by the numeric date and year.)*

HARTFORD FIRE INSURANCE COMPANY  
*(Surety)*  
  
*(Signature of authorized representative)*

Attest:  
(Seal): \_\_\_\_\_  
1, Witness

Tom S. Lobrano, IV, Attorney-In-Fact  
*(Printed name and title)*



**EXHIBIT 19  
SAMPLE**

# POWER OF ATTORNEY

*Direct Inquiries/Claims to:*

**THE HARTFORD**  
BOND, T-4  
P.O. BOX 2103, 690 ASYLUM AVENUE  
HARTFORD, CONNECTICUT 06115  
call: 888-266-3488 or fax: 860-757-5835

**KNOW ALL PERSONS BY THESE PRESENTS THAT:**

**Agency Code: 21-222192**

- Hartford Fire Insurance Company**, a corporation duly organized under the laws of the State of Connecticut
- Hartford Casualty Insurance Company**, a corporation duly organized under the laws of the State of Indiana
- Hartford Accident and Indemnity Company**, a corporation duly organized under the laws of the State of Connecticut
- Hartford Underwriters Insurance Company**, a corporation duly organized under the laws of the State of Connecticut
- Twin City Fire Insurance Company**, a corporation duly organized under the laws of the State of Indiana
- Hartford Insurance Company of Illinois**, a corporation duly organized under the laws of the State of Illinois
- Hartford Insurance Company of the Midwest**, a corporation duly organized under the laws of the State of Indiana
- Hartford Insurance Company of the Southeast**, a corporation duly organized under the laws of the State of Florida

having their home office in Hartford, Connecticut, (hereinafter collectively referred to as the "Companies") do hereby make, constitute and appoint, **up to the amount of unlimited:**

*James C. Congelio, Tom S. Loblano III, Tom S. Loblano IV, James N. Congelio*  
of  
*Jacksonville, FL*

their true and lawful Attorney(s)-in-Fact, each in their separate capacity if more than one is named above, to sign its name as surety(ies) only as delineated above by , and to execute, seal and acknowledge any and all bonds, undertakings, contracts and other written instruments in the nature thereof, on behalf of the Companies in their business of guaranteeing the fidelity of persons, guaranteeing the performance of contracts and executing or guaranteeing bonds and undertakings required or permitted in any actions or proceedings allowed by law.

**In Witness Whereof**, and as authorized by a Resolution of the Board of Directors of the Companies on January 22, 2004 the Companies have caused these presents to be signed by its Assistant Vice President and its corporate seals to be hereto affixed, duly attested by its Assistant Secretary. Further, pursuant to Resolution of the Board of Directors of the Companies, the Companies hereby unambiguously affirm that they are and will be bound by any mechanically applied signatures applied to this Power of Attorney.



*Scott Sadowsky*

Scott Sadowsky, Assistant Secretary

*M. Ross Fisher*

M. Ross Fisher, Assistant Vice President

STATE OF CONNECTICUT }  
COUNTY OF HARTFORD } ss. Hartford

On this 3<sup>rd</sup> day of March, 2008, before me personally came M. Ross Fisher, to me known, who being by me duly sworn, did depose and say: that he resides in the County of Hartford, State of Connecticut; that he is the Assistant Vice President of the Companies, the corporations described in and which executed the above instrument; that he knows the seals of the said corporations; that the seals affixed to the said instrument are such corporate seals; that they were so affixed by authority of the Boards of Directors of said corporations and that he signed his name thereto by like authority.



CERTIFICATE

*Scott E. Paseka*

Scott E. Paseka  
Notary Public  
My Commission Expires October 31, 2012

I, the undersigned, Assistant Vice President of the Companies, DO HEREBY CERTIFY that the above and foregoing is a true and correct copy of the Power of Attorney executed by said Companies, which is still in full force effective as of **April 7, 2011**. Signed and sealed at the City of Hartford.



*Gary W. Stumper*

Gary W. Stumper, Assistant Vice President

EXHIBIT 20

WAIVER AND RELEASE OF LIEN UPON PROGRESS PAYMENT

The undersigned lienor, in consideration of the sum of \_\_\_\_\_, hereby waives and releases its lien and right to claim a lien for labor, services or materials furnished through \_\_\_\_ (date)\_\_\_\_\_ to \_\_\_\_ (contractor)\_\_\_\_\_ on the job of \_\_\_\_ (job title)\_\_\_\_\_ to the following described property:

(Project name) \_\_\_\_\_  
(Project location) \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

This waiver and release does not cover any retention or labor, services or materials furnished after the date specified.

DATED on \_\_\_\_\_

Lienor's Name \_\_\_\_\_  
Address \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

By \_\_\_\_\_  
Printed Name \_\_\_\_\_  
Title \_\_\_\_\_

STATE OF \_\_\_\_\_

COUNTY OF \_\_\_\_\_

BEFORE ME, the undersigned officer, personally appeared \_\_\_\_\_ as \_\_\_\_\_ of \_\_\_\_\_, who is personally known to me or presented \_\_\_\_\_ as identification, and who did \_\_\_\_\_ take an oath, and who is known to be the person described in and who executed the foregoing instrument, and acknowledged to and before me that he/she executed said instrument in the capacity and for the purposes therein expressed.

Signature of Notary: \_\_\_\_\_

Commission Expiration Date: \_\_\_\_\_

## SECTION 024119 - SELECTIVE DEMOLITION

### PART 1 - GENERAL

#### 1.1 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.

#### 1.2 DEFINITIONS

- A. Remove: Detach items from existing construction and legally dispose of them off-site unless indicated to be removed and salvaged or removed and reinstalled.
- B. Remove and Salvage: Carefully detach 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, prepare for reuse, and reinstall where indicated.
- D. Existing to Remain: Existing items of construction that are not to be permanently removed and that are not otherwise indicated to be removed, removed and salvaged, or removed and reinstalled.

#### 1.3 QUALITY ASSURANCE

- A. Refrigerant Recovery Technician Qualifications: Certified by an EPA-approved certification program.

#### 1.4 FIELD CONDITIONS

- A. Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.
1. Before selective demolition, Owner will remove the following items:
    - a. Non-fixed interior furniture, fixtures and equipment.
- B. Notify Architect of discrepancies between existing conditions and Drawings before proceeding with selective demolition.
- C. Storage or sale of removed items or materials on-site is not permitted.

- 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. 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.

## 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 ANSI/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. Survey existing conditions and correlate with requirements indicated to determine extent of selective demolition required.
- C. When unanticipated mechanical, electrical, or structural elements that conflict with intended function or design are encountered, investigate and measure the nature and extent of conflict. Promptly submit a written report to Architect.
- D. Survey of Existing Conditions: Record existing conditions by use of preconstruction photographs, and preconstruction videotapes.

### 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 indicated utility services and mechanical/electrical systems serving areas to be selectively demolished.
  - 1. Arrange to shut off indicated utilities with utility companies.

2. 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.
  3. Disconnect, plumbing, and HVAC systems, equipment, and components indicated 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.
    - 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.
- C. Refrigerant: Remove refrigerant from mechanical equipment to be selectively demolished according to 40 CFR 82 and regulations of authorities having jurisdiction.

### 3.3 PREPARATION

- A. 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.
- B. Temporary Facilities: Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.

### 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. 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, to minimize disturbance of adjacent surfaces. Temporarily cover openings to remain.
  2. Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.
  3. 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 fire watch and portable fire-suppression devices during flame-cutting operations.
4. Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
  5. Dispose of demolished items and materials promptly.
- B. 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.
- C. Removed and Reinstalled Items:
1. Clean and repair items to functional condition adequate for intended reuse.
  2. Pack or crate items after cleaning and repairing. Identify contents of containers.
  3. Protect items from damage during transport and storage.
  4. Reinstall items in locations indicated. Comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make item functional for use indicated.
- 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 cleaned and reinstalled in their original locations after selective demolition operations are complete.

### 3.5 DISPOSAL OF DEMOLISHED MATERIALS

- A. General: Except for items or materials indicated to be recycled, reused, salvaged, reinstalled, or otherwise indicated to remain Owner's property, remove demolished materials from Project site and legally dispose of them in an EPA-approved landfill.
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. Remove debris from elevated portions of building by chute, hoist, or other device that will convey debris to grade level in a controlled descent.
- B. Burning: Do not burn demolished materials.
- C. Disposal: Transport demolished materials off Owner's property and legally dispose of them.

### 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.

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END OF SECTION 024119

## SECTION 034500 - PRECAST ARCHITECTURAL CONCRETE

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Section includes architectural precast concrete wainscot wall cap trim units.

#### 1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Design Mixtures: For each precast concrete mixture. Include compressive strength and water-absorption tests.
- C. Shop Drawings:
  - 1. Detail fabrication and installation of architectural precast concrete units.
  - 2. Indicate locations, plans, elevations, dimensions, shapes, and cross sections of each unit.
  - 3. Indicate joints, reveals, drips, chamfers, and extent and location of each surface finish.
  - 4. Indicate details at building corners.
- D. Samples: Design reference samples for initial verification of design intent, for each type of finish indicated on exposed surfaces of architectural precast concrete units, in sets of three, representative of finish, color, and texture variations expected; approximately 4 by 4 by 2 inches.

#### 1.3 QUALITY ASSURANCE

- A. Fabricator Qualifications: A firm that assumes responsibility for engineering architectural precast concrete units to comply with performance requirements. This responsibility includes preparation of Shop Drawings.

#### 1.4 COORDINATION

- A. Furnish loose connection hardware and anchorage items to be embedded in or attached to other construction without delaying the Work. Provide locations, setting diagrams, templates, instructions, and directions, as required, for installation.



## PART 2 - PRODUCTS

### 2.1 PERFORMANCE REQUIREMENTS

- A. Design Standards: Comply with ACI 318 (ACI 318M) and design recommendations of PCI MNL 120, "PCI Design Handbook - Precast and Prestressed Concrete," applicable to types of architectural precast concrete units indicated.

### 2.2 REINFORCING MATERIALS

- A. Reinforcing Bars: ASTM A 615/A 615M, Grade 60 (Grade 420), deformed.

### 2.3 CONCRETE MATERIALS

- A. 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.
- B. Normal-Weight Aggregates: Except as modified by PCI MNL 117, 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.
  - 1. Face-Mixture-Fine Aggregates: Selected, natural or manufactured sand compatible with coarse aggregate; to match approved finish sample.
- C. Coloring Admixture: ASTM C 979/C 979M, synthetic or natural mineral-oxide pigments or colored water-reducing admixtures, temperature stable, and nonfading.
- D. Water: Potable; free from deleterious material that may affect color stability, setting, or strength of concrete and complying with chemical limits of PCI MNL 117.
- E. Air-Entraining Admixture: ASTM C 260, certified by manufacturer to be compatible with other required admixtures.
- F. 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.

### 2.4 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.

## 2.5 CONCRETE MIXTURES

- A. Prepare design mixtures for each type of precast concrete required.
- B. Design mixtures may be prepared by a qualified independent testing agency or by qualified precast plant personnel at architectural precast 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 117 when tested according to ASTM C 1218/C 1218M.
- D. Normal-Weight Concrete Mixtures: Proportion mixtures 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) minimum.
- E. Water Absorption: 6 percent by weight or 14 percent by volume, tested according to ASTM C 642, except for boiling requirement.
- F. 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 117.
- G. When included in design mixtures, add other admixtures to concrete mixtures according to manufacturer's written instructions.

## 2.6 FABRICATION

- A. Reinforcement: Comply with recommendations in PCI MNL 117 for fabricating, placing, and supporting reinforcement.
- B. Reinforce architectural precast concrete units to resist handling, transportation, and erection stresses and specified in-place loads.
- C. Comply with requirements in PCI MNL 117 and requirements in this Section for measuring, mixing, transporting, and placing concrete. After concrete batching, no additional water may be added.
- D. Place face mixture to a minimum thickness after consolidation of the greater of 1 inch (25 mm) or 1.5 times the maximum aggregate size, but not less than the minimum reinforcing cover specified.
- E. Place concrete in a continuous operation to prevent cold joints or planes of weakness from forming in precast concrete units.
- F. Thoroughly consolidate placed concrete by internal and external 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 117.
  - 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.

- G. Comply with PCI MNL 117 for hot- and cold-weather concrete placement.
- H. Identify pickup points of architectural precast concrete units and orientation in structure with permanent markings, complying with markings indicated on Shop Drawings. Imprint or permanently mark casting date on each architectural precast concrete unit on a surface that does not show in finished structure.
- I. Cure concrete, according to requirements in PCI MNL 117, by moisture retention without heat or by accelerated heat curing using low-pressure 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.
- J. Discard and replace architectural precast concrete units that do not comply with requirements, including structural, manufacturing tolerance, and appearance, unless repairs meet requirements in PCI MNL 117 and Architect's approval.

## 2.7 FABRICATION TOLERANCES

- A. Fabricate architectural precast concrete units to shapes, lines, and dimensions indicated so each finished unit complies with PCI MNL 117 product tolerances as well as position tolerances for cast-in items.

## 2.8 FINISHES

- A. Exposed faces shall be free of joint marks, grain, and other obvious defects. Corners, including false joints shall be uniform, straight, and sharp. Finish exposed-face surfaces of architectural precast concrete units to match the color, finish and texture of Basis-of-Design "Tabby Stone" color "Latte" in the "smooth / wet" finish and as follows:
  - 1. Smooth-Surface Finish: Provide surfaces free of pockets, sand streaks, and honeycombs, with uniform color and texture.
- B. Finish exposed top, front and bottom surfaces of precast architectural concrete coping and sill units to match face-surface finish.
- C. Finish exposed back surfaces of precast architectural concrete coping and sill units by smooth, steel-trowel finish.

## PART 3 - EXECUTION

### 3.1 INSTALLATION

- A. Do not install architectural precast concrete until supporting concrete masonry has attained minimum design compressive strength.
- B. Erect architectural precast concrete level, plumb, and square within specified allowable tolerances. Provide temporary supports and bracing as required to maintain position, stability, and alignment of units until permanent connections are completed.

1. Maintain horizontal and vertical joint alignment and uniform joint width as erection progresses.
  2. Unless otherwise indicated, maintain uniform joint widths of 3/8 inch.
  3. Install architectural precast concrete units of equal size beginning at the center of each individual wall working outward maintaining a consistent symmetrical dimension and placement about the centerline of the wall. Provide units of equal dimension at intersections.
  4. Miter or provide custom formed corner units at 90 degree corners.
- C. Install clips and other accessories required for connecting precast architectural concrete coping and sill units to supporting members and backup materials.

### 3.2 ERECTION TOLERANCES

- A. Erect architectural precast concrete units level, plumb, square, and in alignment without exceeding the noncumulative erection tolerances of PCI MNL 117, Appendix I.

### 3.3 FIELD QUALITY CONTROL

- A. Repair or remove and replace work where tests and inspections indicate that it does not comply with specified requirements.

### 3.4 REPAIRS

- A. Repair architectural precast concrete units if permitted by Architect. Architect reserves the right to reject repaired units that do not comply with requirements.
- 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. Remove and replace damaged architectural precast concrete units when repairs do not comply with requirements.

### 3.5 CLEANING

- A. Clean surfaces of precast concrete units exposed to view.
- B. Clean mortar and other deleterious material from concrete surfaces and adjacent materials immediately.
- C. 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 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.

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END OF SECTION 034500

## SECTION 042200 - CONCRETE UNIT MASONRY

### PART 1 - GENERAL

#### 1.1 SUMMARY

A. Section Includes:

1. Concrete masonry units (CMU's).

#### 1.2 ACTION SUBMITTALS

A. Product Data: For each type of product indicated.

B. Samples: For each type and color of exposed masonry unit and colored mortar.

#### 1.3 INFORMATIONAL SUBMITTALS

A. Material Certificates: For each type and size of product indicated. For masonry units include data on material properties.

B. Mix Designs: For each type of mortar. Include description of type and proportions of ingredients.

1. Include test reports for mortar mixes required to comply with property specification. Test according to ASTM C 109/C 109M for compressive strength, ASTM C 1506 for water retention, and ASTM C 91 for air content.
2. Include test reports, according to ASTM C 1019, for grout mixes required to comply with compressive strength requirement.

#### 1.4 QUALITY ASSURANCE

A. Masonry Standard: Comply with ACI 530.1/ASCE 6/TMS 602 unless modified by requirements in the Contract Documents.

#### 1.5 PROJECT CONDITIONS

A. Cold-Weather Requirements: Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen substrates. Remove and replace unit masonry damaged by frost or by freezing conditions. Comply with cold-weather construction requirements contained in ACI 530.1/ASCE 6/TMS 602.

B. Hot-Weather Requirements: Comply with hot-weather construction requirements contained in ACI 530.1/ASCE 6/TMS 602.

## PART 2 - PRODUCTS

### 2.1 MASONRY UNITS, GENERAL

- A. Defective Units: Referenced masonry unit standards may allow a certain percentage of units to contain chips, cracks, or other defects exceeding limits stated in the standard. Do not use units where such defects will be exposed in the completed Work.

### 2.2 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 square-edged units for outside corners unless otherwise indicated.
- B. Integral Water Repellent: Provide units made with integral water repellent for exposed units.
  - 1. Integral Water Repellent: Liquid polymeric, integral water-repellent admixture that does not reduce flexural bond strength. Units made with integral water repellent, when tested according to ASTM E 514/E 514M as a wall assembly made with mortar containing integral water-repellent manufacturer's mortar additive, with test period extended to 24 hours, shall show no visible water or leaks on the back of test specimen.
- C. Decorative CMUs: ASTM C 90.
  - 1. Unit Compressive Strength: Provide units with minimum average net-area compressive strength of 2150 psi.
  - 2. Density Classification: Normal weight.
  - 3. Pattern and Texture:
    - a. Standard pattern, split-face finish.
    - b. Color and Appearance – Basis-of-Design: A1 Block color S-115.

### 2.3 MORTAR AND GROUT MATERIALS

- A. Portland Cement: ASTM C 150, Type I or II, except Type III may be used for cold-weather construction. Provide natural color or white cement as required to produce mortar color indicated.
- B. Hydrated Lime: ASTM C 207, Type S.
- C. Portland Cement-Lime Mix: Packaged blend of portland cement and hydrated lime containing no other ingredients.
- D. Masonry Cement: ASTM C 91.

- E. Mortar Cement: ASTM C 1329.
- F. Mortar Pigments: Natural and synthetic iron oxides and chromium oxides, compounded for use in mortar mixes and complying with ASTM C 979. Use only pigments with a record of satisfactory performance in masonry mortar.
  - 1. Colored Masonry Cement:
    - a. Products: Subject to compliance with requirements, provide one of the following:
      - 1) Capital Materials Corporation; Flamingo Color Masonry Cement.
      - 2) Cemex S.A.B. de C.V.; Richcolor Masonry Cement.
      - 3) Essroc, Italcementi Group; Brixment-in-Color.
      - 4) Holcim (US) Inc.; Rainbow Mortamix Custom Color Masonry Cement.
      - 5) Lafarge North America Inc.; U.S. Cement Custom Color Masonry Cement.
      - 6) Lehigh Cement Company; Lehigh Custom Color Masonry Cement.
      - 7) National Cement Company, Inc.; Coosa Masonry Cement.
- G. Aggregate for Mortar: ASTM C 144.
  - 1. For joints less than 1/4 inch thick, use aggregate graded with 100 percent passing the No. 16 sieve.
  - 2. White-Mortar Aggregates: Natural white sand or crushed white stone.
  - 3. Colored-Mortar Aggregates: Natural sand or crushed stone of color necessary to produce required mortar color.
- H. Aggregate for Grout: ASTM C 404.
- I. Water: Potable.

## 2.4 REINFORCEMENT

- A. Masonry Joint Reinforcement, General: ASTM A 951/A 951M.
  - 1. Exterior Walls: Hot-dip galvanized, carbon steel.
  - 2. Wire Size for Side Rods: 0.148-inch diameter.
  - 3. Wire Size for Cross Rods: 0.148-inch diameter.
  - 4. Wire Size for Veneer Ties: 0.187-inch diameter.
  - 5. Spacing of Cross Rods, Tabs, and Cross Ties: Not more than 16 inches o.c.
  - 6. Provide in lengths of not less than 10 feet, with prefabricated corner and tee units.

## 2.5 TIES AND ANCHORS

- A. Materials: Provide ties and anchors specified in this article that are made from materials that comply with the following unless otherwise indicated.
  - 1. Hot-Dip Galvanized, Carbon-Steel Wire: ASTM A 82/A 82M; with ASTM A 153/A 153M, Class B-2 coating.



2. Steel Sheet, Galvanized after Fabrication: ASTM A 1008/A 1008M, Commercial Steel, with ASTM A 153/A 153M, Class B coating.
3. Tie Section: Triangular-shaped wire tie, sized to extend within 1 inch of masonry face, made from 0.187-inch- diameter, hot-dip galvanized steel wire.
4. Corrosion Protection: Hot-dip galvanized to comply with ASTM A 153/A 153M.

## 2.6 EMBEDDED FLASHING MATERIALS

### A. Flexible Flashing: Use the following unless otherwise indicated:

1. Copper-Laminated Flashing: 7-oz./sq. ft. copper sheet bonded between 2 layers of glass-fiber cloth. Use only where flashing is fully concealed in masonry.
  - a. Products: Subject to compliance with requirements, provide one of the following:
    - 1) Advanced Building Products Inc.; Copper Fabric Flashing.
    - 2) Dayton Superior Corporation, Dur-O-Wal Division; Copper Fabric Thru-Wall Flashing.
    - 3) Phoenix Building Products; Type FCC-Fabric Covered Copper.
    - 4) Sandell Manufacturing Co., Inc.; Copper Fabric Flashing.

### B. Adhesives, Primers, and Seam Tapes for Flashings: Flashing manufacturer's standard products or products recommended by flashing manufacturer for bonding flashing sheets to each other and to substrates.

## 2.7 MISCELLANEOUS MASONRY ACCESSORIES

- A. Compressible Filler: Premolded filler strips complying with ASTM D 1056, Grade 2A1; compressible up to 35 percent; formulated from neoprene, urethane or PVC.
- B. Preformed Control-Joint Gaskets: Made from styrene-butadiene-rubber compound, complying with ASTM D 2000, Designation M2AA-805 or PVC, complying with ASTM D 2287, Type PVC-65406 and designed to fit standard sash block and to maintain lateral stability in masonry wall; size and configuration as indicated.
- C. Bond-Breaker Strips: Asphalt-saturated, organic roofing felt complying with ASTM D 226, Type I (No. 15 asphalt felt).

## 2.8 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.

- B. Preblended, Dry Mortar Mix: Furnish dry mortar ingredients in form of a preblended mix. Measure quantities by weight to ensure accurate proportions, and thoroughly blend ingredients before delivering to Project site.
- C. Mortar for Unit Masonry: Comply with ASTM C 270, Property Specification. Provide the following types of mortar for applications stated unless another type is indicated.
  - 1. For masonry below grade or in contact with earth, use Type S.
  - 2. For all other masonry, use Type N.
- D. Pigmented Mortar: Use colored cement product. Do not add pigments to colored cement products.
  - 1. Application: Use pigmented mortar for exposed mortar joints with the following units:
    - a. Decorative CMUs.
    - b. Color – As selected by Architect from Manufacturer's full range of options.

### PART 3 - EXECUTION

#### 3.1 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 or minus 1/4 inch.
  - 2. For location of elements in plan do not vary from that indicated by more than plus or minus 1/2 inch.
  - 3. For location of elements in elevation do not vary from that indicated by more than plus or minus 1/4 inch in a story height or 1/2 inch 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, or 1/2 inch 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, 1/4 inch in 20 feet, or 1/2 inch maximum.
  - 3. For vertical lines and surfaces do not vary from plumb by more than 1/4 inch in 10 feet, 3/8 inch in 20 feet, or 1/2 inch 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, 1/4 inch in 20 feet, or 1/2 inch maximum.
  - 5. For lines and surfaces do not vary from straight by more than 1/4 inch in 10 feet, 3/8 inch in 20 feet, or 1/2 inch maximum.
- C. Joints:

1. For bed joints, do not vary from thickness indicated by more than plus or minus 1/8 inch, with a maximum thickness limited to 1/2 inch.
2. For head and collar joints, do not vary from thickness indicated by more than plus 3/8 inch or minus 1/4 inch.
3. For exposed head joints, do not vary from thickness indicated by more than plus or minus 1/8 inch.

### 3.2 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. 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.
- C. Bond Pattern for Exposed Masonry: Unless otherwise indicated, lay exposed masonry in running bond; do not use units with less than nominal 4-inch horizontal face dimensions at corners or jambs.
- D. Built-in Work: As construction progresses, build in items specified in this and other Sections. Fill in solidly with masonry around built-in items.
- E. Fill space between steel frames and masonry solidly with mortar unless otherwise indicated.
- F. 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.

### 3.3 MORTAR BEDDING AND JOINTING

- A. Lay hollow CMUs as follows:
  1. With face shells fully bedded in mortar and with head joints of depth equal to bed joints.
  2. With webs fully bedded in mortar in all courses of piers, columns, and pilasters.
  3. With webs fully bedded in mortar in grouted masonry, including starting course on footings.
  4. With entire units, including areas under cells, fully bedded in mortar at starting course on footings where cells are not grouted.
- B. Lay solid masonry units with completely filled bed and head joints; butter ends with sufficient mortar to fill head joints and shove into place. Do not deeply furrow bed joints or slush head joints.
- C. Tool exposed joints slightly concave when thumbprint hard, using a jointer larger than joint thickness unless otherwise indicated.
- D. Cut joints flush for masonry walls to receive plaster or other direct-applied finishes (other than paint) unless otherwise indicated.

### 3.4 MASONRY JOINT REINFORCEMENT

- A. General: Install entire length of longitudinal side rods in mortar with a minimum cover of 5/8 inch on exterior side of walls, 1/2 inch elsewhere. Lap reinforcement a minimum of 6 inches.
  - 1. Space reinforcement not more than 16 inches o.c.
- B. Interrupt joint reinforcement at control and expansion joints unless otherwise indicated.
- C. Provide continuity at corners by using prefabricated L-shaped units.
  - 1. 24 inches o.c. vertically and 36 inches o.c. horizontally.

### 3.5 FLASHING

- A. General: Install embedded flashing in masonry at lintels, ledges, other obstructions to downward flow of water in wall, and where indicated.
- B. Install flashing as follows unless otherwise indicated:
  - 1. Prepare masonry surfaces so they are smooth and free from projections that could puncture flashing. Where flashing is within mortar joint, place through-wall flashing on sloping bed of mortar and cover with mortar. Before covering with mortar, seal penetrations in flashing with adhesive, sealant, or tape as recommended by flashing manufacturer.
  - 2. Install metal drip edges beneath flexible flashing at exterior face of wall. Stop flexible flashing 1/2 inch back from outside face of wall and adhere flexible flashing to top of metal drip edge.
  - 3. Install metal flashing termination beneath flexible flashing at exterior face of wall. Stop flexible flashing 1/2 inch back from outside face of wall and adhere flexible flashing to top of metal flashing termination.

### 3.6 REINFORCED UNIT MASONRY INSTALLATION

- A. Placing Reinforcement: Comply with requirements in ACI 530.1/ASCE 6/TMS 602.
- B. Grouting: Do not place grout until entire height of masonry to be grouted has attained enough strength to resist grout pressure.
  - 1. Comply with requirements in ACI 530.1/ASCE 6/TMS 602 for cleanouts and for grout placement, including minimum grout space and maximum pour height.

### 3.7 REPAIRING, POINTING, AND CLEANING

- A. In-Progress Cleaning: Clean unit masonry as work progresses by dry brushing to remove mortar fins and smears before tooling joints.
- B. Final Cleaning: After mortar is thoroughly set and cured, clean exposed masonry as follows:

1. Test cleaning methods on sample wall panel; leave one-half of panel uncleaned for comparison purposes.
2. Clean concrete masonry by cleaning method indicated in NCMA TEK 8-2A applicable to type of stain on exposed surfaces.

### 3.8 MASONRY WASTE DISPOSAL

- A. Excess Masonry Waste: Remove excess clean masonry waste that cannot be used as fill, as described above, and other masonry waste, and legally dispose of off Owner's property.

END OF SECTION 042200

## SECTION 066400 - PLASTIC PANELING

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Section includes glass-fiber reinforced plastic (FRP) wall and ceiling paneling and trim accessories.

#### 1.2 QUALITY ASSURANCE

- A. Surface-Burning Characteristics: As determined by testing identical products according to ASTM E 84 by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
  - 1. Flame-Spread Index: 25 or less.
  - 2. Smoke-Developed Index: 450 or less.

### PART 2 - PRODUCTS

#### 2.1 PLASTIC SHEET PANELING

- A. General: Gelcoat-finished, glass-fiber reinforced plastic panels complying with ASTM D 5319.
  - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
    - a. Kemlite Company Inc.
    - b. Marlite.
    - c. Nudo Products, Inc.
  - 2. Nominal Thickness: Not less than 0.075 inch (1.9 mm).
  - 3. Surface Finish: Smooth for walls.
  - 4. Color: As selected by Architect from manufacturer's full range.

#### 2.2 ACCESSORIES

- A. Trim Accessories: Manufacturer's standard one-piece vinyl extrusions designed to retain and cover edges of panels. Provide division bars, inside corners, outside corners, and caps as needed to conceal edges.
  - 1. Color: Match panels.
- B. Adhesive: As recommended by plastic paneling manufacturer.

- C. Sealant: Single-component, mildew-resistant, neutral-curing silicone or Single-component, mildew-resistant, acid-curing silicone sealant recommended by plastic paneling manufacturer.

### PART 3 - EXECUTION

#### 3.1 PREPARATION

- A. Clean substrates of substances that could impair bond of adhesive, including oil, grease, dirt, and dust.
- B. Condition panels by unpacking and placing in installation space before installation according to manufacturer's written recommendations.
- C. Lay out paneling before installing. Locate panel joints where indicated and to provide equal panels at ends of walls not less than half the width of full panels and so that trimmed panels at corners are not less than 12 inches (300 mm) wide.

#### 3.2 INSTALLATION

- A. Install plastic paneling according to manufacturer's written instructions.
- B. Install panels in a full spread of adhesive.
- C. Install trim accessories with adhesive.
- D. Fill grooves in trim accessories with sealant before installing panels and bed inside corner trim in a bead of sealant.
- E. Maintain uniform space between panels and wall fixtures. Fill space with sealant.
- F. Remove excess sealant and smears as paneling is installed. Clean with solvent recommended by sealant manufacturer and then wipe with clean dry cloths until no residue remains.

END OF SECTION 066400

## SECTION 072100 - THERMAL INSULATION

### PART 1 - GENERAL

#### 1.1 SUMMARY

A. Section Includes:

1. Foam-plastic board insulation.
2. Spray polyurethane foam insulation.

### PART 2 - PRODUCTS

#### 2.1 FOAM-PLASTIC BOARD INSULATION

A. Extruded-Polystyrene Board Insulation: ASTM C 578, with maximum flame-spread and smoke-developed indexes of 75 and 450, respectively, per ASTM E 84.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
  - a. DiversiFoam Products.
  - b. Dow Chemical Company (The).
  - c. Owens Corning.
  - d. Pactiv Building Products.
2. Type X, 15 psi (104 kPa).

#### 2.2 SPRAY POLYURETHANE FOAM INSULATION

A. Open-Cell Polyurethane Foam Insulation: Spray-applied polyurethane foam using water as a blowing agent, with maximum flame-spread and smoke-developed indexes of 75 and 450, respectively, per ASTM E 84.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - a. BaySystems NorthAmerica, LLC.
  - b. Demilec (USA) LLC.
  - c. Icynene Inc.
  - d. SWD Urethane Company.
2. Minimum density of 0.4 lb/cu. ft. (6.4 kg/cu. m), thermal resistivity of 3.4 deg F x h x sq. ft./Btu x in. at 75 deg F (24 K x m/W at 24 deg C).



### PART 3 - EXECUTION

#### 3.1 INSTALLATION, GENERAL

- A. Comply with insulation manufacturer's written instructions applicable to products and applications indicated.
- B. Install insulation that is undamaged, dry, and unsoiled and that has not been left exposed to ice, rain, or snow at any time.
- C. Extend insulation to envelop entire area to be insulated. Cut and fit tightly around obstructions and fill voids with insulation. Remove projections that interfere with placement.
- D. Provide sizes to fit applications indicated and selected from manufacturer's standard thicknesses, widths, and lengths. Apply single layer of insulation units to produce thickness indicated unless multiple layers are otherwise shown or required to make up total thickness.
- E. Spray-Applied Insulation: Apply spray-applied insulation according to manufacturer's written instructions. Do not apply insulation until installation of pipes, ducts, conduits, wiring, and electrical outlets in walls is completed and windows, electrical boxes, and other items not indicated to receive insulation are masked. After insulation is applied, make flush with face of studs by using method recommended by insulation manufacturer.
- F. Miscellaneous Voids: Install insulation in miscellaneous voids and cavity spaces where required to prevent gaps in insulation using the following materials:
  - 1. Spray Polyurethane Insulation: Apply according to manufacturer's written instructions.

END OF SECTION 072100

## SECTION 073113 - ASPHALT SHINGLES

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Section Includes:
1. Granule surfaced asphalt shingle roofing.
  2. Moisture shedding underlayment, eaves, valley and ridge protection
  3. Associated metal flashing

#### 1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Samples: For each exposed product and for each color and texture specified.

#### 1.3 QUALITY ASSURANCE

- A. Installer Qualifications: An authorized representative who is trained and approved by manufacturer.
1. Installer Minimum Qualifications: Installer shall be licensed or otherwise authorized by all federal, state and local authorities to install all products specified in this section. Installer shall perform work in accordance with NRCA Roofing and Waterproofing Manual. Work shall be acceptable to the asphalt shingle manufacturer.
- B. Pre-Installation Meeting – Conduct a pre-installation meeting at the site prior to commencing work of this section: Require attendance of entities directly concerned with roof installation. Agenda will include:
1. Installation methods and manufacturer's requirements and recommendations.
  2. Safety procedures.
  3. Coordination with installation of other work.
  4. Availability of roofing materials.
  5. Preparation and approval of substrate and penetrations through roof.
  6. Other items related to successful execution of work.
  7. Product Compliance – Verify that products conform with all requirements specified by local Authority Having Jurisdiction (AHJ)
- C. Maintain one copy of manufacturer's application instructions on the project site.

#### 1.4 WARRANTY

- A. Manufacturer's Warranty: Manufacturer agrees to repair or replace asphalt shingles that fail within specified warranty period.

1. Material Warranty Period: 30 years from date of Substantial Completion.
2. Wind-Speed Warranty Period: Asphalt shingles will resist blow-off or damage caused by wind speeds up to wind speeds as indicated for five years from date of Substantial Completion.
3. Algae-Resistance Warranty Period: Asphalt shingles will not discolor for 10 years from date of Substantial Completion.
4. Workmanship Warranty Period: Two years from date of Substantial Completion.

#### 1.5 DELIVERY, STORAGE, AND HANDLING

- A. Store Products in manufacturer's unopened packaging until ready for installation.
- B. Store and dispose of solvent-based materials and materials used with solvent based materials in accordance with requirements of Authorities Having Jurisdiction.
- C. Deliver shingles to site in manufacturer's unopened labeled bundles. Promptly verify quantities and conditions. Immediately remove damaged products from site.

#### 1.6 PROJECT ENVIRONMENTAL CONDITIONS

- A. Anticipate and observe environmental conditions (temperature, humidity and moisture) within limits recommended by manufacturer for optimum results. Do not install products under environment conditions outside manufacturer's limits.

### PART 2 - PRODUCTS

#### 2.1 PERFORMANCE REQUIREMENTS

- A. Exterior Fire-Test Exposure: Provide asphalt shingles and related roofing materials identical to those of assemblies tested for Class A fire resistance according to ASTM E 108 or UL 790 by Underwriters Laboratories, Inc. or another testing and inspecting agency acceptable to authorities having jurisdiction. Identify products with appropriate markings of applicable testing agency.

#### 2.2 GLASS-FIBER-REINFORCED ASPHALT SHINGLES

- A. Laminated-Strip Asphalt Shingles: Conforming to ASTM D 3018 Type I – Self-Sealing, UL Certification of ASTM D 3462, ASTM D 3161/UL997 110-mph Wind Resistance and UL Class A Fire Resistance, glass fiber mat base, ceramically colored/UV resistant mineral surface granules across entire face of shingle; algae-resistance; two piece laminate shingle.
- B. Products and Manufacturer's: Subject to compliance with the requirements, available products and manufacturers that may be incorporated into the work include, but are not limited to, the following:
  1. Basis-of-Design: CertainTeed Landmark AR Asphalt Shingles

2. Butt Edge: Straight cut.
3. Strip Size: Manufacturer's standard.
4. Algae Resistance: Granules resist algae discoloration.
5. Color: To be selected by the architect from the manufacturers full range of colors..

- C. Hip and Ridge Shingles: Manufacturer's standard units to match asphalt shingles.

## 2.3 UNDERLAYMENT MATERIALS

- A. Self-Adhering Sheet Underlayment, High Temperature: Minimum of 40-mil- (1.0-mm-) thick; with slip-resisting, polymer-film-reinforced or glass-reinforced top surface laminated to layer of butyl or SBS-modified asphalt adhesive; with release backing; cold applied; and evaluated and documented to be suitable for use for intended purpose under applicable codes by a testing and inspecting agency acceptable to authorities having jurisdiction.
1. Thermal Stability: Stable after testing at 240 deg F (116 deg C) according to ASTM D 1970/D 1970M.
  2. Low-Temperature Flexibility: Passes after testing at minus 20 deg F (29 deg C) according to ASTM D 1970/D 1970M.

## 2.4 ACCESSORIES

- A. Asphalt Roofing Cement: ASTM D 4586, Type II, asbestos free.
- B. Roofing Nails: ASTM F 1667; aluminum, stainless-steel, copper, or hot-dip galvanized-steel wire shingle nails, minimum 0.120-inch- (3-mm-) diameter, sharp-pointed, with a minimum 3/8-inch- (9.5-mm-) diameter flat head and of sufficient length to penetrate 3/4 inch (19 mm) into solid wood decking or extend at least 1/8 inch (3 mm) through OSB or plywood sheathing.
1. Shank: Barbed.
  2. Where nails are in contact with metal flashing, use nails made from same metal as flashing.
- C. Asphalt Roofing Cement: ASTM D 4586, Type I or II

## 2.5 METAL FLASHING AND TRIM

- A. General: Comply with requirements in Section 076200 "Sheet Metal Flashing and Trim."
1. Sheet Metal: Aluminum, mill finished.
- B. Fabricate sheet metal flashing and trim to comply with recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to design, dimensions, metal, and other characteristics of the item.

### PART 3 - EXECUTION

#### 3.1 EXAMINATION

- A. Verify that roof penetrations and plumbing stacks are in place and flashed to deck surfaces.
- B. Verify deck surfaces are dry and free of ridges, warps or voids.

#### 3.2 ROOF DECK PREPARATION

- A. Follow shingle manufacturer's recommendations for acceptable roof deck material.
- B. Broom clean deck surfaces under eave protection and underlayment prior to their application.

#### 3.3 UNDERLAYMENT INSTALLATION

- A. General: Comply with underlayment manufacturer's written installation instructions applicable to products and applications indicated unless more stringent requirements apply.
- B. Self-Adhering Sheet Underlayment: Install, wrinkle free, on roof deck. Comply with low-temperature installation restrictions of underlayment manufacturer if applicable. Install lapped in direction that sheds water. Lap sides not less than 3-1/2 inches (89 mm). Lap ends not less than 6 inches (150 mm) staggered 24 inches (600 mm) between courses. Roll laps with roller. Cover underlayment within seven days.
  - 1. Install self-adhering sheet underlayment at all valleys and ridges.

#### 3.4 METAL FLASHING INSTALLATION

- A. General: Install metal flashings and other sheet metal to comply with requirements in Section 076200 "Sheet Metal Flashing and Trim."
  - 1. Install metal flashings according to recommendations in ARMA's "Residential Asphalt Roofing Manual" and NRCA's "NRCA Guidelines for Asphalt Shingle Roof Systems."

#### 3.5 ASPHALT-SHINGLE INSTALLATION

- A. General: Install asphalt shingles according to manufacturer's written instructions, recommendations in ARMA's "Residential Asphalt Roofing Manual," and recommendations in NRCA's "NRCA Guidelines for Asphalt Shingle Roof Systems."
- B. Install starter strip along lowest roof edge, consisting of an asphalt-shingle strip at least 7 inches (175 mm) wide with self-sealing strip face up at roof edge.

1. Extend asphalt shingles 1/2 inch (13 mm) over fasciae at eaves and rakes.
  2. Install starter strip along rake edge.
  3. Set Starter Strip in full bed of asphalt roofing cement.
- C. Install first and remaining courses of asphalt shingles stair-stepping diagonally across roof deck with manufacturer's recommended offset pattern at succeeding courses, maintaining uniform exposure.
- D. Install first and remaining courses of asphalt shingles stair-stepping diagonally across roof deck with manufacturer's recommended offset pattern at succeeding courses, maintaining uniform exposure.
- E. Install asphalt shingles by single-strip column or racking method, maintaining uniform exposure. Install full-length first course followed by cut second course, repeating alternating pattern in succeeding courses.
- F. Fasten asphalt-shingle strips with a minimum of four roofing nails located according to manufacturer's written instructions.
- G. Hip and Ridge Shingles: Maintain same exposure of cap shingles as roofing shingle exposure. Lap cap shingles at ridges to shed water away from direction of prevailing winds. Fasten with roofing nails of sufficient length to penetrate sheathing.
1. Fasten ridge cap asphalt shingles to cover ridge vent without obstructing airflow.

END OF SECTION 073113

SECTION 074113 - STANDING-SEAM METAL ROOF PANELS – ADDITIVE ALTERNATE

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes standing-seam metal roof panels.

1.2 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: Include fabrication and installation layouts of metal panels; details of edge conditions, joints, panel profiles, corners, anchorages, attachment system, trim, flashings, closures, and accessories; and special details.
- C. Samples: For each type of metal panel indicated.

1.4 INFORMATIONAL SUBMITTALS

- A. Product test reports.
- B. Warranties: Sample of special warranties.

1.5 CLOSEOUT SUBMITTALS

- A. Maintenance data.

1.6 QUALITY ASSURANCE

- A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer.

1.7 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of metal panel systems that fail in materials or workmanship within specified warranty period.

1. Warranty Period: Two years from date of Substantial Completion.
- B. Special Warranty on Panel Finishes: Manufacturer's standard form in which manufacturer agrees to repair finish or replace metal panels that show evidence of deterioration of factory-applied finishes within specified warranty period.
  1. Finish Warranty Period: 20 years from date of Substantial Completion.
- C. Special Weathertightness Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace standing-seam metal roof panel assemblies that fail to remain weathertight, including leaks, within specified warranty period.
  1. Warranty Period: 20 years from date of Substantial Completion.

## PART 2 - PRODUCTS

### 2.1 PERFORMANCE REQUIREMENTS

- A. Structural Performance: Provide metal panel systems capable of withstanding the effects of the following loads, based on testing according to ASTM E 1592:
  1. Wind Loads: As indicated on Drawings.
- B. Wind-Uplift Resistance: Provide metal roof panel assemblies that comply with UL 580 for wind-uplift-resistance class indicated.
  1. Uplift Rating: UL 90.
- C. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes by preventing buckling, opening of joints, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Base calculations on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
  1. Temperature Change (Range): 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.

### 2.2 STANDING-SEAM METAL ROOF PANELS

- A. General: Provide factory-formed metal roof panels designed to be installed by lapping and interconnecting raised side edges of adjacent panels with joint type indicated and mechanically attaching panels to supports using concealed clips in side laps. Include clips, cleats, pressure plates, and accessories required for weathertight installation.
  1. Steel Panel Systems: Unless more stringent requirements are indicated, comply with ASTM E 1514.



- B. Vertical-Rib, Snap-Joint, Standing-Seam Metal Roof Panels: Formed with vertical ribs at panel edges and a flat pan between ribs; designed for sequential installation by mechanically attaching panels to supports using concealed clips located under one side of panels, engaging opposite edge of adjacent panels, and snapping panels together.
1. Basis-of-Design Product: Subject to compliance with requirements, provide Gulf Stream Hidden Screw Metal Roof System by Gulf Coast Supply or Berridge Cee-Lock by Berridge Manufacturing Co. or comparable product by one of the following:
    - a. Advanced Architectural Products.
    - b. AEP Span; a BlueScope Steel company.
    - c. Architectural Building Components.
    - d. Architectural Metal Systems; a Nucor company.
    - e. CENTRIA Architectural Systems.
    - f. Dimensional Metals, Inc.
    - g. Englert, Inc.
    - h. Fabral.
    - i. Garland Company, Inc. (The)
    - j. IMETCO.
    - k. MBCI; a division of NCI Building Systems, L.P.
    - l. McElroy Metal, Inc.
    - m. Merchant & Evans.
    - n. Metal-Fab Manufacturing, LLC.
    - o. Metal Sales Manufacturing Corporation.
    - p. Morin; a Kingspan Group company.
    - q. Petersen Aluminum Corporation.
    - r. Ryerson, Inc.
    - s. Ultra Seam, Inc.
    - t. Union Corrugating Company.
    - u. VICWEST.
  2. Metallic-Coated Steel Sheet: Zinc-coated (galvanized) steel sheet complying with ASTM A653/A653M, G90 (Z275) coating designation, or aluminum-zinc alloy-coated steel sheet complying with ASTM A792/A792M, Class AZ50 (Class AZM150) coating designation; structural quality. Prepainted by the coil-coating process to comply with ASTM A755/A755M.
    - a. Thickness: 24 Gauge.
    - b. Surface: Flat finish with striation.
    - c. Exterior Finish: Two-coat fluoropolymer.
    - d. Color: Equal to Sierra Tan.
  3. Panel Coverage: 16 inches (406 mm).
  4. Panel Height: 1.75 inches (44 mm).

## 2.3 UNDERLAYMENT MATERIALS

- A. Self-Adhering, High-Temperature Underlayment: Provide self-adhering, cold-applied, sheet underlayment, a minimum of 30 mils (0.76 mm) thick, consisting of slip-resistant, polyethylene-film top surface laminated

to a layer of butyl or SBS-modified asphalt adhesive, with release-paper backing. Provide primer when recommended by underlayment manufacturer.

1. Thermal Stability: Stable after testing at 240 deg F (116 deg C); ASTM D 1970.
2. Low-Temperature Flexibility: Passes after testing at minus 20 deg F (29 deg C); ASTM D 1970.
3. Products: Subject to compliance with requirements, provide one of the following:
  - a. Carlisle Residential, a division of Carlisle Construction Materials; WIP 300HT.
  - b. Grace Construction Products, a unit of W. R. Grace & Co.; Grace Ice and Water Shield HT.
  - c. Henry Company; Blueskin PE200 HT.
  - d. Kirsch Building Products, LLC; Sharkskin Ultra SA.
  - e. Metal-Fab Manufacturing, LLC; MetShield.
  - f. Owens Corning; WeatherLock Metal High Temperature Underlayment.

- B. Slip Sheet: Manufacturer's recommended slip sheet, of type required for application.

## 2.4 MISCELLANEOUS MATERIALS

- A. Panel Accessories: Provide components required for a complete, weathertight panel system including trim, copings, fasciae, mullions, sills, corner units, clips, flashings, sealants, gaskets, fillers, closure strips, and similar items. Match material and finish of metal panels unless otherwise indicated.
1. Closures: Provide closures at eaves and ridges, fabricated of same metal as metal panels.
  2. Backing Plates: Provide metal backing plates at panel end splices, fabricated from material recommended by manufacturer.
  3. Closure Strips: Closed-cell, expanded, cellular, rubber or crosslinked, polyolefin-foam or closed-cell laminated polyethylene; minimum 1-inch- (25-mm-) thick, flexible closure strips; cut or remolded to match metal panel profile. Provide closure strips where indicated or necessary to ensure weathertight construction.
- B. Flashing and Trim: Provide flashing and trim formed from same material as metal panels as required to seal against weather and to provide finished appearance. Locations include, but are not limited to, eaves, rakes, corners, bases, framed openings, ridges, fasciae, and fillers. Finish flashing and trim with same finish system as adjacent metal panels.
- C. Panel Fasteners: Self-tapping screws designed to withstand design loads.
- D. Panel Sealants: Provide sealant type recommended by manufacturer that are compatible with panel materials, are nonstaining, and do not damage panel finish.
1. Sealant Tape: Pressure-sensitive, 100 percent solids, gray polyisobutylene compound sealant tape with release-paper backing; 1/2 inch (13 mm) wide and 1/8 inch (3 mm) thick.
  2. Joint Sealant: ASTM C 920; as recommended in writing by metal panel manufacturer.
  3. Butyl-Rubber-Based, Solvent-Release Sealant: ASTM C 1311.

## 2.5 FABRICATION

- A. General: Fabricate and finish metal panels and accessories at the factory, by manufacturer's standard procedures and processes, as necessary to fulfill indicated performance requirements demonstrated by laboratory testing. Comply with indicated profiles and with dimensional and structural requirements.
- B. On-Site Fabrication: Subject to compliance with requirements of this Section, metal panels may be fabricated on-site using UL-certified, portable roll-forming equipment if panels are of same profile and warranted by manufacturer to be equal to factory-formed panels. Fabricate according to equipment manufacturer's written instructions and to comply with details shown.
- C. Provide panel profile, including major ribs and intermediate stiffening ribs, if any, for full length of panel.
- D. Fabricate metal panel joints with factory-installed captive gaskets or separator strips that provide a weathertight seal and prevent metal-to-metal contact, and that minimize noise from movements.
- E. Sheet Metal Flashing and Trim: Fabricate flashing and trim to comply with manufacturer's recommendations and recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to design, dimensions, metal, and other characteristics of item indicated.

## 2.6 FINISHES

- A. Panels and Accessories:
  - 1. Two-Coat Fluoropolymer: AAMA 621. Fluoropolymer finish containing not less than 70 percent PVDF resin by weight in color coat.

## PART 3 - EXECUTION

### 3.1 PREPARATION

- A. Miscellaneous Supports: Install subframing, furring, and other miscellaneous panel support members and anchorages according to ASTM C 754 and metal panel manufacturer's written recommendations.

### 3.2 UNDERLAYMENT INSTALLATION

- A. Self-Adhering Sheet Underlayment: Apply primer if required by manufacturer. Comply with temperature restrictions of underlayment manufacturer for installation. Apply at locations indicated below, wrinkle free, in shingle fashion to shed water, and with end laps of not less than 6 inches (152 mm) staggered 24 inches (610 mm) between courses. Overlap side edges not less than 3-1/2 inches (90 mm). Roll laps with roller. Cover underlayment within 14 days.
  - 1. Apply over the entire roof surface.
- B. Slip Sheet: Apply slip sheet over underlayment before installing metal roof panels.

### 3.3 METAL PANEL INSTALLATION

- A. Standing-Seam Metal Roof Panel Installation: Fasten metal roof panels to supports with concealed clips at each standing-seam joint at location, spacing, and with fasteners recommended in writing by manufacturer.
  - 1. Install clips to supports with self-tapping fasteners.
  - 2. Install pressure plates at locations indicated in manufacturer's written installation instructions.
  - 3. Snap Joint: Nest standing seams and fasten together by interlocking and completely engaging factory-applied sealant.
  - 4. Watertight Installation:
    - a. Apply a continuous ribbon of sealant or tape to seal joints of metal panels, using sealant or tape as recommend in writing by manufacturer as needed to make panels watertight.
    - b. Provide sealant or tape between panels and protruding equipment, vents, and accessories.
    - c. At panel splices, nest panels with minimum 6-inch (152-mm) end lap, sealed with sealant and fastened together by interlocking clamping plates.
- B. Accessory Installation: Install accessories with positive anchorage to building and weathertight mounting, and provide for thermal expansion. Coordinate installation with flashings and other components.
- C. Flashing and Trim: Comply with performance requirements, manufacturer's written installation instructions, and SMACNA's "Architectural Sheet Metal Manual." Provide concealed fasteners where possible, and set units true to line and level as indicated. Install work with laps, joints, and seams that will be permanently watertight and weather resistant.

### 3.4 CLEANING AND PROTECTION

- A. Remove temporary protective coverings and strippable films, if any, as metal panels are installed, unless otherwise indicated in manufacturer's written installation instructions. On completion of metal panel installation, clean finished surfaces as recommended by metal panel manufacturer. Maintain in a clean condition during construction.

END OF SECTION 074113.16

## SECTION 074213.53 - METAL SOFFIT PANELS

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Section includes metal soffit panels.

#### 1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Samples: For each type of metal panel indicated.

#### 1.3 INFORMATIONAL SUBMITTALS

- A. Warranties: Samples of special warranties.

#### 1.4 WARRANTY

- A. Special Warranty on Panel Finishes: Manufacturer's standard form in which manufacturer agrees to repair finish or replace metal panels that show evidence of deterioration of factory-applied finishes within specified warranty period.
  - 1. Finish Warranty Period: 20 years from date of Substantial Completion.

### PART 2 - PRODUCTS

#### 2.1 PERFORMANCE REQUIREMENTS

- A. Structural Performance: Provide metal panel systems capable of withstanding the effects of the following loads, based on testing according to ASTM E 1592:
  - 1. Wind Loads: As indicated on Drawings.
  - 2. Deflection Limits: For wind loads, no greater than 1/180 of the span.
- B. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes by preventing buckling, opening of joints, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Base calculations on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.

1. Temperature Change (Range): 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.

## 2.2 METAL SOFFIT PANELS

- A. General: Provide metal soffit panels designed to be installed by lapping and interconnecting side edges of adjacent panels and mechanically attaching through panel to supports using concealed fasteners in side laps.
- B. Flush-Profile Metal Soffit Panels: Solid panels formed with vertical panel edges a flat pan between panel edges; with flush joint between panels.
  1. Basis-of-Design Product: Subject to compliance with requirements, provide PAC-CLAD Petersen Aluminum Flush Panel or comparable product by one of the following:
    - a. AEP Span; a BlueScope Steel company.
    - b. Architectural Building Components.
    - c. ATAS International, Inc.
    - d. Berridge Manufacturing Company.
    - e. CENTRIA Architectural Systems.
    - f. Dimensional Metals, Inc.
    - g. Englert, Inc.
    - h. Fabral.
    - i. Firestone Metal Products, LLC.
    - j. Innovative Metals Company, Inc.
    - k. MBCI; a division of NCI Building Systems, L.P.
    - l. McElroy Metal, Inc.
    - m. Merchant & Evans Inc.
    - n. Metal-Fab Manufacturing, LLC.
    - o. Metal Sales Manufacturing Corporation.
    - p. Petersen Aluminum Corporation.
    - q. Ultra Seam, Inc.
  2. Aluminum Sheet: Coil-coated sheet, ASTM B 209 (ASTM B 209M), alloy as standard with manufacturer, with temper as required to suit forming operations and structural performance required.
    - a. Thickness: 0.032 inch (0.81 mm).
    - b. Surface: Smooth, flat finish.
    - c. Exterior Finish: Two-coat fluoropolymer.
    - d. Color: As selected by Architect from manufacturer's full range.
  3. Panel Coverage: 12 inches (305 mm).
  4. Panel Height: 1.0 inch (25 mm).

## 2.3 MISCELLANEOUS MATERIALS

- A. Miscellaneous Metal Subframing and Furring: ASTM C 645, cold-formed, metallic-coated steel sheet, ASTM A 653/A 653M, G90 (Z275 hot-dip galvanized) coating designation or ASTM A 792/A 792M, Class AZ50 (Class AZM150) aluminum-zinc-alloy coating designation unless otherwise indicated. Provide manufacturer's standard sections as required for support and alignment of metal panel system.
- B. Flashing and Trim: Provide flashing and trim formed from same material as metal panels as required to seal against weather and to provide finished appearance. Finish flashing and trim with same finish system as adjacent metal panels.
- C. Panel Fasteners: Self-tapping screws designed to withstand design loads. Provide exposed fasteners with heads matching color of metal panels by means of plastic caps or factory-applied coating. Provide EPDM or PVC sealing washers for exposed fasteners.

## 2.4 FABRICATION

- A. General: Fabricate and finish metal panels and accessories at the factory, by manufacturer's standard procedures and processes, as necessary to fulfill indicated performance requirements demonstrated by laboratory testing. Comply with indicated profiles and with dimensional and structural requirements.
- B. Provide panel profile, including major ribs and intermediate stiffening ribs, if any, for full length of panel.
- C. Sheet Metal Flashing and Trim: Fabricate flashing and trim to comply with manufacturer's recommendations and recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to design, dimensions, metal, and other characteristics of item indicated.

## 2.5 FINISHES

- A. Panels and Accessories:
  - 1. Two-Coat Fluoropolymer: AAMA 621 or AAMA 620. Fluoropolymer finish containing not less than 70 percent PVDF resin by weight in color coat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.

## PART 3 - EXECUTION

### 3.1 PREPARATION

- A. Miscellaneous Supports: Install subframing, furring, and other miscellaneous panel support members and anchorages according to ASTM C 754 and metal panel manufacturer's written recommendations.
  - 1. Soffit Framing: Fasten furring channels to supports, as required to comply with requirements for assemblies indicated.

### 3.2 METAL PANEL INSTALLATION

- A. Metal Soffit Panels: Fasten metal panels to supports with fasteners at each lapped joint at location and spacing recommended by manufacturer.
  - 1. Apply panels and associated items true to line for neat and weathertight enclosure.
  - 2. Locate and space exposed fasteners in uniform vertical and horizontal alignment. Use proper tools to obtain controlled uniform compression for positive seal without rupture of washer.
  - 3. Install screw fasteners with power tools having controlled torque adjusted to compress washer tightly without damage to washer, screw threads, or panels. Install screws in predrilled holes.
- B. Accessory Installation: Install accessories with positive anchorage to building and weathertight mounting, and provide for thermal expansion. Coordinate installation with flashings and other components.
- C. Flashing and Trim: Comply with performance requirements, manufacturer's written installation instructions, and SMACNA's "Architectural Sheet Metal Manual." Provide concealed fasteners where possible, and set units true to line and level as indicated. Install work with laps, joints, and seams that are permanently watertight.

### 3.3 CLEANING

- A. Remove temporary protective coverings and strippable films, if any, as metal panels are installed unless otherwise indicated in manufacturer's written installation instructions. On completion of metal panel installation, clean finished surfaces as recommended by metal panel manufacturer. Maintain in a clean condition during construction.

END OF SECTION 074213.53



## SECTION 074600 - SIDING

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Section includes aluminum siding.

#### 1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Samples: For siding including related accessories.

#### 1.3 QUALITY ASSURANCE

- A. Source Limitations: Obtain each type, color, texture, and pattern of siding, including related accessories, from single source from single manufacturer.

#### 1.4 WARRANTY

- A. Special Warranty: Standard form in which manufacturer agrees to repair or replace siding that fail(s) in materials or workmanship within specified warranty period.
  - 1. Warranty Period: 10 years from date of Substantial Completion.

### PART 2 - PRODUCTS

#### 2.1 ALUMINUM SIDING

- A. General: Formed and coated aluminum siding complying with AAMA 1402.
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Alcoa Home Exteriors, Inc.
    - b. Gentek Building Products, Inc.
    - c. Kaycan Ltd.
    - d. Norandex/Reynolds Distribution; an Owens Corning company.
    - e. Rollex Corporation.
- B. Horizontal Pattern: 8-inch (203-mm) exposure in plain, single- 4-inch (102-mm) board style.

- C. Texture: Smooth.
- D. Nominal Thickness: 0.019 inch (0.5 mm).
- E. Finish: Manufacturer's standard primer and baked-on acrylic or primer and baked-on polyester.
  - 1. Colors: As selected by Architect from manufacturer's full range of industry colors.

## 2.2 ACCESSORIES

- A. Siding Accessories, General: Provide starter strips, edge trim, outside and inside corner caps, and other items as recommended by siding manufacturer for building configuration.
  - 1. Provide accessories made from same material as and matching color and texture of adjacent siding unless otherwise indicated.
- B. Aluminum Accessories: Where aluminum accessories are indicated, provide accessories complying with AAMA 1402.
  - 1. Texture: Smooth.
  - 2. Nominal Thickness: 0.019 inch (0.5 mm).
  - 3. Finish: Manufacturer's standard primer and baked-on acrylic or primer and baked-on polyester.
- C. Fasteners:
  - 1. For fastening to wood, use siding nails of sufficient length to penetrate a minimum of 1 inch (25 mm) into substrate.
  - 2. For fastening to metal, use ribbed bugle-head screws of sufficient length to penetrate a minimum of 1/4 inch (6 mm), or three screw-threads, into substrate.
  - 3. For fastening aluminum, use aluminum fasteners. Where fasteners will be exposed to view, use prefinished aluminum fasteners in color to match item being fastened.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine substrates for compliance with requirements for installation tolerances and other conditions affecting performance of siding and related accessories.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 INSTALLATION

- A. General: Comply with siding manufacturer's written installation instructions applicable to products and applications indicated unless more stringent requirements apply.

1. Do not install damaged components.
  2. Center nails in elongated nailing slots without binding siding to allow for thermal movement.
- B. Install aluminum siding and related accessories according to AAMA 1402.
1. Install fasteners no more than 24 inches (600 mm) o.c.
- C. Install joint sealants as specified in Section 079200 "Joint Sealants" and to produce weathertight installation.
- D. Where aluminum siding will contact dissimilar metals, protect against galvanic action by painting contact surfaces with primer or by applying sealant or tape or installing nonconductive spacers as recommended by manufacturer for this purpose.

### 3.3 ADJUSTING AND CLEANING

- A. Remove damaged, improperly installed, or otherwise defective materials and replace with new materials complying with specified requirements.
- B. Clean finished surfaces according to manufacturer's written instructions and maintain in a clean condition during construction.

END OF SECTION 074600

## SECTION 079200 - JOINT SEALANTS

### PART 1 - GENERAL

#### 1.1 SUMMARY

A. Section Includes:

1. Joint sealants for the applications indicated in the Joint-Sealant Specification at the end of Part 3.

### PART 2 - PRODUCTS

#### 2.1 MATERIALS, GENERAL

- A. Liquid-Applied Joint Sealants: Comply with ASTM C 920 and other requirements indicated for each liquid-applied joint sealant specified, including those referencing ASTM C 920 classifications for type, grade, class, and uses related to exposure and joint substrates.

1. Suitability for Immersion in Liquids. Where sealants are indicated for Use I for joints that will be continuously immersed in liquids, provide products that have undergone testing according to ASTM C 1247. Liquid used for testing sealants is deionized water, unless otherwise indicated.

- B. Stain-Test-Response Characteristics: Where sealants are specified to be nonstaining to porous substrates, provide products that have undergone testing according to ASTM C 1248 and have not stained porous joint substrates indicated for Project.

#### 2.2 SILICONE JOINT SEALANTS

- A. Silicone Joint Sealant: ASTM C 920.

1. Basis-of-Design Product: Subject to compliance with requirements, provide Tremco Tremsil 200 General Construction Grade Silicone Building Sealant or comparable product by one of the following:

- a. BASF Building Systems.
- b. Dow Corning Corporation.
- c. GE Advanced Materials - Silicones.
- d. May National Associates, Inc.
- e. Pecora Corporation.
- f. Polymeric Systems, Inc.
- g. Schnee-Morehead, Inc.
- h. Sika Corporation; Construction Products Division.
- i. Tremco Incorporated.

2. Type: Single component (S).
3. Grade: nonsag (NS).
4. Class: 25.
5. Uses Related to Exposure: Nontraffic (NT).

B. Silicone Joint Sealant: ASTM C 920.

1. Basis-of-Design Product: Subject to compliance with requirements, provide Dow Corning 790 Silicone Building Sealant or comparable product by one of the following:
  - a. BASF Building Systems.
  - b. Dow Corning Corporation.
  - c. GE Advanced Materials - Silicones.
  - d. May National Associates, Inc.
  - e. Pecora Corporation.
  - f. Polymeric Systems, Inc.
  - g. Schnee-Morehead, Inc.
  - h. Sika Corporation; Construction Products Division.
  - i. Tremco Incorporated.
2. Type: Single component (S).
3. Grade: nonsag (NS).
4. Class: 100/50.
5. Uses Related to Exposure: Traffic (T) and Nontraffic (NT).

### 2.3 URETHANE JOINT SEALANTS

A. Urethane Joint Sealant: ASTM C 920.

1. Basis-of-Design Product: Subject to compliance with requirements, provide Tremco Vulkem 116 One-Part, High Performance Polyurethane Sealant or comparable product by one of the following:
  - a. BASF Building Systems.
  - b. Bostik, Inc.
  - c. Lyntal, International, Inc.
  - d. May National Associates, Inc.
  - e. Pacific Polymers International, Inc.
  - f. Pecora Corporation.
  - g. Polymeric Systems, Inc.
  - h. Schnee-Morehead, Inc.
  - i. Sika Corporation; Construction Products Division.
  - j. Tremco Incorporated.
2. Type: Single component (S).
3. Grade: nonsag (NS).
4. Class: 25.
5. Uses Related to Exposure: Traffic (T) and Nontraffic (NT).

## 2.4 LATEX JOINT SEALANTS

- A. Latex Joint Sealant: Acrylic latex or siliconized acrylic latex, ASTM C 834, Type OP, Grade NF.
  - 1. Basis-of-Design Product: Subject to compliance with requirements, provide Pecora Corporation AC-20 FTR (Fire & Temperature Rated) Acrylic Latex Caulking Compound or comparable product by one of the following:
    - a. BASF Building Systems.
    - b. Bostik, Inc.
    - c. May National Associates, Inc.
    - d. Pecora Corporation.
    - e. Schnee-Morehead, Inc.
    - f. Tremco Incorporated.

## 2.5 JOINT SEALANT BACKING

- A. General: Provide sealant backings of material and type that are non-staining; are 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 C (closed-cell 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 the back of the joint where such adhesion would result in sealant failure. Provide self-adhesive tape where applicable.

## 2.6 MATERIALS, 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 sealant manufacturer, based on testing and field experience.

## 2.7 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 joint-sealant performance.
- 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.
  - 1. Remove laitance and form-release agents from concrete.
  - 2. 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. Non-porous substrates include metal, glass, porcelain enamel, and glazed surfaces of ceramic tile.
  - 3. Remove all foreign material from joint substrates that could interfere with adhesion of joint sealant, including dust, paints (except 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.
  - 4. 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 concrete, masonry and unglazed 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

- A. General: Comply with joint-sealant manufacturer's written 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.
  - 4. Use masking tape to protect surfaces adjacent to recessed tooled joints.
- G. 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.

### 3.4 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 and remove damaged or deteriorated joint sealants immediately so installations with repaired areas are indistinguishable from original work.

### 3.5 FIELD QUALITY CONTROL

- A. Field-Adhesion Testing: Field test joint-sealant adhesion to joint substrates as follows:



1. Extent of Testing: Test completed and cured sealant joints as follows:
    - a. Perform 5 tests for the first 500 feet of joint length for each kind of sealant and joint substrate.
  2. Test Method: Test joint sealants according to Method A, Field-Applied Sealant Joint Hand Pull Tab, in Appendix X1 in ASTM C 1193 or Method A, Tail Procedure, in ASTM C 1521.
- B. Evaluation of Field-Adhesion Test Results: Sealants not evidencing adhesive failure from testing or noncompliance with other indicated requirements will be considered satisfactory. Remove sealants that fail to adhere to joint substrates during testing or to comply with other requirements. Retest failed applications until test results prove sealants comply with indicated requirements.

### 3.6 JOINT-SEALANT SCHEDULE

- A. Joint-Sealant Application: Exterior joints in vertical surfaces and horizontal nontraffic surfaces.
1. Joint Locations:
    - a. Construction joints in cast-in-place concrete.
    - b. Joints between plant-precast architectural concrete units.
    - c. Control and expansion joints in unit masonry.
    - d. Joints in architectural precast concrete units.
    - e. Joints between different materials listed above.
    - f. Other joints as indicated.
  2. Joint Sealant: Dow 790 Silicone Joint Sealant.
  3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.
- B. Joint-Sealant Application: Exterior joints in vertical surfaces and horizontal nontraffic surfaces.
1. Joint Locations:
    - a. Perimeter joints between materials listed above and frames of doors, windows and louvers.
    - b. Other joints as indicated.
  2. Joint Sealant: Tremco Vulkem 116 One-Part, High Performance Polyurethane Sealant
  3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.
- C. Joint-Sealant Application: Interior joints in vertical surfaces and horizontal nontraffic surfaces.
1. Joint Locations:
    - a. Control and expansion joints on exposed interior surfaces of exterior walls.
    - b. Perimeter joints of exterior openings where indicated.
    - c. Tile control and expansion joints.
    - d. Perimeter joints between interior wall surfaces and frames of interior doors, windows.
    - e. Other joints as indicated.

2. Joint Sealant: Pecora Corporation AC-20 FTR (Fire & Temperature Rated) Acrylic Latex Caulking  
Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.
- D. Joint-Sealant Application: Mildew-resistant interior joints in vertical surfaces and horizontal nontraffic surfaces.
1. Joint Sealant Location:
    - a. Joints between plumbing fixtures and adjoining walls, floors, and counters.
    - b. Tile control and expansion joints where indicated.
    - c. Other joints as indicated.
  2. Joint Sealant: Silicone.
  3. Joint Sealant: Tremco Tremsil 200 General Construction Grade Silicone Building Sealant.
  4. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.
  5. Joint-Sealant Color: As selected by Architect from manufacturer's full range.

END OF SECTION 079200

## SECTION 081113 - HOLLOW METAL DOORS AND FRAMES

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Section includes hollow-metal work.

#### 1.2 DEFINITIONS

- A. Minimum Thickness: Minimum thickness of base metal without coatings according to NAAMM-HMMA 803 or SDI A250.8.

#### 1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: Include elevations, door edge details, frame profiles, metal thicknesses, preparations for hardware, and other details.
- C. Schedule: Prepared by or under the supervision of supplier, using same reference numbers for details and openings as those on Drawings.

#### 1.4 INFORMATIONAL SUBMITTALS

- A. Product test reports.

### PART 2 - PRODUCTS

#### 2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
  1. Amweld International, LLC.
  2. Ceco Door Products; an Assa Abloy Group company.
  3. Curries Company; an Assa Abloy Group company.
  4. Republic Doors and Frames.
  5. Steelcraft; an Ingersoll-Rand company.

## 2.2 REGULATORY REQUIREMENTS

- A. Fire-Rated Assemblies: Complying with NFPA 80 and listed and labeled by a qualified testing agency acceptable to authorities having jurisdiction for fire-protection rating and temperature-rise limits indicated, based on testing at positive pressure according to NFPA 252 or UL 10C.
  - 1. Smoke- and Draft-Control Assemblies: Provide an assembly with gaskets listed and labeled for smoke and draft control by a qualified testing agency acceptable to authorities having jurisdiction, based on testing according to UL 1784 and installed in compliance with NFPA 105.

## 2.3 INTERIOR DOORS AND FRAMES

- A. Standard-Duty Doors and Frames: SDI A250.8, Level 1.
  - 1. Physical Performance: Level C according to SDI A250.4.
  - 2. Doors:
    - a. Type: As indicated in the Door and Frame Schedule.
    - b. Thickness: 1-3/4 inches (44.5 mm).
    - c. Face: Uncoated, cold-rolled steel sheet, minimum thickness of 0.032 inch (0.8 mm).
    - d. Edge Construction: Model 1, Full Flush.
    - e. Core: Manufacturer's standard kraft-paper honeycomb, polystyrene, polyurethane, polyisocyanurate, mineral-board, or vertical steel-stiffener core at manufacturer's discretion.
  - 3. Frames:
    - a. Materials: Uncoated, cold-rolled steel sheet, minimum thickness of 0.042 inch (1.0 mm).
    - b. Construction: Full profile welded.
  - 4. Exposed Finish: Prime.

## 2.4 EXTERIOR HOLLOW-METAL DOORS

- A. Heavy-Duty Doors: SDI A250.8, Level 2.
  - 1. Physical Performance: Level B according to SDI A250.4.
  - 2. Doors:
    - a. Type: As indicated in the Door and Frame Schedule.
    - b. Thickness: 1-3/4 inches (44.5 mm).
    - c. Face: Metallic-coated steel sheet, minimum thickness of 0.042 inch (1.0 mm).
    - d. Edge Construction: Model 1, Full Flush.
    - e. Core: Manufacturer's standard insulation material.
    - f. Thermal-Rated Doors: Provide doors fabricated with thermal resistance value (R-value) of not less than R-5 minimum when test according to ASTM C 1363.
  - 3. Exposed Finish: Prime.

## 2.5 FRAME ANCHORS

### A. Jamb Anchors:

1. Stud-Wall Type: Designed to engage stud, welded to back of frames; not less than 0.042 inch (1.0 mm) thick.

### B. Floor Anchors: Formed from same material as frames, minimum thickness of 0.042 inch (1.0 mm), and as follows:

1. Monolithic Concrete Slabs: Clip-type anchors, with two holes to receive fasteners.
2. Separate Topping Concrete Slabs: Adjustable-type anchors with extension clips, allowing not less than 2-inch (51-mm) height adjustment. Terminate bottom of frames at finish floor surface.

## 2.6 MATERIALS

### A. Recycled Content of Steel Products: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 25 percent.

### B. Cold-Rolled Steel Sheet: ASTM A 1008/A 1008M, Commercial Steel (CS), Type B; suitable for exposed applications.

### C. Hot-Rolled Steel Sheet: ASTM A 1011/A 1011M, Commercial Steel (CS), Type B; free of scale, pitting, or surface defects; pickled and oiled.

### D. Metallic-Coated Steel Sheet: ASTM A 653/A 653M, Commercial Steel (CS), Type B.

### E. Frame Anchors: ASTM A 879/A 879M, Commercial Steel (CS), 04Z (12G) coating designation; mill phosphatized.

1. For anchors built into exterior walls, steel sheet complying with ASTM A 1008/A 1008M or ASTM A 1011/A 1011M, hot-dip galvanized according to ASTM A 153/A 153M, Class B.

### F. Inserts, Bolts, and Fasteners: Hot-dip galvanized according to ASTM A 153/A 153M.

### G. Grout: ASTM C 476, except with a maximum slump of 4 inches (102 mm), as measured according to ASTM C 143/C 143M.

### H. Glazing: Section 088000 "Glazing."

## 2.7 FABRICATION

### A. Fabricate hollow-metal work to be rigid and free of defects, warp, or buckle. Accurately form metal to required sizes and profiles, with minimum radius for metal thickness. Where practical, fit and assemble units in manufacturer's plant. To ensure proper assembly at Project site, clearly identify work that cannot be permanently factory assembled before shipment.

### B. Hollow-Metal Doors:

1. Exterior Doors: Provide weep-hole openings in bottoms of exterior doors to permit moisture to escape. Seal joints in top edges of doors against water penetration.
  2. Astragals: Provide overlapping astragal on one leaf of pairs of doors where required by NFPA 80 for fire-performance rating or where indicated.
- C. Hollow-Metal Frames: Where frames are fabricated in sections due to shipping or handling limitations, provide alignment plates or angles at each joint, fabricated of same thickness metal as frames.
1. Frames: Provide closed tubular members with no visible face seams or joints, fabricated from same material as door frame. Fasten members at crossings and to jambs by butt welding.
  2. Provide countersunk, flat- or oval-head exposed screws and bolts for exposed fasteners unless otherwise indicated.
  3. Grout Guards: Weld guards to frame at back of hardware mortises in frames to be grouted.
  4. Floor Anchors: Weld anchors to bottoms of jambs with at least four spot welds per anchor.
  5. Jamb Anchors: Provide number and spacing of anchors as follows:
    - a. Stud-Wall Type: Locate anchors not more than 18 inches (457 mm) from top and bottom of frame. Space anchors not more than 32 inches (813 mm) o.c. and as follows:
      - 1) Three anchors per jamb up to 60 inches (1524 mm) high.
      - 2) Four anchors per jamb from 60 to 90 inches (1524 to 2286 mm) high.
      - 3) Five anchors per jamb from 90 to 96 inches (2286 to 2438 mm) high.
      - 4) Five anchors per jamb plus one additional anchor per jamb for each 24 inches (610 mm) or fraction thereof above 96 inches (2438 mm) high.
  6. Door Silencers: Except on weather-stripped frames, drill stops to receive door silencers.
    - a. Single-Door Frames: Drill stop in strike jamb to receive three door silencers.
    - b. Double-Door Frames: Drill stop in head jamb to receive two door silencers.
- D. Hardware Preparation: Factory prepare hollow-metal work to receive templated mortised hardware; include cutouts, reinforcement, mortising, drilling, and tapping according to SDI A250.6, the Door Hardware Schedule, and templates.
1. Reinforce doors and frames to receive nontemplated, mortised, and surface-mounted door hardware.
  2. Comply with applicable requirements in SDI A250.6 and BHMA A156.115 for preparation of hollow-metal work for hardware.
- E. Stops and Moldings: Provide stops and moldings around glazed lites and louvers where indicated. Form corners of stops and moldings with mitered hairline joints.
1. Single Glazed Lites: Provide fixed stops and moldings welded on secure side of hollow-metal work.
  2. Provide fixed frame moldings on outside of exterior and on secure side of interior doors and frames.
  3. Provide loose stops and moldings on inside of hollow-metal work.
  4. Coordinate rabbet width between fixed and removable stops with glazing and installation types indicated.

## 2.8 STEEL FINISHES

- A. Prime Finish: Clean, pretreat, and apply manufacturer's standard primer.
  - 1. Shop Primer: SDI A250.10.

## 2.9 ACCESSORIES

- A. Louvers: Provide sightproof louvers for interior doors, where indicated, which comply with SDI 111C, with blades or baffles formed of 0.020-inch- (0.5-mm-) thick, cold-rolled steel sheet set into 0.032-inch- (0.8-mm-) thick steel frame.
- B. Mullions and Transom Bars: Join to adjacent members by welding or rigid mechanical anchors.
- C. Grout Guards: Formed from same material as frames, not less than 0.016 inch (0.4 mm) thick.

## PART 3 - EXECUTION

### 3.1 INSTALLATION

- A. Hollow-Metal Frames: Install hollow-metal frames of size and profile indicated. Comply with SDI A250.11 or NAAMM-HMMA 840 as required by standards specified.
  - 1. Set frames accurately in position; plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is complete, remove temporary braces, leaving surfaces smooth and undamaged.
    - a. At fire-rated openings, install frames according to NFPA 80.
    - b. Install door silencers in frames before grouting.
    - c. Remove temporary braces necessary for installation only after frames have been properly set and secured.
    - d. Check plumb, square, and twist of frames as walls are constructed. Shim as necessary to comply with installation tolerances.
  - 2. Floor Anchors: Provide floor anchors for each jamb and mullion that extends to floor, and secure with postinstalled expansion anchors.
    - a. Floor anchors may be set with power-actuated fasteners instead of postinstalled expansion anchors if so indicated and approved on Shop Drawings.
  - 3. Metal-Stud Partitions: Solidly pack mineral-fiber insulation inside frames.
  - 4. Installation Tolerances: Adjust hollow-metal door frames for squareness, alignment, twist, and plumb to the following tolerances:
    - a. Squareness: Plus or minus 1/16 inch (1.6 mm), measured at door rabbet on a line 90 degrees from jamb perpendicular to frame head.

- b. Alignment: Plus or minus 1/16 inch (1.6 mm), measured at jambs on a horizontal line parallel to plane of wall.
  - c. Twist: Plus or minus 1/16 inch (1.6 mm), measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.
  - d. Plumbness: Plus or minus 1/16 inch (1.6 mm), measured at jambs at floor.
- B. Hollow-Metal Doors: Fit hollow-metal doors accurately in frames, within clearances specified below. Shim as necessary.
1. Non-Fire-Rated Steel Doors:
    - a. Between Door and Frame Jambs and Head: 1/8 inch (3.2 mm) plus or minus 1/32 inch (0.8 mm).
    - b. Between Edges of Pairs of Doors: 1/8 inch (3.2 mm) to 1/4 inch (6.3 mm) plus or minus 1/32 inch (0.8 mm).
    - c. At Bottom of Door: 3/4 inch (19.1 mm) plus or minus 1/32 inch (0.8 mm).
    - d. Between Door Face and Stop: 1/16 inch (1.6 mm) to 1/8 inch (3.2 mm) plus or minus 1/32 inch (0.8 mm).
  2. Fire-Rated Doors: Install doors with clearances according to NFPA 80.
  3. Smoke-Control Doors: Install doors and gaskets according to NFPA 105.
- C. Glazing: Comply with installation requirements in Section 088000 "Glazing" and with hollow-metal manufacturer's written instructions.
1. Secure stops with countersunk flat- or oval-head machine screws spaced uniformly not more than 9 inches (230 mm) o.c. and not more than 2 inches (51 mm) o.c. from each corner.

### 3.2 ADJUSTING AND CLEANING

- A. Final Adjustments: Check and readjust operating hardware items immediately before final inspection. Leave work in complete and proper operating condition. Remove and replace defective work, including hollow-metal work that is warped, bowed, or otherwise unacceptable.
- B. 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.
- C. Metallic-Coated Surface Touchup: Clean abraded areas and repair with galvanizing repair paint according to manufacturer's written instructions.
- D. Touchup Painting: Cleaning and touchup painting of abraded areas of paint are specified in painting Sections.

END OF SECTION 081113



## SECTION 085313 - VINYL WINDOWS

### GENERAL

#### 1.1 SECTION INCLUDES

- A. Fixed and sliding windows

#### 1.2 REFERENCES

- A. American Architectural Manufacturer Association (AAMA)
  - 1. ANSI/AAMA/NWDA 101/I.S.2 /NAFS; Voluntary Specifications for Aluminum, Vinyl (PVC) and Wood Windows and Glass Doors

#### 1.3 QUALITY ASSURANCE

- A. Qualifications
  - 1. Installer shall have successfully completed training through the window manufacturer's qualified training program. The installer must be an authorized installer by the window manufacturer.
- B. Pre-installation Meeting
  - 1. Conduct meeting on site with Window Manufacturer's Representative, Window Installer and General Contractor.

#### 1.4 DELIVERY, STORAGE AND HANDLING

- A. Deliver windows materials and components in manufacturer's original, unopened, undamaged containers with identification labels intact.
- B. Store windows as recommended by manufacturer.

## PRODUCTS

### 1.5 MANUFACTURER

- A. Basis-of-design Manufacturer: JELD-WEN® Windows and Doors; 3250 Lakeport Blvd. P.O. Box 1329; Klamath Falls, OR 97601-0268, USA; Phone 541.885.7412, fax 541.884.3331; Toll free 800.535.3936; website [www.jeld-wen.com](http://www.jeld-wen.com) or equivalent.
- B. Basis of Design: Windows are based on the JELD-WEN®'s Vinyl Windows or equivalent.
- C. Glazing
  - 1. Window Glazing
    - a. Strength: Tempered
    - b. Insulated Glass standard:
      - 1) Two panes of glass utilizing a continuous roll formed stainless steel and dual seal sealant.
      - 2) Overall Nominal Thickness: 3/4 inch
      - 3) Type: standard: Type 1- Clear and Specialty Glass – Obscure for bathroom window glazing
      - 4) Coating Options: Low E on surface 2

### 1.6 WINDOW ACCESSORIES

- A. Insect Screens
  - 1. Material: standard: Charcoal fiberglass screen cloth (18 by 16 mesh) set in painted roll formed aluminum frame.
    - a. Frame Finish: Color match window frame extrusion.
- B. Sealants: Refer to Section 07 92 00 Joint Sealants

### 1.7 FABRICATION

- A. General: Fixed and Operable Windows
  - 1. Frame: Fusion welded corners
  - 2. Sash: Fusion welded corners

3. Glass: Mounted using silicone glazing compound or glazing tape.

## 1.8 FINISH

- A. Color: Standard White

## EXECUTION

### 1.9 GENERAL

- A. Install windows in accordance with manufacturer's installation guidelines and recommendations.

### 1.10 EXAMINATION

- A. Inspect window prior to installation.
- B. Inspect rough opening for compliance with window manufacturer recommendations. Verify rough opening conditions are within recommended tolerances.

### 1.11 PREPARATION

- A. Prepare windows for installation in accordance with manufacturer's recommendations.

### 1.12 INSTALLATION

- A. Insert window into rough opening:
  1. Shim side jambs straight.
  2. Inspect window for square, level and plumb.
  3. Fasten window through jamb, shim and into rough opening jamb.
  4. Test and adjust for smooth operation of window.
  5. Ensure weep holes are clear of debris for proper drainage.

### 1.13 CLEANING

- A. Remove protective film from glass.
- B. Clean the exterior surface and glass with mild soap and water.

### 1.14 PROTECTION

- A. Protect installed windows from damage.

END OF SECTION

## SECTION 087100 - DOOR HARDWARE

### 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. Commercial door hardware for the following:
    - a. Swinging doors.
    - b. Other doors to the extent indicated.
  - 2. Cylinders for doors specified in other Sections.
- B. Related Sections include the following:
  - 1. Division 8 Section "Steel Doors and Frames" for astragals provided as part of a fire-rated labeled assembly and for door silencers provided as part of the frame.
- C. Products furnished, but not installed, under this Section include the following. Coordinating, purchasing, delivering, and scheduling remain requirements of this Section.
  - 1. Final replacement cores and keys to be installed by Owner.

#### 1.3 SUBMITTALS

- A. Product Data: Include installation details, material descriptions, dimensions of individual components and profiles, and finishes.
- B. Shop Drawings.
- C. 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.

- a. Organize door hardware sets in same order as in the Door Hardware Schedule at the end of Part 3.
  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 each 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. Description of each electrified door hardware function, including location, sequence of operation, and interface with other building control systems.
      - 1) Sequence of Operation: Include description of component functions that occur in the following situations: authorized person wants to enter; authorized person wants to exit; unauthorized person wants to enter; unauthorized person wants to exit.
  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.
  - D. Keying Schedule: Prepared by or under the supervision of supplier, detailing Owner's final keying instructions for locks. Include schematic keying diagram and index each key set to unique door designations.
  - E. Warranties: Special warranties specified in this Section.
- 1.4 QUALITY ASSURANCE
- A. Installer Qualifications: An experienced installer who has completed 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.
  - B. Supplier Qualifications: Door hardware supplier with warehousing facilities in Project's vicinity and who is or employs a qualified Architectural Hardware Consultant, available during the course of the Work to consult with Contractor, Architect, and Owner about door hardware and keying.
    1. Scheduling Responsibility: Preparation of door hardware and keying schedules.
  - C. Architectural Hardware Consultant Qualifications: A person who is currently certified by the Door and Hardware Institute as an Architectural Hardware Consultant and who is experienced in providing consulting services for door hardware installations that are comparable in material, design, and extent to that indicated for this Project.

- D. Regulatory Requirements: Comply with provisions of the following:
1. Where indicated to comply with accessibility requirements, comply with Americans with Disabilities Act (ADA), "Accessibility Guidelines for Buildings and Facilities (ADAAG)," ANSI A117.1, as follows:
    - a. Handles, Pulls, Latches, Locks, and other Operating Devices: Shape that is easy to grasp with one hand and does not require tight grasping, tight pinching, or twisting of the wrist.
    - b. Door Closers: Comply with the following maximum opening-force requirements indicated:
      - 1) Interior Hinged Doors: 5 lbf (22.2 N) applied perpendicular to door.
      - 2) Sliding or Folding Doors: 5 lbf (22.2 N) applied parallel to door at latch.
      - 3) Fire Doors: Minimum opening force allowable by authorities having jurisdiction.
    - c. Thresholds: Not more than 1/2 inch (13 mm) high. Bevel raised thresholds with a slope of not more than 1:2.
  2. NFPA 101: Comply with the following for means of egress doors:
    - a. Latches, Locks, and Exit Devices: Not more than 15 lbf (67 N) to release the latch. Locks shall not require the use of a key, tool, or special knowledge for operation.
    - b. Delayed-Egress Locks: Lock releases within 15 seconds after applying a force not more than 15 lbf (67 N) for not more than 3 seconds.
    - c. Door Closers: Not more than 30 lbf (133 N) to set door in motion and not more than 15 lbf (67 N) to open door to minimum required width.
    - d. Thresholds: Not more than 1/2 inch (13 mm) high.
- E. Keying Conference: Conduct conference at Project site with the Owner. Incorporate keying conference decisions into final keying schedule after reviewing door hardware keying system including, but not limited to, the following:
1. Function of building, flow of traffic, purpose of each area, degree of security required, and plans for future expansion.
  2. Preliminary key system schematic diagram.
  3. Requirements for key control system.
  4. Address for delivery of keys.
- F. Pre-installation Conference: Conduct conference at Project site. Review methods and procedures related to electrified door hardware including, but not limited to, the following:
1. Inspect and discuss preparatory work performed by other trades.
  2. Review sequence of operation for each type of door hardware.
  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. Review required testing, inspecting, and certifying procedures.
  5. Inspect frames for square conditions prior to door and hardware installation. Advise General Contractor of frames needing correction prior to installation of doors.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Inventory door hardware on receipt and provide secure lock-up for door hardware delivered to Project site.
- 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 keys to Owner by registered mail or overnight package service.

1.6 COORDINATION

- A. Coordinate layout and installation of recessed pivots and closers with floor construction. Cast anchoring inserts into concrete.
- B. Templates: Obtain and distribute to the parties involved templates for doors, frames, and other work specified to be factory prepared for installing door hardware. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing door hardware to comply with indicated requirements.
- C. Electrical System Roughing-in: Coordinate layout and installation of door hardware with connections to power supplies, fire alarm system and detection devices, access control system, security system and building control system.

1.7 WARRANTY

- A. General Warranty: 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: One (1) year from date of Substantial Completion, unless otherwise indicated.

1.8 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.

PRODUCTS

1.9 SCHEDULED DOOR HARDWARE

- A. General: Provide door hardware for each door to comply with requirements in this Section, door hardware sets indicated in door and frame schedule, and the Door Hardware Schedule at the end of Part 3.

1. Door Hardware Sets: Requirements for quantity, item, design, grade, function, finish, size, and other distinctive qualities of each type of door hardware are indicated in the Door Hardware Schedule at the end of Part 3. Products are identified by descriptive titles corresponding to requirements specified in Part 2.

1.10 HINGES AND PIVOTS, GENERAL

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Hinges:
  - a. Hager Companies.
  - b. Lawrence Brothers, Inc.
  - c. McKinney Products Company; Div. of ESSEX Industries, Inc.

- B. Standards: Comply with the following:

1. Butts and Hinges: BHMA A156.1.
2. Template Hinge Dimensions: BHMA A156.7.
3. Self-Closing Hinges and Pivots: BHMA A156.17.
4. Pivots: BHMA A156.4.

- C. Quantity: Provide the following, unless otherwise indicated:

1. Two Hinges: For doors with heights up to 60 inches (1524 mm).
2. Three Hinges: For doors with heights 61 to 90 inches (1549 to 2286 mm).

- D. Size: Provide the following, unless otherwise indicated, with hinge widths sized for door thickness and clearances required:

PART 2 -	PART 3 -	PART 4 - Metal Thickness (inches)	PART 5 -
PART 6 - Maximum Door Size (inches)	PART 7 - Hinge Height (inches)	PART 8 - Standard Weight	PART 9 - Heavy Weight
PART 10 -	PART 11 -	PART 12 -	PART 13 -
32 by 84 by 1-3/8	3-1/2	0.123	-
36 by 84 by 1-3/8	4	0.130	-
36 by 84 by 1-3/4	4-1/2	0.134	0.180
42 by 90 by 1-3/4	4-1/2	0.134	0.180
48 by 120 by 1-3/4	5	0.146	0.190

- A. Template Requirements: Except for hinges and pivots to be installed entirely (both leaves) into wood doors and frames, provide only template-produced units.

- B. Hinge Applications: Unless otherwise indicated, provide the following:

1. Entrance Doors: Heavy-weight hinges.
2. Doors with Closers: Antifriction-bearing hinges.



3. Interior Doors: Standard-weight hinges.

C. Fasteners: Comply with the following:

1. Machine Screws: For metal doors and frames. Install into drilled and tapped holes.
2. Wood Screws: For wood doors and frames.
3. Threaded-to-the-Head Wood Screws: For fire-rated wood doors.
4. Screws: Use only manufacturer supplied fasteners with matching finish heads.

### 13.2 LOCKS AND LATCHES, GENERAL

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Mechanical Locks and Latches:
  - a. Best Lock Corporation
2. Bored Locks and Latches: BHMA A156.2.
3. Mortise Locks and Latches: BHMA A156.13.
4. Exit Locks: BHMA A156.5.

B. Bored Locks: BHMA Grade 1; Series 4000.

C. Certified Products: Provide door hardware listed in the following BHMA directories:

1. Mechanical Locks and Latches: BHMA's "Directory of Certified Locks & Latches."

D. Lock Throw: Comply with testing requirements for length of bolts to comply with labeled fire door requirements, and as follows:

1. Bored Locks: Minimum 1/2-inch (12.7-mm) latchbolt throw.
2. Mortise Locks: Minimum 3/4-inch (19-mm) latchbolt throw.
3. Deadbolts: Minimum 1-inch (25-mm) bolt throw.

### 13.3 DOOR BOLTS, GENERAL

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Surface Bolts:
  - a. Hager Companies.
  - b. Ives: H. B. Ives.
  - c. Rockwood Manufacturing Company.
2. Flush Bolts:
  - a. Hiawatha, Inc.
  - b. Ives: H. B. Ives.
  - c. Rixson-Firemark, Inc.; Div. of Yale Security Inc.
  - d. Rockwood Manufacturing Company.

B. Standards: Comply with the following:

1. Surface Bolts: BHMA A156.16.
2. Automatic and Self-Latching Flush Bolts: BHMA A156.3.
3. Manual Flush Bolts: BHMA A156.16.

13.4 CYLINDERS AND KEYING

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Cylinders: Same manufacturer as for locks and latches.
2. Cylinders:
  - a. Best Locks Corporation
3. Key Control Systems:
  - a. Key Control Systems, Inc.
  - b. Major Metalfab Co.
  - c. Sargent Manufacturing Company; Div. of ESSEX Industries, Inc.

B. Standards: Comply with the following:

1. Cylinders: BHMA A156.5.
2. Key Control System: BHMA A156.5.

C. Cylinder Grade: BHMA Grade 1.

D. Cylinders: Manufacturer's standard tumbler type, constructed from brass or bronze, stainless steel, or nickel silver, and complying with the following:

1. Number of Pins: Seven
2. Mortise Type: Threaded cylinders with rings and straight- or clover-type cam.
3. Rim Type: Cylinders with back plate, flat-type vertical or horizontal tailpiece, and raised trim ring.
4. Bored-Lock Type: Cylinders with tailpieces to suit locks.

E. Construction Keying: Comply with the following:

1. Construction Master Keys: Provide cylinders with feature that permits voiding of construction keys without cylinder removal. Provide 10 construction master keys.

F. Keying System: Unless otherwise indicated, provide a factory-registered keying system complying with the following requirements:

1. Grand Master Key System: Cylinders are operated by a change key, a master key, and a grand master key.
  - a. Cylinders shall be master keyed at the direction of the designated owner's representative.
  - b. Keys: Provide nickel-silver keys complying with the following:

2. Stamping: Permanently inscribe each key with a visual key control number and include the following notation:
    - a. Notation: "DO NOT DUPLICATE."
  3. Quantity: In addition to one extra blank key for each lock, provide the following:
    - a. Cylinder Change Keys: Three.
    - b. Master Keys: Five.
    - c. Grand Master Keys: Five.
- G. Key Control System: BHMA Grade 1 system, including key-holding hooks, labels, two sets of key tags with self-locking key holders, key-gathering envelopes, and temporary and permanent markers. Contain system in metal cabinet with baked-enamel finish.
1. Portable Cabinet: Tray for mounting in file cabinet, equipped with key-holding panels, envelopes, and cross-index system.
  2. Capacity: Able to hold keys for 150 percent of the number of locks.
  3. Cross-Index System: Set up by key control manufacturer, complying with the following:
    - a. Card Index: Furnish four sets of index cards for recording key information. Include three receipt forms for each key-holding hook.
    - b. Computer Software: Furnish cross-index software for recording and reporting key-holder listings, tracking keys and lock and key history, and printing receipts for transactions. Include instruction manual.

### 13.5 STRIKES

- A. Standards: Comply with the following:
1. Strikes for Bored Locks and Latches: BHMA A156.2.
  2. Strikes for Mortise Locks and Latches: BHMA A156.13.
  3. Strikes for Interconnected Locks and Latches: BHMA A156.12.
  4. Strikes for Auxiliary Deadlocks: BHMA A156.5.
  5. Dustproof Strikes: BHMA A156.16.
- B. 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.
- C. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Baldwin Hardware Corporation.

2. Hager Companies.
3. Rockwood Manufacturing Company.

- D. Standard: Comply with BHMA A156.6.
- E. Materials: Fabricate from stainless steel, unless otherwise indicated.

### 13.6 ACCESSORIES FOR PAIRS OF DOORS, GENERAL

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Coordinators:
  - a. Hager Companies.
  - b. Ives: H. B. Ives.
  - c. Rockwood Manufacturing Company.
2. Astragals:
  - a. Hager Companies.
  - b. National Guard Products, Inc.
  - c. Pemko Manufacturing Co., Inc.

- B. Standards: Comply with the following:

1. Coordinators: BHMA A156.3.
2. Removable Mullions: BHMA A156.3.

### 13.7 CLOSERS, GENERAL

- 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. Surface-Mounted Closers:
  - a. Corbin Russwin Architectural Hardware; Div. of Yale Security Inc.
  - b. Dor-O-Matic
  - c. Norton Door Controls; Div. of Yale Security Inc.
  - d. Rixson-Firemark, Inc.; Div. of Yale Security Inc.
  - e. Sargent Manufacturing Company; Div. of ESSEX Industries, Inc.
  - f. Yale Security Inc.; Div. of Williams Holdings.

- C. Standards: Comply with the following:

1. Closers: BHMA A156.4.
2. Closer Holder Release Devices: BHMA A156.15.

- D. Surface Closers: BHMA Grade 1
- E. Size of Units: Unless otherwise indicated, comply with manufacturer's written recommendations for size of door closers depending on size of door, exposure to weather, and anticipated frequency of use. Provide factory-sized closers, adjustable to meet field conditions and requirements for opening force.

### 13.8 CLOSERS

- A. Traditional Surface Closers: Rack-and-pinion hydraulic type; with adjustable sweep and latch speeds controlled by key-operated valves; with forged-steel main arm; enclosed in a cast-aluminum alloy shell; complying with the following:
  - 1. Mounting: as indicated in hardware sets. Install all closers on non-public side of door opening.
  - 2. Backcheck: Adjustable, effective between 60 and 85 degrees of door opening.

### 13.9 PROTECTIVE TRIM UNITS, GENERAL

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. Metal Protective Trim Units:
    - a. Baldwin Hardware Corporation.
    - b. Hager Companies.
    - c. Hiawatha, Inc.
    - d. Ives: H. B. Ives.
    - e. Rockwood Manufacturing Company.
- C. Standard: Comply with BHMA A156.6.
- D. Materials: Fabricate protection plates from the following:
  - 1. Stainless Steel: 0.050 inch (1.3 mm) thick; beveled top and 2 sides.
- E. Fasteners: Provide manufacturer's standard exposed fasteners for door trim units consisting of either machine or self-tapping screws.
- F. Furnish protection plates sized 1-1/2 inches (38 mm) less than door width on push side and 1/2 inch (13 mm) less than door width on pull side, by height specified in schedule.

### 13.10 PROTECTIVE TRIM UNITS

- A. Armor Plates: 36 inches (914 mm) high by door width, with allowance for frame stops.
- B. Kick Plates: 12 inches (305 mm) high by door width, with allowance for frame stops.
- C. Mop Plates: 6 inches (152 mm) high by 1 inch (25 mm) less than door width.

13.11 STOPS AND HOLDERS, GENERAL

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. Baldwin Hardware Corporation.
  - 2. Hager Companies.
  - 3. Ives: H. B. Ives.
  - 4. Norton Door Controls; Div. of Yale Security Inc.
  - 5. Rixson-Firemark, Inc.; Div. of Yale Security Inc.
  - 6. Rockwood Manufacturing Company.
  - 7. Yale Security Inc.; Div. of Williams Holdings.
- B. Standards: Comply with the following:
  - 1. Stops and Bumpers: BHMA A156.16.
  - 2. Door Silencers: BHMA A156.16.
- C. Floor Stops: For doors, unless wall or other type stops are scheduled or indicated. Do not mount floor stops where they will impede traffic.
  - 1. Where floor or wall stops are not appropriate, provide overhead holders.
- D. Silencers for Metal Door Frames: BHMA Grade 1; neoprene or rubber, minimum diameter 1/2 inch (13 mm); fabricated for drilled-in application to frame.

13.12 STOPS AND HOLDERS

- A. Dome-Type Floor Stop: Polished cast brass, bronze, or aluminum, with rubber bumper; and as follows:
  - 1. Height: Minimum 1 inch (25 mm) high, for doors without threshold, 1-3/8 inches (35 mm) high, for doors with threshold.
  - 2. Riser: Extruded aluminum for carpet installations.

13.13 DOOR GASKETING, GENERAL

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. Door Gasketing:
    - a. Hager Companies.
    - b. National Guard Products, Inc.
    - c. Pemko Manufacturing Co., Inc.
- B. General: Provide continuous weather-strip gasketing on exterior doors and provide smoke, light, or sound gasketing on interior doors where indicated or scheduled. Provide noncorrosive fasteners for exterior applications and elsewhere as indicated.
  - 1. Perimeter Gasketing: Apply to head and jamb, forming seal between door and frame.
  - 2. Meeting Stile Gasketing: Fasten to meeting stiles, forming seal when doors are closed.

3. Door Bottoms: Apply to bottom of door, forming seal with threshold when door is closed.

- C. Air Leakage: Not to exceed 0.50 cfm per foot (0.000774 cu. m/s per m) of crack length for gasketing other than for smoke control, as tested according to ASTM E 283.
- D. Replaceable Seal Strips: Provide only those units where resilient or flexible seal strips are easily replaceable and readily available from stocks maintained by manufacturer.
- E. Gasketing Materials: Comply with ASTM D 2000 and AAMA 701/702.

#### 13.14 DOOR GASKETING

- A. Rigid, Housed Perimeter Gasketing: Gasket material held in place by metal housing; fastened to frame stop with screws.
  - 1. Gasket Material: Silicone bulb
  - 2. Housing Material: Aluminum
- B. Door Sweeps: Gasket material held in place by flat metal housing or flange; surface mounted to face of door with screws.
  - 1. Gasket Material: Vinyl.
  - 2. Housing Material: Aluminum.

#### 13.15 THRESHOLDS, GENERAL

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. Hager Companies.
  - 2. National Guard Products, Inc.
  - 3. Pemko Manufacturing Co., Inc.
- B. Standard: Comply with BHMA A156.21.

#### 13.16 THRESHOLDS

- A. Saddle Thresholds: Type and base metal as follows:
  - 1. Type: Fluted top.
  - 2. Base Metal: Aluminum

#### 13.17 FABRICATION

- A. Manufacturer's Nameplate: Do not provide manufacturers' products that have manufacturer's name or trade name displayed in a visible location (omit removable nameplates) except in conjunction with required fire-rated labels and as otherwise approved by Architect.

1. Manufacturer's identification will be permitted on rim of lock cylinders only.
- B. Base Metals: Produce door hardware units of base metal, fabricated by forming method indicated, using manufacturer's standard metal alloy, composition, temper, and hardness. Furnish metals of a quality equal to or greater than that of specified door hardware units and BHMA A156.18 for finishes. Do not furnish manufacturer's standard materials or forming methods if different from specified standard.
- C. Fasteners: Provide door hardware manufactured to comply with published templates generally prepared for machine, wood, and sheet metal screws. Provide screws according to commercially recognized industry standards for application intended. Provide Phillips flat-head screws with finished heads to match surface of door hardware, unless otherwise indicated.
  1. Concealed Fasteners: For door hardware units that are exposed when door is closed, except for units already specified with concealed fasteners. Do not use through bolts for installation where bolt head or nut on opposite face is exposed unless it is the only means of securely attaching the door hardware. Where through bolts are used on hollow door and frame construction, provide sleeves for each through bolt.

#### 13.18 FINISHES

- A. Standard: Comply with BHMA A156.18.
- B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- C. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in the same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.
- D. BHMA Designations: Comply with base material and finish requirements indicated by the following:
  1. BHMA 600: Primed for painting, over steel base metal.
  2. BHMA 626: Satin chromium plated over nickel, over brass or bronze base metal.
  3. BHMA 630: Satin stainless steel, over stainless-steel base metal.
  4. BHMA 689: Aluminum painted, over any base metal.

#### 13.19 EXAMINATION

- A. Examine doors and frames, with Installer present, for compliance with requirements for installation tolerances, labeled fire door assembly construction, wall and floor construction, and other conditions affecting performance of door hardware.
- B. Examine roughing-in for electrical power systems to verify actual locations of wiring connections before electrified door hardware installation.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.



13.20 PREPARATION

- A. Steel Doors and Frames: Comply with DHI A115 series.
  - 1. Surface-Applied Door Hardware: Drill and tap doors and frames according to SDI 107.

13.21 INSTALLATION

- A. 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."
- B. Install each door hardware item to comply with manufacturer's 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.
  - 1. Set units level, plumb, and true to line and location. Adjust and reinforce attachment substrates as necessary for proper installation and operation.
  - 2. Drill and countersink units that are not factory prepared for anchorage fasteners. Space fasteners and anchors according to industry standards.
- C. Key Control System: Place keys on markers and hooks in key control system cabinet, as determined by final keying schedule.
- D. Thresholds: Set thresholds for exterior and acoustical doors in full bed of sealant complying with requirements specified in Division 7 Section "Joint Sealants."

13.22 CLEANING AND PROTECTION

- A. Clean adjacent surfaces soiled by door hardware installation.
- B. Clean operating items as necessary to restore proper function and finish.
- C. Provide final protection and maintain conditions that ensure door hardware is without damage or deterioration at time of Substantial Completion.

13.23 DOOR HARDWARE SCHEDULE

Door Hardware Set No. One

Locations: Doors 100, 110B, 100C, 113, 201A, 201B, 201C: to have the following:

Qty.	Item	Manufacturer	Product	Finish
3	Hinges	McKinney	T4A3386 NRP T4B	32D
1	Lockset	Best (Office)		32D

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1	Deadbolt	Best		689
1	Closer	Sargent	1431-P10	689
1	Threshold	McKinney	MCK-2001AV-3/0	Aluminum
1	Door Gasketing	McKinney	MCK-303AS-307070	
1	Stop	McKinney	FS01	626

Door Hardware Set No. Two

Locations: 102, 106, 202, 203; to have the following:

Qty.	Item	Manufacturer	Product	Finish
3	Hinges	McKinney	T4A3386 T4B	32D
1	Lockset	Best (Storeroom)		32D
1	Deadbolt	Best		689
1	Closer	Sargent	1431-P10	689
1	Stop	McKinney	FS01	626

Door Hardware Set No. Three

Locations: Doors 113, 206 to have the following:

Qty.	Item	Manufacturer	Product	Finish
3	Hinges	McKinney	T4A3386 T4B	32D
1	Lockset	Best (Storeroom)		32D
1	Deadbolt	Best		689
1	Closer	Sargent	1431-P10	689
1	Door Gasketing	McKinney	MCK-303AS-307070	
1	Threshold	See plans		
1	Stop	McKinney	FS01	626

Door Hardware Set No. Four

Locations: Doors 103, 104, 105, 107, 108, 109 to have the following:

Qty.	Item	Manufacturer	Product	Finish
3	Hinges	McKinney	T4A3386	32D
1	Lockset	Best (Office)		32D
1	Closer	Sargent	1431-P10	689
1	Stop	McKinney	FS01	626

END OF SECTION 087100

## SECTION 089000 - LOUVERS AND VENTS

### PART 1 - GENERAL

#### 1.1 SUMMARY

A. Section Includes:

1. Fixed, extruded-aluminum louvers.

B. Related Sections:

1. See Section 081113 "Hollow Metal Doors and Frames" for louvers in hollow-metal doors.

#### 1.2 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Design louvers, including comprehensive engineering analysis by a qualified professional engineer, using structural performance requirements and design criteria indicated.

- B. Structural Performance: Louvers shall withstand the effects of gravity loads and the following loads and stresses within limits and under conditions indicated without permanent deformation of louver components, noise or metal fatigue caused by louver blade rattle or flutter, or permanent damage to fasteners and anchors.

1. Wind Loads: Determine loads based on pressures as indicated on Drawings.

- C. Louver Performance Ratings: Provide louvers complying with requirements specified, as demonstrated by testing manufacturer's stock units identical to those provided, except for length and width according to AMCA 500-L.

#### 1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.

1. For louvers specified to bear AMCA seal, include printed catalog pages showing specified models with appropriate AMCA Certified Ratings Seals.

- B. Shop Drawings: For louvers and accessories. Include plans, elevations, sections, details, and attachments to other work. Show frame profiles and blade profiles, angles, and spacing.

- C. Samples: For each type of metal finish required.

- D. Delegated-Design Submittal: For louvers indicated to comply with structural performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

#### 1.4 INFORMATIONAL SUBMITTALS

- A. Product Test Reports: Based on tests performed according to AMCA 500-L.

### PART 2 - PRODUCTS

#### 2.1 MATERIALS

- A. Aluminum Extrusions: ASTM B 221 (ASTM B 221M), Alloy 6063-T5, T-52, or T6.
- B. Fasteners: Use types and sizes to suit unit installation conditions.
  - 1. For fastening aluminum, use aluminum or 300 series stainless-steel fasteners.
  - 2. For color-finished louvers, use fasteners with heads that match color of louvers.
- C. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D 1187.

#### 2.2 FABRICATION, GENERAL

- A. Fabricate frames, including integral sills, to fit in openings of sizes indicated, with allowances made for fabrication and installation tolerances, adjoining material tolerances, and perimeter sealant joints.
- B. Join frame members to each other and to fixed louver blades with welds, threaded fasteners, or both, as standard with louver manufacturer unless otherwise indicated or size of louver assembly makes bolted connections between frame members necessary.

#### 2.3 FIXED, EXTRUDED-ALUMINUM LOUVERS

- A. Horizontal Storm-Resistant Louver:
  - 1. Basis-of-Design Product: Subject to compliance with requirements, provide Model RS-4300 by Construction specialties, Inc. or comparable product by one of the following:
    - a. Air Balance Inc.; a Mestek company.
    - b. Air Flow Company, Inc.
    - c. Airolite Company, LLC (The).
    - d. All-Lite Architectural Products.
    - e. Construction Specialties, Inc.
    - f. Greenheck Fan Corporation.
    - g. Reliable Products, Inc.
    - h. Ruskin Company; Tomkins PLC.

2. Louver Depth: 4 inches (102 mm).
3. Frame and Blade Nominal Thickness: Not less than 0.060 inch (1.52 mm) for blades and 0.080 inch (2.03 mm) for frames.
4. AMCA Seal: Mark units with AMCA Certified Ratings Seal.

## 2.4 LOUVER SCREENS

- A. General: Provide screen at each exterior louver.
- B. Louver Screen Frames: Same kind and form of metal as indicated for louver to which screens are attached.
- C. Louver Screening:
  1. Bird Screening: Aluminum, 18 x 16 aluminum mesh, .011 inch (.279 mm) diameter wire insect screens secured within .055inch (1.40 mm) thick extruded aluminum frames. Frames shall have mitered corners and corner locks

## 2.5 ALUMINUM FINISHES

- A. High-Performance Organic Finish: 2-coat fluoropolymer finish complying with AAMA 2605, 70% resin. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
  1. Color and Gloss: As selected by Architect from manufacturer's full range.

## PART 3 - EXECUTION

### 3.1 INSTALLATION

- A. Locate and place louvers and vents level, plumb, and at indicated alignment with adjacent work.
- B. Use concealed anchorages where possible. Provide brass or lead washers fitted to screws where required to protect metal surfaces and to make a weathertight connection.
- C. Provide perimeter reveals and openings of uniform width for sealants and joint fillers, as indicated.
- D. Repair damaged finishes so no evidence remains of corrective work. Return items that cannot be refinished in the field to the factory and refinish entire unit or provide new units.
- E. Protect galvanized and nonferrous-metal surfaces that will be in contact with concrete, masonry, or dissimilar metals from corrosion and galvanic action by applying a heavy coating of bituminous paint.

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END OF SECTION 089000

## SECTION 092216 - NON-STRUCTURAL METAL FRAMING

### PART 1 - GENERAL

#### 1.1 SUMMARY

##### A. Section Includes:

1. Non-load-bearing steel framing systems for interior gypsum board assemblies.

### PART 2 - PRODUCTS

#### 2.1 FRAMING SYSTEMS

- A. Recycled Content of Steel Products: Postconsumer recycled content plus one-half of preconsumer recycled content is not less than 25 percent.
- B. Z-Shaped Furring: With slotted or nonslotted web, face flange of 1-1/4 inches (31.8 mm), wall attachment flange of 7/8 inch (22 mm), minimum uncoated-metal thickness of 0.018 inch (0.45 mm), and depth required to fit insulation thickness indicated.
- C. Flat Strap and Backing Plate: Steel sheet for blocking and bracing in length and width indicated.
  1. Minimum Base-Metal Thickness: 0.033 inch (0.84 mm).

#### 2.2 AUXILIARY MATERIALS

- A. Fasteners for Metal Framing: Of type, material, size, corrosion resistance, holding power, and other properties required to fasten steel members to substrates.

### PART 3 - EXECUTION

#### 3.1 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 supplementary framing, and blocking to support fixtures, equipment services, heavy trim, grab bars, toilet accessories, furnishings, or similar construction.

- C. Install bracing at terminations in assemblies.
- D. Do not bridge building control and expansion joints with non-load-bearing steel framing members. Frame both sides of joints independently.

### 3.2 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.
- 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. Z-Furring Members:
  - 1. Erect insulation vertically and hold in place with Z-furring members spaced 24 inches (610 mm) o.c.
  - 2. Except at exterior corners, securely attach narrow flanges of furring members to wall with screws designed for masonry attachment, or powder-driven fasteners spaced 24 inches (610 mm) o.c.
  - 3. At exterior corners, attach wide flange of furring members to wall with short flange extending beyond corner; on adjacent wall surface, screw-attach short flange of furring channel to web of attached channel. At interior corners, space second member no more than 12 inches (305 mm) from corner and cut insulation to fit.
- 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.

END OF SECTION 092216



## SECTION 092900 - GYPSUM BOARD

### PART 1 - GENERAL

#### 1.1 SUMMARY

A. Section Includes:

1. Interior gypsum board.
2. Glass matt, water resistant backing board.

### PART 2 - PRODUCTS

#### 2.1 INTERIOR GYPSUM BOARD

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. CertainTeed Corp.
2. Georgia-Pacific Gypsum LLC.
3. Lafarge North America Inc.
4. National Gypsum Company.
5. USG Corporation.

B. Gypsum Board: ASTM C 1396/C 1396M.

1. Thickness: 1/2 inch.
2. Long Edges: Tapered and featured (rounded or beveled) for prefilling.

#### 2.2 TILE BACKING PANELS

A. Glass-Mat, Water-Resistant Backing Board: ASTM C 1178/C 1178M, with manufacturer's standard edges.

1. Products: Subject to compliance with requirements, provide one of the following:
  - a. CertainTeed Corp.; GlasRoc Tile Backer.
  - b. Georgia-Pacific Gypsum LLC; DensShield Tile Backer.
2. Core: 1/2 inch.
3. Mold Resistance: ASTM D 3273, score of 10 as rated according to ASTM D 3274.

## 2.3 TRIM ACCESSORIES

- A. Interior Trim: ASTM C 1047.
  - 1. Material: Galvanized or aluminum-coated steel sheet, rolled zinc, plastic, or paper-faced galvanized steel sheet.
- B. Aluminum Trim: ASTM B 221 (ASTM B 221M), Alloy 6063-T5.

## 2.4 JOINT TREATMENT MATERIALS

- A. General: Comply with ASTM C 475/C 475M.
- B. Joint Tape:
  - 1. Interior Gypsum Board: Paper.
  - 2. Glass-Mat Gypsum Sheathing Board: 10-by-10 glass mesh.
- C. Joint Compound for Interior Gypsum Board: For each coat use formulation that is compatible with other compounds applied on previous or for successive coats.

## 2.5 AUXILIARY MATERIALS

- A. Steel Drill Screws: ASTM C 1002, unless otherwise indicated.
- B. Thermal Insulation: As specified in Section 072100 "Thermal Insulation."

## PART 3 - EXECUTION

### 3.1 APPLYING AND FINISHING PANELS

- A. Comply with ASTM C 840.
- B. Examine panels before installation. Reject panels that are wet, moisture damaged, and mold damaged.
- C. Isolate perimeter of gypsum board applied to non-load-bearing partitions at structural abutments, except floors. Provide 1/4- to 1/2-inch- (6.4- to 12.7-mm-) wide spaces at these locations and trim edges with edge trim where edges of panels are exposed.
- D. Install trim with back flanges intended for fasteners, attach to framing with same fasteners used for panels. Otherwise, attach trim according to manufacturer's written instructions.
- E. Prefill open joints, rounded or beveled edges, and damaged surface areas.

- F. Apply joint tape over gypsum board joints, except for trim products specifically indicated as not intended to receive tape.
- G. Gypsum Board Finish Levels: Finish panels to levels indicated below and according to ASTM C 840:
  - 1. Level 2: Panels that are substrate for tile, FRP Board and panels that are concealed by suspended acoustical ceiling tile.
  - 2. Level 4: At panel surfaces that will be exposed to view unless otherwise indicated.
    - a. Primer and its application to surfaces are specified in Section 099123 "Interior Painting."
- H. Protect adjacent surfaces from drywall compound and texture finishes and promptly remove from floors and other non-drywall surfaces. Repair surfaces stained, marred, or otherwise damaged during drywall application.
- I. Remove and replace panels that are wet, moisture damaged, and mold damaged.

END OF SECTION 092900

## SECTION 093000 – TILING

### PART 1 - GENERAL

#### 1.1 SUMMARY

A. This Section includes the following:

1. Floor tile.
2. Wall tile.

### PART 2 - PRODUCTS

#### 2.1 MANUFACTURERS

A. In other Part 2 articles where titles below introduce lists, the following requirements apply for product selection:

1. Basis-of-Design Product: The design for each tile type is based on the product named. Subject to compliance with requirements, provide either the named product or a comparable product by one of the other manufacturers specified.

#### 2.2 TILE PRODUCTS

A. ANSI Ceramic Tile Standard: Provide Standard grade tile that complies with ANSI A137.1, "Specifications for Ceramic Tile," for types, compositions, and other characteristics indicated.

B. Porcelain Floor Tile:

1. Basis-of-Design Product: Iris U.S. – size 3" x 3".
2. Color: Deluxe Collection – "Olive Brown" (Honed)
3. Grout color: Mapei – "11 Sahara Beige".
4. Install per TCA Method F122-01.

C. Glazed Porcelain Ceramic Wall Tile:

1. Basis-of-Design Product: Iris U.S. – size 12" x 12".
2. Color: Deluxe Collection - "Crema" (Polished)
3. Grout color: Mapei – "49 Light Almond".
4. Locations: Wall tile in shower and drying areas. Refer to drawings.
5. Base Trim: Iris U.S. Cove Base IRH612C008, size 6" x 12".
6. Install per TCA Method W244-01.

## 2.3 ACCESSORY MATERIALS

- B. Waterproofing and Crack-Suppression Membranes for Thin-Set Tile Installations: Manufacturer's standard product that complies with ANSI A118.10.

## 2.4 SETTING AND GROUTING MATERIALS

- A. Basis of Design Product:
  - 1. Grouting Materials Equivalent to: StarQuartz Industries, Inc. "Quartz-Lock Grout." - Custom Building Products CEG-Lite Grout Exceed ANSI 118.3
  - 2. *Floor* Setting Materials: Latex-Portland Cement Mortar ANSI-A118.4 Custom Building Products Versabond over Liquid Applied Waterproofing ANSI-A118.10. Custom Building Products Red Gard AntiFracture and Waterproofing.
  - 3. *Wall* Setting Materials: Latex-Portland Cement Mortar ANSI-A118.4. Custom Building Products ProLite Mortar

## 2.5 MISCELLANEOUS MATERIALS

- A. Trowelable Underlayments and Patching Compounds: Latex-modified, portland cement-based formulation provided or approved by manufacturer of tile-setting materials. Custom Building Products LevelQuik ES

# PART 3 - EXECUTION

## 3.1 PREPARATION

- A. Remove coatings, including curing compounds and other substances that contain soap, wax, oil, or silicone, that are incompatible with tile-setting materials.
- B. Fill cracks, holes, and depressions with trowelable leveling and patching compound according to tile-setting material manufacturer's written instructions.
- C. Remove protrusions, bumps, and ridges by sanding or grinding.
- D. Blending: For tile exhibiting color variations, use factory blended tile or blend tiles at Project site before installing.
- E. Field-Applied Temporary Protective Coating: Where indicated under tile type or needed to prevent grout from staining or adhering to exposed tile surfaces, precoat them with continuous film of temporary protective coating, taking care not to coat unexposed tile surfaces.

### 3.2 INSTALLATION, GENERAL

- A. ANSI Tile Installation Standards: Comply with parts of ANSI A108 Series "Specifications for Installation of Ceramic Tile" that apply to types of setting and grouting materials and to methods indicated in ceramic tile installation schedules.
- B. TCA Installation Guidelines: TCA's "Handbook for Ceramic Tile Installation." Comply with TCA installation methods indicated in ceramic tile installation schedules.
- C. Extend tile work into recesses and under or behind equipment and fixtures to form complete covering without interruptions, unless otherwise indicated. Terminate work neatly at obstructions, edges, and corners without disrupting pattern or joint alignments.
- D. Accurately form intersections and returns. Perform cutting and drilling of tile without marring visible surfaces. Grind cut edges of tile abutting trim, finish, or built-in items. Fit tile closely to electrical outlets, piping, fixtures, and other penetrations so plates, collars, or covers overlap tile.
- E. Jointing Pattern: Lay tile in patterns indicated in drawings, unless otherwise indicated. Align joints when adjoining tiles on floor, base, walls, and trim are same size. Lay out tile work and center tile fields in both directions in each space or on each wall area. Adjust to minimize tile cutting. Provide uniform joint widths, unless otherwise indicated.
- F. Lay out tile wainscots as indicated in drawings.
- G. Expansion Joints: Locate expansion joints and other sealant-filled joints during installation of setting materials, mortar beds, and tile. Do not saw-cut joints after installing tiles.
  - 1. Locate joints in tile surfaces directly above joints in concrete substrates.
  - 2. Prepare joints and apply sealants to comply with requirements in Division 07 Section "Joint Sealants."
- H. Grout tile to comply with requirements of ANSI A108.10, unless otherwise indicated.
- I. Install waterproofing to comply with ANSI A108.13 and waterproofing manufacturer's written instructions to produce waterproof membrane of uniform thickness bonded securely to substrate.
  - 1. Do not install tile over waterproofing until waterproofing has cured and been tested to determine that it is watertight.
- J. Install tile on floors with the following joint widths:
  - 1. Porcelain Tile: 1/8 inch.
- K. Stone Thresholds: Install stone thresholds at locations indicated; set in same type of setting bed as abutting field tile, unless otherwise indicated.
  - 1. Set thresholds in latex-portland cement mortar for locations where mortar bed would otherwise be exposed above adjacent nontile floor finish.

- L. Install tile on walls with the following joint widths:
  - 1. 1/8 inch installed with the 6 inch tile dimension installed vertically and all joints aligned.

### 3.3 FLOOR TILE INSTALLATION SCHEDULE

- A. Interior floor installation on waterproofing membrane over concrete; thin-set mortar; TCA F122.
  - 1. Thin-Set Mortar: Water-cleanable, 100% solids epoxy mortar and nonsagging grout.
  - 2. Grout: Equivalent to: StarQuartz Industries, Inc. "Quartz-Lock Grout." Custom Building Products CEG Lite Epoxy Grout

### 3.4 WALL TILE INSTALLATION SCHEDULE

- A. Interior wall installation; thin-set mortar; over tile backer units; TCA W244.
  - 1. Thin-Set Mortar: Water-cleanable, 100% solids epoxy mortar and nonsagging grout.
  - 2. Grout: Equivalent to: StarQuartz Industries, Inc. "Quartz-Lock Grout." Custom Building Products CEG Lite Epoxy Grout

END OF SECTION 093000

## SECTION 096513 - RESILIENT BASE AND ACCESSORIES

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Section Includes:
  - 1. Resilient base.
  - 2. Resilient molding accessories.

### PART 2 - PRODUCTS

#### 2.1 THERMOPLASTIC-RUBBER BASE (RWB)

- A. Basis-of-Design: Johnsonite Rubber Wall Base
- B. Product Standard: ASTM F 1861, Type TP (rubber, thermoplastic).
  - 1. Group: I (solid, homogeneous).
  - 2. Style and Location:
    - a. Style A, Straight: Provide in areas with carpet.
    - b. Style B, Cove: Provide in areas with resilient flooring.
      - 1) Profile: As indicated.
- C. Thickness: 0.125 inch (3.2 mm).
- D. Height: 4 inches (102 mm).
- E. Lengths: Cut lengths 48 inches (1219 mm) long or coils in manufacturer's standard length.
- F. Outside Corners: Job formed or preformed.
- G. Inside Corners: Job formed or preformed.

#### 2.2 INSTALLATION MATERIALS

- A. Trowelable Leveling and Patching Compounds: Latex-modified, portland cement based or blended hydraulic-cement-based formulation provided or approved by 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 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 they are the same temperature as the space where they are to be installed.
- D. Immediately before installation, sweep and vacuum clean substrates to be covered by resilient products.

#### 3.2 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. Preformed Corners: Install preformed corners before installing straight pieces.

#### 3.3 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.

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3.4 CLEANING AND PROTECTION

- A. Comply with manufacturer's written instructions for cleaning and protecting resilient products.
- B. Cover resilient products subject to wear and foot traffic until Substantial Completion.

END OF SECTION 096513

## SECTION 099123 - PAINTING

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Section includes surface preparation and the application of paint systems on the following substrates:
  - 1. Steel.
  - 2. Gypsum board.

#### 1.2 DEFINITIONS

- A. Gloss Level 1: Not more than 5 units at 60 degrees and 10 units at 85 degrees, according to ASTM D 523.
- B. 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. Gloss Level 3: 10 to 25 units at 60 degrees and 10 to 35 units at 85 degrees, according to ASTM D 523.
- D. Gloss Level 4: 20 to 35 units at 60 degrees and not less than 35 units at 85 degrees, according to ASTM D 523.
- E. Gloss Level 5: 35 to 70 units at 60 degrees, according to ASTM D 523.
- F. Gloss Level 6: 70 to 85 units at 60 degrees, according to ASTM D 523.
- G. Gloss Level 7: More than 85 units at 60 degrees, according to ASTM D 523.

### PART 2 - PRODUCTS

#### 2.1 MANUFACTURERS

- A. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to products listed in other Part 2 articles for the paint category indicated.

#### 2.2 PAINT, GENERAL

- A. MPI Standards: Provide products that comply with MPI standards indicated and that are listed in its "MPI Approved Products List."

B. Material Compatibility:

1. Provide materials for use within each paint system that are 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, provide products recommended in writing by manufacturers of topcoat for use in paint system and on substrate indicated.

2.3 PRIMERS/SEALERS

A. Primer Sealer, Latex, Interior:

1. Basis-of-Design – Benjamin Moore Fresh Start Multi-purpose Latex Primer N023.
2. Basis-of-Design – Benjamin Moore Ultra Spec 500 Interior Latex Primer N534.

2.4 METAL PRIMERS

A. Primer, Rust-Inhibitive, Water Based:

1. Basis-of-Design – Benjamin Moore Super Spec HP Acrylic Metal Primer P04.

2.5 WATER-BASED PAINTS

A. Latex, Interior, Flat:

1. Basis-of-Design – Benjamin Moore Ultra Spec 500 Interior Flat Finish 536.

B. Latex, Interior, Eggshell:

1. Basis-of-Design – Benjamin Moore Ultra Spec 500 Interior Eggshell Finish N538.

C. Latex, Interior, Semi-Gloss:

1. Basis-of-Design – Benjamin Moore Ultra Spec 500 Interior Semi-gloss Finish N539.

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. Concrete: 12 percent.
  2. Masonry (Clay and CMU): 12 percent.
  3. Wood: 15 percent.
  4. Gypsum Board: 12 percent.
- C. Verify suitability of substrates, including surface conditions and compatibility with existing finishes and primers.
- D. 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 Manual" applicable to substrates 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.

### 3.3 APPLICATION

- A. Apply paints according to manufacturer's written instructions and to recommendations in "MPI Manual."
- B. 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.

### 3.4 CLEANING AND PROTECTION

- A. 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.
- B. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

### 3.5 PAINTING SCHEDULE

#### A. Steel Substrates:

1. Prime Coat: Basis-of-Design – Benjamin Moore Super Spec HP Acrylic Metal Primer P04.
2. Intermediate Coat: Basis-of-Design – Benjamin Moore Ultra Spec 500 Interior Semi-gloss Finish N539.
3. Topcoat: Basis-of-Design – Benjamin Moore Ultra Spec 500 Interior Semi-gloss Finish N539.

#### B. Gypsum Board and Plywood Substrates:

1. Prime Coat: Basis-of-Design – Benjamin Moore Fresh Start Multi-purpose Latex Primer N023.
2. Intermediate Coat: Basis-of-Design – Benjamin Moore Ultra Spec 500 Interior Flat Finish 536.
3. Topcoat: Basis-of-Design – Benjamin Moore Ultra Spec 500 Interior Eggshell Finish N538. All gypsum wallboard walls except where noted otherwise.
4. Topcoat: Basis-of-Design – Benjamin Moore Ultra Spec 500 Interior Flat Finish 536. All gypsum wallboard ceilings except where noted otherwise.
5. Topcoat: Basis-of-Design – Benjamin Moore Ultra Spec 500 Interior Semi-gloss Finish N539- Restrooms all ceilings.

END OF SECTION 099123

## SECTION 099600 - HIGH-PERFORMANCE COATINGS

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. This Section includes surface preparation and application of high-performance coating systems for the above grade exterior surfaces of the Portland Cement Plaster (Stucco).

#### 1.2 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Samples for Initial Selection: For each type of finish-coat product indicated.
- C. Product List: For each product indicated. Cross-reference products to coating system and locations of application areas. Use same designations indicated on Drawings and in schedules.
- D. Qualification Data: For Installer and manufacturer.
- E. Warranties: Special warranties specified in this Section.
- F. Installer Certificates: Signed by coating system manufacturer certifying that Installer is approved, authorized, or licensed by manufacturer to install the coating system.
- G. Manufacturer Certificates: Signed by coating manufacturer certifying that coating system complies with requirements specified in "Performance Requirements" Article.
  1. Submit evidence of meeting performance requirements.

#### 1.3 QUALITY ASSURANCE

- A. Installer Qualifications: A qualified firm that is approved, authorized, or licensed by the coating system manufacturer to install manufacturer's product and that is eligible to receive manufacturer's warranty. Installer shall have a minimum of five (5) years experience in successfully installing the same coating materials.
- B. Manufacturer Qualifications: A qualified manufacturer that has a coating system identical to that used for this Project. Coating system materials shall be supplied by a single manufacturer which has been successfully producing the specified types of primary products for not less than 5 years.
- C. Preparation and Workmanship: Comply with the manufacturer's written instructions for handling and application of the specified coating system.

- D. Material Compatibility: Provide coating materials that are compatible with one another under conditions of service and application required, as demonstrated by coating manufacturer based on testing and field experience.
- E. Manufacturer Requirements: Ensure that the primary coating materials manufacturer provides direct trained company personnel to attend necessary job meetings, perform periodic inspections as necessary, and conducts a final inspection upon successful completion of the project.
- F. Mockups: Apply benchmark samples of each coating system indicated to verify preliminary selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
  - 1. Architect will select one surface to represent surfaces and conditions for application of each type of coating and substrate.
    - a. Wall Surfaces: Provide samples of at least 100 sq. ft. (9 sq. m).
  - 2. Final approval of color selections will be based on benchmark samples.
    - a. If preliminary color selections are not approved, apply additional benchmark samples of additional colors selected by Architect at no added cost to Owner.

#### 1.4 WARRANTY

- A. Coating System Manufacturer's Warranty: Submit manufacturer's Standard Warranty Form for coating system products, including affirmation of coating system inspection by manufacturer required by warranty provisions. Approval by manufacturer for warranty is required prior to system application. This warranty is in addition to, and not a limitation of, other rights Owner may have under the contract.
  - 1. Beneficiary: Issue warranty in legal name of project owner.
  - 2. Warranty Period: 10 years commencing on date of substantial completion.
  - 3. Warranty Areas: All surfaces receiving the specified coating system.

#### 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 the manufacturer's written requirements.
  - 1. Maintain containers in clean condition, free of foreign materials and residue.
  - 2. Remove rags and waste from storage areas daily.

#### 1.6 PROJECT CONDITIONS

- A. Apply coatings only when temperature of surfaces to be coated and ambient air temperatures are within the acceptable temperature limits defined by the coating manufacturer's written guidelines.



- B. Do not apply coatings in snow, rain, fog, or mist; and when relative humidity exceeds the limits defined by the coating manufacturer's written guidelines.

## 1.7 EXTRA MATERIALS

- A. Furnish extra materials described below that are from same production run (batch mix) as materials applied and that are packaged for storage and identified with labels describing contents.
  - 1. Quantity: Furnish an additional 5 percent, but not less than 1 gal. (3.8 L) of each material and color applied.

## PART 2 - PRODUCTS

### 2.1 HIGH-PERFORMANCE COATINGS, GENERAL

#### A. Material Compatibility:

- 1. Provide materials for use within each coating system that are compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
- 2. Provide products of same manufacturer for each coat in a coating system.

- B. Colors: As selected by Architect from manufacturer's full range matching Architect's samples.

### 2.2 WATER-BASED ACRYLIC READY-MIX PRIMER

- A. Basis-of-Design Product: Subject to compliance with requirements, provide Thoro CM Primer as manufactured by BASF or a comparable product.

### 2.3 HIGH BUILD ACRYLIC COATINGS SEALANTS

- A. Basis-of-Design Product: Subject to compliance with requirements, provide Thorolastic Knife Grade Sealant as manufactured by BASF or a comparable product.
- B. Basis-of-Design Product: Subject to compliance with requirements, provide Thorolastic Brush Grade Sealant as manufactured by BASF or a comparable product.
- C. Basis-of-Design Product: Subject to compliance with requirements, provide Sikaflex 15 LM Polyurethane Sealant, as manufactured by Sika Corporation or a comparable product.
- D. Basis-of-Design Product Stucco Joints: Subject to compliance with requirements, provide Sikaflex -2c NS EX Mix Polyurethane Elastomeric Sealant, as manufactured by Sika Corporation or a comparable product.

## 2.4 HIGH BUILD ACRYLIC COATINGS FINISH COAT

- A. Basis-of-Design Product: Subject to compliance with requirements, provide Thorocoat 100% Acrylic emulsion coating (Smooth texture) as manufactured by BASF or a comparable product.

## 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 work.
  - 1. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as required by manufacturer's written guidelines.
  - 2. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.
  - 3. Begin coating application only after unsatisfactory conditions have been corrected and surfaces are dry.
  - 4. Coating application indicates acceptance of surfaces and conditions.

### 3.2 PREPARATION

- A. Comply with manufacturer's written instructions and recommendations applicable to substrates indicated.
- B. Remove plates, machined surfaces, and similar items already in place that are not to be coated. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and coating.
  - 1. After completing coating operations, reinstall items that were removed; use workers skilled in the trades involved.
- C. Clean substrates of substances that could impair bond of coatings, including dirt, oil, grease, and incompatible paints and encapsulants.
  - 1. Remove incompatible primers and reprime substrate with compatible primers as required to produce coating systems indicated.
- D. Stucco Substrates: Remove release agents, curing compounds, efflorescence, and chalk. Remove efflorescence and chalk by pressure washing or other method recommended by coating manufacturer. Do not coat surfaces if moisture content or alkalinity of surfaces to be coated exceeds that permitted in manufacturer's written instructions.

### 3.3 APPLICATION, GENERAL

- A. Apply high-performance coatings according to manufacturer's written instructions.

1. Use applicators and techniques suited for coating and substrate indicated.

B. Apply coatings to produce surface films without cloudiness, spotting, holidays, laps, brush marks, runs, sags, ropiness, or other surface imperfections. Produce sharp glass lines and color breaks.

### 3.4 APPLICATION OF SPECIFIED PRODUCT

A. Prime all exterior above grade exposed Stucco and concrete masonry with Thoro Primer 2K surface conditioner, applied at 200-300 sq.ft. per gallon.

B. Seal all through wall penetrating items, mechanically fastened fixtures, louvers, etc., using specified polyurethane sealant, Sikaflec 15 LM.

C. Seal all Stucco Joints and masonry joints using specified polyurethane elastomeric sealant, Sikaflec -2c NS EZ Mix.

D. Clean and seal cracks over 1/16 inch in width with Thorlosatic Knife Grade Sealant applied in accordance with manufacturer's instructions.

E. Cracks less than 1/16 inch in width and all cracks previously sealed with Thorlosatic Knife Grade Sealant will be coated with 3 – 4 inch wide band of Thorolastic Buttering Grade Sealant at a maximum coverage of 100 lf / gallon, and in accordance with manufacturer's instructions.

F. For the first coat, apply by  $\frac{3}{4}$  inch nap roller, or plaster type sprayer, at a rate of 80 to 100 sq.ft. per gallon (dry mil thickness 7.75). If sprayed, backroll after application.

G. Let first coat dry for the manufacturer's recommended period, but not less than 24 hours.

H. Apply the second coat in the same manner as the first coat. If sprayed, the second coat does not need to be backrolled. Coating should be applied at the rate of 80 to 100 sq.ft. per gallon (dry mil thickness 7.75).

I. Dampen all tools to be used prior to application. When rolling aggregate textures, clean rollers periodically to eliminate build-up. Use roller screen to even the material on the roller cover.

### 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 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.

CBJTC RENOVATE BARRACKS 3873 & 3875  
CAMP BLANDING JOINT TRAINING CENTER  
STARKE, FLORIDA  
ARCHITECT'S PROJECT # 18038

FLORIDA ARMY NATIONAL GUARD  
CONSTRUCTION AND FACILITY MANAGEMENT OFFICE  
DEPARTMENT OF MILITARY AFFAIRS  
CFMO PROJECT #217085

END OF SECTION 099600

## SECTION 102113 - TOILET COMPARTMENTS

### PART 1 - GENERAL

#### 1.1 SUMMARY

A. Section Includes:

1. Solid-polymer toilet compartments configured as toilet compartments, compartment doors and urinal screens.

#### 1.2 QUALITY ASSURANCE

A. Surface-Burning Characteristics: As determined by testing identical products according to ASTM E 84, or another standard acceptable to authorities having jurisdiction, by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

1. Flame-Spread Index: 75 or less.
2. Smoke-Developed Index: 450 or less.

### PART 2 - PRODUCTS

#### 2.1 MATERIALS

A. Zamac: ASTM B 86, commercial zinc-alloy die castings.

#### 2.2 SOLID-POLYMER UNITS

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. Accurate Partitions Corporation.
2. Ampco, Inc.
3. Bradley Corporation; Mills Partitions.
4. Comtec Industries/Capitol Partitions.
5. General Partitions Mfg. Corp.
6. Hadrian Manufacturing Inc.
7. Knickerbocker Partition Corporation.
8. Partition Systems Incorporated of South Carolina.
9. Rockville Partitions Incorporated.
10. Santana Products, Inc.
11. Sanymetal; a Crane Plumbing company.

- B. Door and Pilaster Construction: Solid, high-density polyethylene (HDPE) panel material, not less than 1 inch (25 mm) thick, seamless, with eased edges, no-sightline system, and with homogenous color and pattern throughout thickness of material.
  - 1. Integral Hinges: Configure doors and pilasters to receive integral hinges.
  - 2. Heat-Sink Strip: Manufacturer's standard continuous, extruded-aluminum or stainless-steel strip fastened to exposed bottom edges of solid-polymer components to prevent burning.
  - 3. Polymer Panel Finish: One color and pattern in each room.
    - a. Color and Pattern: As selected by Architect from manufacturer's full range.
- C. Pilaster Shoes and Sleeves (Caps): Manufacturer's standard design; polymer or stainless steel.
  - 1. Polymer Color and Pattern: Matching pilaster.
- D. Brackets (Fittings):
  - 1. Stirrup Type: Ear or U-brackets, chrome-plated zamac or clear-anodized aluminum or stainless steel or chrome-plated brass.
  - 2. Full-Height (Continuous) Type: Manufacturer's standard design; polymer or extruded aluminum or stainless steel.
    - a. Polymer Color and Pattern: Matching panel.

## 2.3 ACCESSORIES

- A. Hardware and Accessories: Manufacturer's standard design, heavy-duty operating hardware and accessories.
  - 1. Material: Chrome-plated zamac or Clear-anodized aluminum or Stainless steel or Chrome-plated brass.
  - 2. Hinges: Manufacturer's standard paired, self-closing type that can be adjusted to hold doors open at any angle up to 90 degrees or continuous, cam type that swings to a closed or partially open position or continuous, spring-loaded type or integral hinge for solid-polymer doors.
  - 3. Latch and Keeper: Manufacturer's standard surface-mounted latch unit designed for emergency access and with combination rubber-faced door strike and keeper. Provide units that comply with regulatory requirements for accessibility at compartments designated as accessible.
  - 4. Coat Hook: Manufacturer's standard combination hook and rubber-tipped bumper, sized to prevent in-swinging door from hitting compartment-mounted accessories.
  - 5. Door Bumper: Manufacturer's standard rubber-tipped bumper at out-swinging doors and entrance-screen doors.
  - 6. Door Pull: Manufacturer's standard unit at out-swinging doors that complies with regulatory requirements for accessibility. Provide units on both sides of doors at compartments designated as accessible.
- B. Overhead Bracing: Manufacturer's standard continuous, extruded-aluminum head rail with antigrip profile and in manufacturer's standard finish.

- C. Anchorages and Fasteners: Manufacturer's standard exposed fasteners of stainless steel or chrome-plated steel or brass, finished to match the items they are securing, with theft-resistant-type heads. Provide sex-type bolts for through-bolt applications. For concealed anchors, use stainless steel, hot-dip galvanized steel, or other rust-resistant, protective-coated steel.

## 2.4 FABRICATION

- A. Floor-and-Ceiling-Anchored Units: Provide manufacturer's standard corrosion-resistant anchoring assemblies with leveling adjustment at tops and bottoms of pilasters. Provide shoes and sleeves (caps) at pilasters to conceal anchorage.
- B. Door Size and Swings: Unless otherwise indicated, provide 24-inch- (610-mm-) wide, in-swinging doors for standard toilet compartments and 36-inch- (914-mm-) wide, out-swinging doors with a minimum 32-inch- (813-mm-) wide, clear opening for compartments designated as accessible.

## PART 3 - EXECUTION

### 3.1 INSTALLATION

- A. General: Comply with manufacturer's written installation instructions. Install units rigid, straight, level, and plumb. Secure units in position with manufacturer's recommended anchoring devices.
- B. Clearances: Maximum 1/2 inch (13 mm) between pilasters and panels; 1 inch (25 mm) between panels and walls.
- C. Stirrup Brackets: Secure panels to walls and to pilasters with no fewer than two brackets attached near top and bottom of panel. Locate wall brackets so holes for wall anchors occur in masonry or tile joints. Align brackets at pilasters with brackets at walls.

### 3.2 ADJUSTING

- A. Hardware Adjustment: Adjust and lubricate hardware according to hardware manufacturer's written instructions for proper operation. Set hinges on in-swinging doors to hold doors open approximately 30 degrees from closed position when unlatched. Set hinges on out-swinging doors and doors in entrance screens to return doors to fully closed position.

END OF SECTION 102113

## SECTION 104416 - FIRE EXTINGUISHERS

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Section includes portable, hand-carried fire extinguishers and mounting brackets for fire extinguishers.

#### 1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.

#### 1.3 INFORMATIONAL SUBMITTALS

- A. Warranty: Sample of special warranty.

#### 1.4 CLOSEOUT SUBMITTALS

- A. Operation and maintenance data.

#### 1.5 QUALITY ASSURANCE

- 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.
- C. 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 PORTABLE, HAND-CARRIED FIRE EXTINGUISHERS

- A. Fire Extinguishers: Type, size, and capacity for each fire protection cabinet and mounting bracket indicated.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Amerex Corporation.
    - b. Ansul Incorporated; Tyco International Ltd.
    - c. Badger Fire Protection; a Kidde company.
    - d. Buckeye Fire Equipment Company.
    - e. Fire End & Croker Corporation.
    - f. J. L. Industries, Inc.; a division of Activar Construction Products Group.
    - g. Kidde Residential and Commercial Division; Subsidiary of Kidde plc.
    - h. Larsen's Manufacturing Company.
    - i. Moon-American.
    - j. Pem All Fire Extinguisher Corp.; a division of PEM Systems, Inc.
    - k. Potter Roemer LLC.
    - l. Pyro-Chem; Tyco Safety Products.
  2. 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: UL-rated 10 pound nominal capacity, with monoammonium phosphate-based dry chemical in manufacturer's standard enameled container.

### 2.2 MOUNTING BRACKETS

- A. Mounting Brackets: Manufacturer's standard galvanized steel, designed to secure fire extinguisher to wall or structure, of sizes required for types and capacities of fire extinguishers indicated, with plated or red baked-enamel finish.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Amerex Corporation.
    - b. Ansul Incorporated; Tyco International Ltd.
    - c. Badger Fire Protection; a Kidde company.
    - d. Buckeye Fire Equipment Company.
    - e. Fire End & Croker Corporation.
    - f. J. L. Industries, Inc.; a division of Activar Construction Products Group.
    - g. Larsen's Manufacturing Company.
    - h. Potter Roemer LLC.
- 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.
  - a. Orientation: Vertical.

### PART 3 - EXECUTION

#### 3.1 INSTALLATION

- A. Examine fire extinguishers for proper charging and tagging.
  1. Remove and replace damaged, defective, or undercharged fire extinguishers.
- B. 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.
- C. Mounting Brackets: Fasten mounting brackets to surfaces, square and plumb, at locations indicated.

END OF SECTION 104416

## SECTION 220501 - GENERAL PLUMBING REQUIREMENTS

### PART 1 GENERAL

#### 1.1 SECTION INCLUDES

- A. General requirements for plumbing systems.
- B. Trench excavation, pumping, backfilling and compaction for underground piping & plumbing.

#### 1.2 DESCRIPTION

- A. The scope of work shall include complete plumbing systems as shown on the Drawings and specified herein.

#### 1.3 PRE-INSTALLATION CONFERENCE

- A. Prior to start of any work, the successful Contractor shall meet with the Architect to determine that no questions remain concerning the intent of the Drawings or Specifications. The Contractor shall outline his method of procedure and bring up for discussion and decision any questions concerning the project. No work shall be performed prior to this meeting. The Architect shall set the date, time and place of conference.

#### 1.4 CODES, ORDINANCES AND PERMITS:

- A. Comply with the Florida Plumbing Code, latest edition.
- B. Obtain information on all code restrictions and requirements. In case of conflict between the Contract Documents and a governing code or ordinance, such conflict shall be immediately brought to the attention of the Architect for resolution. Extra payment will not be allowed for Work required by code restrictions except through written agreement with the Owner.
- C. Apply for, obtain, and pay for all required permits and inspection certificates. Final payment is contingent upon delivery of such certificates to the Architect.
- D. As far as is practical, similar products shall be by one manufacturer. Where applicable, all materials and equipment shall bear the Underwriters' Laboratories seal or ASME code stamp. Certificates to this effect shall be furnished to the Architect upon request.

#### 1.5 SITE INSPECTION

- A. Visit the site and thoroughly inspect conditions affecting the Work before submitting Bid. Assume responsibility for meeting all existing conditions including access and work space limitations.

1.6 DRAWINGS AND SPECIFICATIONS:

- A. Refer to the general Construction Drawings which are bound with the Drawings of this Work for construction details, elevations, etc. Architectural and Structural Drawings shall take precedence over Plumbing Drawings. It is the intent of the Plumbing Drawings to show the general arrangement of the system and not to indicate all offsets, fittings and accessories which may be required, nor to show exact locations of piping or equipment except where actual dimensions are given. All vertical piping shall be located in walls in finished spaces unless otherwise noted.
- B. It is the intent of the Drawings and Specifications to call for finished Work, tested, and ready for operation, and in complete conformance with all applicable codes, rules and regulations. Minor details not usually shown or specified, but manifestly necessary for the proper installation and operation of the various systems, shall be included in the Work and in the proposal, the same as if specified or shown on the Drawings.
- C. If any departures from the Drawings and Specifications are deemed necessary, details of such departures and the reasons therefore shall be submitted to the Architect for approval. No departures shall be made without prior approval of the Architect.
- D. Specific reference in the Specifications to any article, device, product, material, fixture or type of construction, etc., by proprietary name, make or catalog number shall be interpreted as establishing a standard of quality and shall not be construed as limiting competition. Substitutes may be used subject to compliance with requirements set forth in the General Requirements, Division I, and as approved by the Architect.

1.7 MANUFACTURER'S SPECIFICATIONS

- A. Where the name of a concern or manufacturer is mentioned on the Drawings or in Specifications in reference to his required service or product, and no qualifications or specification of such is included, then the material gauges, details of manufacturer, finish, etc., shall be in accordance with his standard practice, directions or specifications. The Contractor shall be responsible for any infringement of patents, royalties, or copyrights which may be incurred thereby.
- B. Equipment scheduled on Drawings was used to arrive at space, maintenance, and utility service. If other equipment is submitted and approved, take responsibility for maintaining these space, maintenance, and utility service requirements and cost for any resulting changes including cost to change electrical service required by substituted equipment.

1.8 SUBMITTALS

- A. Submittals shall be provided in one complete package. Partial submittal packages will be rejected. Where Engineer documents deficiencies in the submittals, the Contractor shall ensure follow-on submittals have addressed the deficiencies. Should follow-on submittals not address previously noted deficiencies, the Contractor shall incur the Engineers costs associated with the unnecessary review and documentation of such re-submittals.

- B. Submit shop drawings or catalog data for Engineers approval before purchasing or installing items. Refer to specific submittal requirements for each section.
- C. Shop drawings for mounting details of major equipment.

#### 1.9 PERFORMANCE DATA

- A. All performance data specified herein shall be considered actual performance of equipment as installed. Make suitable allowances if installation details are such that actual operating conditions unfavorably affect performance as compared to conditions under which the equipment was rated.

#### 1.10 OPERATION AND MAINTENANCE DATA

- A. Provide a complete set of a compilation of catalog data of each manufactured item of equipment used in the Plumbing Work. Provide catalog, installation, operating and maintenance data and bill of materials for all operating equipment shall be submitted. Provide an indexed PDF file and a separate hard copy bound in a loose leaf binder and submit to the Architect before final payment is made. A complete double index shall be provided as follows:
  - 1. Listing the Products alphabetically by name.
  - 2. Listing the names of manufacturer's alphabetically by name together with their addresses and the names and addresses of local sales representatives.
- B. It is the intent of this catalog, operation and maintenance data to provide the Owner with complete instructions on the proper operation and use, lubrication and periodic maintenance, together with the source of replacement parts and service, for the items of equipment covered.

#### 1.11 CONTRACTOR COORDINATION

- A. The Electrical Contractor shall furnish, set and wire all disconnect devices and starters as required for all equipment except for those items furnished with integral disconnect devices and/or starters.
- B. Furnish detailed information to the Electrical Contractor on power wiring requirements for all plumbing equipment actually purchased as soon as practical. This shall include all diagrams and instructions necessary for the Electrical Contractor to make connections properly. If equipment actually purchased requires larger electrical service than equipment scheduled, arrange and pay for required electrical service change.
- C. Coordinate location of equipment and piping with Electrical and HVAC Contractors to maintain clearance for equipment maintenance, avoid interference with duct and HVAC piping runs, and to prevent piping from being installed over electrical panels. If interference develops, the Architect will decide which equipment, conduit, duct, piping, etc., must be relocated regardless of installation order. Take responsibility for relocating Plumbing Work, if so ordered, including all associated costs.
- D. Within 30 days following award of the Contract, report to the Architect, in writing, all real or potential errors, ambiguities and/or conflicts on the Plumbing Work or between the trades and obtain an agreement with the Architect on a solution. Those reported after 30 days, except as a result of unforeseen circumstances, shall be resolved at the discretion of the Architect. Report conflicts resulting from the

progress of Work to the Architect immediately or accept the expense of corrective work caused by failure to report such a conflict.

#### 1.12 CHANGES

- A. Do not make any changes in design without the written approval of the Engineer. Changes in design means any change which may affect the capacity, reliability, operation or safety of the systems or any parts thereof, including changes which may be required to conform to local regulations or codes. Minor routing changes that do not alter the general configuration or parameters noted above are acceptable. Notify Engineer when in question.

#### 1.13 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than three years of documented experience.
- B. Products Requiring Electrical Connection: Listed and classified by UL or other testing agency as specified as suitable for the purpose specified in the indicated location.
- C. Products requiring gas or propane connection: Listed and classified by AGA or other testing agency as specified as suitable for the purpose specified in the indicated location.

#### 1.14 APPROVED BY AHJ

- A. Where drawings and specifications call for a product, feature or installation to be 'Approved by AHJ'; the product, feature or installation shall be specifically submitted, reviewed and accepted by the authority having jurisdiction (AHJ) for use on the project. This is not an approval by the designer of record, and is not related to the shop drawing or product data sheets submitted to the designer of record for review. The AHJ shall be a representative of the permitting agency for the project, or contracting agency for federal projects. The contractor is encouraged to obtain AHJ approval prior to ordering and/or installing the product to limit the cost associated with any rework.

#### 1.15 DELIVERY, STORAGE, AND PROTECTION

- A. Protect all materials and equipment against damage and vandalism during construction. Replace any damaged material or equipment and place the systems in perfect working condition.

#### 1.16 WARRANTY

- A. Provide written warranties as specified in the General Requirements, Division 1, and repair any defects becoming apparent within the warranty period as directed by the Architect.
- B. The warranty shall not cause an obligation to repair damage resulting from accident or improper operation or care on the part of the Owner.

### 1.17 ADDITIONAL REQUIREMENTS

- A. Refer to Division 01 for additional general requirements.

## PART 2 PRODUCTS

### 2.1 PIPE AND EQUIPMENT IDENTIFICATION.

- A. Plastic Tags: Laminated three-layer plastic with engraved black letters on light contrasting background color. Tag size minimum 1-1/2 inch diameter.
- B. Tape Pipe Markers: Flexible, vinyl film tape with pressure sensitive adhesive backing and printed markings.

## PART 3 EXECUTION

### 3.1 GENERAL

- A. Examine the site and all Drawings before proceeding with the layout and installation of the Work.
- B. Arrange the Work essentially as shown, exact layout to be made on the job to suit actual conditions encountered. Confer and cooperate with other trades on the job so all Work will be installed in proper relationship and coordinate precise location of parts with the Work of others.
- C. Arrange for required chases, slots and openings with the General Contractor including locations of required pipe sleeves through walls and foundations. Assume liability for cutting or patching made necessary by failure to make proper arrangements in this respect.
- D. Indicated equipment connections are necessarily based on equipment of a given manufacturer. Assume responsibility for proper arrangement of pipes, etc., to connect approved equipment in a proper and approved manner. Follow equipment manufacturer's detailed instructions and recommendations in the installation and connection of all equipment. In case of conflict between manufacturer's instructions and the Contract Documents, notify the Architect before proceeding. No equipment installation or connections shall be made in a manner that voids the manufacturers warranty.
- E. Install all Work in a neat and workmanlike manner, using only workmen thoroughly qualified in the trade or duties they are to perform. Rough Work will be rejected.

### 3.2 EXCAVATION, BACKFILLING AND PUMPING

- A. Perform all excavation, backfilling and pumping necessary for the completion of the Work in accordance with the requirements of Excavation and Backfill, Division 02.
- B. Excavate trenches suitable in width to provide a minimum of 6" clear space between the barrel of the pipe and the trench wall on both sides of the pipe. Accurately grade the trench bottom to provide uniform bearing and support for each section of the pipe on undisturbed soil at every point along its entire length.

Take care not to excavate below the depth necessary and excavate bell holes to ensure proper bedding. Backfill over-depths with loose, granular, moist material and thoroughly compact to the depth required.

- C. Place and compact backfill material in 6" layers until the pipe has a minimum cover of 12". Place and compact the remaining material in 12" layers. Grade the surface to a reasonable uniformity and leave the mounding in neat condition as approved by the Architect.
- D. Backfill all trenches passing under foundations with concrete to the underside of the foundation and at a 2:1 slope away from each side of the foundation. Backfill all trenches that are parallel and deeper than foundations with concrete to a point that will place the top of the concrete on a 2:1 slope away from the foundation bottom. Do not backfill trenches until all required tests and inspections are completed.
- E. Repair or replace all topsoil, shrubbery, sod, sidewalks, streets, walls, etc. disturbed by the excavation, backfilling or pumping to the satisfaction of the Architect. Repair sidewalks in complete blocks; partial patching will not be accepted.

### 3.3 PIPE INSTALLATION

- A. Because of the small scale of the Drawings, it is not possible to indicate all offsets, fittings and valves. Carefully investigate all conditions affecting the Work to avoid interferences between pipes, ducts, valves, conduits, electrical fixtures and equipment and install as conditions may dictate as part of this Contract.

### 3.4 PIPE AND EQUIPMENT IDENTIFICATION

- A. Permanently identify plumbing equipment such as water heaters, pumps, etc. with permanent plastic tags. Indicate tag identifier used on equipment schedule on plans.
- B. Provide pipe tape markers for water piping indicating system and direction of flow. Where pipe size is too small for tape markers, provide tags. Separately indicate the following systems as applicable for the given project:
  - 1. Cold Water
  - 2. Hot Water

### 3.5 INSTRUCTION OF OWNER'S REPRESENTATIVE

- A. After final acceptance of all Work and occupancy of building, provide service to make system adjustments to suit conditions created by the occupancy; instruct Owner's operating personnel in operation adjustment and maintenance procedures of system components and acquaint them with locations and functions of valves, control devices, etc., in the system.
- B. The actual time of this service shall be as directed but shall not be less than 4 hours nor exceed 1 day. Additional time, if required, to fully prepare Owners operating personnel to operate and maintain the system shall be as directed by the Owner at the Owner's expense. Quote rates for this additional time in the Bid Proposal.



3.6 CLEANING AND RUBBISH

- A. During the Work, keep the premises clear of rubbish created as a result of the Work. Protect and prevent unnecessary induction of dirt into piping, fixtures and equipment. On completion of the Work, remove all rubbish and debris resulting from the Work and dispose of same.

3.7 RECORD DRAWINGS

- A. The Architect will furnish one set of signed and sealed prints of the Drawings and Specifications as issued for this Contract to the prime construction contractor. Use these prints to indicate accurately and neatly any deviation in the actual installation from the Drawings as issued. At the completion of the job, deliver the marked-up Drawings to the Architect for a permanent record of the exact location of all equipment, pipe runs, etc., as incorporated in the job.

3.8 COMPLETE SYSTEMS

- A. Leave all systems completely operative in all details and in satisfactory working condition, as determined by the Architect. Furnish and install as part of this Contract all apparatus and material obviously a part of the systems and necessary for their operation.

END OF SECTION

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ARCHITECT'S PROJECT # 18038

FLORIDA ARMY NATIONAL GUARD  
CONSTRUCTION AND FACILITY MANAGEMENT OFFICE  
DEPARTMENT OF MILITARY AFFAIRS  
CFMO PROJECT #217085

## SECTION 220719 - PIPING AND EQUIPMENT INSULATION

### PART 1 GENERAL

#### 1.1 SECTION INCLUDES

- A. Piping insulation.
- B. Jackets and accessories.

#### 1.2 RELATED REQUIREMENTS

- A. Section 221005 - Plumbing Piping: Placement of hangers and hanger inserts.

#### 1.3 REFERENCE STANDARDS

#### 1.4 SUBMITTALS

- A. See Division 1 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide product description, thermal characteristics, list of materials and thickness for each service, and locations.
- C. Manufacturer's Instructions: Indicate installation procedures that ensure acceptable workmanship and installation standards will be achieved.

#### 1.5 FIELD CONDITIONS

- A. Maintain ambient conditions required by manufacturers of each product.
- B. Maintain temperature before, during, and after installation for minimum of 24 hours.

### PART 3 EXECUTION

#### 2.1 EXAMINATION

- A. Verify that piping has been tested before applying insulation materials.
- B. Verify that surfaces are clean and dry, with foreign material removed.

#### 2.2 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Insulate entire system including fittings, valve bodies, unions, flanges, strainer bodies, flexible connections, and expansion joints. Insulate using like materials of adjacent piping, or other insulation methods as approved. Pump bodies are not required to be insulated.

- C. Glass fiber insulated cold water pipes conveying fluids below ambient temperature:
  - 1. Provide vapor barrier jackets, factory-applied or field-applied. Secure with self-sealing longitudinal laps and butt strips with pressure sensitive adhesive. Secure with outward clinch expanding staples and vapor barrier mastic.
  - 2. Insulate fittings, joints, and valves with molded insulation of like material and thickness as adjacent pipe. Finish with glass cloth and vapor barrier adhesive or PVC fitting covers.
- D. Glass fiber insulated pipes conveying fluids above ambient temperature:
  - 1. Provide standard jackets, with or without vapor barrier, factory-applied or field-applied. Secure with self-sealing longitudinal laps and butt strips with pressure sensitive adhesive. Secure with outward clinch expanding staples.
  - 2. Insulate fittings, joints, and valves with insulation of like material and thickness as adjoining pipe. Finish with glass cloth and adhesive or PVC fitting covers.
- E. Inserts and Shields:
  - 1. Application: Piping 1-1/2 inches diameter or larger.
  - 2. Shields: Galvanized steel between pipe hangers or pipe hanger rolls and inserts.
  - 3. Insert Location: Between support shield and piping and under the finish jacket.
  - 4. Insert configuration: Comply with MSS SP 69, minimum 6 inches long, of same thickness and contour as adjoining insulation.
- F. Continue insulation through walls, sleeves, pipe hangers, and other pipe penetrations. Finish at supports, protrusions, and interruptions. Do not extend through rated walls.

## 2.3 SCHEDULES

- A. Plumbing Systems, Interior:
  - 1. Domestic Hot Water Supply (140F or less):
    - a. Fiberglass insulation with standard jacket, preformed fittings and PVC fitting covers.
      - 1) Pipe Size Range: 1-1/4" and smaller: 1" thickness.
      - 2) Pipe Size Range: 1-1/2" and larger: 1-1/2" thickness.

## SECTION 221004 - FACILITY FUEL GAS PIPING AND ACCESSORIES

### PART 1 GENERAL

#### 1.1 SECTION INCLUDES

- A. Pipe, pipe fittings, regulators, valves, and connections for natural gas and liquified petroleum gas (LP Gas) piping systems.

#### 1.2 REFERENCE STANDARDS

- A. ANSI Z21.18/CSA 6.3 - Gas Appliance Pressure Regulators; 2007 (Reaffirmed 2016).
- B. ANSI Z21.24/CSA 6.10 - Connectors for Gas Appliances, 2006 (Reaffirmed 2011).
- C. ANSI Z21.69/CSA 6.16 - Connectors for Movable Gas Appliances, 2009.
- D. ANSI Z21.75/CSA 6.27 - Connectors for Outdoor Gas Appliances and Manufactured Homes, 2007.
- E. ANSI Z21.80/CSA 6.22 - Line Pressure Regulators; 2011 (Addendum A, 2012).
- F. ASME BPVC-IX - Boiler and Pressure Vessel Code, Section IX - Welding, Brazing, and Fusing Procedures; Welders; Brazers; and Welding, Brazing and Fusing Operators; 2017.
- G. ASME B16.3 - Malleable Iron Threaded Fittings: Classes 150 and 300; 2016.
- H. ASME B31.9 - Building Services Piping; 2014.
- I. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless; 2018.
- J. ASTM A234/A234M - Standard Specification for Piping Fittings of Wrought Carbon Steel and Alloy Steel for Moderate and High Temperature Service; 2017.
- K. ASTM D2513 - Standard Specification for Polyethylene (PE) Gas Pressure Pipe, Tubing, and Fittings; 2018.
- L. ICC-ES AC01 - Acceptance Criteria for Expansion Anchors in Masonry Elements; 2015.
- M. ICC-ES AC106 - Acceptance Criteria for Predrilled Fasteners (Screw Anchors) in Masonry Elements; 2015.
- N. ICC-ES AC193 - Acceptance Criteria for Mechanical Anchors in Concrete Elements; 2015.
- O. ICC-ES AC308 - Acceptance Criteria for Post-Installed Adhesive Anchors in Concrete Elements; 2016.
- P. MSS SP-58 - Pipe Hangers and Supports - Materials, Design, Manufacture, Selection, Application, and Installation; 2009.
- Q. MSS SP-78 - Cast Iron Plug Valves, Flanged and Threaded Ends; 2011.
- R. MSS SP-110 - Ball Valves Threaded, Socket-Welding, Solder Joint, Grooved and Flared Ends; 2010.

- S. NFPA 58 - Liquefied Petroleum Gas Code; 2016.
- T. NFPA 54 - National Fuel Gas Code; 2018.

### 1.3 SUBMITTALS

- A. See Division 1 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data on pipe materials, pipe fittings, valves, and accessories. Provide manufacturers catalog information. Indicate valve data and ratings.
- C. Welder Certificate: Include welders certification of compliance with ASME BPVC-IX where welding of steel pipe is involved.
- D. Project Record Documents: Record actual locations of valves and regulators.

### 1.4 QUALITY ASSURANCE

- A. Perform work in accordance with NFPA 54, NFPA 58, and Florida Fuel Gas Code.
- B. Valves: Manufacturer's name and pressure rating marked on valve body.
- C. Welding Materials and Procedures: Conform to ASME BPVC-IX and applicable state labor regulations.
- D. Welder Qualifications: Certified in accordance with ASME BPVC-IX.
- E. Identify pipe with marking including size, ASTM material classification, and ASTM specification.

### 1.5 DELIVERY, STORAGE, AND HANDLING

- A. Accept valves on site in shipping containers with labeling in place. Inspect for damage.
- B. Provide temporary end caps and closures on piping and fittings. Maintain in place until installation.
- C. Protect piping systems from entry of foreign materials by temporary covers, completing sections of the work, and isolating parts of completed system.

### 1.6 FIELD CONDITIONS

- A. Do not install underground piping when bedding is wet or frozen.

## PART 2 PRODUCTS

### 2.1 GAS PIPING, BURIED, EXTERIOR TO BUILDING

- A. Polyethylene plastic pipe, tubing and fittings, ASTM D2513 (pressures less than 20 psig and pipe sizes 2" and less).

- B. Joints: Heat Fusion with ASTM D2513 marking or compression type mechanical joints as recommended by manufacturer. Pullout strength shall equal tensile strength of plastic piping material.
- C. Steel to plastic connections ASTM D2513 Category I anodeless riser.
- D. Tracer wire shall be insulated copper conductor not less than 14 AWG; or a listed product specifically designed for electrical detection of buried gas piping.

## 2.2 GAS PIPING, ABOVE GRADE

- A. Steel Pipe: ASTM A53/A53M Schedule 40 black.
  - 1. Fittings: ASME B16.3, Class 150 malleable iron, or ASTM A234/A234M, wrought steel welding type.
  - 2. Joints: NFPA 54, threaded or welded to ASME B31.1. Threaded joints shall be tapered and shall comply with ANSI/ASME B1.20.1. Number of threads shall comply with NFPA 54, and shall be made with thread joint compound listed for natural gas service.

## 2.3 APPLIANCE CONNECTIONS

- A. Connectors other than rigid metallic pipe and fittings shall comply with the following:
  - 1. Connectors for indoor appliances: ANSI Z21.24 / CSA 6.10, ANSI Z21.69 / CSA 6.16.
  - 2. Connectors for outdoor appliances: ANSI Z21.275 / CSA 6.27.
  - 3. Connectors shall be constructed of stainless steel 304 tubing with epoxy coating, fittings zinc plated steel.
- B. Connectors shall be rated for gas pressure requirements of the appliance, but not less than 0.5 psi. Connectors shall be rated for operating temperatures of -40F to 150F.

## 2.4 BALL VALVES

- A. Construction, 2 Inches and Smaller: MSS SP-110; Class 150; 400 psi CWP; bronze body; 304 stainless steel or chrome plated brass ball; regular port; Teflon seats and stuffing box ring; blow-out proof stem; lever handle; solder, threaded, or grooved ends. Valve shall be listed for natural gas service.
- B. ASME B16.33 rated.

## 2.5 PLUG VALVES

- A. Construction 2-1/2 Inches and Larger: MSS SP-78, 175 psi CWP, cast iron body and plug, pressure lubricated, Teflon or Buna N packing, flanged or grooved ends. Provide lever operator or square head for wrench operation. Valve shall be listed for natural gas service.
- B. ASME B16.33 rated.

## 2.6 LINE PRESSURE REGULATORS AND APPLIANCE REGULATORS INDICATORS

- A. Manufacturers:

1. Actaris Metering Systems
  2. Maxitrol
  3. Dungs Combustion Controls
- B. Compliance Requirements:
1. Appliance Regulator: ANSI Z21.18/CSA 6.3.
  2. Line Pressure Regulator: ANSI Z21.80/CSA 6.22. Line pressure regulators shall be listed as MP (medium pressure) regulators and shall maintain reduced outlet pressure under lockup (no flow) conditions.
- C. Materials in Contact With Gas:
1. Housing: Aluminum, steel (free of non-ferrous metals).
  2. Seals and Diaphragms: NBR-based rubber.
- D. Exterior regulators shall be intended for outdoor installations and shall be approved as such by the AHJ.
- E. Inlet and outlet operating conditions shall be as indicated on the plans. Unless otherwise indicated, all regulators shall have adjustable outlet pressures. Adjustment outlet pressure range shall be as indicated on the plans, but not less than 15%.
- F. Maximum Body Pressure: 10 psi.

## 2.7 PIPE HANGERS AND SUPPORTS

- A. Provide hangers and supports that comply with MSS SP-58.
1. If type of hanger or support for a particular situation is not indicated, select appropriate type using MSS SP-58 recommendations.
  2. Overhead Supports: Individual steel rod hangers attached to structure or to trapeze hangers.
  3. Trapeze Hangers: Welded steel channel frames attached to structure.
  4. Vertical Pipe Support: Steel riser clamp.
- B. Hanger Fasteners: Attach hangers to structure using appropriate fasteners as approved by structural engineer specifications:
1. Concrete Wedge Expansion Anchors: Complying with ICC-ES AC193.
  2. Masonry Wedge Expansion Anchors: Complying with ICC-ES AC01.
  3. Concrete Screw Type Anchors: Complying with ICC-ES AC193.
  4. Masonry Screw Type Anchors: Complying with ICC-ES AC106.
  5. Concrete Adhesive Type Anchors: Complying with ICC-ES AC308.

## 2.8 SLEEVES AND ESCUTCHEONS

- A. Sleeves through non-load bearing walls and above ground floors of non-masonry construction shall be 18 gauge galvanized steel or pre-formed plastic.
- B. Sleeves through masonry shall be galvanized steel pipe (load bearing wall) or PVC pipe (non-load bearing wall or floor).
- C. Sleeves shall be sized to allow approximately 1/8" gap around the pipe.



- D. Escutcheon plates for finished spaces will be nickel-plated.

## 2.9 LP TANKS

- A. Unless otherwise indicated, LP tanks shall be provided by the LP utility provider. LP gas storage containers shall be designed and installed in accordance with NFPA 58, and shall meet minimum storage requirements indicated on the plans.

## PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Verify that excavations are to required grade, dry, and not over-excavated.

### 3.2 PREPARATION

- A. Steel Pipe: Ream pipe and tube ends. Remove burrs. Prepare ends of pipe for fittings or welding.
- B. Remove scale and dirt, on inside and outside, before assembly.
- C. Prepare piping connections to equipment with flanges or unions.

### 3.3 GENERAL INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Provide non-conducting dielectric connections wherever jointing dissimilar metals.
- C. Route piping in orderly manner and maintain gradient. Route parallel and perpendicular to walls. Slope horizontal runs of pipe at 1/4" per 15'. Provide drip legs at base of risers and other low points in the system. Drip legs shall have a removable cap and shall be accessible.
- D. Install piping to maintain headroom, conserve space, and not interfere with use of space.
- E. Do not install gas piping through clothes chute, chimney or gas vent, dumbwaiter, elevator shaft or air duct.
- F. Piping installed in concealed locations (including wall cavities, floor cavities, ceiling cavities and chases) shall be installed per NFPA 54 requirements.
- G. Install piping to allow for expansion and contraction without stressing pipe, joints, or connected equipment.
- H. Provide hand access where valves and fittings are not exposed.
- I. Install valves with stems upright or horizontal, not inverted.
- J. Pipe vents from gas pressure reducing valves (where required by valve listing or AHJ) to outdoors and terminate to prevent rain and insect entrainment. Regulator vent piping shall be same as the gas piping

material and fittings; or alternates as approved by the AHJ. Vent pipe size shall be at least as large as the regulator outlet size unless otherwise indicated by regulator manufacturer.

- K. Bond all above ground portions of metal gas piping systems to an effective ground fault current path per NFPA 54 and NEC 250.104(B). Coordinate with electrician. Gas piping shall not be used as a grounding conductor or electrode.
- L. Any metallic piping or tubing that conveys fuel gas from an LP gas storage container shall be provided with an approved dielectric fitting to electrically isolate the underground portion of the pipe or tube from the above ground portion that enters the building. Such dielectric fittings shall be installed above ground, outdoors.
- M. Sleeve pipes passing through partitions, walls and above grade floors as specified in Part 2. Secure sleeves in position during construction, with sufficient length to pass entirely through walls, floors or roofs. For above ground slabs, core drilling of concrete may be provided in lieu of pipe sleeves when cavities in core drilled hole are grouted smooth. Seal the annular space between the pipe and the sleeve with sealant conforming to ASTM C 920. For fire rated penetrations, refer to specifications for Firestopping. See also limitations in structural specifications as applicable. For piping buried below building, see paragraph below.
- N. Steel piping exposed to corrosive atmosphere shall be coated with a corrosion resistant material.
- O. Inserts:
  - 1. Provide inserts for placement in concrete formwork.
  - 2. Provide inserts for suspending hangers from reinforced concrete slabs and sides of reinforced concrete beams.
- P. Pipe Hangers and Supports:
  - 1. Install in accordance with ASME B31.9.
  - 2. Support horizontal piping in accordance with NFPA 54.
  - 3. Install hangers to provide minimum 1/2 inch space between finished covering and adjacent work.
  - 4. Place hangers within 12 inches of each horizontal elbow.
  - 5. Support vertical piping at every floor. Support riser piping independently of connected horizontal piping.
  - 6. Where several pipes can be installed in parallel and at same elevation, provide multiple or trapeze hangers.
  - 7. Outdoor above ground piping shall be at least 3-1/2" above finished grade.
  - 8. Piping above rooftops shall be elevated above the roof and shall be supported per NFPA 54 guidelines.

### 3.4 UNDERGROUND PIPING

- A. If used, steel piping installed underground shall meet the corrosion protection requirements of NFPA 54.
- B. Establish elevations of buried piping outside the building to ensure not less than 18" of cover.
- C. Excavate and backfill in accordance with 22 05 01 requirements.

- D. Sleeve penetrations through foundation walls and seal annular gap between pipe and sleeve to prevent entry of gas and water.
- E. Where piping is installed underground beneath buildings, encase the piping in a steel conduit. Piping from outdoors to indoors beneath building shall be sealed at both ends and vented to the outdoors per NPFA 54. Piping with both ends terminating inside shall terminate in accessible areas and need not be sealed.
- F. Provide tracer wire for detection of all plastic pipe. Provide above grade access to one or both ends of tracer wire at wall or riser.

### 3.5 APPLICATION

- A. Install unions downstream of valves and at equipment or apparatus connections.
- B. Install ball valves to isolate equipment, part of systems, or vertical risers as indicated on plans.
- C. Provide dedicated ball valve upstream of each interior pressure regulator.
- D. Provide plug valves for shut-off service on the exterior of the building upstream of building entrance regulator. Post and mark the location of the emergency shutoff valve as required by the AHJ. The gas service shall enter the building above grade.
- E. Provide a separate shutoff valve for each dwelling served by a common gas service in a multi-family occupancy. Piping serving a given dwelling unit shall not pass through other dwelling units.
- F. Provide shutoff valves for laboratories per NFPA 54 requirements.
- G. Provide line regulators at building entrances and intermediate regulator locations within the building distribution system as indicated on the plans. All line regulators shall be marked by a permanent metal tag designating the building or area of the building served. Prior to purchasing gas service entrance regulators, confirm the gas meter (or LP tank) discharge pressure with gas service provider.
- H. Provide appliance regulators where not included with appliances, and where indicated on plans. Coordinate with appliance providers and confirm final outlet gas pressure requirements for appliance regulators with actual equipment purchased.
- I. Set regulator pressures as indicated on plans. The maximum operating pressures inside buildings shall not exceed 5 psi.
- J. Where gas service provider delivers pressures greater than 2 psig, provide an over-pressure protection device to limit the gas pressure to limit the gas pressure delivered to the appliance to 2 psi or less upon failure of the line regulator.
- K. Provide connectors as indicated on plans or recommended by appliance installation instructions. Provide a dedicated connector for each appliance, installed with a dedicated shutoff valve upstream of the connector. Shutoff valve shall be located within 6' of the appliance served.

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3.6 PRESSURE TEST AND INSPECTION

- A. Prior to acceptance and initial operation, all piping installations shall be visually inspected and pressure tested per the requirements of Florida Fuel Gas Code, latest edition adopted by the AHJ.

END OF SECTION

## SECTION 221005 - PLUMBING PIPING

### PART 1 GENERAL

#### 1.1 SECTION INCLUDES

- A. Pipe, pipe fittings, valves, and connections for piping systems.
  - 1. Sanitary sewer.
  - 2. Domestic water.
  - 3. Flanges, unions, and couplings.
  - 4. Pipe hangers and supports.

#### 1.2 RELATED REQUIREMENTS

- A. Section 220719 - Piping and Equipment Insulation.
- B. Section 22 10 06 - Plumbing Specialties
- C. Section 22 05 01- General Plumbing Requirements.

#### 1.3 REFERENCE STANDARDS

- A. ASTM D2564 - Standard Specification for Solvent Cements for Poly(Vinyl Chloride) (PVC) Plastic Piping Systems; 2012.
- B. ASTM D2665 - Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Drain, Waste, and Vent Pipe and Fittings; 2014.
- C. ASTM D2846/D2846M - Standard Specification for Chlorinated Poly(Vinyl Chloride) (CPVC) Plastic Hot- and Cold-Water Distribution Systems; 2017b, with Editorial Revision (2018).
- D. ASTM D2855 - Standard Practice for the Two-Step (Primer & Solvent Cement) Method of Joining Poly (Vinyl Chloride) (PVC) or Chlorinated Poly (Vinyl Chloride) (CPVC) Pipe and Piping Components with Tapered Sockets; 2015.
- E. ASTM D3034 - Standard Specification for Type PSM Poly(Vinyl Chloride) (PVC) Sewer Pipe and Fittings; 2016.
- F. ASTM F437 - Standard Specification for Threaded Chlorinated Poly(Vinyl Chloride) (CPVC) Plastic Pipe Fittings, Schedule 80; 2015.
- G. ASTM F438 - Standard Specification for Socket-Type Chlorinated Poly(Vinyl Chloride) (CPVC) Plastic Pipe Fittings, Schedule 40; 2017.
- H. ASTM F439 - Standard Specification for Chlorinated Poly(Vinyl Chloride) (CPVC) Plastic Pipe Fittings, Schedule 80; 2013.
- I. ASTM F441/F441M - Standard Specification for Chlorinated Poly(Vinyl Chloride) (CPVC) Plastic Pipe, Schedules 40 and 80; 2015.

- J. ASTM F442/F442M - Standard Specification for Chlorinated Poly(Vinyl Chloride) (CPVC) Plastic Pipe (SDR-PR); 2013, with Editorial Revision.
- K. ASTM F493 - Standard Specification for Solvent Cements for Chlorinated Poly (Vinyl Chloride) (CPVC) Plastic Pipe and Fittings; 2014.
- L. MSS SP-58 - Pipe Hangers and Supports - Materials, Design, Manufacture, Selection, Application, and Installation; 2009.
- M. MSD SP-69 - Manufacturer's Standardized Society: Pipe Hangers and Supports - Selection and Applications.
- N. NFPA 54 - National Fuel Gas Code; National Fire Protection Association; 2012.
- O. NFPA 58 - Liquefied Petroleum Gas Code; National Fire Protection Association; 2014.
- P. NSF 61 - Drinking Water System Components - Health Effects; 2017.
- Q. NSF 372 - Drinking Water System Components - Lead Content; 2016.

#### 1.4 SUBMITTALS

- A. See Division 1 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data on pipe materials, pipe fittings, valves, and accessories. Provide manufacturers catalog information. Indicate valve data and ratings.

#### 1.5 QUALITY ASSURANCE

- A. Perform work in accordance with applicable codes.

#### 1.6 DELIVERY, STORAGE, AND HANDLING

- A. Provide temporary protective coating on cast iron and steel valves.
- B. Provide temporary end caps and closures on piping and fittings. Maintain in place until installation.
- C. Protect piping systems from entry of foreign materials by temporary covers, completing sections of the work, and isolating parts of completed system.

#### 1.7 FIELD CONDITIONS

- A. Do not install underground piping when bedding is wet or frozen.

## PART 2 PRODUCTS

### 2.1 GENERAL REQUIREMENTS

- A. Potable Water Supply Systems: Provide piping, pipe fittings, and solder and flux (if used), that comply with NSF 61 and NSF 372 for maximum lead content; label pipe and fittings.

### 2.2 SANITARY SEWER PIPING, BURIED WITHIN 5 FEET OF BUILDING

- A. PVC Pipe: PVC DWV Schedule 40, ASTM D 2665, Solid Core.
  - 1. Fittings: PVC.
  - 2. Joints: Solvent welded, with ASTM D2564 solvent cement.

### 2.3 SANITARY SEWER PIPING, ABOVE GRADE

- A. PVC Pipe: ASTM D2665, PVC DWV Schedule 40, Solid Core.
  - 1. Fittings: PVC.
  - 2. Joints: Solvent welded, with ASTM D2564 solvent cement.

### 2.4 DOMESTIC WATER PIPING, BURIED WITHIN 5 FEET OF BUILDING

- A. CPVC Pipe: 2" and smaller: ASTM D 2846; larger than 2": F441 Sch 80.
  - 1. Fittings: ASTM D 2846; ASTM F 437, ASTM F 438, ASTM F 439; compatible with pipe.
  - 2. Joints: Solvent weld with ASTM F 493 solvent cement, with approved primer where required by code.

### 2.5 DOMESTIC WATER PIPING, ABOVE GRADE

- A. CPVC Pipe: 2" and smaller: ASTM D 2846; larger than 2": F441 Sch 80.
  - 1. Fittings: ASTM D 2846, ASTM F 437, ASTM F 438, ASTM F 439; compatible with pipe.
  - 2. Joints: Solvent weld with ASTM F 493 solvent cement, with approved primer where required by code.

### 2.6 FLANGES, UNIONS, AND COUPLINGS

- A. Unions for Pipe Sizes 3 Inches and Under:
  - 1. Ferrous pipe: Class 150 malleable iron threaded unions.
  - 2. Copper tube and pipe: Class 150 bronze unions with soldered joints.
- B. Flanges for Pipe Size Over 1 Inch:
  - 1. Ferrous Pipe: Class 150 malleable iron threaded or forged steel slip-on flanges; preformed neoprene gaskets.
  - 2. Copper Tube and Pipe: Class 150 slip-on bronze flanges; preformed neoprene gaskets.

- C. Dielectric Connections: Union with galvanized or plated steel threaded end, copper solder end, water impervious isolation barrier.

## 2.7 PIPE HANGERS AND SUPPORTS

- A. Provide hangers and supports that comply with MSS SP-58.
  - 1. If type of hanger or support for a particular situation is not indicated, select appropriate type using MSS SP- 69 recommendations.
  - 2. Overhead Supports: Individual steel rod hangers attached to structure or to trapeze hangers.
  - 3. Trapeze Hangers: Welded steel channel frames attached to structure.
  - 4. Vertical Pipe Support: Steel riser clamp.
  - 5. Floor Supports: Concrete pier or steel pedestal with floor flange; fixture attachment.
- B. Plumbing Piping - Drain, Waste, and Vent:
  - 1. Conform to MSS SP-58. Field fabricated components shall conform to MMS SP-89.
  - 2. Hangers for Pipe Sizes 1/2 Inch to 1-1/2 Inches: Carbon steel, adjustable swivel, split ring.
  - 3. Hangers for Pipe Sizes 2 Inches and Over: Carbon steel, adjustable, clevis.
  - 4. Wall Support for Pipe Sizes to 3 Inches: Cast iron hook.
  - 5. Wall Support for Pipe Sizes 4 Inches and Over: Welded steel bracket and wrought steel clamp.
  - 6. Floor Support: Cast iron adjustable pipe saddle, lock nut, nipple, floor flange, and concrete pier or steel support.
  - 7. Copper Pipe Support: Carbon steel ring, adjustable, copper plated.
- C. Plumbing Piping - Water:
  - 1. Hangers for Pipe Sizes 1/2 Inch to 1-1/2 Inches: Malleable iron, adjustable swivel, split ring.
  - 2. Hangers for Cold Pipe Sizes 2 Inches and Over: Carbon steel, adjustable, clevis.
  - 3. Hangers for Hot Pipe Sizes 2 Inches to 4 Inches: Carbon steel, adjustable, clevis.
  - 4. Wall Support for Pipe Sizes to 3 Inches: Cast iron hook.
  - 5. Floor Support for Cold Pipe: Cast iron adjustable pipe saddle, lock nut, nipple, floor flange, and concrete pier or steel support.
  - 6. Floor Support for Hot Pipe Sizes to 4 Inches: Cast iron adjustable pipe saddle, locknut, nipple, floor flange, and concrete pier or steel support.

## 2.8 SLEEVES AND ESCUTCHEONS

- A. Sleeves through non-load bearing walls and floors of non-masonry construction shall be 18 gauge galvanized steel or pre-formed plastic.
- B. Sleeves through masonry shall be galvanized steel pipe (load bearing wall) or PVC pipe (non-load bearing wall or floor). Sleeves through floor slabs shall extend 2" above the finished floor.
- C. Sleeves are not required where DWV piping passes through concrete floor slab on grade. Core drilling of masonry and concrete may be provided in lieu of pipe sleeves when cavities in core drilled hole are grouted smooth.
- D. Sleeves shall be sized to allow approximately 1/8" gap around the pipe or its insulation.



- E. Escutcheon plates for finished spaces will be nickel-plated.

### PART 3 EXECUTION

#### 3.1 PREPARATION

- A. Ream pipe and tube ends. Remove burrs.
- B. Remove scale and dirt, on inside and outside, before assembly.
- C. Prepare piping connections to equipment with flanges or unions.

#### 3.2 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Provide non-conducting dielectric connections wherever jointing dissimilar metals.
- C. Provide clearance in hangers and from structure and other equipment for installation of insulation and access to valves and fittings.
- D. Provide access panels where valves and fittings are not exposed. Panels shall be provided in locations approved by the Architect and where indicated on the plans, and shall meet fire ratings of walls or ceilings. Adjust location of valves/piping when requested.
- E. Install all piping in lavatory cabinets and vanities as tight to the rear of the cabinet or vanity as possible to provide full utilization of the cabinet or vanity for storage.
- F. Install all piping so as not to interfere with any electric lighting outlets, duct work, other piping, or equipment. Do not install piping in front of any door or window and avoid interference with any such openings. Do not install any piping over any motors, transformers, electrical panels, or other electrical equipment.
- G. Install trap primers in accessible locations. Provide access panels as necessary.
- H. PVC Pipe: Make solvent-welded joints in accordance with ASTM D2855.
- I. Pipe Hangers and Supports:
  - 1. Select and install in accordance with MSS-SP-69, and MSS SP-89 guidelines.
  - 2. Support horizontal and vertical piping in accordance with Florida Plumbing Code/International Plumbing Code spacing requirements.
  - 3. Place hangers within 12 inches of each horizontal elbow.
  - 4. Use hangers with 1-1/2 inch minimum vertical adjustment. Design hangers for pipe movement without disengagement of supported pipe.
  - 5. Hanger rods shall be sized as follows:
    - a. 2" & less      3/8" diameter
    - b. 2-1/2" to 3"    1/2" diameter
    - c. 4"                5/8" diameter

- d. 6" 3/4" diameter
- 6. Support vertical piping at every other floor. Support riser piping independently of connected horizontal piping.
- 7. Where several pipes can be installed in parallel and at same elevation, provide multiple or trapeze hangers.
- 8. Provide copper plated hangers and supports for copper piping.
- 9. Prime coat exposed steel hangers and supports. Hangers and supports located in crawl spaces, pipe shafts, and suspended ceiling spaces are not considered exposed.
- 10. Provide hangers adjacent to motor driven equipment with vibration isolation.
- 11. Support cast iron drainage piping at every joint.

### 3.3 APPLICATION

- A. Fixtures, Floor Drains and Cleanouts: Provide all fixtures and floor drains with traps to comply with local regulations and as hereinafter specified. Provide exposed traps with brass cleanout plugs. Provide cleanouts in soil and waste lines as shown on the Plans and as required by the governing codes. Extend cleanouts for piping concealed in floor or ceiling construction through the floor above and provide with adjustable floor level cleanout set flush with the finished floor. Use wall cleanouts for piping concealed in wall construction only where indicated on the Drawings
- B. Install unions downstream of valves and at equipment or apparatus connections.

### 3.4 TOLERANCES

- A. Drainage Piping: Establish invert elevations within 1/2 inch vertically of location indicated and slope to drain at minimum of 1/4 inch per foot slope.
- B. Water Piping: Slope at minimum of 1/32 inch per foot and arrange to drain at low points.

### 3.5 TESTS

- A. Testing requirements are minimum and are not intended to be limiting where additional testing methods are required by the authority having jurisdiction.
- B. All drainage, vent and inside conductor piping shall be tested before fixtures are installed by capping or plugging the openings and filling the entire system with water, allowing it to stand thus filled for 3 hours. If required to test system in sections, provide necessary test tees, plugs and stand pipe to test the system with at least 10 feet of pressure. Remake all leaking joints and retest.
- C. Test all water supply piping before fixtures, equipment and/or hydrants are connected. Cap or plug the openings, fill the system with water and apply a hydrostatic pressure of 125 PSIG. Hold test pressure for at least 2 hours. Remake all leaking joints and retest.
- D. Test each fixture for soundness, stability of support and satisfactory operation of all its parts.
- E. Test water service line pressure near entrance to the building. Where water service pressure exceeds 80 psi static, make provisions to install an approved ASSE 1003 water pressure regulator with strainer in the

service line exterior to the finished building. Test the pressure at the start of construction and again at completion of design prior to occupancy.

### 3.6 DISINFECTION OF DOMESTIC WATER PIPING SYSTEM

- A. Disinfect the domestic water piping system in accordance with local municipality requirements. In the absence of a locally adopted municipality procedure, after all plumbing work has been completed and the system tested, disinfect the system as follows:
  - 1. Prior to starting work, verify system is complete, flushed and clean.
  - 2. After tests are completed, fill all water supply systems with a solution containing 50 PPM of chlorine and allow to stand for a period of at least 24 hours. As an alternate, fill the system with a solution containing 200 PPM of chlorine and allow to stand for 3 hours.
  - 3. Following the standing time, the systems shall be flushed with clean potable water until the chlorine is purged from the system.
  - 4. The procedure shall be repeated where shown by a bacteriological examination that contamination remains present in the system.
- B. Deliver a dated letter certifying sterilization to the Owner.

### 3.7 SERVICE CONNECTIONS

- A. Before commencing work check invert elevations required for sewer connections, confirm inverts and ensure that these can be properly connected with slope for drainage and cover.
- B. See Civil plans for water service protection and meter requirements.

END OF SECTION

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## SECTION 221006 - PLUMBING PIPING SPECIALTIES

### PART 1 GENERAL

#### 1.1 SECTION INCLUDES

- A. Mixing valves.

#### 1.2 RELATED REQUIREMENTS

- A. Section 221005 - Plumbing Piping.
- B. Section 224000 - Plumbing Fixtures.

#### 1.3 REFERENCE STANDARDS

- A. NSF 61 - Drinking Water System Components - Health Effects; 2017.
- B. NSF 372 - Drinking Water System Components - Lead Content; 2016.

#### 1.4 SUBMITTALS

- A. See Section 013000 - Administrative Requirements, for submittal procedures.
- B. See Division 1 - Administrative Requirements, for submittal procedures.
- C. Product Data: Provide component sizes, rough-in requirements, service sizes, and finishes.

#### 1.5 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with not less than three years documented experience.

### PART 2 PRODUCTS

#### 2.1 GENERAL REQUIREMENTS

- A. Specialties in Potable Water Supply Systems: Provide products that comply with NSF 61 and NSF 372 for maximum lead content.

#### 2.2 MIXING VALVES

- A. Thermostatic Mixing Valves:
  - 1. Valve: ASSE 1017 and 1070 chrome plated cast brass body, stainless steel or copper alloy bellows, integral temperature adjustment.
  - 2. Minimum and maximum flow rates as scheduled on plans.
  - 3. Accessories:

- a. Check valve on inlets.
  - b. Volume control shut-off valve on outlet.
  - c. Stem thermometer on outlet.
  - d. Strainer stop checks on inlets.
4. Cabinet: 16 gage, 0.0598 inch prime coated steel, for recessed mounting with keyed lock.

### PART 3 EXECUTION

#### 3.1 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Install temperature limiting devices for all water delivered to public hand washing facilities.

END OF SECTION

## SECTION 223000 - PLUMBING EQUIPMENT

### PART 1 GENERAL

#### 1.1 SECTION INCLUDES

- A. Instantaneous gas water heaters.

#### 1.2 RELATED REQUIREMENTS

- A. Section 22 40 00 - Plumbing Fixtures

#### 1.3 REFERENCE STANDARDS

- A. ANSI Z21.10.1 - Gas Water Heaters - Volume I - Storage Water Heaters with Input Ratings of 75,000 Btu per Hour or Less; 2014.
- B. ANSI Z21.10.3 - Gas-Fired Water Heaters - Volume III - Storage Water Heaters with Input Ratings Above 75,000 Btu per Hour, Circulating and Instantaneous; 2015.
- C. ASME BPVC-VIII-1 - Boiler and Pressure Vessel Code, Section VIII, Division 1 - Rules for Construction of Pressure Vessels; 2017.
- D. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- E. UL 174 - Standard for Household Electric Storage Tank Water Heaters; Current Edition, Including All Revisions.
- F. UL 1453 - Standard for Electric Booster and Commercial Storage Tank Water Heaters; Current Edition, Including All Revisions.

#### 1.4 SUBMITTALS

- A. See Division 1 - Administrative Requirements, for submittals procedures.
- B. Product Data:
  - 1. Provide dimension drawings of water heaters indicating components and connections to other equipment and piping.
  - 2. Indicate pump type, capacity, power requirements.
  - 3. Provide certified pump curves showing pump performance characteristics with pump and system operating point plotted. Include NPSH curve when applicable. Clearly indicate in writing any minimum flow requirements to prevent pump from overheating.
  - 4. Provide electrical characteristics and connection requirements.
- C. Shop Drawings:
  - 1. Indicate heat exchanger dimensions, size of tappings, and performance data.
  - 2. Indicate listed clearance requirements.

- D. Operation and Maintenance Data: Include operation, maintenance, and inspection data, replacement part numbers and availability, and service depot location and telephone number.
- E. Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

#### 1.5 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with minimum three years of documented experience.
- B. Identification: Provide pumps and water heaters with manufacturer's name, model number, and rating/capacity identified by permanently attached label.

#### 1.6 CERTIFICATIONS

- A. Water Heaters: NSF approved.
- B. Gas Water Heaters: Certified by CSA International or UL to ANSI Z21.10.1 or ANSI Z21.10.3, as applicable, in addition to requirements specified elsewhere.
- C. Electric Water Heaters: UL listed and labeled to UL 174 or UL 1453.
- D. Products Requiring Electrical Connection: Listed and classified by Underwriters Laboratories Inc., as suitable for the purpose specified and indicated.

#### 1.7 DELIVERY, STORAGE, AND HANDLING

- A. Provide temporary inlet and outlet caps. Maintain caps in place until installation.

#### 1.8 WARRANTY

- A. See Division 1 - Closeout Submittals, for additional warranty requirements.
- B. Provide five year manufacturer warranty for packaged water heating systems.

### PART 2 PRODUCTS

#### 2.1 INSTANTANEOUS GAS WATER HEATER

- A. Water heaters shall be indoor or outdoor as scheduled, wall mounted, instantaneous, multiple point-of-use natural gas fired direct vent units design certified to the ANSI Z21.10.3 standard for gas fired water heaters. Water heaters shall be sized, configured and controlled as scheduled on the plans.
- B. Units shall have a minimum recovery energy rating of 96%.
- C. Units shall have a minimum operating flow rate of 0.4 gpm with a 50 degree F temperature rise when manifolded in the configuration shown on the plans.



- D. Water heater shall be microprocessor controlled and shall utilize a direct ignition system (with no standing pilot), fully modulating gas control valve, turbine flow meter, automatic flow control valve and water temperature regulators to maintain outlet temperature between +/- 2 degrees F of setpoint.
- E. Safety devices shall include flame failure lockout, boiling protection lockout, thermal overheat protection, and internal freeze protection down to 0F.
- F. Water heater shall have an internally coated copper heat exchanger with a 5 year warranty.
- G. Units shall have stainless steel burners, solid brass flow control valves.

### PART 3 EXECUTION

#### 3.1 INSTALLATION

- A. Install water heaters in accordance with manufacturer's instructions and to UL, AGA, CSA and other listing requirements as applicable.
- B. Coordinate with plumbing piping and related electrical work to achieve operating system.
- C. Maintain access clearance of at least 30 inches deep by 30 inches wide in front of water heater control panel.
- D. Provide heat traps on non recirculating systems when not integral to the water heater.
- E. Connections of metallic pipe to water heaters shall be made with dielectric unions or flanges.

END OF SECTION

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## SECTION 224000 - PLUMBING FIXTURES

### PART 1 GENERAL

#### 1.1 SECTION INCLUDES

- A. Flush valve water closets.
- B. Urinals.
- C. Lavatories.
- D. Service sinks.
- E. Electric water coolers.
- F. Showers.

#### 1.2 RELATED REQUIREMENTS

- A. Section 221005 - Plumbing Piping.
- B. Section 221006 - Plumbing Piping Specialties.
- C. Section 223000 - Plumbing Equipment.

#### 1.3 REFERENCE STANDARDS

- A. ANSI Z124.2 - American National Standard for Plastic Shower Units; 1995.
- B. ASME A112.18.1 - Plumbing Supply Fittings; 2012.
- C. ASME A112.19.2 - Ceramic Plumbing Fixtures; 2013.
- D. ASME A112.19.3 - Stainless Steel Plumbing Fixtures; 2017.
- E. ASME A112.19.4M - Porcelain Enameled Formed Steel Plumbing Fixtures; 1994 (R2009).

#### 1.4 SUBMITTALS

- A. See Division 1 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide catalog illustrations of fixtures, sizes, rough-in dimensions, utility sizes, trim, and finishes. Product data shall include required flush valve flow pressures.
- C. Manufacturer's Instructions: Indicate installation methods and procedures.
- D. Maintenance Data: Include fixture trim exploded view and replacement parts lists. Include manufacturer's recommended flushing procedures. For emergency fixtures, include ANSI Z358.1 flushing procedures.

- E. Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

## 1.5 WARRANTY

- A. Provide five year manufacturer warranty for electric water cooler.

## PART 2 PRODUCTS

### 2.1 GENERAL

- A. The following specifications supplement the fixtures as scheduled on the drawings. See schedule for pre-approved manufacturer's/models.
- B. Prior to ordering fixtures, confirm dimensional fit-up requirements for DWV piping layouts, framing/millwork, faucet trim holes, etc., and coordinate any required adjustments to ensure proper fit, form and function of each fixture.
- C. Potable Water Systems: Provide plumbing fittings and faucets that comply with NSF 61 and NSF 372 for maximum lead content; label pipe and fittings.
- D. This specification apply only to new fixtures, and /or trims as indicated in specifications and plans.

### 2.2 WATER CLOSETS (FLUSH VALVE TYPE)

- A. Unless otherwise indicated, all water closets shall comply with the following requirements: floor mounted or wall mounted as scheduled vitreous china (ASME A112.19.2M), syphon jet with elongated rim. Provide open front, white plastic seat, hinged, without cover, compatible with toilet. Provide all required fittings for complete installation including, but not limited to, 1-1/2" top spud or back spud, as applicable, & bolt caps. Wall hung units shall have compatible ASME A112.6.1M or ASME A112.6.2 floor mounted carriers. Water closets shall support flush rates as scheduled; including dual flush applications where indicated.
- B. All water closets identified on drawings as "ADA" or "Handicapped" shall have mounting height of 17" to 19" inches as measured from the finished floor to the top of seat.
- C. Flush Valves (ASME A112.19.2, ASSE 1037)
  - 1. Flush Valves shall be designed for operation with the matching toilet at flow pressures of 25 psi or less.
  - 2. Exposed Flush Valve:
    - a. Exposed chrome plated, diaphragm type with oscillating handle, escutcheon, seat bumper, integral screwdriver stop and vacuum breaker; flush rate as scheduled. Provide dual flush where indicated.

### 2.3 WALL HUNG URINALS

- A. Urinal:

1. ASME A112.19.2M; vitreous china, wall hung washout urinal with shields, integral trap, removable stainless steel strainer, 3/4" top spud, compatible floor mounted carrier.
  2. Urinal shall be designed for flush rate as scheduled.
- B. Flush Valves (ASME A112.19.2, ASSE 1037)
1. Flush Valves shall be designed for operation with the matching toilet at flow pressures of 25 psi or less.
  2. Exposed Flush Valve:
    - a. Exposed chrome plated, diaphragm type with oscillating handle, escutcheon, seat bumper, integral screwdriver stop and vacuum breaker; flush rate as scheduled. Provide dual flush where indicated.
- C. Carrier:
1. ASME A112.6.1M; cast iron and steel frame with tubular legs, lugs for floor and wall attachment, threaded fixture studs for fixture hanger, bearing studs.

## 2.4 LAVATORIES

- A. Unless otherwise indicated, all lavatories shall comply with the following requirements: Vitreous china (ASME A112.19.2M) with front overflow, drillings for required trim, ASME A112.18.6 compliant 3/8" flexible supplies, escutcheon plates and stop valves. Countertop lavatories shall be sealed, self rimming. Exposed traps and arms shall be brass with cleanout. Provide removable P-traps. Faucets (ASME A112.18.1M) shall limit flow to 0.5 GPM at 80 PSI. Waste fittings shall conform to ASME A112.18.2.
- B. All lavatories identified on drawings as "ADA" or "Handicapped" shall be selected and mounted to maintain rim heights, clearances to bottom of apron, and knee & toe clearance as identified in locally adopted accessibility codes. Provide offset waste as required. Controls shall be operable with one hand and shall not require tight grasping, pinching or twisting of the wrist, and shall activate with less than 5 lbs of force. Provide ADA compliant protective shielding for piping and all sharp or abrasive surfaces under lavatory.

## 2.5 SERVICE SINKS

- A. Bowl:
1. ASME A112.19.1M, white molded stone, floor mounted, size as indicated on plans, with one inch wide shoulders, vinyl bumper guard, stainless steel strainer, integral molded drain.
- B. Trim:
1. ASME A112.18.1M exposed wall type supply with cross or lever handles, spout wall brace, ASSE 1011 vacuum breaker, hose end spout, strainers, eccentric adjustable inlets, integral screwdriver stops with covering caps and adjustable threaded wall flanges.
- C. Accessories:
1. 5 feet of 1/2 inch diameter plain end reinforced plastic hose.
  2. Hose clamp hanger.
  3. Mop hanger.

## 2.6 ELECTRIC WATER COOLERS

- A. ARI 1010, ASME A112.19.1M, and NSF 61, Section 9; surface handicapped mounted electric water cooler with stainless steel top, galvanized structural steel chassis elevated anti-squirt bubbler with stream guard, automatic stream regulator, push bar, mounting bracket, refrigerated with integral air cooled condenser .
- B. Capacity: 8 gallons per minute of 50 degrees F water with inlet at 80 degrees F and room temperature of 90 degrees F, when tested in accordance with ASHRAE Std 18.
- C. Electrical: 115 V, 60 Hertz compressor, 6 foot cord and plug for connection to electric wiring system including grounding connector.

## 2.7 SHOWERS

- A. Unless otherwise indicated, all showers shall comply with the following requirements:
  - 1. Tiled Shower Floor
    - a. Trim with copper alloy, single control ASSE 1016 combination thermostatic/pressure balance mixing valve with integral stops; self cleaning, adjustable pattern ASME A112.18.1 shower head with ball joint, chrome plate arm and escutcheon plate, flow rate as scheduled. For tiled floor showers without a prefabricated receptor, provide ASTM D4551 flexible shower pan liner designed to be installed over sloped mortar bed and integrated into shower floor drain assembly.
  - 2. All showers identified on drawings as "ADA" or "Handicapped" shall comply with the following: shower stalls and location of controls shall meet the dimensional criteria of the Florida Accessibility Code, latest edition, and shall include ADA seat and grab bars. A shower spray unit with a 60" long hose that can be used as a fixed shower head and as a hand held shower shall be provided. Controls shall be operable with one hand and shall not require tight grasping, pinching or twisting of the wrist, and shall activate with less than 5 lbs of force. Shower bases for ADA applications shall meet ADA roll-in requirements while being sloped to drain to interior floor drain.

## PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Verify that walls and floor finishes are prepared and ready for installation of fixtures.
- B. Verify that electric power is available and of the correct characteristics.
- C. Confirm with cabinet makers and framers in advance to properly size cutouts and make other provisions necessary for the installation of counter top lavatories and sinks prior to purchasing.

### 3.2 PREPARATION

- A. Rough-in fixture piping connections in accordance with minimum sizes indicated in fixture rough-in schedule for particular fixtures.

### 3.3 INSTALLATION

- A. Install each fixture with trap, easily removable for servicing and cleaning.
- B. Provide rigid or flexible supplies to fixtures with reducers and escutcheons.
- C. Install components level and plumb.
- D. Install and secure off the floor fixtures in place with chair carriers and bolts. Support plates may be used for support of lavatories only in masonry wall construction and where steel studs are reinforced with cross members and additional studs where necessary.
- E. Seal fixtures to wall and floor surfaces with sealant as specified in Architectural Specifications, color to match fixture. Confirm color of fixtures with Architect.
- F. Solidly attach water closets to floor with lag screws.
- G. Independently support riser to structure from shower valve to shower head.
- H. Fasten shower pan liners to waste outlet at seepage entrance.
- I. Provide temperature limiting devices (Section 22 10 06) for hot water supply to public hand washing fixtures.
- J. Provide dedicated stop valves for isolation of all fixtures.
- K. Mount fixtures at heights required by governing codes and as indicated in architectural interior elevations.

### 3.4 INTERFACE WITH WORK OF OTHER SECTIONS

- A. Review millwork shop drawings. Confirm location and size of fixtures and openings before rough-in and installation.

### 3.5 ADJUSTING

- A. Adjust shower shower mixing valves to limit outlet temperature to 110 degrees F.
- B. Adjust stops or valves for intended water flow rate to fixtures without splashing, noise, or overflow.

### 3.6 CLEANING

- A. Clean plumbing fixtures and equipment.

### 3.7 PROTECTION

- A. Protect installed products from damage due to subsequent construction operations.
- B. Repair or replace damaged products before Date of Substantial Completion.

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- C. Do not permit use of fixtures until all required testing, sterilization, and final inspections are completed and acceptable.

### 3.8 SCHEDULES

- A. See Drawings for fixture schedule.

END OF SECTION



## SECTION 230510 - GENERAL MECHANICAL REQUIREMENTS

### PART 1 GENERAL

#### 1.1 SECTION INCLUDES

- A. General requirements for heating, ventilating and air conditioning systems.
- B. Miscellaneous material and execution requirements (pipe hangers, sleeves, escutcheons, equipment supports, etc.)

#### 1.2 DESCRIPTION

- A. The scope of work shall include complete heating, ventilating and air conditioning systems as shown on the Drawings and specified herein.

#### 1.3 PRE-INSTALLATION CONFERENCE

- A. Prior to start of any work, the successful Subcontractor(s) shall thoroughly review the plans and specifications to determine that no questions remain concerning the intent of the contract documents, and shall bring concerns to the attention of the Architect and Engineer. Subcontractors shall meet with the Architect when requested. Each Subcontractor shall outline his method of procedure and bring up for discussion and decision any questions concerning the project. No work shall be performed prior to this meeting. The Architect shall set the date, time and place of conference.

#### 1.4 CODES, ORDINANCES AND PERMITS

- A. Comply with all codes applying to the Work of this Contract including the Florida Energy Code. Obtain information on all code restrictions and requirements. In case of conflict between the Contract Documents and a governing code or ordinance, such conflict shall be immediately brought to the attention of the Architect for resolution. Extra payment will not be allowed for Work required by code restrictions except through written agreement with the Owner.
- B. Apply for, obtain, and pay for all required permits and inspection certificates. Final payment is contingent upon delivery of such certificates to the Architect.
- C. All materials and equipment shall be new and first class in every respect. As far as is practical, similar products shall be by one manufacturer. Where applicable, all materials and equipment shall bear the Underwriters' Laboratories seal or ASME code stamp. Certificates to this effect shall be furnished to the Architect upon request.

#### 1.5 STANDARDS

- A. Unless modified by these Specifications, the design, manufacture, testing and method of installing all materials, apparatus and equipment shall conform to the following:
  - 1. ASHRAE Standard 90.1, Energy Standard for Buildings.
  - 2. ANSI B9. 1, Safety Code for Mechanical Refrigeration.

3. NFPA, Standards of National Fire Protection Association.
4. ASHRAE Handbook of Fundamentals.
5. SMACNA Standards for Duct Work.
6. Associated Air Balance Council Standards for Field Measurement and Instrumentation.
7. Underwriters' Laboratories.
8. National Electrical Code.
9. Air Moving and Conditioning Association.
10. Air Conditioning and Refrigeration Institute.

#### 1.6 SITE INSPECTION

- A. Visit the site and thoroughly inspect conditions affecting the Work before submitting Bid. Assume responsibility for meeting all existing conditions including access and work space limitations.

#### 1.7 DRAWINGS AND SPECIFICATIONS

- A. Refer to the general Construction Drawings which are bound with the Drawings of this Work for construction details, elevations, etc. Bring any discrepancies between Mechanical/Plumbing drawings and Architectural/Structural/Civil to the attention of the Architect prior to initiating work. It is the intent of the Mechanical and Plumbing Drawings to show the general arrangement of the system and not to indicate all offsets, fittings and accessories which may be required, nor to show exact locations of piping, ductwork or equipment except where actual dimensions are given. All vertical piping shall be located in walls in finished spaces unless otherwise noted.
- B. It is the intent of the Drawings and Specifications to call for finished Work, tested, and ready for operation, and in complete conformance with all applicable codes, rules and regulations. Minor details not usually shown or specified, but manifestly necessary for the proper installation and operation of the various systems, shall be included in the Work and in the proposal, the same as if specified or shown on the Drawings.
- C. If any departures from the Drawings and Specifications are deemed necessary, details of such departures and the reasons therefore shall be submitted to the Engineer for approval. No departures shall be made without prior approval of the Engineer.
- D. Specific reference in the Specifications to any article, device, product, material, fixture or type of construction, etc., by proprietary name, make or catalog number shall be interpreted as establishing a standard of quality and shall not be construed as limiting competition. Substitutes may be used subject to compliance with requirements set forth in the General Requirements, Division I, and the requirements of this section.

#### 1.8 APPROVED ALTERNATE MANUFACTURERS AND PRODUCT SUBSTITUTIONS

- A. Equipment substitutions other than the basis of design scheduled on drawings shall comply in every respect with the applicable schedules and specifications contained in the contract documents, and shall meet the requirements of any relevant architectural administrative specification requirements on product substitutions. Equipment scheduled on Drawings was used to arrive at performance, space, maintenance, and utility service requirements. If other equipment is submitted and approved, take

responsibility for providing the space, maintenance, and utility service requirements of this substituted equipment, and ensure the capacities, accessories and features as indicated for the scheduled manufacturer are provided. This responsibility shall include the costs associated with any resulting changes during and following installation, including costs to change electrical service required by substituted equipment, to obtain required clearances, or to provide missing accessories and features. Approval of equipment substitutions during the submittal review process or listing of alternate approved manufacturers in these specifications represents an acceptance of the general level of product quality and reliability, and does not imply that the alternate manufacturer's have been reviewed for compliance with the performance, features, materials and accessories already specified for the equipment scheduled on the drawings. It is the ultimate responsibility of the contractor to ensure any equipment substituted for what was scheduled on the drawings meets the contract document requirements.

- B. Where the name of a concern or manufacturer is mentioned on the Drawings or in Specifications in reference to his required service or product, and no qualifications or specification of such is included, then the material gauges, details of manufacturer, finish, etc., shall be in accordance with his standard practice, directions or specifications. The Contractor shall be responsible for any infringement of patents, royalties, or copyrights which may be incurred thereby.

#### 1.9 SUBMITTALS

- A. Submittals shall be provided in one complete package. Partial submittal packages will be rejected. Where Engineer documents deficiencies in the submittals, the Contractor shall ensure follow-on submittals have addressed the deficiencies. Should follow-on submittals not address previously noted deficiencies, the Contractor shall incur the Engineers costs associated with the unnecessary review and documentation of such re-submittals.
- B. Submit shop drawings or catalog data for Engineers approval before purchasing or installing items. Refer to specific submittal requirements for each section.
- C. Shop drawings for mounting details of major equipment.

#### 1.10 DATA

- A. All performance data specified herein shall be considered actual performance of equipment as installed. Make suitable allowances if installation details are such that actual operating conditions unfavorably affect performance as compared to conditions under which the equipment was rated.

#### 1.11 OPERATION AND MAINTENANCE DATA

- A. Provide a complete set of a compilation of catalog data of each manufactured item of equipment used in the Mechanical Work. Include catalog, installation, operation and maintenance data and bill of materials for all operating equipment shall be submitted. Provide an indexed PDF file and a separate hard copy bound in loose leaf binders and submitted to the Architect before final payment is made. A complete double index shall be provided as follows:
  1. Listing the Products alphabetically by name.
  2. Listing the names of manufacturer's alphabetically by name together with their addresses and the names and addresses of local sales representatives.

- B. Include the following information where applicable: Name and Mark number, Location, Complete Nameplate Data, Certified Record Drawings and Shop Drawings, Parts List, Performance Curves, Wiring Diagrams, Lubrication Charts, Manufacturer's operating and maintenance instructions with all non-applicable information deleted.
- C. Maintenance instruction manuals shall include complete oiling, cleaning, and servicing data compiled in clearly and easily understandable form. Data shall show all serial numbers of each piece of equipment, complete list of replacement parts, motor ratings, and actual loads.
- D. It is the intent of this catalog, operation and maintenance data to provide the Owner with complete instructions on the proper operation and use, lubrication and periodic maintenance, together with the source of replacement parts and service, for the items of equipment covered.
- E. Include submittal data stating equipment size and selected options for each peice of equipment requiring maintenance.
- F. Required routine maintenance actions shall be clearly identified and included with manufacturer's operation and maintenance manuals for each peice of equipment requiring maintenance provided as a part of this project.
- G. Include the name and address of at least one qualified service agency capable servicing the systems involved in the project.
- H. Provide HVAC control system maintenance and calibration information, including wiring diagrams, schematics, and control sequence descriptions. Desired or field determined setpoints shall be recorded on control drawings at control devices or in system programming instructions where digital control systems are provided.
- I. Provide a narative of how each system is intended to operate, including recommended setpoints.

#### 1.12 CONTRACTOR COORDINATION

- A. The Electrical Contractor shall furnish, set and wire all disconnect devices and starters as required for all equipment except for those items furnished with integral disconnect devices and/or starters.
- B. Furnish detailed information to the Electrical Contractor on power wiring requirements for all mechanical and plumbing equipment actually purchased as soon as practical. This shall include all diagrams and instructions necessary for the Electrical Contractor to make connections properly. If equipment actually purchased requires larger electrical service than equipment scheduled, arrange and pay for required electrical service change.
- C. Provide all air conditioning control devices, including thermostats, and complete all control wiring, including final connections.
- D. Coordinate location of equipment, piping, and duct work with other trades to maintain clearance for equipment maintenance, prevent interference with duct and piping runs, and to prevent ducts and piping from being installed over electrical panels. If interference develops, the Architect will decide which equipment, conduit, duct, piping, etc., must be relocated regardless of installation order. Take responsibility for relocating the work of your trade, if so ordered, including all associated costs.

- E. Within 30 days following award of the Contract, report to the Architect, in writing, all real or potential errors, ambiguities and/or conflicts on the Mechanical and Plumbing Work or between the trades and obtain an agreement with the Architect on a solution. Those reported after 30 days, except as a result of unforeseen circumstances, shall be resolved at the discretion of the Architect. Report conflicts resulting from the progress of Work to the Architect immediately or accept the expense of corrective work caused by failure to report such a conflict.

#### 1.13 APPROVED BY AHJ

- A. Where drawings and specifications call for a product, feature or installation to be 'Approved by AHJ'; the product, feature or installation shall be specifically submitted, reviewed and accepted by the authority having jurisdiction (AHJ) for use on the project. This is not an approval by the designer of record, and is not related to the shop drawing or product data sheets submitted to the designer of record for review. The AHJ shall be a representative of the permitting agency for the project, or contracting agency for federal projects. The contractor is encouraged to obtain AHJ approval prior to ordering and/or installing the product to limit the cost associated with any rework.

#### 1.14 CHANGES

- A. Do not make any changes in design without the written approval of the Engineer. Changes in design means any change which may affect the capacity, reliability, operation or safety of the systems or any parts thereof, including changes which may be required to conform to local regulations or codes.

#### 1.15 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than three years of documented experience.
- B. Products Requiring Electrical Connection: Listed and classified by UL as suitable for the purpose specified and indicated.

#### 1.16 DELIVERY, STORAGE, AND PROTECTION

- A. Protect all materials and equipment against damage and vandalism during construction. Replace any damaged material or equipment and place the systems in perfect working condition.

#### 1.17 WARRANTY

- A. Provide written warranties as specified in the General Requirements, Division 1 for additional warranty requirements.
- B. Provide five year manufacturer warranty for refrigeration compressors against defects in materials and workmanship. Repair any defects becoming apparent within the warranty period as directed by the Architect. The warranty shall not cause an obligation to repair damage resulting from accident or improper operation or care on the part of the Owner.

## PART 2 PRODUCTS

### 2.1 MOTORS

- A. All permanently wired polyphase motors 1 HP or more shall be classified under the National Electric Manufacturer's Associations Standard as "energy efficient".

## PART 3 EXECUTION

### 3.1 GENERAL

- A. Examine the site and all Drawings before proceeding with the layout and installation of the Work. Locate all vertical piping within walls in finished spaces unless specifically noted otherwise. Such piping cannot always be shown within walls on Drawings due to their small scale.
- B. Arrange the Work essentially as shown, exact layout to be made on the job to suit actual conditions encountered. Confer and cooperate with other trades on the job so all Work will be installed in proper relationship and coordinate precise location of parts with the Work of others.
- C. Arrange for required chases, slots and openings with the General Contractor including locations of required pipe sleeves through walls and foundations. Assume liability for cutting or patching made necessary by failure to make proper arrangements in this respect.
- D. Indicated equipment connections are necessarily based on equipment of a given manufacture. Assume responsibility for proper arrangement of pipes, ducts, etc., to connect approved equipment in a proper and approved manner. Follow equipment manufacturer's detailed instructions and recommendations in the installation and connection of all equipment. In case of conflict between manufacturer's instructions and the Contract Documents, notify the Architect before proceeding. No equipment installation or connections shall be made in a manner that voids the manufacturers warranty.
- E. Install all Work in a neat and workmanlike manner, using only workmen thoroughly qualified in the trade or duties they are to perform. Rough Work will be rejected.

### 3.2 EQUIPMENT INSTALLATION

- A. Supports
  1. Where required, install galvanized steel supports under the air handling units to allow installation of supply and return air ducts and access to filters and access panels.
  2. Prepare and furnish Drawing and Templates indicating all concrete Work required for equipment furnished under this Work. All concrete required will be provided by the General Contractor. Provide, at the time concrete foundations, bases, or curbs or formed, all necessary anchor bolt as required for the various equipment in this Work. Grout all spaces between the equipment base and concrete supports.
- B. Install all equipment to permit removal of coils, fan shafts and wheels, filters, belt guards, sheaves and drives, and all other parts requiring periodic replacement or maintenance.

- C. Arrange equipment to permit ready access to valves, cocks, traps, starters, motors and control components, and to clear the openings of swinging and overhead doors and of access panels.

### 3.3 IDENTIFICATION OF EQUIPMENT

- A. Securely attach manufacturers nameplate to all equipment giving data as to design and operating characteristics. Securely attach permanent metal tags identifying each major plumbing and HVAC component (i.e. air handlers, condensing units, rooftop units, pumps, exhaust fans, water heaters, circulators, etc.) with the original equipment tag assigned to the component by the equipment schedule on the drawings.
- B. Securely attach nameplates to all switches, starters, gauges, control devices and similar items, giving the name and number of the item of equipment to which it is connected.

### 3.4 SLEEVE INSTALLATION

- A. Accurately locate and set required sleeves for pipe and duct. Where more than one pipe is necessarily passed through a single sleeve as to a unit piping enclosure or other conditions resulting in larger than 1/8" gap within the sleeve, tightly pack space with proper material to form a barrier against sound, vermin, fire, etc.

### 3.5 MACHINERY GUARDS

- A. Provide all belts, couplings, wheels, fan blades and other moving parts of machinery with removable metal guards. Provide tachometer openings for all belt driven or variable speed machinery.

### 3.6 FIRESTOPPING

- A. Thoroughly review Architectural plans and provide approved Firestopping at penetration of every fire rated wall, floor or ceiling system.
- B. Refer to Architectural specifications for Firestopping product and installation requirements. In the absence of relevant Architectural specifications, Firestopping shall comply with the requirements of the Authority Having Jurisdiction and the following as a minimum:
  1. Fire Testing: Provide firestopping assemblies of designs which provide the specified fire ratings when tested in accordance with methods indicated.
    - a. Listing in the current classification or certification books of UL, FM, or ITS (Warnock Hersey) will be considered as constituting an acceptable test report.
  2. Firestopping: Any material meeting requirements.
    - a. Fire Ratings: Use any system listed by UL or tested in accordance with ASTM E 814 that has F Rating equal to fire rating of penetrated assembly and minimum T Rating Equal to F Rating and that meets all other specified requirements.
  3. Clean substrate surfaces of dirt, dust, grease, oil, loose material, or other matter which may affect bond of firestopping material. Remove incompatible materials which may affect bond. Install backing materials to arrest liquid material leakage.

4. Install materials in manner described in fire test report and in accordance with manufacturer's instructions, completely closing openings. Do not cover installed firestopping until inspected by authority having jurisdiction. Install labelling required by code. Clean adjacent surfaces of firestopping materials. Protect adjacent surfaces from damage by material installation.

### 3.7 INSTRUCTION OF OWNER'S REPRESENTATIVE

- A. After final acceptance of all Work and occupancy of building, provide service to make system adjustments to suit conditions created by the occupancy; instruct Owner's operating personnel in operation adjustment and maintenance procedures of system components and acquaint them with locations and functions of valves, control devices, etc., in the system.
- B. The actual time of this service shall be as directed but shall not be less than 4 hours nor exceed 1 day. Additional time, if required, to fully prepare Owners operating personnel to operate and maintain the system shall be as directed by the Owner at the Owner's expense. Quote rates for this additional time in the Bid Proposal.

### 3.8 CLEANING AND RUBBISH

- A. During the Work, keep the premises clear of rubbish created as a result of the Work. Protect and prevent unnecessary induction of dirt and thoroughly clean all equipment used for temporary heat and/or ventilation, as well as piping, fixtures, and plumbing equipment.
- B. Use and maintain adequate filters in all fan coil equipment used for temporary heat and/or ventilation. Replace with new filters after construction and before units are placed in service. Close all air duct openings to effectively prevent the entrance of dust and construction debris during construction.
- C. On completion of the Work, remove all rubbish and debris resulting from the Work and dispose of same. Thoroughly clean and leave in a satisfactory condition for use all equipment, pipe, fixtures, duct work, etc.

### 3.9 RECORD DRAWINGS

- A. The Architect will furnish one set of prints of the Mechanical Drawings as issued for this Contract. Use these prints to indicate accurately and neatly any deviation in the actual installation from the Drawings as issued. At the completion of the job, deliver the marked-up Drawings to the Architect for a permanent record of the exact location of all equipment, pipe runs, etc., as incorporated in the job.

### 3.10 COMPLETE SYSTEMS

- A. Leave all systems completely operative in all details and in satisfactory working condition, as determined by the Architect. Furnish and install as part of this Contract all apparatus and material obviously a part of the systems and necessary for their operation.

END OF SECTION



## SECTION 230593 - TESTING, ADJUSTING, AND BALANCING FOR HVAC

### PART 1 GENERAL

#### 1.1 SECTION INCLUDES

- A. Testing, adjustment, and balancing of air systems.
- B. Measurement of final operating condition of HVAC systems.

#### 1.2 RELATED REQUIREMENTS

- A. Section 23 05 10: General Mechanical Requirements (including commissioning).

#### 1.3 REFERENCE STANDARDS

- A. AABC (NSTSB) - AABC National Standards for Total System Balance, 7th Edition; 2016.
- B. AABC MN-1 - AABC National Standards for Total System Balance; 2002.
- C. ASHRAE Std 111 - Measurement, Testing, Adjusting, and Balancing of Building HVAC Systems; 2008.
- D. NEBB (TAB) - Procedural Standards for Testing Adjusting and Balancing of Environmental Systems; 2015, with Errata (2017).
- E. SMACNA (TAB) - HVAC Systems Testing, Adjusting and Balancing; 2002.

#### 1.4 SUBMITTALS

- A. See Division 1 - Administrative Requirements, for submittal procedures.
- B. Qualifications: Submit name of adjusting and balancing agency, TAB supervisor, and TAB technicians along with qualifications for approval within 30 days after award of Contract.
- C. Test Equipment:
  - 1. Submit a list of test equipment to be used on the project. Identify make and model of each device.
  - 2. For each device, submit manufacturer's tolerances for measurement ranges.
  - 3. For each device, submit manufacturer's correction factors as applicable.
  - 4. Submit latest calibration date for each device as well as manufacturer's recommended calibration interval.
- D. TAB Plan: Submit a written plan indicating the testing, adjusting, and balancing standard to be followed and the specific approach for each system and component.
  - 1. Include at least the following in the plan:
    - a. List of all air flow, water flow, sound level, system capacity and efficiency measurements to be performed and a description of specific test procedures, parameters, formulas to be used.

- b. Copy of field checkout sheets and logs to be used, listing each piece of equipment to be tested, adjusted and balanced with the data cells to be gathered for each.
  - c. Discussion of what notations and markings will be made on the duct and piping drawings during the process.
  - d. Final test report forms to be used.
  - e. Procedures for formal deficiency reports, including scope, frequency and distribution.
- E. TAB Report:
- 1. Submit Preliminary TAB report if required to document any tolerances cannot be met.
  - 2. Submit Final TAB. Include any followup corrective actions from preliminary submittal.

### 1.5 QUALITY ASSURANCE

- A. Perform total system balance in accordance with AABC MN-1, ASHRAE Std 111, or NEBB Procedural Standards for Testing, Balancing and Adjusting of Environmental Systems.
- B. TAB Agency Qualifications: Company specializing in the testing, adjusting, and balancing of systems specified in this Section with minimum three years documented experience certified by AABC.
- C. Perform Work under supervision of AABC Certified Test and Balance Engineer or NEBB Certified Testing, Balancing and Adjusting Supervisor experienced in performance of this Work and licensed at the Florida.

### 1.6 WARRANTY

- A. Furnish AABC National Performance Guaranty for this project.

## PART 2 PRODUCTS - NOT USED

## PART 3 EXECUTION

### 3.1 GENERAL REQUIREMENTS

- A. Perform total system balance in accordance with one of the following:
  - 1. AABC (NSTSB), AABC National Standards for Total System Balance.
  - 2. ASHRAE Std 111, Practices for Measurement, Testing, Adjusting and Balancing of Building Heating, Ventilation, Air-Conditioning, and Refrigeration Systems.
  - 3. NEBB Procedural Standards for Testing Adjusting Balancing of Environmental Systems.
  - 4. SMACNA (TAB).
- B. Begin work after completion of systems to be tested, adjusted, or balanced and complete work prior to Substantial Completion of the project.
- C. Where HVAC systems and/or components interface with life safety systems, including fire and smoke detection, alarm, and control, coordinate scheduling and testing and inspection procedures with the authorities having jurisdiction.
- D. TAB Agency Qualifications:

1. Company specializing in the testing, adjusting, and balancing of systems specified in this section.
2. Having minimum of three years documented experience.
3. Certified by one of the following:
  - a. AABC, Associated Air Balance Council.
  - b. NEBB, National Environmental Balancing Bureau.
  - c. TABB, The Testing, Adjusting, and Balancing Bureau of National Energy Management Institute.

E. TAB Supervisor and Technician Qualifications: Certified by same organization as TAB agency.

### 3.2 EXAMINATION

A. Verify that systems are complete and operable before commencing work. Ensure the following conditions:

1. Systems are started and operating in a safe and normal condition.
2. Temperature control systems are installed complete and operable.
3. Proper thermal overload protection is in place for electrical equipment.
4. Final filters are clean and in place. If required, install temporary media in addition to final filters.
5. Duct systems are clean of debris.
6. Fans are rotating correctly.
7. Fire and volume dampers are in place and open.
8. Air coil fins are cleaned and combed.
9. Access doors are closed and duct end caps are in place.
10. Air outlets are installed and connected.
11. Duct system leakage is minimized.

B. Confirm the proper functions of all components as noted in the sequence of operations including, but not limited to, interlocks, overrides, and damper positions & equipment operations based on occupied and unoccupied modes of operation.

C. Beginning of work means acceptance of existing conditions.

### 3.3 PREPARATION

A. Provide instruments required for testing, adjusting, and balancing operations. Make instruments available to Engineer to facilitate spot checks during testing.

B. Provide additional balancing devices as required.

### 3.4 ADJUSTMENT TOLERANCES

A. Air Handling Systems: Adjust system level airflow to within plus or minus 10 percent of design for supply, outside air and exhaust system. Independently measure and record system return air.

B. Building Pressurization: Adjust systems to ensure the total of outside air is not less than 5 percent greater than the total exhaust for the building.

C. Air Outlets and Inlets: Adjust outlets and inlets in space to within plus or minus 10 percent of design.

### 3.5 RECORDING AND ADJUSTING

- A. Ensure recorded data represents actual measured or observed conditions.
- B. Permanently mark settings of valves, dampers, and other adjustment devices allowing settings to be restored. Set and lock memory stops.
- C. After adjustment, take measurements to verify balance has not been disrupted or that such disruption has been rectified.
- D. Leave systems in proper working order, replacing belt guards, closing access doors, closing doors to electrical switch boxes, and restoring thermostats to specified settings.
- E. At final inspection, recheck random selections of data recorded in report. After building occupation, recheck points or areas (up to 20%) as selected and witnessed by the Engineer, at no additional cost.

### 3.6 AIR SYSTEM PROCEDURE

- A. Adjust air handling and distribution systems to provide required or design supply, return, and exhaust air quantities. For multi-stage systems, including 2 speed compressor systems, balance system airflow at full load conditions with all stages calling.
- B. Make system level air quantity measurements in ducts by Pitot tube traverse of entire cross sectional area of duct.
- C. Measure air quantities at air inlets and outlets using the airflow measuring device with the highest degree of accuracy for the condition encountered. Use correction factors where recommended by device manufacturer.
- D. Adjust distribution system to obtain uniform space temperatures free from objectionable drafts and noise.
- E. Use volume control devices to regulate air quantities only to extend that adjustments do not create objectionable air motion or sound levels. Effect volume control by duct internal devices such as dampers and splitters.
- F. Vary total system air quantities by adjustment of fan speeds. Provide drive changes required and bid accordingly. Vary branch air quantities by damper regulation.
- G. Provide system schematic with required and actual air quantities recorded at each outlet or inlet.
- H. Measure static air pressure conditions on air supply units, including filter and coil pressure drops, and total pressure across the fan. Make allowances for 50 percent loading of filters.
- I. Adjust outside air automatic dampers, outside air, return air, and exhaust dampers for design conditions.
- J. Where low exhaust rates are indicating when using an airflow hood, confirm the measurements with duct traverse or other alternate means.
- K. For DX systems with 2 speed compressors, measure and record the 1st stage (low speed) airflow and cooling coil leaving air temperature.

- L. For energy recovery devices, measure and record airflow data for both entering airstreams as well as both leaving airstreams.
- M. Upon completion of test and balance work, insert all data into a complete type written report up to submit six copies of this report, including a copy to the owner and a copy to the design engineer.

### 3.7 SCOPE

- A. Unless otherwise indicated, all phases of test and balance activities shall apply to all equipment as scheduled on the plans.

### 3.8 MINIMUM DATA TO BE REPORTED

- A. Electric Motors:
  - 1. Manufacturer.
  - 2. Model/Frame.
  - 3. HP/BHP.
  - 4. Phase, voltage, amperage; nameplate, actual, no load.
  - 5. RPM.
  - 6. Service factor.
  - 7. Starter size, rating, heater elements.
  - 8. Sheave Make/Size/Bore.
- B. Air Cooled Condensers:
  - 1. Identification/number.
  - 2. Location.
  - 3. Manufacturer.
  - 4. Model number.
  - 5. Serial number.
  - 6. Entering DB air temperature, design and actual.
  - 7. Leaving DB air temperature, design and actual.
  - 8. Number of compressors.
- C. Cooling Coils:
  - 1. Identification/number.
  - 2. Location.
  - 3. Service.
  - 4. Manufacturer.
  - 5. Air flow, design and actual.
  - 6. Entering air DB temperature, design and actual.
  - 7. Entering air WB temperature, design and actual.
  - 8. Leaving air DB temperature, design and actual.
  - 9. Leaving air WB temperature, design and actual.
  - 10. First Stage Leaving air DB temperature, actual (2 speed compressor, where applicable)
  - 11. First Stage Leaving air WB temperature, actual (2 speed compressor, where applicable)
  - 12. Saturated suction temperature, design and actual.

13. Air pressure drop, design and actual.
- D. Heating Coils:
1. Identification/number.
  2. Location.
  3. Service.
  4. Manufacturer.
  5. Air flow, design and actual.
  6. Entering air temperature, design and actual.
  7. Leaving air temperature, design and actual.
  8. Air pressure drop, design and actual.
- E. Electric Duct Heaters:
1. Manufacturer.
  2. Identification/number.
  3. Location.
  4. Model number.
  5. Design kW.
  6. Number of stages.
  7. Phase, voltage, amperage.
  8. Test voltage (each phase).
  9. Test amperage (each phase).
  10. Air flow, specified and actual.
  11. Temperature rise, specified and actual.
- F. Air Moving Equipment:
1. Location.
  2. Manufacturer.
  3. Model number.
  4. Serial number.
  5. Arrangement/Class/Discharge.
  6. Supply air flow, specified and actual
  7. First stage supply air flow (2 speed compressors, where applicable)
  8. Return air flow, specified and actual.
  9. Return air temperatures, dry-bulb and wet-bulb
  10. Outside air flow, specified and actual.
  11. Outside air temperatures, dry bulb and wet bulb
  12. Total static pressure, specified and actual
  13. External static pressure, specified and actual
  14. Inlet pressure.
  15. Discharge pressure.
  16. Sheave Make/Size/Bore.
  17. Number of Belts/Make/Size.
  18. Fan RPM.
- G. Exhaust Fans:

1. Location.
  2. Manufacturer.
  3. Model number.
  4. Serial number.
  5. Air flow, specified and actual.
  6. Total static pressure (total external), specified and actual.
  7. Inlet pressure.
  8. Discharge pressure.
  9. Sheave Make/Size/Bore.
  10. Number of Belts/Make/Size.
  11. Fan RPM.
- H. Duct Traverses:
1. System zone/branch.
  2. Duct size.
  3. Area.
  4. Design velocity.
  5. Design air flow.
  6. Test velocity.
  7. Test air flow.
  8. Duct static pressure.
  9. Air temperature.
  10. Air correction factor.
- I. Air Distribution Tests:
1. Air terminal number.
  2. Room number/location.
  3. Terminal type.
  4. Terminal size.
  5. Area factor.
  6. Design velocity.
  7. Design air flow.
  8. Test (final) velocity.
  9. Test (final) air flow.
  10. Percent of design air flow.

END OF SECTION

MCTFT RENOVATE BARRACKS 3873 & 3875  
CAMP BLANDING JOINT TRAINING CENTER  
STARKE, FLORIDA  
ARCHITECT'S PROJECT # 18038

FLORIDA ARMY NATIONAL GUARD  
CONSTRUCTION AND FACILITY MANAGEMENT OFFICE  
DEPARTMENT OF MILITARY AFFAIRS  
CFMO PROJECT #217085



## SECTION 230713 - DUCT INSULATION

### PART 1 GENERAL

#### 1.1 SECTION INCLUDES

- A. Duct insulation.
- B. Duct and plenum liner.
- C. Insulation jackets.
- D. Miscellaneous installation products.

#### 1.2 RELATED REQUIREMENTS

- A. Section 233100 - HVAC Ducts and Casings.

#### 1.3 REFERENCE STANDARDS

- A. ASTM C518 - Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus; 2017.
- B. ASTM C553 - Standard Specification for Mineral Fiber Blanket Thermal Insulation for Commercial and Industrial Applications; 2013.
- C. ASTM C612 - Standard Specification for Mineral Fiber Block and Board Thermal Insulation; 2014.
- D. ASTM C795 - Standard Specification for Thermal Insulation for Use in Contact with Austenitic Stainless Steel; 2008 (Reapproved 2013).
- E. ASTM C1071 - Standard Specification for Fibrous Glass Duct Lining Insulation (Thermal and Sound Absorbing Material); 2016.
- F. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2018.
- G. SMACNA (DCS) - HVAC Duct Construction Standards Metal and Flexible; 2005 (Revised 2009).
- H. UL 723 - Standard for Test for Surface Burning Characteristics of Building Materials; Current Edition, Including All Revisions.

#### 1.4 SUBMITTALS

- A. See Division 1 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide product description, thermal characteristics, list of materials and thickness for each service, and locations.
- C. Manufacturer's Instructions: Indicate installation procedures necessary to ensure acceptable workmanship and that installation standards will be achieved.

1.5 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing products of the type specified in this section with not less than three years of documented experience.
- B. Applicator Qualifications: Company specializing in performing the type of work specified in this section, with minimum 3 years of experience and approved by manufacturer.

1.6 REGULATORY REQUIREMENTS

- A. Materials: Flame spread/smoke developed rating of 25/50 in accordance with ASTM E 84 or UL 723.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Accept materials on site in original factory packaging, labelled with manufacturer's identification, including product density and thickness.
- B. Protect insulation from weather and construction traffic, dirt, water, chemical, and mechanical damage, by storing in original wrapping.

PART 2 PRODUCTS

2.1 REGULATORY REQUIREMENTS

- A. Surface Burning Characteristics: Flame spread index/Smoke developed index of 25/50, maximum, when tested in accordance with ASTM E84 or UL 723.

2.2 GENERAL

- A. Duct insulation shall be the required thickness and material to provide a minimum thermal resistance "R" as scheduled herein. Rating shall be at 75 degrees F, tested in accordance with ASTM C-518 or ASTM C-177.
- B. Coverings and linings shall have a flamespread rating of not over 25 without evidence of continued progressive combustion and a smoke developed rating of not over 50, and shall not flame, flow, smolder or smoke when tested in accordance with ASTM C 411 at the designated maximum service temperature.

2.3 GLASS FIBER, FLEXIBLE

- A. For determination of thermal performance of flexible duct wrap, the installed wrap shall have an assumed thickness of 75% of the nominal thickness, allowing for 25% compression.
- B. Manufacturer:
  - 1. Johns Manville
  - 2. Knauf Insulation
  - 3. Owens Corning Corporation

4. CertainTeed Corporation

C. Insulation: ASTM C553; flexible, noncombustible blanket.

1. 'K' value: 0.27 at 75 degrees F, when tested in accordance with ASTM C518.
2. Maximum Service Temperature: 250 degrees F.
3. Maximum Water Vapor Sorption: 5.0 percent by weight.
4. Maximum Water Vapor Permeance: 0.02 Perms

D. Vapor Barrier Jacket:

1. Kraft paper with glass fiber yarn and bonded to aluminized film.
2. Moisture vapor transmission: ASTM E 96; 0.05 perm.

## 2.4 GLASS FIBER, RIGID

A. Manufacturer:

1. Johns Manville
2. Knauf Insulation
3. Owens Corning Corporation
4. CertainTeed Corporation

B. Insulation: ASTM C612; rigid, noncombustible blanket.

1. 'K' Value: 0.24 at 75 degrees F, when tested in accordance with ASTM C518.
2. Maximum Service Temperature: 450 degrees F.
3. Maximum Water Vapor Absorption: 5.0 percent.
4. Density: 3.0 lb/cu ft.

C. Vapor Barrier Jacket:

1. Kraft paper with glass fiber yarn and bonded to aluminized film.
2. Moisture vapor transmission: ASTM E 96; 0.04 perm.

## 2.5 DUCT AND PLENUM LINER

A. Manufacturers:

1. Johns Manville
2. Knauf Insulation
3. Owens Corning Corporation
4. CertainTeed Corporation

B. Glass Fiber Insulation: Incombustible glass fiber complying with NFPA 90A & 90B, ASTM C 1071; rigid board, cleanable.

1. Apparent Thermal Conductivity: Maximum of 0.28 at 75 degrees F.
2. Service Temperature: Up to 250 degrees F.
3. Water Vapor Sorption: less than 3% by weight per ASTM C 1104.
4. Rated Velocity on Coated Air Side for Air Erosion: 6,000 fpm, minimum.
5. Corrosion resistance shall pass per ASTM C 665.
6. Fungi Resistance: No growth per ASTM C 1338 & G 21.
7. Bacteria Resistance: No growth per ASTM G 22.

8. Water Repellency: greater than or equal to 4 per INDA IST 80.6-92.
9. Acoustical Performance: equal to Certaineed ToughGard with enhanced performance.

## 2.6 MISCELLANEOUS INSTALLATION PRODUCTS

- A. Vapor-Barrier Mastic: Water based, suitable for indoor use on below ambient surfaces.
  1. Foster Brand or Vimasco 739
  2. Color: White
  3. Maximum Water Vapor Permeance: 0.08 Perms at 32 mils dry film (ASTM F 1249)
- B. Vapor-Barrier Mastic: Water based, suitable for outdoor use on below ambient surfaces.
  1. Foster Brand or Vimasco 739
  2. Color: White
  3. Maximum Water Vapor Permeance: 0.08 Perms at 32 mils dry film (ASTM F 1249)
- C. Staples
  1. Outward clinching insulation staples, nominal 3/4 inch wide, stainless steel or monel.

## PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Examine duct and overall project conditions for compliance with requirements for installation tolerances and other conditions affecting performance of insulation application.
  1. Verify that ducts have been tested as required and are free of defects.
  2. Verify that surfaces are clean, foreign material removed, and dry.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 GENERAL INSTALLATION REQUIREMENTS

- A. Install in accordance with manufacturer's instructions.
- B. Provide insulation with factory applied vapor barrier jackets.
- C. Install insulation materials, accessories, and finishes with smooth, straight, and even surfaces; free of voids throughout the length of ducts and fittings.
- D. Install multiple layers of insulation with longitudinal and end seams staggered. Multiple layers are not normally used and require specific approval.
- E. Keep insulation materials dry during application and finishing.
- F. Install insulation with tight longitudinal seams and end joints.
- G. Install insulation with least number of joints practical.
- H. Seal all joints with two coats of glass fabric and mastic.

- I. Install insulation continuously through walls, sleeves, hangers, and other duct penetrations.
- J. Seal joints, seams, and penetrations in insulation at hangers, supports, anchors, and other projections with vapor-barrier mastic.
- K. Apply adhesives, mastics, and sealants at manufacturer's recommended coverage rate and wet and dry film thicknesses.
- L. Inspect installation with systems at operating conditions. Repair joint separations and cracking caused by thermal movement.
- M. Repair damaged insulation facings by applying same facing material over damaged areas. Extend patches at least 4 inches beyond damaged areas. Adhere, staple, and seal patches similar to butt joints.
- N. Factory insulate the backs of all diffusers. Field insulate all other backpans and transitions.

### 3.3 INSTALLATION OF FLEXIBLE GLASS FIBER INSULATION

- A. Insulation shall be cut to "stretch-out" dimensions and install with facing to the outside to obtain specified R-value using a maximum of 25% compression.
- B. Remove a 2 inch piece of duct wrap from the facing at the end to form an overlapping staple flap for the vapor barrier.
- C. Butt all insulation joints firmly together. Seams must be overlapped a minimum of 2".
- D. Seams and joints shall be secured by stapling at 6" on center with outward clinching staples.
- E. All penetrations, joints, seams and damage to the facing should be sealed with two coats of glass fabric and mastic prior to system startup.
- F. For rectangular ducts over 24" wide, secure the insulation to the bottom side of the duct with mechanical fasteners spaced at 18" on center. Avoid over compressing the insulation with the retaining washer.
- G. Insulation shall be impaled on the fasteners and secured with self-locking washers. The pin shall be trimmed and bent over.
- H. Stop and point insulation around access doors and damper operators to allow operation without disturbing wrapping.
- I. Adhesive is not recommended to secure insulation to duct surfaces.

### 3.4 INSTALLATION OF RIGID GLASS FIBER INSULATION

- A. Remove a 2 inch piece of insulation from the facing at the end to form an overlapping vapor barrier flap.
- B. Butt all insulation joints firmly together. Seams must be overlapped a minimum of 2".
- C. Secure to ductwork using mechanical fasteners. Fasteners shall be located a maximum of 3" from each end and spaced at no more than 12' on center.

- D. Insulation shall be impaled on the fasteners and secured with self-locking washers. The pin shall be trimmed and bent over.
- E. All penetrations, joints, seams and damage to the facing should be sealed with two coats of glass fabric and mastic prior to system startup.

### 3.5 INSTALLATION OF DUCT AND PLENUM LINER:

- A. Adhere insulation with adhesive for 90 percent coverage.
- B. Secure insulation with mechanical liner fasteners. Refer to SMACNA (DCS) for spacing.
- C. Seal and smooth joints. Seal and coat transverse joints.
- D. Seal liner surface penetrations with adhesive.
- E. Duct dimensions indicated are net inside dimensions required for air flow. Increase duct size to allow for insulation thickness.

### 3.6 SCHEDULES

- A. Supply and Return (concealed):
  - 1. Insulate ductwork using 2" external ductwrap with vapor barrier, 1.0 PCF (R-6.0 minimum).
- B. Supply and Return (exposed): Insulate ductwork in mechanical rooms and other exposed spaces using fiberglass insulation board with vapor barrier, 1" thick. 6.0 PCF (minimum R-4.4).
- C. Outside Air Intake Ducts (concealed): Insulate locations within the building insulation using 1-1/2" external duct wrap with vapor barrier, 1.0 pcf (R 4.5 minimum).
- D. General Exhaust (concealed): Insulate exhaust ductwork using 1-1/2" external duct wrap with vapor barrier, 1.0 pcf (R-4.5 minimum).
- E. Plenum Liner: Insulate interior of return air plenum boxes (typical for heat pump AHU's) using duct and plenum liner. 1-1/2", 3.0 PCF, (R-6.5 minimum).

END OF SECTION

## SECTION 233100 - HVAC DUCTS AND CASINGS

### PART 1 GENERAL

#### 1.1 SECTION INCLUDES

- A. Ductwork for Comfort Cooling and Heating Systems, General Supply and Return
- B. Ductwork for General Exhaust Systems
- C. Ductwork for Outside Air Intakes
- D. Duct cleaning

#### 1.2 RELATED REQUIREMENTS

- A. Section 230593 - Testing, Adjusting, and Balancing for HVAC.
- B. Section 230713 - Duct Insulation: External insulation and duct liner.
- C. Section 233300 - Air Duct Accessories.
- D. Section 233700 - Air Outlets and Inlets.

#### 1.3 REFERENCE STANDARDS

- A. ASHRAE (FUND) - ASHRAE Handbook - Fundamentals; Most Recent Edition Cited by Referring Code or Reference Standard.
- B. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2014.
- C. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2017.
- D. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2018.
- E. ICC-ES AC01 - Acceptance Criteria for Expansion Anchors in Masonry Elements; 2015.
- F. ICC-ES AC106 - Acceptance Criteria for Predrilled Fasteners (Screw Anchors) in Masonry Elements; 2015.
- G. ICC-ES AC193 - Acceptance Criteria for Mechanical Anchors in Concrete Elements; 2015.
- H. ICC-ES AC308 - Acceptance Criteria for Post-Installed Adhesive Anchors in Concrete Elements; 2016.
- I. NFPA 90A - Standard for the Installation of Air-Conditioning and Ventilating Systems; 2018.
- J. SMACNA (DCS) - HVAC Duct Construction Standards Metal and Flexible; 2005 (Revised 2009).
- K. UL 181 - Standard for Factory-Made Air Ducts and Air Connectors; current edition, including all revisions.
- L. NAIMA - North American Insulation Manufacturer's Association.

#### 1.4 SUBMITTALS

- A. See Division 1 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data for each duct system including the following information for each system:
  - 1. System name and type.
  - 2. System material and sheet metal gages.
  - 3. System sealant method and materials.
  - 4. Transverse joints and longitudinal seams.
  - 5. Reinforcement type.
- C. Prepare shop drawings for internal use for the purpose of coordination with other trades including structural, piping, plumbing, electrical, lighting and architectural. Submit to general contractor for coordination with other trades.
- D. Submit formal shop drawings to Engineer showing significant deviations from drawings upon request.
- E. Project Record Documents: Record actual locations of ducts and duct fittings. Record changes in fitting location and type. Show additional fittings used.

#### 1.5 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with minimum three years of documented experience.
- B. Installer Qualifications: Company specializing in performing the type of work specified in this section, with minimum 5 years of documented experience.

#### 1.6 FIELD CONDITIONS

- A. Do not install duct sealants when temperatures are less than those recommended by sealant manufacturers.
- B. Maintain temperatures within acceptable range during and after installation of duct sealants.

### PART 2 PRODUCTS

#### 2.1 GENERAL

- A. Regulatory Requirements: Construct ductwork to NFPA 90A standards.
- B. This section covers duct system application requirements, ductwork materials, field fabricated ductwork, and factory fabricated ductwork. See Air Duct Accessories Section for requirements for the following components: turning vane elbows, spin-in fittings, conical fittings, volume control dampers, fire/smoke dampers, flexible duct connectors, and access doors.



- C. Requirements established in these specifications are to be considered minimum requirements. Contractor shall review applicable building code requirements and construct to the more stringent of the two.

## 2.2 APPLICATION REQUIREMENTS

- A. Comfort Heating and Cooling Systems, General Supply and Return
  - 1. Galvanized Steel, 1 inch w.g. pressure class, Class A duct sealing.
- B. General Exhaust Systems
  - 1. Galvanized Steel, 1 inch w.g. pressure class. Duct sealing: Class A.
- C. General Outside Air Intake
  - 1. Galvanized Steel, 1 inch w.g. pressure class, Class A duct sealing.

## 2.3 DUCT AND APPLICATION MATERIALS

- A. Galvanized Steel Ducts: Hot-dipped galvanized steel sheet, ASTM A 653/A 653M FS Type B, with G60/Z180 coating. Lock forming quality.
- B. Joint Sealers and Sealants: Non-hardening, water resistant, mildew and mold resistant.
  - 1. Type: Heavy mastic or liquid used alone or with tape, suitable for joint configuration and compatible with substrates, and recommended by manufacturer for pressure class of ducts.
  - 2. Surface Burning Characteristics: Flame spread index of zero and smoke developed index of zero, when tested in accordance with ASTM E84.
  - 3. Except as noted, oil or solvent based sealants are prohibited.
  - 4. For exterior applications, United McGill Corporation "Uni-weather" solvent based sealant or Foster 32-19 shall be used.
- C. Hanger Rod: ASTM A36/A36M; steel, galvanized; threaded both ends, threaded one end, or continuously threaded.
- D. Hanger Fasteners: Attach hangers to structure using appropriate fasteners, as follows:
  - 1. Concrete Wedge Expansion Anchors: Complying with ICC-ES AC193.
  - 2. Masonry Wedge Expansion Anchors: Complying with ICC-ES AC01.
  - 3. Concrete Screw Type Anchors: Complying with ICC-ES AC193.
  - 4. Masonry Screw Type Anchors: Complying with ICC-ES AC106.
  - 5. Concrete Adhesive Type Anchors: Complying with ICC-ES AC308.
- E. Pressure sensitive tape shall have acrylic based adhesive and shall comply with UL 181A.
  - 1. Material shall not exceed a flame spread rating of 25 or a smoke developed rating of 50, and shall fully comply with requirements of NFPA 90A.
  - 2. Water vapor transmission rate shall be less than 0.02 perms.
- F. Scrim tape shall be fiberglass open weave, 3 inches wide, with maximum 20/10 thread count.

## 2.4 DUCTWORK FABRICATION

- A. Fabricate and support in accordance with SMACNA HVAC Duct Construction Standards - Metal and Flexible, and as indicated. Select sheet metal gages, duct dimensions and reinforcement spacing based on the pressure class specified as set forth in the Standard.
- B. No variation of duct configuration or size is permitted except by written permission. Where substitution is allowed, size round duct installed in place of rectangular ducts for equal pressure drop.
- C. Sheet metal ductwork shall be constructed from steel sheets up to 60" in width. Each sheet shall be stenciled with the manufacturer's name and gage. Sheet metal must conform to tolerances as outlined in SMACNA's "HVAC Duct Construction Standards". Provide cross breaking or external stiffening on dimensions over 18", where recommended in the Standard and as necessary to minimize oil canning or vibration.
- D. Rectangular duct transverse and longitudinal seams shall be selected for the pressure class, materials and other provisions indicated and shall be as shown in SMACNA Duct Construction Standards.
- E. Round duct transverse and longitudinal seams shall be selected for the pressure class, materials and other provisions indicated and shall be as shown in SMACNA Duct Construction Standards. Round duct elbows and tee fittings shall be indicated in the Standards.
  - 1. Snaplock longitudinal seams, crimp style transverse joints, adjustable round duct elbows and 90 degree tap tee fittings are limited to duct systems with a pressure class of 1 inch w.g. or less; including downstream of terminal units unless otherwise indicated. Transverse joints shall be screwed per the Standard, not less than 3 places.
  - 2. Duct systems with a pressure class greater than 1 inch w.g. shall be fabricated with pre-manufactured spiral round duct or continuous weld seam duct, and fitted with saddle tap tee fittings and stamped or segmented elbows.
- F. Class A sealing shall have all transverse joints, longitudinal seams and duct wall penetrations sealed.
  - 1. Unless otherwise indicated, sealing for systems with a pressure class of 1 inch w.g. or less may be accomplished with pressure sensitive tape. Duct fabric and mastic shall be used as a supplement where necessary. Pressure sensitive tape alone shall not be used for sealing systems with a pressure class greater than 1 inch w.g..
  - 2. Unless otherwise indicated, systems with a pressure class of 3 inch w.g. or less may be sealed by applying one layer of sealant, then immediately spanning the joint with a single layer of 3 inch wide open weave fiberglass scrim tape. Sufficient additional sealant shall then be applied to completely embed the cloth. As an alternate, sealing may be accomplished using gasketed joints under compression installed in accordance with SMACNA Duct Construction Standards or continuous welded seams.
  - 3. Systems with a pressure class greater than 3" shall be sealed using pre-manufactured duct and fittings with gasket joints under compression or continuous welded seams.

## 2.5 MANUFACTURED DUCTWORK

- A. Acoustical Flexible Ducts: UL 181, Class 1, aluminum laminate and polyester film with latex adhesive supported by helically wound spring steel wire.

1. Insulation: Fiberglass insulation with polyethylene vapor barrier film. Insulate to values indicated under HVAC Insulation section.
2. Pressure Rating: 10 inches WG positive and 1.0 inches WG negative.
3. Maximum Velocity: 4000 fpm.
4. Temperature Range: Minus 20 degrees F to 210 degrees F.

## 2.6 CASINGS

- A. Fabricate casings in accordance with SMACNA HVAC Duct Construction Standards - Metal and Flexible, and construct for operating pressures indicated. All casings shall enclose the filter and dampers as shown on the Drawings.
- B. Casings rated for pressure class up to 2 inches w.g. shall be fabricated of galvanized sheet metal erected with three-foot center maximum standing seams reinforced with 1/4-inch bars. The casing shall be stiffened on three-foot centers maximum with angle irons tack welded in place.
- C. Casings rated for pressure class up to 6 inches w.g. shall be constructed of cellular, standing seam panels with 3 inch deep reinforced "hat" sections as manufactured by metal deck manufacturers and as described in SMACNA Standards.
- D. All openings to the casing shall be properly sealed to prevent any air leakage as described above for the general ductwork. Access doors shall be installed as indicated on the Drawings and shall be air tight, double skin insulated construction with frames welded in place. Doors shall be rubber gasketed and equipped with latches and hinges that can be operated from both the inside and the outside.
- E. Casings shall be anchored by the use of angle irons sealed and bolted to the curb and floor of the apparatus casing.

## PART 3 EXECUTION

### 3.1 INSTALLATION

- A. Install, support, and seal ducts in accordance with SMACNA HVAC Duct Construction Standards - Metal and Flexible.
- B. Install in accordance with manufacturer's instructions.
- C. Duct sizes indicated are inside clear dimensions. Allowances shall be made for duct liner thicknesses where applicable.
- D. Provide 45 degree entry on all tees used for branch duct to main duct connections. Splitters and extractors shall not be used unless specifically called for on drawings.
- E. Use fittings (no scoop) with manual volume dampers for all diffuser and grille connection takeoffs, unless otherwise indicated on drawings. Refer to section 23 33 00.
- F. Make all ductwork connections to air handler units, including fan terminal units, with flexible connectors.

- G. All elbows shall have turning vanes or shall be radius elbows. See Air Duct Accessories section for turning vane elbows. Radius elbows may be substituted for turning vane elbows unless specifically otherwise indicated on drawings. Construct T's, bends, and elbows with radius of not less than 1-1/2 times width of duct on centerline.
  - H. Increase duct sizes gradually, not exceeding 15 degrees divergence wherever possible; maximum 30 degrees divergence upstream of equipment and 45 degrees convergence downstream.
  - I. Where ducts are connected to exterior wall louvers and duct outlet is smaller than louver frame, provide boxed in plenum with depth to suit field conditions but not less than 16" deep, same size as louver opening. Use same material as duct; seal to louver frame and duct.
  - J. Flexible ducts shall be used where shown on the drawings for connections to air distribution devices and to terminal units as applicable.
    - 1. Terminal ends shall be sealed to metal core insert with adhesive and secured using compression couplings or stainless steel worm gear type clamp. Collars shall be inserted into the flexible duct a minimum of 1" before fastening.
    - 2. Insulation on flexible duct shall be slipped over the connection to the point where insulation abuts the terminal unit or insulation on main duct. Seal joints in insulation as specified under Duct Insulation Section.
    - 3. Install flexible duct connections to diffusers and grilles with a minimum run (not to exceed 6'). Bends shall have a minimum radius of 1-1/2 times the diameter of the duct as measured from the centerline. Duct shall be fully extended. Do not lay on light fixtures or ceiling.
  - K. Provide openings in ductwork where required to accommodate thermometers and controllers. Provide pilot tube openings where required for testing of systems, complete with metal can with spring device or screw to ensure against air leakage. Where openings are provided in insulated ductwork, install insulation material inside a metal ring.
  - L. Locate ducts with sufficient space around equipment to allow normal operating and maintenance activities.
  - M. Use double nuts and lock washers on threaded rod supports.
  - N. Metal Duct
    - 1. Fabricate and support in accordance with SMACNA HVAC Duct Construction Standards - Metal and Flexible, and as indicated. Provide duct material, gages, and reinforcing for operating external static pressures indicated in Part 2 under Application Requirements.
  - O. Where ducts are exposed to view (including equipment rooms) and where ducts pass through walls, floors or ceilings; furnish and install sheet metal collars around the duct.
  - P. Project inspector shall be notified to allow inspection of field installed ductwork prior to coverup or application of field installed insulation.
- 3.2 CLEANING
- A. Before installing ductwork, wipe ductwork to a visibly clean condition.

- B. During construction, provide temporary closures of metal or taped polyethylene on open ductwork and duct taps to prevent construction dust or contaminants from entering the system. Seal ends of ductwork prior to installation to keep ductwork interior clean. Remove closures only for installation of the next section.
- C. During the duration of construction, maintain the integrity of all temporary closures until air systems are activated.
- D. Following completion of construction and prior to testing and balancing the system, provide new air filters as specified for the equipment.

### 3.3 DUCT AIR LEAK TESTING

- A. All low-pressure duct systems (positive or negative) shall be inspected for visible and audible signs of leakage.
  - 1. Leaks identified by inspection shall be repaired by:
    - a. Complete removal of the sealing materials.
    - b. Thorough cleaning of the joint surfaces.
    - c. Installation of multiple layers of sealing materials.
  - 2. Discrepancies found during testing and balancing between duct traverses and diffuser/grille readings shall result in re-inspection, repair and retest until discrepancies are eliminated.
- B. Ductwork leakage testing and/or inspection shall be performed prior to installation of external ductwork insulation.

END OF SECTION

MCTFT RENOVATE BARRACKS 3873 & 3875  
CAMP BLANDING JOINT TRAINING CENTER  
STARKE, FLORIDA  
ARCHITECT'S PROJECT # 18038

FLORIDA ARMY NATIONAL GUARD  
CONSTRUCTION AND FACILITY MANAGEMENT OFFICE  
DEPARTMENT OF MILITARY AFFAIRS  
CFMO PROJECT #217085

## SECTION 233300 - AIR DUCT ACCESSORIES

### PART 1 GENERAL

#### 1.1 SECTION INCLUDES

- A. Air turning devices.
- B. Duct test holes.
- C. Flexible duct connections.
- D. Manual volume dampers.

#### 1.2 RELATED REQUIREMENTS

- A. Section 233100 - HVAC Ducts and Casings.

#### 1.3 REFERENCE STANDARDS

- A. NFPA 90A - Standard for the Installation of Air-Conditioning and Ventilating Systems; 2018.
- B. SMACNA (DCS) - HVAC Duct Construction Standards Metal and Flexible; 2005 (Revised 2009).
- C. UL 555 - Standard for Fire Dampers; Current Edition, Including All Revisions.
- D. UL 555S - Standard for Smoke Dampers; Current Edition, Including All Revisions.

#### 1.4 SUBMITTALS

- A. See Division 1 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide for each type of product indicated. Include electrical characteristics and connection requirements.
- C. Shop Drawings: Provide for shop fabricated assemblies for each type of product indicated.
- D. Manufacturer's Installation Instructions: Provide instructions for products provided.

#### 1.5 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with minimum three years of documented experience.
- B. Products Requiring Electrical Connection: Listed and classified by Underwriters Laboratories Inc. as suitable for the purpose specified and indicated.

## PART 2 PRODUCTS

### 2.1 GENERAL REQUIREMENTS

- A. Refer to Specification Section titled HVAC Ducts and Casings for pressure class, sealing requirements and material requirements of each air system.
- B. Duct accessories shall be fabricated from material suitable for duct materials; use stainless steel accessories for stainless steel ductwork, aluminum accessories for aluminum ductwork, etc. Where galvanized steel is indicated herein, adjust accordingly unless otherwise indicated.

### 2.2 TURNING VANE ELBOWS, TEES AND OFFSETS

- A. Construct elbows, tees, and offsets with turning vanes shall be single or double thickness with 24 gauge rails and hollow vanes fabricated/manufactured in accordance with SMACNA Duct Construction Standards. Vanes shall be securely attached to runners.

### 2.3 RADIUS ELBOWS, TEES AND OFFSETS

- A. Construct tees, bends, and elbows with radius of not less than 1-1/2 times width of duct on centerline in accordance with SMACNA Duct Construction Standards.
- B. Radius fittings do not require turning vanes unless specifically indicated otherwise.

### 2.4 ROUND ELBOWS, TEES AND OFFSETS

- A. Round duct elbows and tee fittings shall be as indicated in the SMACNA Duct Construction Standards.
- B. Adjustable round duct elbows and 90 degree tap tee fittings are limited to duct systems with a pressure class of less than 1 inch w.g.; including downstream of terminal units unless otherwise indicated.
- C. Duct systems with a pressure class greater than 1 inch w.g. shall utilize saddle tap tee fittings and stamped or segmented elbows, fitted for pre-manufactured spiral round duct or continuous weld seam duct.

### 2.5 BRANCH CONNECTIONS

- A. Rectangular branch duct entry fittings shall be the 45 degree entry type fabricated and installed in accordance with SMACNA Duct Construction Standards.
- B. Round duct systems with a pressure class greater than 1 inch w.g. shall utilize saddle tap branch connections fitted for pre-manufactured spiral round duct or continuous weld seam duct, with 90 degree entries for runouts to diffusers and 45 degree entry type for branch connections.
- C. Round branch entry fittings mounted to rectangular mains greater than 1" pressure class shall be bellmouth fittings with one piece bellmouth base and continuous weld round duct collar. Bellmouth flange



shall include gasket and pre-drilled mounting holes (3 minimum). Bellmouth radius shall be 1/5 the branch duct diameter. Provide integral damper where indicated on plans and specified elsewhere.

- D. Round branch entry fittings mounted to rectangular mains rated for 1" pressure class and less shall be straight takeoff spin-in fittings with continuous weld round duct collar, without scoop.
- E. Where called for, integral dampers at takeoff fittings shall be constructed with 2" damper standoff handle to allow clearance for external insulation, locking nut and nylon grommets installed at sleeve penetration. Damper for sizes 6" and smaller shall have a reinforced damper axis. Dampers for sizes 8" and larger shall have a continuous rod damper.

## 2.6 DUCT TEST HOLES

- A. Temporary Test Holes: Cut or drill in ducts as required. Cap with neoprene plugs, threaded plugs, or threaded or twist-on metal caps.
- B. Instrument Test Holes: Factory fabricated, air tight flanged fittings with screw cap cast iron or cast aluminum to suit duct material. Size to allow insertion of pitot tube and other testing instruments. Provide extended neck fittings to clear insulation.

## 2.7 FLEXIBLE DUCT CONNECTORS

- A. Fabricate flexible duct connectors used to connect ductwork to motorized equipment in accordance with SMACNA HVAC Duct Construction Standards - Metal and Flexible, and as indicated.
- B. Flexible Duct Connections: Fabric crimped into metal edging strip.
  - 1. Fabric: UL listed fire-retardant neoprene coated woven glass fiber fabric to NFPA 90A, minimum density 30 oz per sq yd.
    - a. Net Fabric Width: Approximately 3 inches to 6 inches wide.
  - 2. Metal: 3 inches wide, 24 gage, 0.0239 inch thick galvanized steel.

## 2.8 MANUAL VOLUME DAMPERS

- A. Standard leakage rating, with linkage outside of airstream, rated for duct pressure class indicated.
- B. Suitable for vertical or horizontal orientation as indicated on plans.
- C. Single blade dampers
  - 1. Frames shall be constructed from galvanized steel, 22 gauge minimum thickness channels, with mitered and welded corners, flanges where required for wall installations.
  - 2. Blade width shall not exceeding 12 inches. Blade shall be stiffened for stability. Blade construction shall be minimum 22 gauge. Blade axles to be pinned at either end or continuous.
  - 3. Adhesives shall be UL 181 Class 1 listed.
- D. Multi-blade dampers
  - 1. Frames shall be constructed from galvanized steel channels, 16 gauge minimum thickness, with mitered and welded corners, flanges where required for wall installations. Maximum frame width to be 48 inches; provide sectionalized damper assembly for larger dimensions.

2. Blade width shall not exceeding 12 inches. Provide opposed or parallel blades as indicated. Blades shall be stiffened for stability. Blade construction shall be minimum 16 gauge. Blade axles to be continuous.
  3. Tie bars and brackets shall be galvanized steel.
- E. Blade axles
1. Molded synthetic sleeve type bearings, corrosion resistant.
  2. Square or hexagonal axles positively locked into the damper blade.
  3. Operators mounted on 2 inch standoff handles for insulation clearance with position indicators and wing nut locking device.

### PART 3 EXECUTION

#### 3.1 INSTALLATION

- A. Install accessories in accordance with manufacturer's instructions, NFPA 90A, and follow SMACNA HVAC Duct Construction Standards. Refer to HVAC Ducts and Casings section for duct construction and pressure class.
- B. Install duct accessories of material suitable for duct materials used; use stainless steel accessories for stainless steel ductwork, aluminum accessories for aluminum ductwork, etc.
- C. Provide duct test holes where required for testing and balancing purposes and where required for instrumentation.
- D. Provide fire dampers, combination fire and smoke dampers, and smoke dampers at locations indicated, where ducts and outlets pass through fire rated components, and where required by authorities having jurisdiction. Prior to bidding, review latest architectural plans for final coordination on locations of fire rated walls. Install with required perimeter mounting angles, sleeves, breakaway duct connections, corrosion resistant springs, bearings, bushings and hinges in strict accordance with manufacturer's instructions and UL listing requirements.
- E. At fans and motorized equipment associated with ducts, provide flexible duct connectors immediately adjacent to the equipment.
- F. Provide balancing dampers at points on supply, return, outside air and exhaust systems where branches are taken from larger ducts as required for air balancing. Install minimum 2 duct widths from duct take-off to the maximum extent practical.
- G. Use splitter dampers only where indicated on plans.
- H. Provide single blade balancing dampers at duct take-off to diffusers, grilles, and registers, unless included in diffuser or register schedule. If impractical due to space limitations, an opposed blade damper shall be provided as an accessory to the diffuser, grille or register. Adjust diffuser neck size if noise generated by diffuser damper is unacceptable.
- I. Provide opposed blade dampers for all other balancing, mixing, and modulating control applications. Provide opposed blade dampers as necessary to supplement multiple speed air handling units to obtain scheduled total airflow.

- J. Set dampers to fully open position before testing, adjusting and balancing.

### 3.2 FIELD QUALITY CONTROL

- A. Operate dampers to verify full range of movement and proper actuation of motorized dampers.
- B. Inspect turning vanes for proper and secure installation.

END OF SECTION

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## SECTION 233423 - HVAC POWER VENTILATORS

### PART 1 GENERAL

#### 1.1 SECTION INCLUDES

- A. Cabinet and ceiling exhaust fans.

#### 1.2 RELATED REQUIREMENTS

- A. Section 233300 - Air Duct Accessories: Backdraft dampers.

#### 1.3 REFERENCE STANDARDS

- A. AMCA 99 - Standards Handbook; 2016.
- B. AMCA 204 - Balance Quality and Vibration Levels for Fans; 2005.
- C. AMCA 210 - Laboratory Methods of Testing Fans for Certified Aerodynamic Performance Rating; 2016.
- D. AMCA 300 - Reverberant Room Method for Sound Testing of Fans; 2014.
- E. AMCA 301 - Methods for Calculating Fan Sound Ratings from Laboratory Test Data; 2014.
- F. NFPA 96 - Standard for Ventilation Control and Fire Protection of Commercial Cooking Operations; 2017.
- G. UL 705 - Power Ventilators; Current Edition, Including All Revisions.
- H. UL 762 - Outline of Investigation for Power Roof Ventilators for Restaurant Exhaust Appliances; Current Edition, Including All Revisions.

#### 1.4 SUBMITTALS

- A. See Division 1 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data on fans and accessories including fan curves with specified operating point clearly plotted, power, RPM, sound power levels at rated capacity, and electrical characteristics and connection requirements.
- C. Manufacturer's Instructions: Indicate installation instructions.
- D. Maintenance Data: Include instructions for lubrication, motor and drive replacement, spare parts list, and wiring diagrams.

#### 1.5 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with minimum three years of documented experience.

## PART 2 PRODUCTS

### 2.1 MANUFACTURERS

- A. Greenheck Fan Corporation
- B. Loren Cook Company
- C. PennBarry
- D. Substitutions: As allowed by Section 23 05 10.

### 2.2 POWER VENTILATORS - GENERAL

- A. Static and Dynamically Balanced: AMCA 204 - Balance Quality and Vibration Levels for Fans. Not applicable to ceiling and cabinet fans.
- B. Performance Ratings: Determined in accordance with AMCA 210 and bearing the AMCA Certified Rating Seal. Not applicable to ceiling and cabinet fans.
- C. Sound Ratings: AMCA 301, tested to AMCA 300, and bearing AMCA Certified Sound Rating Seal. Not applicable to ceiling and cabinet fans.
- D. Fabrication: Conform to AMCA 99. Not applicable to ceiling and cabinet fans.
- E. UL Compliance: UL listed and labeled, designed, manufactured, and tested in accordance with UL 705.
- F. Electrical Components: Listed and classified by Underwriters Laboratories Inc. as suitable for the purpose specified and indicated.
- G. Kitchen Hood Exhaust Fans: Comply with requirements of NFPA 96 and UL 762.

### 2.3 CABINET AND CEILING EXHAUST FANS

- A. Centrifugal Fan Unit: Direct driven with steel housing , resilient mounted motor, gravity backdraft damper in discharge.
- B. Cabinet: Square steel design with integral duct collars for in-line fan applications..
- C. Wheel: Constructed of 100% aluminum or high impact plastic, statically balanced.
- D. Provide unit mounted variable speed controller allowing a minimum airflow adjustment from 100% to down to 50%.
- E. Built-in thermal overload protection.
- F. Disconnect Switch: Cord and plug in housing for thermal overload protected motor .
- G. Unit shall be convertible for in-line mounting configurations.

- H. Grille: Molded white plastic for ceiling mount where scheduled.
- I. Fans shall be selected to deliver scheduled airflow through a range of +/- 25% of external static pressure indicated.
- J. Sound performance shall be as scheduled. If not scheduled, sound performance shall be 3 sones or less, unless otherwise authorized.

### PART 3 EXECUTION

#### 3.1 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Hung Fans:
  - 1. Install fans with resilient mountings and flexible electrical leads.
  - 2. Install flexible connections specified in Section 233300 between fan and ductwork. Ensure metal bands of connectors are parallel with minimum one inch flex between ductwork and fan while running.
- C. Provide sheaves required for final air balance on belt drive fans.
- D. Provide backdraft dampers on outlet from cabinet and ceiling exhaust fans, and on in-line fans as indicated.

#### 3.2 SCHEDULES

- A. See drawings for equipment schedules.

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## SECTION 233700 - AIR OUTLETS AND INLETS

### PART 1 GENERAL

#### 1.1 SECTION INCLUDES

- A. Diffusers.
- B. Registers/grilles.

#### 1.2 REFERENCE STANDARDS

- A. ASHRAE Std 70 - Method of Testing the Performance of Air Outlets and Inlets; 2006 (Reaffirmed 2011).
- B. SMACNA (DCS) - HVAC Duct Construction Standards Metal and Flexible; 2005 (Revised 2009).

#### 1.3 SUBMITTALS

- A. See Division 1 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide data for equipment required for this project. Review outlets and inlets as to size, finish, and type of mounting prior to submission. Submit schedule of outlets and inlets showing type, size, location, application, pressure drop dimensions, construction and noise level.

#### 1.4 QUALITY ASSURANCE

- A. Test and rate air outlet and inlet performance in accordance with ASHRAE Std 70.
- B. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with minimum three years of documented experience.

### PART 2 PRODUCTS

#### 2.1 MANUFACTURERS

- A. Price Industries
- B. Titus
- C. Tuttle and Bailey
- D. Nailor

#### 2.2 ALL DIFFUSERS, GRILLES AND REGISTERS

- A. See legend on mechanical plans.
- B. Unless otherwise indicated, all diffusers, supply grilles and registers shall meet the following:

1. Pressure drop shall fall between the range of 0.035 to 0.80 inches w.g., based on airflow and neck size shown on plans.
  2. Based on airflow and neck size shown on plans, noise criteria rating for corridor applications shall be less than or equal to NC 35. All other applications shall be less than or equal to NC 25.
- C. Unless otherwise indicated, all return grilles shall meet the following:
1. Pressure drop shall be less than 0.035 inches w.g. for the indicated airflow, based on neck size shown on plans.
  2. Based on airflow and neck size shown on plans, noise criteria rating for corridor applications shall be less than or equal to NC 35. All other applications shall be less than or equal to NC 25.
- D. All diffusers, grilles and registers shall be factory furnished devices of aluminum construction. Exterior and exposed edges shall be rolled, or otherwise stiffened or rounded.
- E. Backs of diffusers shall be factory insulated with fiberglass blanket wrap and scrim kraft vapor barrier to an installed value of R-6. Provide additional field installed insulation if required to meet R-6.
- F. Color shall be white unless otherwise indicated.
- G. Where called for on plans, integral dampers shall be factory fabricated opposed blade .
- H. Provide adapter frames to match mounting configurations, and square to round and round to round adapters as required to match neck sizes indicated on plans.

### PART 3 EXECUTION

#### 3.1 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Coordinate framed opening requirements of roof hoods, goosenecks and louvers with general contractor and/or metal building manufacturer.
- C. Provide all required flashing/waterproofing for louver installations for a watertight installation.
- D. Check location of outlets and inlets and make necessary adjustments in position to conform with architectural features, symmetry, and lighting arrangement.
- E. Ensure exhaust outlets are located at least 10' away from air intakes. Adjust location of outlet as necessary to maintain this separation.
- F. Provide balancing dampers on duct take-off to diffusers, and grilles and registers, unless specifically excluded and included with diffuser.
- G. Coordinate with other trades as necessary to provide door grilles and undercut doors where called for. Undercuts shall be 1" minimum clear space above finished floor surface.
- H. Paint ductwork visible behind air outlets and inlets matte black. Refer to Section 099123.

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3.2 AIR OUTLET AND INLET SCHEDULE

- A. See drawings for schedules.

END OF SECTION

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## SECTION 238126 - FURNACE WITH SPLIT-SYSTEM COOLING

### PART 1 GENERAL

#### 1.1 SECTION INCLUDES

- A. Forced air furnaces.
- B. Auxiliary cooling coils.
- C. Air cooled condensing units.
- D. Controls.
- E. Refrigerant and condensate piping and insulation.

#### 1.2 RELATED REQUIREMENTS

- A. Section 233100 - HVAC Ducts and Casings.

#### 1.3 SUBMITTALS

- A. See Division 1 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide rated capacities, weights, accessories, electrical nameplate data, and wiring diagrams.
- C. Shop Drawings: Indicate assembly, required clearances, and location and size of field connections.
- D. Manufacturer's Instructions: Indicate rigging, assembly, and installation instructions.
- E. Operation and Maintenance Data: Include manufacturer's descriptive literature, operating instructions, installation instructions, maintenance and repair data, and parts listing.
- F. Warranty: Submit manufacturers warranty and ensure forms have been filled out in Owner's name and registered with manufacturer.

#### 1.4 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with minimum three years of documented experience.
- B. Installer Qualifications: Company specializing in performing the work of this section with minimum 3 years of experience and approved by manufacturer.
- C. Heating capacities and efficiencies ratings shall be per ANSI Z21.47. Cooling capacities and efficiencies ratings shall be per AHRI 210/240 for units systems with a cooling capacity of less than 65,000 btu/hr. Capacities and efficiencies shall ratings shall be per AHRI 340/360 for units with a cooling capacity of greater than or equal to 65,000 btu/hr.

- D. Efficiency ratings as scheduled, but not less than prescribed by ASHRAE Std 90.1, or the Florida Energy Code, latest edition.
- E. Factory built equipment and appliances shall listed and labeled as conforming to UL 1995, and outdoor units shall be listed and labeled as suitable for outdoor use.
- F. Factory built equipment shall comply with ASHRAE Std 15, as modified by the International Mechanical Code, latest edition. All refrigerant components shall be factory pressure and leak tested to not less than the design pressure for which they are rated, or in accordance with the equipment listings, whichever is greater.

#### 1.5 WARRANTY

- A. Provide 5 year manufacturers warranty for compressors.

### PART 2 PRODUCTS

#### 2.1 MANUFACTURERS

- A. Carrier
- B. Trane
- C. Lennox
- D. Pre-approval of above manufacturers listed is based on selections meeting features and performance as specified and scheduled.

#### 2.2 GENERAL DESCRIPTION

- A. The system shall consist of an indoor air handling unit comprised of a gas fired furnace assembly and auxiliary cooling coil, and an outdoor condensing unit. The system shall be provided by a common manufacturer, with all components selected by the manufacturer for complete compatibility. The system shall be classified as a Central Furnace, forced air furnace with cooling unit, per the International Fuel Gas Code, ICC (IFGC).

#### 2.3 GAS FIRED FURNACES

- A. Units: Self-contained, packaged, factory assembled, pre-wired unit consisting of cabinet, supply fan, heating element, controls, air filter and other accessories as scheduled. Furnace shall be a multi-poise unit suitable for upflow, downflow, and horizontal flow, including configuration indicated on the plans. Performance and efficiency shall be as scheduled.
  - 1. Safety certified by CSA in accordance with ANSI Z21.47.
  - 2. Venting System: Direct.
  - 3. Combustion: Sealed.
  - 4. Air Flow Configuration: Upflow.

5. Heating: Natural gas fired or propane fired as scheduled. Unit shall be fuel convertible in the field. Reconfirm at time of order.
- B. Casing shall be constructed of heavy duty sheet steel on galvanized steel frame, with baked enamel finish. Removable, gasketed panels shall be provided for fan and coil sections and shall provide full access to all internal parts. Furnace access panels shall have safety interlocks. Unit shall have dedicated filter access panel and filter rack. Casing shall have foil faced R-4.2 (minimum) insulation. All insulating materials shall meet the requirements of NFPA 90A. Knockouts shall be provided for electrical wiring. Units shall have condensing flue gas drain connection.
- C. Primary Heat Exchanger:
  1. Material: Aluminized steel.
  2. Shape: Clamshell type.
- D. Secondary Heat Exchanger:
  1. Material: Stainless steel, fin and tube design.
- E. Gas Burner:
  1. Atmospheric type with adjustable combustion air supply.
  2. Gas valve, modulating, 100 percent safety gas shut-off; 24 volt, pressure regulation, safety pilot, manual set (On-Off), pilot filtration, automatic electric valve.
  3. Electronic pilot ignition, with electric spark igniter.
  4. Combustion air damper with synchronous spring return damper motor.
  5. Non-corrosive combustion air blower with permanently lubricated motor.
- F. Gas Burner Safety Controls:
  1. Thermocouple sensor: Prevents opening of gas valve until pilot flame is proven and stops gas flow on ignition failure.
  2. Flame rollout switch: Installed on burner box and prevents operation.
  3. Vent safety shutoff sensor: Temperature sensor installed on draft hood and prevents operation, manual reset.
  4. Limit Control: Fixed stop at maximum permissible setting, de-energizes burner on excessive bonnet temperature, automatic resets.
- G. Supply Fan
  1. Fan shall be forward curved, centrifugal, dynamically and statically balanced. ECM fan motor shall have permanently lubricated bearings, and thermal overload protection. Fan shall be mounted on vibration isolators.
  2. Provide variable speed air handlers as scheduled on plans.
- H. Filters
  1. Section with filter guides, access doors for face loading. 1" deep disposable flat filters. Filters shall be MERV 8 rated unless otherwise scheduled.
- I. Controls
  1. Furnace shall include microprocessor based integrated control board with LED troubleshooting codes.

2. Controls shall coordinate supply fan modulation with gas burner requirements as well as variable speed algorithms in cooling mode for enhanced dehumidification.

#### 2.4 AUXILIARY COOLING COIL

- A. Auxiliary coil shall be manufactured as a matching accessory to furnace, and coordinated with furnace supply fan airflow and control.
- B. Casing shall be constructed of heavy duty sheet steel on galvanized steel frame, with baked enamel finish. Removable, gasketed panel shall provide access for slide out coil. Casing shall have foil faced R-4.2 (minimum) insulation. All insulating materials shall meet the requirements of NFPA 90A. Knockouts shall be provided for electrical wiring. Units shall have integral, positively sloped, galvanized primary condensate pan with primary and secondary drain connection.
- C. Refrigerant Coils:
  1. Aluminum coil or aluminum fins bonded to copper tube, pressure and leak tested to 375 psig.
  2. Coil shall be designed to avoid condensate blowoff by directing condensate away from fins and into drain pan.
  3. Configuration: Down feed with bottom suction.
  4. Thermal expansion valve (TXV) for refrigerant flow control.
  5. Evaporator defrost control where low ambient cooling is scheduled.
  6. Coils shall be ARI certified with outdoor unit.
  7. Coil shall be designed for R-410a refrigerant.

#### 2.5 OUTDOOR UNITS

- A. General
  1. Units: Self-contained, packaged, factory assembled and pre-wired units suitable for outdoor use consisting of cabinet, compressors, condensing coil and fans, integral sub-cooling coil, controls, liquid receiver, charging valves .
- B. Casing
  1. House components in welded steel frame with galvanized steel panels, weather resistant, baked enamel finish. Surfaces shall be satisfactorily tested to ASTM B117 500 hour salt spray test. Provide drain holes for elimination of rain.
  2. Mount starters, disconnects, and controls in weatherproof panel provided with full opening access doors.
  3. Provide removable access doors or panels with quick fasteners or piano hinges.
- C. Coils
  1. Coils: Aluminum fins mechanically bonded to seamless copper tubing. Provide sub-cooling circuits. Air test under water to 425 psig, and vacuum dehydrate. Seal with holding charge of refrigerant.
  2. Coil Guard: Louvered or PVC coated steel wire grille.
- D. Fans and Motors
  1. Vertical discharge direct driven, statically and dynamically balanced propeller type condenser fans with aluminum blades and fan guard on discharge.



2. Weatherproof motors suitable for outdoor use, single phase permanent split capacitor or 3 phase, with permanent lubricated ball bearings and built in current and thermal overload protection.

E. Compressors

1. Compressor: Hermetic scroll type or hermetic reciprocating, quantity as scheduled. Provide multiple compressors or stages where scheduled on plans.
2. Mounting: Statically and dynamically balance rotating parts and mount on rubber-in-shear vibration isolators. Units of 10 tons and greater shall have internal spring isolation .
3. Lubrication System: Units of 6 tons and greater shall have oil pump with oil charging valve, oil level sight glass, and magnetic plug or strainer.
4. Motor: Constant speed 3600 rpm suction gas cooled with electronic sensor and winding over temperature protection, designed for across-the-line starting. Furnish with starter where applicable.
5. Crankcase Heater: Evaporates refrigerant returning to sump during shut down. Energize heater continuously when compressor is not operating.

F. Refrigerant Circuits

1. Where 2 stages are scheduled, provide each unit with a minimum of two independent refrigerant circuits, factory supplied and piped.
2. For each refrigerant circuit, provide:
  - a. Filter dryer .
  - b. Insulated suction line.
  - c. Suction and liquid line service valves and gage ports.
  - d. Service ports shall be fitted with locking, tamper resistant fittings.
3. Provide R-410A refrigerant.

G. Controls

1. On unit, mount weatherproof steel control panel, NEMA 250, containing power and control wiring, factory wired with single point power connection. .
2. For each compressor, provide contactor, integral overload protection, solid state time delay, and control power transformer or terminal for controls power. For each condenser fan, provide contactor.
3. Provide safety controls as follows:
  - a. High discharge pressure cutout switch for each compressor.
  - b. Low suction pressure cutout switch for each compressor.
  - c. Anti-short cycle timer for each compressor.
  - d. Low ambient operating controls as indicated on schedule.

2.6 THERMOSTAT

- A. Thermostat shall be as recommended by manufacturer.
- B. Provide a programmable thermostats with automatic changeover, adjustable deadband, and a minimum range of 55F to 85F. Thermostat shall have separate, adjustable 7 day/24 hr occupied and unoccupied schedules for heating and cooling.

- C. Thermostat shall be compatible with equipment selected and shall be capable of performing control functions indicated. Thermostat shall support modulating gas valve heating and the stages of cooling as indicated on equipment schedules.
- D. Provide recommended thermostats capable of optimizing multistage compressors and variable speed air handlers for humidity control where scheduled on plans.

## 2.7 REFRIGERANT PIPING AND ACCESSORIES

- A. Tubing shall be Type ACR complying with ASTM B 280.
- B. Insulate refrigerant suction piping as follows:
  - 1. Above Grade or in PVC conduit: for pipe sizes up to 1-1/2" diameter, insulation shall be 3/4" minimum thickness, preformed, flame retardant, nitrile rubber based elastomeric insulation similar to Armstrong FR Armaflex.
  - 2. Below Grade: 1" thick, pre-formed rigid cellular glass type similar to Pittsburgh Corning Foamglas. Finish with two coats of asphalt base mastic equal to Foster 60-25 reinforced with layer of glass fabric.
  - 3. All insulation materials and coatings shall meet flame spread and smoke developed ratings per NFPA 90A when tested in accordance with ASTM Standard E-84. Smoke developed rating shall be less than or equal to 50, and flame spread rating shall be less than or equal to 25. All coatings and mastics shall be non-flammable in wet state.
- C. Pipe Hangers
  - 1. Pipe hangers shall be Auto-Grip, Fee and Mason, Grinnel, or approved equal, steel clevis hangers selected within the manufacturer's published load ratings.
  - 2. Use vibration isolators in hanger rods whenever piping is subject to vibration, or where shown on drawings.
- D. Sleeves
  - 1. Sleeves shall be 18 gauge galvanized steel or preformed plastic. Sleeves shall be sized to allow approximately 1/8" gap around the pipe or its insulation.

## 2.8 CONDENSATE DRAINAGE ACCESSORIES

- A. Condensate piping shall be copper or Schedule 40 PVC. All condensate piping within building shall be insulated with a minimum of 1/2" Armaflex unless otherwise specified.

## 2.9 EQUIPMENT SUPPORTS

- A. Floor mounted air handler supports: Provide a pre-manufactured support frame accessory in configuration as detailed on plans. Equipment supports shall be sized and designed to support the equipment and shall be fabricated from galvanized steel. Supports shall be rated for operational weight of air handler and accessories.
- B. Overhead air handler supports: Provide steel support system including 1-1/2" x 1-1/2" angle and threaded rods (minimum 3/8" diameter) in configuration detailed on plans. Use double nut fasteners and

attachment hardware compatible with overhead structure. Supports shall be rated for operational weight of air handler and accessories.

## 2.10 OUTDOOR UNIT SUPPORTS

- A. Provide concrete pads as detailed on plans for non-flood plain areas.
- B. Provide above grade support structure for flood plain areas. Refer to structural plans for requirements.

## PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Verify that substrates are ready for installation of units and openings are as indicated on shop drawings.
- B. Verify that proper power supply is available and in correct location.
- C. Verify that proper fuel supply is available for connection.

### 3.2 INSTALLATION

- A. Install in accordance with manufacturer's instructions and requirements of local authorities having jurisdiction in configurations shown on plans.
- B. Install in accordance with NFPA 90A and NFPA 90B.
- C. Install gas fired furnaces in accordance with ICC (IFGC). Install combustion air piping, combustion air intakes, and vent piping per equipment listing requirements.
- D. For ducted systems, provide sight glass in liquid line within 12 inches of unit.
- E. Condensate Drain Pan and Piping
  1. Run condensate drain lines (primary, and secondary where detailed) from each air handling unit as noted on the Drawings. For primary line, provide a cleanout and trap (minimum depth per manufacturer) to prevent back suction into the air unit. Drain lines shall be sized to match equipment drains, but not less than 3/4". Condensate drain piping (primary and secondary) shall be copper when installed in a plenum rated ceiling cavity or plenum rated room.
  2. Where indicated on plans, provide secondary drain pan positioned under air handling units. Provide a float switch in pan and/or secondary drain line as detailed on plans and in compliance with local codes.
  3. Insulate primary drain line piping in unconditioned spaces within the building.
- F. Complete structural, mechanical, and electrical connections in accordance with manufacturer's installation instructions.
- G. Install outdoor units in non-flood zones level on concrete base, location as indicated. Install outdoor units in flood zones on elevated support structure. Secure outdoor units to outdoor supports using bolted fasteners and angle clips, or other approved method. Coordinate with general contractor to make provisions to minimize roof runoff into outdoor units by suitable means such as equipment placement,

gutters, diverters, etc. Install air handlers as detailed on plans, maintaining adequate clearance for condensate drain trap.

H. Refrigerant Piping

1. Install all refrigerant piping to complete the system connecting indoor and outdoor HVAC units as indicated on plans. Braze all joints with silver alloy solder. Size per manufacturer's recommendations based on developed length of run, vertical lift, and equivalent lengths of fittings for installed routing.
2. Use long radius elbows. Pitch all horizontal suction lines down towards the compressor to assist in drainage back to compressor.
3. Do not add a drier or filter in line series with a factory installed drier as the added pressure drop may cause flashing. Do not tape or fasten suction and liquid lines together unless there is insulation between them.
4. Add 2 ounces of oil for every 10 feet over 150 feet of installed vapor line. Confirm as-built length following installation.
5. Refrigerant pipe crossing a passageway in any building shall be not less than 7-1/2 feet above the floor or against the ceiling.
6. Insulate refrigerant piping per Piping Insulation Section. In addition to suction piping, the liquid line shall be insulated to prevent flashing prior to expansion valve in hot locations.
7. Flow dry nitrogen through piping during brazing operations to prevent copper oxidation and scaling.
8. If underground refrigerant lines cannot be avoided, individually insulated lines shall be installed in a 6" PVC sleeve with no copper joints within the sleeve run. PVC sleeve shall use only 45 degree elbows and shall extend above grade with open ends completely sealed with expandable foam or other suitable means.
9. After completion of entire system and before any pipe is covered, test the entire refrigerant circuit to assure that it is absolutely tight. Conduct low-side and high-side tests as recommended by equipment manufacturer. Minimum pressures for testing shall be those listed on the condensing unit, compressor or compressor nameplate, as required by ASHRAE Std 15.
10. After completion of leak testing, evacuate and charge the system utilizing a procedure approved by air conditioning unit's manufacturer.

3.3 STARTING EQUIPMENT AND SYSTEMS

- A. Supply initial charge of refrigerant and oil for each refrigeration system. Replace losses of oil or refrigerant prior to end of correction period.

END OF SECTION

## SECTION 260050 - GENERAL ELECTRICAL REQUIREMENTS

### PART 1 GENERAL

#### 1.1 SECTION INCLUDES

- A. General Information on Electrical Installation not covered elsewhere. This section applies to all other electrical sections.

#### 1.2 DEFINITIONS

- A. For the purposes of this contract, the term "Provide" shall mean to provide all labor, material, transportation, and supervision required to furnish and install.

#### 1.3 PROJECT DESCRIPTION:

- A. See Project General Notes in electrical drawings for project description.

#### 1.4 INTERPRETATION:

- A. Specifications and Drawings shall be considered as supplementary to each other, requiring materials and labor indicated, specified, or implied by either Specifications or Drawings. Contradictions shall be presented to the Architect / Engineer for resolution.
- B. Interpretation of Specifications or Drawings, where deemed necessary, shall be made only by the Architect / Engineer.

#### 1.5 CODES, STANDARDS, ORDINANCES, AND PERMITS:

- A. The National Electrical Code (NEC), National Electric Safety Code, Florida Building Code, and OSHA shall establish the minimum requirements for installation, but in addition, all work shall also comply with Federal, State, Local, County or Municipal Code requirements. If there is a conflict between the NEC and these codes, conform to the more stringent of the two. Similarly, if the local Authority Having Jurisdiction has not adopted the latest revision of the NEC and is still using an earlier version, conform to the more stringent of the two.
- B. Be familiar with local Code requirements and local Utility Company Standards for electrical service requirements, and make installation in accordance with such requirements.
- C. In case of conflict between the Contract Documents and a governing code or ordinance, such conflict shall be immediately brought to the attention of the Architect / Engineer for resolution. Extra payment will not be allowed for Work required by code restrictions except through written agreement with the Architect / Engineer.
- D. Apply for, obtain, and pay for all required permits and inspection certificates. Final payment is contingent upon delivery of such permits and certificates to the GOVERNMENT.

1.6 SITE INSPECTION:

- A. Visit the site and thoroughly inspect conditions affecting the Work before submitting Bid. Assume responsibility for meeting all existing conditions including access and work space limitations.

1.7 CUTTING AND PATCHING:

- A. Refer to Section on Cutting and Patching.
- B. Place all sleeves, inserts, conduit hangers, etc. as construction progresses to avoid any unnecessary cutting of structural members. Cooperate with other Contractors in location of electrical outlets that may conflict with location of other equipment.
- C. Obtain authorization from the GOVERNMENT for any necessary cutting of building structure to facilitate installation of this work and do not proceed until authorization has been received. Limit necessary cutting and patching to the minimum size required for installation of conduit or apparatus.

1.8 SUBMITTALS:

- A. Submit Shop Drawings, catalog sheets, or other descriptive data with sufficient information to establish design, quality and performance. Data shall describe apparatus, equipment, panels, fixtures, and other items requiring descriptive literature. Provide submittals as a single package including all required electrical items. Partial packages will not be reviewed. Submittals items shall be in accordance with the individual specification sections. See Project General Notes in electrical drawings for a list of required submittals.

1.9 MAINTENANCE DATA:

- A. Collect and neatly retain maintenance and service data supplied with equipment furnished and installed under this Contract until job completion, at which time deliver to the GOVERNMENT for inclusion in the Maintenance Manual. All such data must be properly identified as for equipment served.
- B. Keep one set of prints current of any changes or variations by marking prints in a legible manner, and upon completion of project, deliver prints to the GOVERNMENT. Do not make changes without prior approval of the GOVERNMENT.

1.10 TEMPORARY ELECTRIC SERVICE:

- A. Provide complete temporary system of power and lighting wiring for use during construction and for testing of equipment. Comply with OSHA and NEC including personnel ground-fault protection requirements.

1.11 ELECTRIC SERVICE:

- A. Contact Government in advance and verify availability of electrical service as indicated.
- B. Provide all labor, materials and equipment not provided by the Utility in accordance with Utilities' installation policies and procedures without additional cost. Should a significant installation conflict occur, notify the Engineer immediately for resolution before starting any work.

1.12 COORDINATION - GENERAL:

- A. Drawings are generally diagrammatic. Review all project Drawings and coordinate all work with General Contractor and different trades prior to installing any work so that interferences between electrical work and ducts, piping, equipment, architectural and structural work will be avoided. Do not install conduits, boxes and fittings in spaces required for ductwork or piping.
- B. Furnish all necessary offsets in raceways, fittings, etc., required to properly install work so as to take up minimum space. Install all equipment to provide code required "working space". Furnish and install all materials required to accomplish this without additional cost.
- C. In case interference develops, the General Contractor will decide which trade work must be relocated regardless of which was installed first. Damage from interference or rework caused by inadequate coordination with other trades shall be rectified without additional cost.

1.13 COORDINATION - ELECTRICAL/MECHANICAL:

- A. Unless specifically required otherwise, all motors, integral starters, control and monitoring devices (including wire and conduit for control circuits), timers, relays, pilot devices and other required control components for mechanical systems will be furnished and installed by the mechanical contractor.
- B. Unless specifically required otherwise, make all power wiring connections to all water heaters, pumps, machinery, appliances, water coolers and other electrically-operated equipment as indicated on the Drawings or as required. Furnish and install disconnect switches, starters and protective devices as indicated on the Drawings, except for items furnished with integral disconnect switches and/or starters. Coordinate the exact location of receptacles, flexible conduit, and disconnects for mechanical and plumbing equipment with the mechanical or plumbing contractor.
- C. Review approved Shop Drawings and verify final electrical characteristics and wiring before rough-in of power feeds to any equipment. When electrical data on approved Shop Drawings differs from contemplated design, make necessary adjustments to wiring, disconnect, and branch-circuit protection for equipment actually installed.

1.14 WORKING CLEARANCES:

- A. Working clearances around electrical equipment requiring service shall comply with NEC requirements. Coordinate and verify clearances from equipment and work furnished by other trades. Should there be any apparent violations of clearance requirements, notify the General Contractor before proceeding with connection or placement of equipment. Rework caused by inadequate coordination shall be rectified at no extra cost.

PART 2 - PRODUCTS:

2.1 MATERIALS:

- A. All materials used in this project shall be new, unless otherwise noted, and listed by the Underwriters' Laboratories, Inc. as conforming to its standards where such standards have been established. These materials shall bear the UL label.

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- B. Before purchasing any equipment, the contractor shall reconfirm the availability of the project's voltage, phase (single phase versus three phase), and service configuration with the electric utility.

### PART 3 EXECUTION

#### 3.1 CLEANUP

- A. After electrical installation, remove all rubbish, trash and debris from the site and dispose of in an approved manner.

END OF SECTION



## SECTION 260501 - MINOR ELECTRICAL DEMOLITION

### PART 1 GENERAL

#### 1.1 SECTION INCLUDES

- A. Electrical demolition.

### PART 3 EXECUTION

#### 2.1 EXAMINATION

- A. Verify that abandoned wiring and equipment serve only abandoned facilities.
- B. Report discrepancies to Architect before disturbing existing installation.
- C. Beginning of demolition means installer accepts existing conditions.

#### 2.2 PREPARATION

- A. Disconnect electrical systems in walls, floors, and ceilings to be removed.
- B. Coordinate utility service outages with utility company.
- C. Provide temporary wiring and connections to maintain existing systems in service during construction. When work must be performed on energized equipment or circuits, use personnel experienced in such operations.
- D. Existing Electrical Service: Maintain existing system in service until new system is complete and ready for service. Disable system only to make switchovers and connections. Minimize outage duration.

#### 2.3 DEMOLITION AND EXTENSION OF EXISTING ELECTRICAL WORK

- A. Remove, relocate, and extend existing installations to accommodate new construction.
- B. Remove abandoned wiring to source of supply.
- C. Remove exposed abandoned conduit, including abandoned conduit above accessible ceiling finishes. Cut conduit flush with walls and floors, and patch surfaces.
- D. Disconnect and remove abandoned outlets and switches. Provide blank cover or patch wall as directed by Architect.
- E. Disconnect and remove abandoned panelboards and distribution equipment.
- F. Disconnect and remove electrical devices and equipment serving utilization equipment that has been removed.

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- G. Disconnect and remove abandoned luminaires. Remove brackets, stems, hangers, and other accessories.
- H. Repair adjacent construction and finishes damaged during demolition and extension work.
- I. Maintain access to existing electrical installations that remain active. Modify installation or provide access panel as appropriate.

END OF SECTION

## SECTION 260519 - LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES

### PART 1 GENERAL

#### 1.1 SECTION INCLUDES

- A. Single conductor building wire.
- B. Wire and cable for 600 volts and less.
- C. Wiring connectors.

#### 1.2 REFERENCES

- A. ASTM B3 - Standard Specification for Soft or Annealed Copper Wire; 2013.
- B. ASTM B8 - Standard Specification for Concentric-Lay-Stranded Copper Conductors, Hard, Medium-Hard, or Soft; 2011.
- C. ASTM B33 - Standard Specification for Tin-Coated Soft or Annealed Copper Wire for Electrical Purposes; 2010 (Reapproved 2014).
- D. ASTM B787/B787M - Standard Specification for 19 Wire Combination Unilay-Stranded Copper Conductors for Subsequent Insulation; 2004 (Reapproved 2014).
- E. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2010.
- F. NEMA WC 70 - Nonshielded Power Cable 2000 V or Less for the Distribution of Electrical Energy; 2009.
- G. NFPA 70 - National Electrical Code, National Fire Protection Association (edition adopted by Authority Having Jurisdiction).
- H. UL 44 - Thermoset-Insulated Wires and Cables; Current Edition, Including All Revisions.
- I. UL 83 - Thermoplastic-Insulated Wires and Cables; Current Edition, Including All Revisions.

#### 1.3 QUALITY ASSURANCE

- A. Conform to requirements of NFPA 70.

### PART 2 PRODUCTS

#### 2.1 ALL CONDUCTORS AND CABLES

- A. Provide products that comply with requirements of NFPA 70.
- B. Provide products listed and classified by Underwriters Laboratories Inc. as suitable for the purpose indicated.

- C. Unless specifically indicated to be excluded, provide all required conduit, boxes, wiring, connectors, etc. as required for a complete operating system.
- D. Comply with NEMA WC 70.
- E. Thermoplastic-Insulated Conductors and Cables: Listed and labeled as complying with UL 83.
- F. Thermoset-Insulated Conductors and Cables: Listed and labeled as complying with UL 44.
- G. Conductor Material:
  - 1. Copper Conductors: Soft drawn annealed, 98 percent conductivity, uncoated copper conductors complying with ASTM B3, ASTM B8, or ASTM B787/B 787M unless otherwise indicated.
  - 2. Tinned Copper Conductors: Comply with ASTM B33.
- H. Conductor Color Coding:
  - 1. Color code conductors as indicated unless otherwise required by the authority having jurisdiction. Maintain consistent color coding throughout project.
  - 2. Color Coding Method: Integrally colored insulation.
  - 3. Color Code:
    - a. Equipment Ground, All Systems: Green.

## 2.2 BUILDING WIRE

- A. Description: Single conductor insulated wire.
- B. Conductor Stranding:
  - 1. Feeders and Branch Circuits:
    - a. Size 10 AWG and Smaller: Solid.
    - b. Size 8 AWG and Larger: Stranded.
- C. Insulation Voltage Rating: 600 V.
- D. Insulation:
  - 1. Copper Building Wire: Type THHN/THWN or THHN/THWN-2, except as indicated below.
- E. Conductor: Copper.
- F. Insulation Voltage Rating: 600 volts.
- G. Insulation: Thermoplastic material rated 90 degrees C.

## PART 3 EXECUTION

### 3.1 PREPARATION

- A. Clean raceways thoroughly to remove foreign materials before installing conductors and cables.

### 3.2 INSTALLATION

- A. Install products in accordance with manufacturer's instructions.

- B. Install conductors and cable in a neat and workmanlike manner in accordance with NECA 1.
- C. Installation in Raceway:
  - 1. Tape ends of conductors and cables to prevent infiltration of moisture and other contaminants.
  - 2. Pull all conductors and cables together into raceway at same time.
  - 3. Do not damage conductors and cables or exceed manufacturer's recommended maximum pulling tension and sidewall pressure.
  - 4. Use suitable wire pulling lubricant where necessary, except when lubricant is not recommended by the manufacturer.
- D. Paralleled Conductors: Install conductors of the same length and terminate in the same manner.
- E. Secure and support conductors and cables in accordance with NFPA 70 using suitable supports and methods approved by the authority having jurisdiction. Provide independent support from building structure. Do not provide support from raceways, piping, ductwork, or other systems.
- F. Install conductors with a minimum of 12 inches of slack at each outlet.
- G. Neatly train and bundle conductors inside boxes, wireways, panelboards and other equipment enclosures.
- H. Make wiring connections using specified wiring connectors.
  - 1. Make splices and taps only in accessible boxes. Do not pull splices into raceways or make splices in conduit bodies or wiring gutters.
  - 2. Remove appropriate amount of conductor insulation for making connections without cutting, nicking or damaging conductors.
  - 3. Do not remove conductor strands to facilitate insertion into connector.
  - 4. Clean contact surfaces on conductors and connectors to suitable remove corrosion, oxides, and other contaminates. Do not use wire brush on plated connector surfaces.
- I. Insulate splices and taps that are made with uninsulated connectors using methods suitable for the application, with insulation and mechanical strength at least equivalent to unspliced conductors.
- J. Insulate ends of spare conductors using vinyl insulating electrical tape.
- K. Color Code Legend: Provide identification label identifying color code for ungrounded conductors at each piece of feeder or branch-circuit distribution equipment when premises has feeders or branch circuits served by more than one nominal voltage system.
- L. Unless specifically indicated to be excluded, provide final connections to all equipment and devices, including those furnished by others, as required for a complete operating system.
- M. Install wire and cable securely, in a neat and workmanlike manner, as specified in NECA 1.
- N. Route wire and cable as required to meet project conditions.
- O. Wire and cable routing indicated is intended to be diagrammatic.
- P. Where wire and cable destination is indicated and routing is not shown, determine exact routing and lengths required.
- Q. Include wire and cable of lengths required to install connected devices within 10 ft of location shown.

- R. No wiring shall be installed until the required raceway system, including junction, outlet and device boxes is completed. Install wiring before painting begins and protect against being painted.
- S. Branch circuit sizes are noted on the Drawings and must be continuous without reduction in size throughout their length except where connecting to fixtures or devices.
- T. Branch circuit wire sizes shall be increased as required where long runs will cause excessive voltage drop per NEC.
- U. Wire circuits as described or indicated on the Drawings to achieve a connected load as scheduled. Should any change be necessary, it must be brought to the GOVERNMENT's attention.
- V. Install wire and cable in accordance with the NECA "Standard of Installation."
- W. Use wiring methods indicated.
- X. Pull all conductors into raceway at same time.
- Y. Use suitable wire pulling lubricant for building wire 4 AWG and larger.
- Z. Neatly train and lace wiring inside boxes, equipment, and panelboards.
- AA. Clean conductor surfaces before installing lugs and connectors.
- AB. Make splices, taps, and terminations to carry full ampacity of conductors with no perceptible temperature rise.
- AC. Use split bolt connectors for copper conductor splices and taps, #4 AWG and larger. Tape uninsulated conductors and connector with electrical tape to 150 percent of insulation rating of conductor.
- AD. Use solderless pressure connectors with insulating covers for copper conductor splices and taps, 8 AWG and smaller.

### 3.3 FIELD QUALITY CONTROL

- A. Test wiring rated 600 volts and less to verify that no short circuits or accidental grounds exist. Perform insulation resistance tests on wiring No. 4 AWG and larger diameter using an instrument which applies voltage of approximately 500 volts to provide direct reading of resistance. Minimum resistance shall be 250,000 ohms.
- B. Correct deficiencies and replace damaged or defective conductors and cables.

END OF SECTION

## SECTION 260526 - GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

### PART 1 GENERAL

#### 1.1 SECTION INCLUDES

- A. Grounding and bonding requirements.
- B. Conductors for grounding and bonding.
- C. Connectors for grounding and bonding.
- D. Grounding and bonding components.
- E. Provide all components necessary to complete the grounding system(s) consisting of:
  - 1. Metal underground water pipe, if available.
  - 2. Effectively bonded and grounded metal frame of the building.
  - 3. Concrete-encased electrode.
  - 4. Rod electrodes.
  - 5. Couterpoise

#### 1.2 REFERENCES

- A. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2010.
- B. NETA ATS - Acceptance Testing Specifications for Electrical Power Equipment and Systems; 2013.
- C. NFPA 70 - National Electrical Code, NFPA (edition adopted by Authority Having Jurisdiction).
- D. UL 467 - Grounding and Bonding Equipment; Current Edition, Including All Revisions.

#### 1.3 PERFORMANCE REQUIREMENTS

- A. Grounding System Resistance: 10 ohms.

#### 1.4 QUALITY ASSURANCE

- A. Conform to requirements of NFPA 70.

### PART 2 PRODUCTS

#### 2.1 GROUNDING AND BONDING REQUIREMENTS

- A. Do not use products for applications other than as permitted by NFPA 70 and product listing.

- B. Unless specifically indicated to be excluded, provide all required components, conductors, connectors, conduit, boxes, fittings, supports, accessories, etc. as necessary for a complete grounding and bonding system.
- C. Where conductor size is not indicated, size to comply with NFPA 70 but not less than applicable minimum size requirements specified.

## 2.2 GROUNDING AND BONDING COMPONENTS

- A. General Requirements:
  - 1. Provide products listed, classified, and labeled by Underwriter's Laboratories Inc. (UL) or testing firm acceptable to authority having jurisdiction as suitable for the purpose indicated.
  - 2. Provide products listed and labeled as complying with UL 467 where applicable.
- B. Conductors for Grounding and Bonding, in addition to requirements of Section 260519:
  - 1. Use insulated copper conductors unless otherwise indicated.
    - a. Exceptions:
      - 1) Use bare copper conductors where installed underground in direct contact with earth.
      - 2) Use bare copper conductors where directly encased in concrete (not in raceway).
- C. Connectors for Grounding and Bonding:
  - 1. Description: Connectors appropriate for the application and suitable for the conductors and items to be connected; listed and labeled as complying with UL 467.
  - 2. Unless otherwise indicated, use exothermic welded connections for underground, concealed and other inaccessible connections.
  - 3. Unless otherwise indicated, use mechanical connectors, compression connectors, or exothermic welded connections for accessible connections.

## 2.3 CONNECTORS AND ACCESSORIES

- A. Wire: TW Stranded copper with green coding sized per NEC.
- B. Grounding Electrode Conductor: Size to meet NFPA 70 requirements.

## PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Verify that work likely to damage grounding and bonding system components has been completed.
- B. Verify that field measurements are as shown on the drawings.
- C. Verify that conditions are satisfactory for installation prior to starting work.
- D. Verify existing conditions prior to beginning work.



### 3.2 INSTALLATION

- A. Install products in accordance with manufacturer's instructions.
- B. Install grounding and bonding system components in a neat and workmanlike manner in accordance with NECA 1.
- C. Make grounding and bonding connections using specified connectors.
  - 1. Remove appropriate amount of conductor insulation for making connections without cutting, nicking or damaging conductors. Do not remove conductor strands to facilitate insertion into connector.
  - 2. Remove nonconductive paint, enamel, or similar coating at threads, contact points, and contact surfaces.
  - 3. Exothermic Welds: Make connections using molds and weld material suitable for the items to be connected in accordance with manufacturer's recommendations.
  - 4. Mechanical Connectors: Secure connections according to manufacturer's recommended torque settings.
  - 5. Compression Connectors: Secure connections using manufacturer's recommended tools and dies.
- D. Identify grounding and bonding system components in accordance with Section 260553.
- E. Install ground electrodes at locations indicated. Install additional rod electrodes as required to achieve specified resistance to ground.
- F. Provide grounding electrode conductor and connect to metal water pipe (if available), ground rods, reinforcing steel in foundation footing, structural steel, and any other items required by NEC Article 250 and local codes. Bond steel together.
- G. Provide bonding to meet requirements described in Quality Assurance.
- H. Bond equipment such as metallic housing and feeder metallic conduits to grounding conductor. Use grounding bushings, on service conduit and at other points where grounding continuity is broken.
- I. Provide a bonding jumper for any equipment, motor, fixture or device to which current carrying conductors are connected that is not bonded directly to the grounded system. Connect bonding jumper to approved lugs and grounding conduit bushings or clamps.
- J. Equipment Grounding Conductor: Provide separate, insulated grounding conductor within each feeder and branch circuit raceway (sized per NEC Section 250). Terminate each end on suitable lug, bus, or bushing. Metal raceways shall not be used as the sole method of grounding.

### 3.3 FIELD QUALITY CONTROL

- A. Perform inspections and tests listed in NETA STD ATS, Section 7.13.
- B. Perform ground electrode resistance tests under normally dry conditions. Precipitation within the previous 48 hours does not constitute normally dry conditions.
- C. Investigate and correct deficiencies where measured ground resistances do not comply with specified requirements.

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- D. Test grounding system to ensure continuity and that resistance to ground is not excessive (above 10 ohms). Test each ground rod for resistance to ground before making connections to rod; tie grounding system together and test for resistance to ground. Make resistance measurements in dry weather, not earlier than 48 hours after rainfall.

END OF SECTION

## SECTION 260529 - HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS

### PART 1 GENERAL

#### 1.1 REFERENCES

- A. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2015.
- B. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2009.
- C. MFMA-4 - Metal Framing Standards Publication; 2004.
- D. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2010.
- E. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

#### 1.2 QUALITY ASSURANCE

- A. Comply with NFPA 70.
- B. Comply with applicable building code.

### PART 2 PRODUCTS

#### 2.1 SUPPORT AND ATTACHMENT COMPONENTS

- A. General Requirements:
  - 1. Provide all required hangers, supports, anchors, fasteners, fittings, accessories, and hardware as necessary for the complete installation of electrical work.
  - 2. Provide products listed, classified, and labeled by Underwriter's Laboratories Inc. (UL) or testing firm acceptable to authority having jurisdiction as suitable for the purpose indicated, where applicable.
  - 3. Do not use products for applications other than as permitted by NFPA 70 and product listing.
  - 4. Steel Components: Use corrosion resistant materials suitable for the environment where installed.
    - a. Zinc-Plated Steel: Electroplated in accordance with ASTM B633.
    - b. Galvanized Steel: Hot-dip galvanized after fabrication in accordance with ASTM A123/A123M or ASTM A153/A153M.
- B. Conduit and Cable Supports: Straps, clamps, etc. suitable for the conduit or cable to be supported.
  - 1. Conduit Straps: One-hole or two-hole type; steel or malleable iron.
  - 2. Conduit Clamps: Bolted type unless otherwise indicated.
- C. Outlet Box Supports: Hangers, brackets, etc. suitable for the boxes to be supported.

- D. Metal Channel (Strut) Framing Systems: Factory-fabricated continuous-slot metal channel (strut) and associated fittings, accessories, and hardware required for field-assembly of supports.
  - 1. Comply with MFMA-4.
- E. Hanger Rods: Threaded zinc-plated steel unless otherwise indicated.
- F. Anchors and Fasteners:
  - 1. Unless otherwise indicated and where not otherwise restricted, use the anchor and fastener types indicated for the specified applications.

## 2.2 MATERIALS

- A. Hangers, Supports, Anchors, and Fasteners - General: Corrosion-resistant materials of size and type adequate to carry the loads of equipment and conduit, including weight of wire in conduit.
- B. Supports: Fabricated of structural steel or formed steel members; galvanized.
- C. Anchors and Fasteners:
  - 1. Do not use powder-actuated anchors, spring clips, or beam clamps.
  - 2. Concrete Structural Elements: Use precast inserts, expansion anchors, powder-actuated anchors, or preset inserts.
  - 3. Steel Structural Elements: Use beam clamps, steel spring clips, steel ramset fasteners, or welded fasteners.
  - 4. Concrete Surfaces: Use self-drilling anchors or expansion anchors.
  - 5. Hollow Masonry, Plaster, and Gypsum Board Partitions: Use toggle bolts or hollow wall fasteners.
  - 6. Solid Masonry Walls: Use expansion anchors or preset inserts.
  - 7. Sheet Metal: Use sheet metal screws.
  - 8. Wood Elements: Use wood screws.

## PART 3 EXECUTION

### 3.1 INSTALLATION

- A. Install products in accordance with manufacturer's instructions.
- B. Install support and attachment components in a neat and workmanlike manner in accordance with NECA 1.
- C. Provide independent support from building structure. Do not provide support from piping, ductwork, or other systems.
- D. Unless specifically indicated or approved by Architect, do not provide support from suspended ceiling support system or ceiling grid.
- E. Unless specifically indicated or approved by Architect, do not provide support from roof deck.
- F. Do not penetrate or otherwise notch or cut structural members without approval of Structural Engineer.
- G. Equipment Support and Attachment:

1. Use metal fabricated supports or supports assembled from metal channel (strut) to support equipment as required.
  2. Use metal channel (strut) secured to studs to support equipment surface-mounted on hollow stud walls when wall strength is not sufficient to resist pull-out.
  3. Use metal channel (strut) to support surface-mounted equipment in wet or damp locations to provide space between equipment and mounting surface.
  4. Securely fasten floor-mounted equipment. Do not install equipment such that it relies on its own weight for support.
- H. Secure fasteners according to manufacturer's recommended torque settings.
- I. Remove temporary supports.

END OF SECTION

## SECTION 260534 - CONDUIT

### PART 1 GENERAL

#### 1.1 SECTION INCLUDES

- A. Galvanized steel rigid metal conduit (RMC).
- B. Aluminum rigid metal conduit (RMC).
- C. Intermediate metal conduit (IMC).
- D. PVC-coated galvanized steel rigid metal conduit (RMC).
- E. Flexible metal conduit (FMC).
- F. Liquidtight flexible metal conduit (LFMC).
- G. Electrical metallic tubing (EMT).
- H. Rigid polyvinyl chloride (PVC) conduit.
- I. Conduit fittings.
- J. Conduit, fittings and conduit bodies.

#### 1.2 REFERENCES

- A. ANSI C80.1 - American National Standard for Electrical Rigid Steel Conduit (ERSC); 2005.
- B. ANSI C80.3 - American National Standard for Steel Electrical Metallic Tubing (EMT); 2005.
- C. ANSI C80.5 - American National Standard for Electrical Rigid Aluminum Conduit (ERAC); 2005.
- D. ANSI C80.6 - American National Standard for Electrical Intermediate Metal Conduit (EIMC); 2005.
- E. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2010.
- F. NECA 101 - Standard for Installing Steel Conduits (Rigid, IMC, EMT); 2013.
- G. NECA 102 - Standard for Installing Aluminum Rigid Metal Conduit; 2004.
- H. NECA 111 - Standard for Installing Nonmetallic Raceways (RNC, ENT, LFNC); 2003.
- I. NEMA FB 1 - Fittings, Cast Metal Boxes, and Conduit Bodies for Conduit, Electrical Metallic Tubing, and Cable; 2012.
- J. NEMA RN 1 - Polyvinyl-Chloride (PVC) Externally Coated Galvanized Rigid Steel Conduit and Intermediate Metal Conduit; 2005.
- K. NEMA TC 2 - Electrical Polyvinyl Chloride (PVC) Conduit; 2013.

- L. NEMA TC 3 - Polyvinyl Chloride (PVC) Fittings for Use with Rigid PVC Conduit and Tubing; 2015.
- M. NFPA 70 - National Electrical Code, National Fire Protection Association (edition adopted by Authority Having Jurisdiction).
- N. UL 1 - Flexible Metal Conduit; Current Edition, Including All Revisions.
- O. UL 6 - Electrical Rigid Metal Conduit-Steel; Current Edition, Including All Revisions.
- P. UL 6A - Electrical Rigid Metal Conduit-Aluminum, Red Brass, and Stainless Steel; Current Edition, Including All Revisions.
- Q. UL 360 - Liquid-Tight Flexible Steel Conduit; Current Edition, Including All Revisions.
- R. UL 514B - Conduit, Tubing, and Cable Fittings; Current Edition, Including All Revisions.
- S. UL 651 - Schedule 40, 80, Type EB and A Rigid PVC Conduit and Fittings; Current Edition, Including All Revisions.
- T. UL 797 - Electrical Metallic Tubing-Steel; Current Edition, Including All Revisions.
- U. UL 1242 - Electrical Intermediate Metal Conduit-Steel; Current Edition, Including All Revisions.

### 1.3 QUALITY ASSURANCE

- A. Conform to requirements of NFPA 70.
- B. Products: Listed and classified by Underwriters Laboratories Inc. as suitable for purpose specified and shown.

### 1.4 DELIVERY, STORAGE, AND HANDLING

- A. Receive, inspect, handle, and store conduit and fittings in accordance with manufacturer's instructions.
- B. Accept conduit on site. Inspect for damage.
- C. Protect conduit from corrosion and entrance of debris by storing above grade. Provide appropriate covering.
- D. Protect PVC conduit from sunlight.

## PART 2 PRODUCTS

### 2.1 CONDUIT REQUIREMENTS

- A. Provide all conduit, fittings, supports, and accessories required for a complete raceway system.
- B. Provide products listed, classified, and labeled by Underwriter's Laboratories Inc. (UL) or testing firm acceptable to authority having jurisdiction as suitable for the purpose indicated.

- C. Where conduit size is not indicated, size to comply with NFPA 70 but not less than applicable minimum size requirements specified.

## 2.2 GALVANIZED STEEL RIGID METAL CONDUIT (RMC)

- A. Description: NFPA 70, Type RMC galvanized steel rigid metal conduit complying with ANSI C80.1 and listed and labeled as complying with UL 6.
- B. Fittings:
  - 1. Non-Hazardous Locations: Use fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B.
  - 2. Material: Use steel or malleable iron.
  - 3. Connectors and Couplings: Use threaded type fittings only. Threadless set screw and compression (gland) type fittings are not permitted.

## 2.3 ALUMINUM RIGID METAL CONDUIT (RMC)

- A. Description: NFPA 70, Type RMC aluminum rigid metal conduit complying with ANSI C80.5 and listed and labeled as complying with UL 6A.
- B. Fittings:
  - 1. Non-Hazardous Locations: Use fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B.
  - 2. Material: Use aluminum.
  - 3. Connectors and Couplings: Use threaded type fittings only. Threadless set screw and compression (gland) type fittings are not permitted.

## 2.4 INTERMEDIATE METAL CONDUIT (IMC)

- A. Description: NFPA 70, Type IMC galvanized steel intermediate metal conduit complying with ANSI C80.6 and listed and labeled as complying with UL 1242.
- B. Fittings:
  - 1. Non-Hazardous Locations: Use fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B.
  - 2. Material: Use steel or malleable iron.
  - 3. Connectors and Couplings: Use threaded type fittings only. Threadless set screw and compression (gland) type fittings are not permitted.
- C. Conduit Size: Comply with NFPA 70.
  - 1. Minimum Size: 1/2 inch unless otherwise specified. This minimum size does not apply to flexible conduit.

## 2.5 METAL CONDUIT

- A. Rigid Steel Conduit: ANSI C80.1.
- B. Rigid Aluminum Conduit: ANSI C80.5.



- C. Fittings and Conduit Bodies: NEMA FB 1; material to match conduit.

## 2.6 PVC COATED METAL CONDUIT

- A. Description: NFPA 70, Type RMC galvanized steel rigid metal conduit with external polyvinyl chloride (PVC) coating complying with NEMA RN 1 and listed and labeled as complying with UL 6.
- B. Exterior Coating: Polyvinyl chloride (PVC), nominal thickness of 40 mil.
- C. PVC-Coated Fittings:
  - 1. Manufacturer: Same as manufacturer of PVC-coated conduit to be installed.
  - 2. Non-Hazardous Locations: Use fittings listed and labeled as complying with UL 514B.
  - 3. Material: Use steel or malleable iron.
  - 4. Exterior Coating: Polyvinyl chloride (PVC), minimum thickness of 40 mil.
- D. PVC-Coated Supports: Furnish with exterior coating of polyvinyl chloride (PVC), minimum thickness of 15 mil.
- E. Description: NEMA RN 1; rigid steel conduit with external PVC coating.
- F. Description: NEMA RN 1; rigid steel conduit with external PVC coating, 20 mil thick.
- G. Fittings and Conduit Bodies: NEMA FB 1; steel fittings with external PVC coating to match conduit.

## 2.7 FLEXIBLE METAL CONDUIT

- A. Description: NFPA 70, Type FMC standard wall steel flexible metal conduit listed and labeled as complying with UL 1, and listed for use in classified firestop systems to be used.
- B. Fittings:
  - 1. Description: Fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B.
  - 2. Material: Use steel or malleable iron.
- C. Description: Interlocked steel construction.
- D. Fittings: NEMA FB 1.

## 2.8 LIQUIDTIGHT FLEXIBLE METAL CONDUIT

- A. Description: NFPA 70, Type LFMC polyvinyl chloride (PVC) jacketed steel flexible metal conduit listed and labeled as complying with UL 360.
- B. Fittings:
  - 1. Description: Fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B.
  - 2. Material: Use steel or malleable iron.
- C. Description: Interlocked steel construction with PVC jacket.
- D. Fittings: NEMA FB 1.

## 2.9 ELECTRICAL METALLIC TUBING (EMT)

- A. Description: NFPA 70, Type EMT steel electrical metallic tubing complying with ANSI C80.3 and listed and labeled as complying with UL 797.
- B. Fittings:
  - 1. Description: Fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B.
  - 2. Material: Use steel or malleable iron.
  - 3. Connectors and Couplings: Use compression (gland) type.
    - a. Do not use indenter type connectors and couplings.
- C. Description: ANSI C80.3; galvanized tubing.
- D. Fittings and Conduit Bodies: NEMA FB 1; steel or malleable iron compression type.

## 2.10 NONMETALLIC CONDUIT

- A. Description: NFPA 70, Type PVC rigid polyvinyl chloride conduit complying with NEMA TC 2 and listed and labeled as complying with UL 651; Schedule 40 unless otherwise indicated, Schedule 80 where subject to physical damage; rated for use with conductors rated 90 degrees C.
- B. Fittings:
  - 1. Manufacturer: Same as manufacturer of conduit to be connected.
  - 2. Description: Fittings complying with NEMA TC 3 and listed and labeled as complying with UL 651; material to match conduit.
- C. Description: NEMA TC 2; Schedule 40 PVC.
- D. Fittings and Conduit Bodies: NEMA TC 3.

## PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Verify that field measurements are as shown on drawings.
- B. Verify that mounting surfaces are ready to receive conduits.
- C. Verify that conditions are satisfactory for installation prior to starting work.
- D. Verify routing and termination locations of conduit prior to rough-in.

### 3.2 INSTALLATION

- A. Install products in accordance with manufacturer's instructions.
- B. Install conduit in a neat and workmanlike manner in accordance with NECA 1.
- C. Install galvanized steel rigid metal conduit (RMC) in accordance with NECA 101.

- D. Install aluminum rigid metal conduit (RMC) in accordance with NECA 102.
- E. Install intermediate metal conduit (IMC) in accordance with NECA 101.
- F. Install PVC-coated galvanized steel rigid metal conduit (RMC) using only tools approved by the manufacturer.
- G. Install rigid polyvinyl chloride (PVC) conduit in accordance with NECA 111.
- H. Conduit Support:
  - 1. Secure and support conduits in accordance with NFPA 70 and Section 260529 using suitable supports and methods approved by the authority having jurisdiction.
  - 2. Provide independent support from building structure. Do not provide support from piping, ductwork, or other systems.
  - 3. Installation Above Suspended Ceilings: Do not provide support from ceiling support system. Do not provide support from ceiling grid or allow conduits to lay on ceiling tiles.
- I. Connections and Terminations:
  - 1. Use approved zinc-rich paint or conduit joint compound on field-cut threads of galvanized steel conduits prior to making connections.
  - 2. Where two threaded conduits must be joined and neither can be rotated, use three-piece couplings or split couplings. Do not use running threads.
  - 3. Use suitable adapters where required to transition from one type of conduit to another.
  - 4. Provide drip loops for liquidtight flexible conduit connections to prevent drainage of liquid into connectors.
  - 5. Terminate threaded conduits in boxes and enclosures using threaded hubs or double lock nuts for dry locations and raintight hubs for wet locations.
  - 6. Provide insulating bushings or insulated throats at all conduit terminations to protect conductors.
  - 7. Secure joints and connections to provide maximum mechanical strength and electrical continuity.
- J. Penetrations:
  - 1. Do not penetrate or otherwise notch or cut structural members, including footings and grade beams, without approval of Structural Engineer.
  - 2. Make penetrations perpendicular to surfaces unless otherwise indicated.
  - 3. Provide sleeves for penetrations as indicated or as required to facilitate installation. Set sleeves flush with exposed surfaces unless otherwise indicated or required.
  - 4. Conceal bends for conduit risers emerging above ground.
  - 5. Seal interior of conduits entering the building from underground at first accessible point to prevent entry of moisture and gases.
  - 6. Where conduits penetrate waterproof membrane, seal as required to maintain integrity of membrane.
  - 7. Make penetrations for roof-mounted equipment within associated equipment openings and curbs where possible to minimize roofing system penetrations. Where penetrations are necessary, seal as indicated or as required to preserve integrity of roofing system and maintain roof warranty. Include proposed locations of penetrations and methods for sealing with submittals.
- K. Conduit Movement Provisions: Where conduits are subject to movement, provide expansion and expansion/deflection fittings to prevent damage to enclosed conductors or connected equipment. This includes, but is not limited to:

1. Where conduits cross structural joints intended for expansion, contraction, or deflection.
  2. Where conduits are subject to earth movement by settlement or frost.
- L. Condensation Prevention: Where conduits cross barriers between areas of potential substantial temperature differential, provide sealing fitting or approved sealing compound at an accessible point near the penetration to prevent condensation. This includes, but is not limited to:
1. Where conduits pass from outdoors into conditioned interior spaces.
  2. Where conduits pass from unconditioned interior spaces into conditioned interior spaces.
- M. Provide grounding and bonding in accordance with Section 260526.

### 3.3 FIELD QUALITY CONTROL

- A. Repair cuts and abrasions in galvanized finishes using zinc-rich paint recommended by manufacturer. Replace components that exhibit signs of corrosion.
- B. Where coating of PVC-coated galvanized steel rigid metal conduit (RMC) contains cuts or abrasions, repair in accordance with manufacturer's instructions.
- C. Correct deficiencies and replace damaged or defective conduits.

### 3.4 CLEANING

- A. Clean interior of conduits to remove moisture and foreign matter.

### 3.5 CONDUIT APPLICATIONS

- A. Immediately after installation of conduit, use suitable manufactured plugs to provide protection from entry of moisture and foreign material and do not remove until ready for installation of conductors.
- B. Install conduit securely, in a neat and workmanlike manner, as specified in NECA 1.
- C. Install steel conduit as specified in NECA 101.
- D. Unless otherwise noted, all wiring shall be in conduit. Routing of conduit shown on drawings is intended to be diagrammatic and where changes are necessary as a result of structural conditions, apparatus, or other causes, routing shall be changed to meet conditions. Conduit risers and offsets are not indicated on Drawings, but are intended to be installed as required. Conduit shall be selected according to location and code requirements.
- E. EMT shall be used in the building interior up to 2" in diameter unless otherwise indicated. EMT conduit shall not be used in wet or hazardous locations, below grade or in concrete, or where exposed to damage. Provide compression fittings.
- F. Liquid-tight flexible metal conduit shall be used for final connections to motors, appliances and vibrating equipment and shall be a maximum of six feet in length (regular flexible metal conduit may be used for final connection to interior light fixtures).

- G. MC Cable and Flexible Metal Conduit shall only be used for final connection to equipment (non vibrating) with a maximum length of six feet (four feet for plenum ceilings). Nonmetallic flex conduit or tubing shall not be used.
- H. Galvanized rigid conduit shall be used for incoming feeder to all the panels unless noted otherwise.
- I. Underground conduit or conduit in concrete shall be PVC Schedule 40 (Type-EPC) or PVC coated rigid steel unless indicated otherwise. Conduit under slab-on-grade shall be buried at least 12" below the vapor barrier. Conduit embedded in concrete slabs, walls, or beams shall not have an outside dimension more than one-third the overall thickness of the concrete in which they are imbedded. Conduit shall not be run lengthwise in footings. Transitions to aboveground shall be made with PVC coated rigid steel or with rigid steel conduit coated with 2 coats of asphaltic mastic. PVC conduit shall not be used aboveground.
- J. Per NEC paragraph 300.5 (D)(3), provide warning tape or ribbon at least 12" above a service lateral conduit that is not encased in concrete.
- K. All metallic conduit terminating in outlet, junction or pull boxes and cabinets must terminate with bushing and double locknuts except exposed cast boxes, where they may be omitted. Conduit sizes 1-1/4" and above shall have insulating fiber bushings with double locknuts. Grounding type bushings must be used at points where grounding continuity is broken and at service entrance equipment. EMT conduit shall have compression type fittings (set screw connectors are not acceptable).
- L. Install nonmetallic conduit in accordance with manufacturer's instructions.
- M. Arrange supports to prevent misalignment during wiring installation.
- N. Support conduit using coated steel or malleable iron straps, lay-in adjustable hangers, clevis hangers, and split hangers.
- O. Group related conduits; support using conduit rack. Construct rack using steel channel; provide space on each for 25 percent additional conduits.
- P. Fasten conduit supports to building structure and surfaces under provisions of Section 260529.
- Q. Do not support conduit with wire or perforated pipe straps. Remove wire used for temporary supports.
- R. Do not attach conduit to ceiling support wires.
- S. Arrange conduit to maintain headroom and present neat appearance.
- T. Route exposed conduit parallel and perpendicular to walls. Do not run conduit exposed in occupied areas unless noted otherwise.
- U. Route conduit installed above accessible ceilings parallel and perpendicular to walls.
- V. Route conduit in and under slab from point-to-point.
- W. Do not cross conduits in slab.
- X. Maintain adequate clearance between conduit and piping.
- Y. Maintain 12 inch clearance between conduit and surfaces with temperatures exceeding 104 degrees F.

- Z. Cut conduit square using saw or pipecutter; de-burr cut ends.
- AA. Bring conduit to shoulder of fittings; fasten securely.
- AB. For conduit installed in floors that are in place before conduit is installed, properly seal around conduit, including any required fire chalk.
- AC. Install no more than equivalent of four 90 degree bends between boxes. Use conduit bodies to make sharp changes in direction, as around beams. Use hydraulic one shot bender to fabricate bends in metal conduit larger than 2 inch size.
- AD. Avoid moisture traps; provide junction box with drain fitting at low points in conduit system.
- AE. Provide suitable fittings to accommodate expansion and deflection where conduit crosses seismic and expansion joints complete with copper bonding jumper.
- AF. Provide suitable pull string in each empty conduit except sleeves and nipples.
- AG. Use suitable caps to protect installed conduit against entrance of dirt and moisture.
- AH. Ground and bond conduit under provisions of Section 260526.
- AI. In wooden load-bearing and exterior walls, do not cut or notch any wooden framing member to a depth exceeding 25 percent of its width. For wooden nonload-bearing walls, do not cut or notch any wooden framing member to a depth exceeding 40 percent of its width.

### 3.6 INTERFACE WITH OTHER PRODUCTS

- A. Install conduit to preserve fire resistance rating of partitions and other elements using materials and methods listed as part of UL system.
- B. Route conduit through roof openings for piping and ductwork wherever possible. Where separate roofing penetration is required, coordinate location and installation method with roofing installation.

END OF SECTION

## SECTION 260537 - BOXES

### PART 1 GENERAL

#### 1.1 SECTION INCLUDES

- A. Outlet and device boxes up to 100 cubic inches, including those used as junction and pull boxes.
- B. Cabinets and enclosures, including junction and pull boxes larger than 100 cubic inches.
- C. Wall and ceiling outlet boxes.
- D. Floor boxes.
- E. Pull and junction boxes.

#### 1.2 REFERENCES

- A. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2010.
- B. NECA 130 - Standard for Installing and Maintaining Wiring Devices; 2010.
- C. NEMA FB 1 - Fittings, Cast Metal Boxes, and Conduit Bodies for Conduit, Electrical Metallic Tubing, and Cable; 2012.
- D. NEMA OS 1 - Sheet-Steel Outlet Boxes, Device Boxes, Covers, and Box Supports; 2013.
- E. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum); 2014.
- F. NFPA 70 - National Electrical Code, National Fire Protection Association (edition adopted by Authority Having Jurisdiction).
- G. UL 50 - Enclosures for Electrical Equipment, Non-Environmental Considerations; Current Edition, Including All Revisions.
- H. UL 50E - Enclosures for Electrical Equipment, Environmental Considerations; Current Edition, Including All Revisions.
- I. UL 508A - Industrial Control Panels; Current Edition, Including All Revisions.
- J. UL 514A - Metallic Outlet Boxes; Current Edition, Including All Revisions.

#### 1.3 QUALITY ASSURANCE

- A. Conform to requirements of NFPA 70.

## PART 2 PRODUCTS

### 2.1 BOXES

#### A. General Requirements:

1. Do not use boxes and associated accessories for applications other than as permitted by NFPA 70 and product listing.
2. Provide all boxes, fittings, supports, and accessories required for a complete raceway system and to accommodate devices and equipment to be installed.
3. Provide products listed, classified, and labeled by Underwriter's Laboratories Inc. (UL) or testing firm acceptable to authority having jurisdiction as suitable for the purpose indicated.
4. Where box size is not indicated, size to comply with NFPA 70 but not less than applicable minimum size requirements specified.
5. Provide grounding terminals within boxes where equipment grounding conductors terminate.

#### B. Outlet and Device Boxes Up to 100 cubic inches, Including Those Used as Junction and Pull Boxes:

1. Use sheet-steel boxes for dry locations unless otherwise indicated or required.
2. Use cast iron boxes or cast aluminum boxes for damp or wet locations unless otherwise indicated or required; furnish with compatible weatherproof gasketed covers.
3. Use suitable concrete type boxes where flush-mounted in concrete.
4. Use suitable masonry type boxes where flush-mounted in masonry walls.
5. Use raised covers suitable for the type of wall construction and device configuration where required.
6. Use shallow boxes where required by the type of wall construction.
7. Do not use "through-wall" boxes designed for access from both sides of wall.
8. Sheet-Steel Boxes: Comply with NEMA OS 1, and list and label as complying with UL 514A.
9. Cast Metal Boxes: Comply with NEMA FB 1, and list and label as complying with UL 514A; furnish with threaded hubs.
10. Boxes for Supporting Luminaires and Ceiling Fans: Listed as suitable for the type and weight of load to be supported; furnished with fixture stud to accommodate mounting of luminaire where required.
11. Boxes for Ganged Devices: Use multigang boxes of single-piece construction. Do not use field-connected gangable boxes.
12. Wall Plates: Comply with Section 262726.

#### C. Cabinets and Enclosures, Including Junction and Pull Boxes Larger Than 100 cubic inches:

1. Comply with NEMA 250, and list and label as complying with UL 50 and UL 50E, or UL 508A.
2. NEMA 250 Environment Type, Unless Otherwise Indicated:
3. Junction and Pull Boxes Larger Than 100 cubic inches:
  - a. Provide screw-cover or hinged-cover enclosures unless otherwise indicated.

### 2.2 OUTLET BOXES

#### A. Sheet Metal Outlet Boxes: NEMA OS 1, galvanized steel.

1. Luminaire and Equipment Supporting Boxes: Rated for weight of equipment supported; include 1/2 inch male fixture studs where required.
2. Concrete Ceiling Boxes: Concrete type.



3. Boxes for installation in concrete block wall construction shall be gang type, 3-1/2" deep for switch devices and 4" square by 1-1/2" deep, with 1-1/4" single and two gang square corner extension covers for receptacle and junction purposes. Boxes for installation in brick wall construction shall be gang type, 3-1/2" deep. Boxes installed in plastered walls shall be 4" square by 1-1/2" deep, with 3/4" single and two gang plaster covers. All boxes shall have internal mounting ears or threaded tappings.
    - B. Cast Boxes: NEMA FB 1, Type FD, aluminum. Provide gasketed cover by box manufacturer. Provide threaded hubs.
    - C. Wall Plates for Finished Areas: As specified in Section 262726.
- 2.3 FLOOR BOXES
- A. Floor Boxes: NEMA OS 1, fully adjustable, 1-1/2 inches deep.
  - B. Material: Cast metal.
- 2.4 PULL AND JUNCTION BOXES
- A. Sheet Metal Boxes: NEMA OS 1, galvanized steel. Boxes shall be 1 1/2" deep minimum. Boxes to which fixtures are installed shall have studs and straps to support fixture weight.
  - B. Pull and junction boxes shall be constructed of code gauge galvanized sheet steel and fitted with screw covers held in place with corrosion resistant machine screws.
  - C. Provide boxes where noted on Drawings or where necessary to facilitate conductor pulling and splicing. Splicing of conductors is to be avoided as much as possible with continuous lengths being preferred. Box sizes shall conform to sizes required by NEC or as indicated on the Drawings (if larger than required by NEC).
  - D. Surface Mounted Cast Metal Box: NEMA 250, Type 4; flat-flanged, surface mounted junction box:
    1. Material: Galvanized cast iron.
    2. Cover: Furnish with ground flange, neoprene gasket, and stainless steel cover screws.
  - E. In-Ground Cast Metal Box: NEMA 250, Type 6, outside flanged, recessed cover box for flush mounting:
    1. Material: Galvanized cast iron.
    2. Cover: Smooth cover with neoprene gasket and stainless steel cover screws.
  - F. Fiberglass Handholes: Die molded glass fiber hand holes:
    1. Cable Entrance: Pre-cut 6 x 6 inch cable entrance at center bottom of each side.
    2. Cover: Glass fiber weatherproof cover with nonskid finish.

## PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Verify that field measurements are as shown on drawings.

- B. Verify that mounting surfaces are ready to receive boxes.
- C. Verify that conditions are satisfactory for installation prior to starting work.
- D. Verify locations of floor boxes and outlets in offices and work areas prior to rough-in.

### 3.2 INSTALLATION

- A. Install products in accordance with manufacturer's instructions.
- B. Perform work in a neat and workmanlike manner in accordance with NECA 1 and, where applicable, NECA 130, including mounting heights specified in those standards where mounting heights are not indicated.
- C. Arrange equipment to provide minimum clearances in accordance with manufacturer's instructions and NFPA 70.
- D. Box Supports:
  - 1. Secure and support boxes in accordance with NFPA 70 and Section 260529 using suitable supports and methods approved by the authority having jurisdiction.
  - 2. Provide independent support from building structure except for cast metal boxes (other than boxes used for fixture support) supported by threaded conduit connections in accordance with NFPA 70. Do not provide support from piping, ductwork, or other systems.
- E. Install boxes plumb and level.
- F. Flush-Mounted Boxes:
  - 1. Install boxes in noncombustible materials such as concrete, tile, gypsum, plaster, etc. so that front edge of box or associated raised cover is not set back from finished surface more than 1/4 inch or does not project beyond finished surface.
  - 2. Install boxes in combustible materials such as wood so that front edge of box or associated raised cover is flush with finished surface.
  - 3. Repair rough openings around boxes in noncombustible materials such as concrete, tile, gypsum, plaster, etc. so that there are no gaps or open spaces greater than 1/8 inch at the edge of the box.
- G. Install boxes as required to preserve insulation integrity.
- H. Install permanent barrier between ganged wiring devices when voltage between adjacent devices exceeds 300 V.
- I. Close unused box openings.
- J. Install blank wall plates on junction boxes and on outlet boxes with no devices or equipment installed or designated for future use.
- K. Provide grounding and bonding in accordance with Section 260526.
- L. Install boxes securely, in a neat and workmanlike manner, as specified in NECA 1.
- M. Install in locations as shown on Drawings, and as required for splices, taps, wire pulling, equipment connections, and as required by NFPA 70.

- N. Coordinate installation of outlet boxes for equipment connected under Section 262717.
- O. Electrical boxes are shown on Drawings in approximate locations unless dimensioned.
  - 1. Adjust box locations up to 10 feet if required to accommodate intended purpose.
- P. Orient boxes to accommodate wiring devices oriented as specified in Section 262726.
- Q. Maintain headroom and present neat mechanical appearance.
- R. Install pull boxes and junction boxes above accessible ceilings and in unfinished areas only.
- S. Inaccessible Ceiling Areas: Install outlet and junction boxes no more than 6 inches from ceiling access panel or from removable recessed luminaire.
- T. Install boxes to preserve fire resistance rating of partitions and other elements.
- U. Coordinate mounting heights and locations of outlets mounted above counters, benches, and backsplashes.
- V. Locate outlet boxes to allow luminaires positioned as shown on reflected ceiling plan.
- W. Align adjacent wall mounted outlet boxes for switches, thermostats, and similar devices.
- X. Use flush mounting outlet box in finished areas.
- Y. Locate flush mounting box in masonry wall to require cutting of masonry unit corner only. Coordinate masonry cutting to achieve neat opening.
- Z. Do not install flush mounting box back-to-back in walls; provide minimum 6 inches separation. Provide minimum 24 inches separation in acoustic rated walls.
- AA. Secure flush mounting box to interior wall and partition studs. Accurately position to allow for surface finish thickness.
- AB. Use stamped steel bridges to fasten flush mounting outlet box between studs.
- AC. Install flush mounting box without damaging wall insulation or reducing its effectiveness.
- AD. Use adjustable steel channel fasteners for hung ceiling outlet box.
- AE. Do not fasten boxes to ceiling support wires.
- AF. Support boxes independently of conduit, except cast box that is connected to two rigid metal conduits both supported within 12 inches of box.
- AG. Use gang box where more than one device is mounted together. Do not use sectional box.
- AH. Use gang box with plaster ring for single device outlets.
- AI. Use cast outlet box in exterior locations exposed to the weather and wet locations.
- AJ. Use cast floor boxes for installations in slab on grade; formed steel boxes are acceptable for other installations.
- AK. Set floor boxes level.

- AL. Large Pull Boxes: Use hinged enclosure in interior dry locations, surface-mounted cast metal box in other locations.

### 3.3 ADJUSTING

- A. Adjust floor boxes flush with finish flooring material.
- B. Adjust flush-mounting outlets to make front flush with finished wall material.
- C. Install knockout closures in unused box openings.

### 3.4 CLEANING

- A. Clean interior of boxes to remove dirt, debris, plaster and other foreign material.

END OF SECTION

## SECTION 260553 - IDENTIFICATION FOR ELECTRICAL SYSTEMS

### PART 1 GENERAL

#### 1.1 SECTION INCLUDES

- A. Electrical identification requirements.
- B. Identification nameplates and labels.
- C. Warning signs and labels.

#### 1.2 REFERENCES

- A. ANSI Z535.2 - American National Standard for Environmental and Facility Safety Signs; 2011.
- B. ANSI Z535.4 - American National Standard for Product Safety Signs and Labels; 2011.
- C. NFPA 70 - National Electrical Code, National Fire Protection Association (edition adopted by Authority Having Jurisdiction).
- D. UL 969 - Marking and Labeling Systems; Current Edition, Including All Revisions.

#### 1.3 QUALITY ASSURANCE

- A. Conform to requirements of NFPA 70.

### PART 2 PRODUCTS

#### 2.1 IDENTIFICATION REQUIREMENTS

- A. Identification for Equipment:
  - 1. Use identification nameplate to identify each piece of electrical distribution and control equipment and associated sections, compartments, and components.
- B. Identification for Conductors and Cables:
  - 1. Color Coding for Power Conductors 600 V and Less: Comply with Section 260519.
  - 2. Use identification nameplate or identification label to identify color code for ungrounded and grounded power conductors inside door or enclosure at each piece of feeder or branch-circuit distribution equipment when premises has feeders or branch circuits served by more than one nominal voltage system.

#### 2.2 NAMEPLATES AND LABELS

- A. Identification Nameplates:
  - 1. Materials:

2. Mounting Holes for Mechanical Fasteners: Two, centered on sides for sizes up to 1 inch high; Four, located at corners for larger sizes.
- B. Identification Labels:
  1. Materials: Use self-adhesive laminated plastic labels; UV, chemical, water, heat, and abrasion resistant.
  2. Text: Use factory pre-printed or machine-printed text. Do not use handwritten text unless otherwise indicated.
- C. Nameplates: Engraved three-layer laminated plastic, white letters on black background.
- D. Locations:
  1. Each electrical distribution and control equipment enclosure.
- E. Letter Size:
  1. Use 1/8 inch letters for identifying individual equipment and loads.
  2. Use 1/4 inch letters for identifying grouped equipment and loads.
- F. Labels (for Power Outlets): Embossed adhesive tape, with 1/8 inch black letters on clear background. Use only for identification of appliances and equipment with their own branch circuits and for dedicated computer circuits. Label outlet with name of load, panel and circuit number.

### 2.3 WARNING SIGNS AND LABELS

- A. Comply with ANSI Z535.2 or ANSI Z535.4 as applicable.
- B. Warning Signs:
  1. Materials:
  2. Minimum Size: 7 by 10 inches unless otherwise indicated.
- C. Warning Labels:
  1. Materials: Use factory pre-printed or machine-printed self-adhesive polyester or self-adhesive vinyl labels; UV, chemical, water, heat, and abrasion resistant; produced using materials recognized to UL 969.
  2. Machine-Printed Labels: Use thermal transfer process printing machines and accessories recommended by label manufacturer.
  3. Minimum Size: 2 by 4 inches unless otherwise indicated.
- D. Description: 4 inch wide plastic tape, detectable type colored red with suitable warning legend describing buried electrical lines.

## PART 3 EXECUTION

### 3.1 PREPARATION

- A. Clean surfaces to receive adhesive products according to manufacturer's instructions.
- B. Degrease and clean surfaces to receive nameplates and labels.

### 3.2 INSTALLATION

- A. Install products in accordance with manufacturer's instructions.
- B. Install identification products to be plainly visible for examination, adjustment, servicing, and maintenance. Unless otherwise indicated, locate products as follows:
  - 1. Surface-Mounted Equipment: Enclosure front.
  - 2. Flush-Mounted Equipment: Inside of equipment door.
  - 3. Free-Standing Equipment: Enclosure front; also enclosure rear for equipment with rear access.
  - 4. Elevated Equipment: Legible from the floor or working platform.
  - 5. Interior Components: Legible from the point of access.
  - 6. Conductors and Cables: Legible from the point of access.
- C. Install identification products centered, level, and parallel with lines of item being identified.
- D. Secure nameplates to exterior surfaces of enclosures using stainless steel screws and to interior surfaces using self-adhesive backing or epoxy cement.
- E. Install self-adhesive labels and markers to achieve maximum adhesion, with no bubbles or wrinkles and edges properly sealed.

END OF SECTION

## SECTION 262717 - EQUIPMENT WIRING

### PART 1 GENERAL

#### 1.1 SECTION INCLUDES

- A. Electrical connections to equipment.

#### 1.2 REFERENCES

- A. NEMA WD 1 - General Color Requirements for Wiring Devices; 1999 (R 2010).
- B. NEMA WD 6 - Wiring Devices - Dimensional Specifications; 2012.
- C. NFPA 70 - National Electrical Code, National Fire Protection Association (edition adopted by Authority Having Jurisdiction).

#### 1.3 QUALITY ASSURANCE

- A. Conform to requirements of NFPA 70.
- B. Products: Listed and classified by Underwriters Laboratories Inc. as suitable for the purpose specified and indicated.

#### 1.4 COORDINATION

- A. Obtain and review shop drawings, product data, manufacturer's wiring diagrams, and manufacturer's instructions for equipment furnished under other sections.
- B. Determine connection locations and requirements.
- C. Sequence rough-in of electrical connections to coordinate with installation of equipment.
- D. Sequence electrical connections to coordinate with start-up of equipment.

### PART 2 PRODUCTS

#### 2.1 MATERIALS

- A. Disconnect Switches: As follows and in individual equipment sections:
  - 1. Safety switches shall be quick-make, quick-break, heavy duty type in sheet steel enclosure, except as required for rain tight installations, with door cover interlock. Provide fused type safety switches and fuses where indicated on the Drawings or as required by Code. Fused switches shall utilize Class R fuseholders and fuses, unless indicated otherwise.
- B. Wiring Devices: As specified in Section 262726.



- C. Flexible Conduit: As specified in Section 260534.
- D. Wire and Cable: As specified in Section 260519.
- E. Boxes: As specified in Section 260537.

### PART 3 EXECUTION

#### 3.1 EXAMINATION

- A. Verify that equipment is ready for electrical connection, wiring, and energization.

#### 3.2 ELECTRICAL CONNECTIONS

- A. Make electrical connections in accordance with equipment manufacturer's instructions.
- B. Make all final power feed connections to starters and/or motorized equipment installed by Heating and Air Conditioning and Plumbing Contractors as indicated or required. Refer to Electrical Sections of other Contractors' Specifications for further information.
- C. For air handling equipment with separate "field-installed" heater unit, provide fuse block with fuses, wiring and power connections for fan motor tapped to unit disconnect switch.
- D. Verify all equipment for service and characteristics provided prior to rough-in and connection. Provide a grounding conductor for all equipment connected with flexible conduit and bond to conduit system and metallic frame of equipment.
- E. Be responsible for securing and installing proper insulated conductors required for equipment of higher temperature range beyond that of specified branch circuit type.
- F. Make conduit connections to equipment using flexible metal conduit. Use liquidtight flexible metal conduit with watertight connectors in damp or wet locations and for all motors and vibrating equipment.
- G. Connect heat producing equipment using wire and cable with insulation suitable for temperatures encountered.
- H. Provide receptacle outlet to accommodate connection with attachment plug.
- I. Provide cord and cap where field-supplied attachment plug is required.
- J. Install suitable strain-relief clamps and fittings for cord connections at outlet boxes and equipment connection boxes.
- K. Install disconnect switches, controllers, control stations, and control devices to complete equipment wiring requirements.
- L. Install terminal block jumpers to complete equipment wiring requirements.

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- M. Install interconnecting conduit and wiring between devices and equipment to complete equipment wiring requirements.

END OF SECTION

## SECTION 262726 - WIRING DEVICES

### PART 1 GENERAL

#### 1.1 SECTION INCLUDES

- A. Wall switches.
- B. Receptacles.
- C. Wall plates.

#### 1.2 REFERENCES

- A. FS W-C-596 - Connector, Electrical, Power, General Specification for; Federal Specification; Revision G, 2001.
- B. FS W-S-896 - Switches, Toggle (Toggle and Lock), Flush-mounted (General Specification); Federal Specification; Revision F, 1999.
- C. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2010.
- D. NEMA WD 1 - General Color Requirements for Wiring Devices; 1999 (R 2010).
- E. NEMA WD 6 - Wiring Devices - Dimensional Specifications; 2012.
- F. NFPA 70 - National Electrical Code, National Fire Protection Association (edition adopted by Authority Having Jurisdiction).
- G. UL 20 - General-Use Snap Switches; Current Edition, Including All Revisions.
- H. UL 498 - Attachment Plugs and Receptacles; Current Edition, Including All Revisions.
- I. UL 514D - Cover Plates for Flush-Mounted Wiring Devices; Current Edition, Including All Revisions.

#### 1.3 SUBMITTALS

- A. Product Data: Provide manufacturer's catalog information showing dimensions, colors, and configurations.

#### 1.4 QUALITY ASSURANCE

- A. Conform to requirements of NFPA 70.
- B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.

## PART 2 PRODUCTS

### 2.1 MANUFACTURERS.

- A. All devices shall be specification grade and shall be the product of one manufacturer throughout the project except as otherwise noted.

### 2.2 ALL WIRING DEVICES

- A. Provide products listed and classified by Underwriters Laboratories Inc. as suitable for the purpose specified and indicated.
- B. Finishes:

### 2.3 WALL SWITCHES

- A. All Wall Switches: AC only, quiet operating, general-use snap switches with silver alloy contacts, complying with NEMA WD 1 and NEMA WD 6, and listed as complying with UL 20 and where applicable, FS W-S-896; types as indicated on the drawings.
  - 1. Wiring Provisions: Terminal screws for side wiring and screw actuated binding clamp for back wiring with separate ground terminal screw.
- B. Wall Switches: NEMA WD 1, Heavy Duty, AC only general-use snap switch, quiet type with side wire terminals. Switches shall be single or multi-pole as indicated on the Drawings. Provide Leviton Decora Switches, or approved equal, if indicated on the design drawings. Also, provide WattStopper AS-100 switches or approved equal, if indicated on the design drawings.
  - 1. Body and Handle: plastic with toggle handle unless otherwise indicated. Color shall be as determined by owner.
  - 2. Ratings:
    - a. Voltage: 120 - 277 volts, AC.
    - b. Current: 20 amperes.

### 2.4 RECEPTACLES

- A. All Receptacles: Self-grounding, complying with NEMA WD 1 and NEMA WD 6, and listed as complying with UL 498, and where applicable, FS W-C-596; types as indicated on the drawings.
  - 1. Wiring Provisions: Terminal screws for side wiring or screw actuated binding clamp for back wiring with separate ground terminal screw.
  - 2. NEMA configurations specified are according to NEMA WD 6.
- B. Receptacles: Heavy duty, complying with NEMA WD 6 and WD 1.
  - 1. Duplex receptacles shall be straight blade, grounding type, with side wiring terminals. Conductors shall be connected to all receptacles using screws (not spring connectors).
  - 2. Device Body: plastic unless otherwise indicated. Color as determined by owner.
  - 3. Configuration: NEMA WD 6, type as specified and indicated.
- C. Convenience Receptacles: Type 5 - 20.

- D. Duplex Convenience Receptacles.
- E. GFCI Receptacles: Convenience receptacle with integral ground fault circuit interrupter to meet regulatory requirements. Also, provide GFCI receptacles where indicated. GFCI type receptacles shall have "test" and "reset" buttons.
- F. Weather proof receptacles shall be in a cast metal box with gasketed, weatherproof cover per NEC paragraph 406.8(B). Weatherproof receptacles shall be UL listed for use in "wet locations" with plug "in-use" and shall be GFCI rated. Receptacle itself shall also be rated weather resistant (WR) per NEC. Receptacles in damp locations may conform to NEC paragraph 406.8(A) with gasketed metal cover and metal weatherproof flip covers (confirm interpretation of damp location with AHJ before purchasing materials).
- G. Floor-mounted receptacles shall have a brass plate and cover, unless noted otherwise.
- H. Special purpose outlets shall be as indicated on the Drawings and have matching cover plates.

## 2.5 WALL PLATES

- A. All Wall Plates: Comply with UL 514D.
  - 1. Configuration: One piece cover as required for quantity and types of corresponding wiring devices.
  - 2. Size: Standard.
  - 3. Screws: Metal with slotted heads finished to match wall plate finish.
- B. Weatherproof Covers for Wet Locations: Gasketed, cast aluminum, with hinged lockable cover and corrosion-resistant screws; listed as suitable for use in wet locations while in use with attachment plugs connected.
- C. Decorative Cover Plates: smooth plastic unless otherwise indicated on drawings. Color as determined by owner.

## PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Verify that field measurements are as shown on the drawings.
- B. Verify that outlet boxes are installed in proper locations and at proper mounting heights and are properly sized to accommodate devices and conductors in accordance with NFPA 70.
- C. Verify that wall openings are neatly cut and will be completely covered by wall plates.
- D. Verify that final surface finishes are complete, including painting.
- E. Verify that floor boxes are adjusted properly.
- F. Verify that branch circuit wiring installation is completed, tested, and ready for connection to wiring devices.
- G. Verify that conditions are satisfactory for installation prior to starting work.

### 3.2 PREPARATION

- A. Provide extension rings to bring outlet boxes flush with finished surface.
- B. Clean dirt, debris, plaster, and other foreign materials from outlet boxes.

### 3.3 INSTALLATION

- A. Perform work in a neat and workmanlike manner in accordance with NECA 1 and, where applicable, NECA 130, including mounting heights specified in those standards unless otherwise indicated.
- B. Coordinate locations of outlet boxes provided under Section 260537 as required for installation of wiring devices provided under this section.
- C. Install wiring devices in accordance with manufacturer's instructions.
- D. Install permanent barrier between ganged wiring devices when voltage between adjacent devices exceeds 300 V.
- E. Where required, connect wiring devices using pigtails not less than 6 inches long. Do not connect more than one conductor to wiring device terminals.
- F. Connect wiring devices by wrapping conductor clockwise 3/4 turn around screw terminal and tightening to proper torque specified by the manufacturer. Where present, do not use push-in pressure terminals that do not rely on screw-actuated binding.
- G. Unless otherwise indicated, connect wiring device grounding terminal to branch circuit equipment grounding conductor and to outlet box with bonding jumper.
- H. Install wiring devices plumb and level with mounting yoke held rigidly in place.
- I. Install wall switches with OFF position down.
- J. Do not share neutral conductor on branch circuits utilizing wall dimmers.
- K. Install vertically mounted receptacles with grounding pole on top and horizontally mounted receptacles with grounding pole on left.
- L. Install wall plates to fit completely flush to wall with no gaps and rough opening completely covered without strain on wall plate. Repair or reinstall improperly installed outlet boxes or improperly sized rough openings. Do not use oversized wall plates in lieu of meeting this requirement.
- M. Install blank wall plates on junction boxes and on outlet boxes with no wiring devices installed or designated for future use.
- N. Do not cut cover plate.

### 3.4 INTERFACE WITH OTHER PRODUCTS

- A. Install wall switch 48 inches (to center of switch) above finished floor, unless otherwise indicated. Conform to all ADA requirements.

- B. Install convenience receptacle 18 inches above finished floor, unless otherwise indicated.
- C. Install convenience receptacle with bottom 6 inches above counter.

### 3.5 FIELD QUALITY CONTROL

- A. Perform field inspection, testing, and adjusting as required and per the latest NETA testing standard.
- B. Inspect each wiring device for damage and defects.
- C. Operate each wall switch, wall dimmer, and fan speed controller with circuit energized to verify proper operation.
- D. Test each receptacle to verify operation and proper polarity.
- E. Test each GFCI receptacle for proper tripping operation according to manufacturer's instructions.
- F. Correct wiring deficiencies and replace damaged or defective wiring devices.

### 3.6 ADJUSTING

- A. Adjust devices and wall plates to be flush and level.

### 3.7 CLEANING

- A. Clean exposed surfaces to remove dirt, paint, or other foreign material and restore to match original factory finish.

END OF SECTION

## SECTION 262818 - ENCLOSED SWITCHES

### PART 1 GENERAL

#### 1.1 SECTION INCLUDES

- A. Fusible switches.
- B. Nonfusible switches.

#### 1.2 RELATED SECTIONS

- A. Section 260526 - Grounding and Bonding for Electrical Systems.
- B. Section 260529 - Hangers and Supports for Electrical Systems.
- C. Section 260553 - Identification for Electrical Systems: Identification products and requirements.
- D. Section 262813 - Fuses.

#### 1.3 REFERENCES

- A. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2010.
- B. NEMA FU 1 - Low Voltage Cartridge Fuses; National Electrical Manufacturers Association; 2002 (R2007).
- C. NEMA KS 1 - Heavy Duty Enclosed and Dead-Front Switches (600 Volts Maximum); 2013.
- D. NETA ATS - Acceptance Testing Specifications for Electrical Power Equipment and Systems; 2013.
- E. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

#### 1.4 QUALITY ASSURANCE

- A. Conform to requirements of NFPA 70.

### PART 2 PRODUCTS

#### 2.1 MANUFACTURERS

- A. Square D, [www.squared.com](http://www.squared.com) (no substitutions allowed).

#### 2.2 COMPONENTS

- A. Fusible Switch Assemblies: NEMA KS 1, Type HD enclosed load interrupter knife switch.



1. Externally operable handle interlocked to prevent opening front cover with switch in ON position.
  2. Handle lockable in OFF position.
  3. Fuse clips: Designed to accommodate NEMA FU1, Class R fuses.
- B. Nonfusible Switch Assemblies: NEMA KS 1, Type HD enclosed load interrupter knife switch.
1. Externally operable handle interlocked to prevent opening front cover with switch in ON position.
  2. Handle lockable in OFF position.
- C. Enclosures: NEMA KS 1.
1. Interior Dry Locations: Type 1.
  2. Exterior Locations: Type 3R.

### PART 3 EXECUTION

#### 3.1 INSTALLATION

- A. Install enclosed switches in accordance with manufacturer's instructions.
- B. Install enclosed switches securely, in a neat and workmanlike manner in accordance with NECA 1.
- C. Arrange equipment to provide minimum clearances in accordance with manufacturer's instructions and NFPA 70.
- D. Provide required supports in accordance with Section 260529.
- E. Install enclosed switches plumb.
- F. Except where indicated to be mounted adjacent to the equipment they supply, mount enclosed switches such that the highest position of the operating handle does not exceed 79 inches above the floor or working platform.
- G. Provide grounding and bonding in accordance with Section 260526.
- H. Provide identification nameplate for each enclosed switch in accordance with Section 260553.
- I. Provide arc flash warning labels in accordance with NFPA 70.
- J. Install fuses in fusible disconnect switches.
- K. Apply adhesive tag on inside door of each fused switch indicating NEMA fuse class and size installed.

#### 3.2 FIELD QUALITY CONTROL

- A. Visually and mechanically confirm that safety switch is working.
- B. For switches rated 200A and greater, perform inspections and tests listed in NETA STD ATS, Section 7.5.

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- C. Correct deficiencies and replace damaged or defective enclosed safety switches or associated components.

END OF SECTION

## SECTION 265100 - INTERIOR LIGHTING

### PART 1 GENERAL

#### 1.1 SECTION INCLUDES

- A. Interior luminaires.
- B. Emergency lighting units.
- C. Exit signs.
- D. Lamps.
- E. Luminaire accessories.

#### 1.2 REFERENCES

- A. ANSI C82.1 - American National Standard for Lamp Ballast - Line Frequency Fluorescent Lamp Ballast; 2004.
- B. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2010.
- C. NECA/IESNA 500 - Standard for Installing Indoor Commercial Lighting Systems; 2006.
- D. NECA/IESNA 502 - Standard for Installing Industrial Lighting Systems; 2006.
- E. NEMA WD 6 - Wiring Devices - Dimensional Requirements; National Electrical Manufacturers Association; 2002 (R2008).
- F. NFPA 70 - National Electrical Code, National Fire Protection Association (edition adopted by Authority Having Jurisdiction).
- G. NFPA 101 - Code for Safety to Life from Fire in Buildings and Structures; National Fire Protection Association (edition adopted by Authority Having Jurisdiction).
- H. UL 924 - Emergency Lighting and Power Equipment; Current Edition, Including All Revisions.
- I. UL 1598 - Luminaires; Current Edition, Including All Revisions.

#### 1.3 SUBMITTALS

- A. Product Data (including ballasts and lighting contactors): Provide dimensions, ratings, and performance data.

#### 1.4 QUALITY ASSURANCE

- A. Conform to requirements of NFPA 70.

- B. Conform to requirements of NFPA 70 and NFPA 101.
- C. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.

#### 1.5 EXTRA MATERIALS

- A. Furnish one replacement lamp for each lamp type.

### PART 2 PRODUCTS

#### 2.1 LUMINAIRES

- A. Provide products that comply with requirements of NFPA 70.
- B. Provide products that are listed and labeled as complying with UL 1598, where applicable.
- C. Provide products that comply with requirements of NFPA 70 and NFPA 101.
- D. Provide products listed and classified by Underwriters Laboratories Inc. as suitable for the purpose specified and indicated.
- E. Unless otherwise indicated, provide complete luminaires including lamp(s) and all sockets, ballasts, reflectors, lenses, housings and other components required to position, energize and protect the lamp and distribute the light.
- F. Unless specifically indicated to be excluded, provide all required conduit, boxes, wiring, connectors, hardware, supports, trims, accessories, etc. as necessary for a complete operating system.
- G. Provide products suitable to withstand normal handling, installation, and service without any damage, distortion, corrosion, fading, discoloring, etc.

#### 2.2 EMERGENCY LIGHTING UNITS

- A. Description: Emergency lighting units complying with NFPA 101 and all applicable state and local codes, and listed and labeled as complying with UL 924.
- B. Operation: Upon interruption of normal power source or brownout condition exceeding 20 percent voltage drop from nominal, solid-state control automatically switches connected lamps to integral battery power for minimum of 90 minutes of rated emergency illumination, and automatically recharges battery upon restoration of normal power source.
- C. Battery:
  - 1. Size battery to supply all connected lamps, including emergency remote heads where indicated.
- D. Diagnostics: Provide power status indicator light and accessible integral test switch to manually activate emergency operation.
- E. Provide low-voltage disconnect to prevent battery damage from deep discharge.

- F. Provide accessories and fittings as recommended by manufacturer to properly and completely install and wire fixtures.
- G. Electrical Characteristics: 120 volts, 60 Hz, unless otherwise indicated.

## 2.3 LUMINAIRES

- A. Furnish products as indicated in Schedule included on the Drawings. Confirm that the fixtures scheduled are the correct, voltage, wattage, size and mounting type and are listed for location used (i.e. damp or wet locations) before ordering fixtures, ballasts, and lamps. For substitutions, see Section for General Electrical Requirements.
- B. Although not specifically shown or specified, all light fixtures shall be provided with all necessary optional accessories and mounting hardware for installation as indicated or required.
- C. Provide insulated ceiling (i.c.) rated fixtures where recessed incandescent, compact fluorescent, or low voltage light fixtures come into direct contact with insulation.

## 2.4 EXIT SIGNS

- A. All Exit Signs: Internally illuminated with LEDs unless otherwise indicated; complying with NFPA 101 and all applicable state and local codes, and listed and labeled as complying with UL 924.
  - 1. Number of Faces: Single or double as indicated or as required for the installed location.
  - 2. Directional Arrows: As indicated or as required for the installed location.
- B. Exit Signs: Exit sign fixture suitable for use as emergency lighting unit.
  - 1. Provide fixtures complying with NFPA 101.
  - 2. Lamps: Compact fluorescent.
  - 3. Mounting: As indicated.

## 2.5 LAMPS

- A. Lamp Types: As specified for each fixture.

## PART 3 EXECUTION

### 3.1 INSTALLATION

- A. Coordinate locations of outlet boxes provided under Section 260537 as required for installation of luminaires provided under this section.
- B. Install products according to manufacturer's instructions.
- C. Install luminaires securely, in a neat and workmanlike manner, as specified in NECA 1 (general workmanship), NECA 500 (commercial lighting), and NECA 502 (industrial lighting).
- D. Install luminaires plumb and square and aligned with building lines and with adjacent luminaires.

- E. Install fixtures securely, in a neat and workmanlike manner, as specified in NECA 500 (commercial lighting).
- F. Install suspended luminaires and exit signs using pendants supported from swivel hangers. Provide pendant length required to suspend luminaire at indicated height.
- G. Support luminaires larger than 2 x 4 foot size independent of ceiling framing.
- H. Locate recessed ceiling luminaires as indicated on reflected ceiling plan.
- I. Install surface mounted luminaires and exit signs plumb and adjust to align with building lines and with each other. Secure to prevent movement.
- J. Support fixtures (2 x 4 foot and smaller) to be recessed in readily removable tile ceilings (lay-in type) from the T-bar tile support and connect to remote mounted 4" square (minimum size, conform to NEC) junction boxes with approved six foot long (four feet long for plenum ceilings), 3/8" flexible conduit "fixture whip" with grounding conductor bonded between conduit system and fixture.
- K. Connect single-connected fixtures, surface or stem hung, with heat resistant fixture wire. Connect multiple-connected fluorescent fixtures, surface or stem hung, with type THHN heat resistant thermoplastic wire of a size indicated for branch circuit.
- L. Install clips to secure recessed grid-supported luminaires in place.
- M. Provide sloped ceiling adaptors and all other required hardware as necessary to properly install ceiling mounted light fixtures in sloped ceilings.
- N. Install wall mounted luminaires, emergency lighting units, and exit signs at height as indicated on Drawings.
- O. Install accessories furnished with each luminaire.
- P. Make wiring connections to branch circuit using building wire with insulation suitable for temperature conditions within fixture; use flexible conduit.
- Q. Connect luminaires and exit signs to branch circuit outlets provided under Section 260537 using flexible conduit.
- R. Make wiring connections to branch circuit using building wire with insulation suitable for temperature conditions within luminaire.
- S. Bond products and metal accessories to branch circuit equipment grounding conductor.
- T. Install specified lamps in each emergency lighting unit, exit sign, and luminaire.
- U. Emergency Lighting Units:
- V. Exit Signs:
- W. Install lamps in each luminaire.

### 3.2 FIELD QUALITY CONTROL

- A. See Section 014000 - Quality Requirements, for additional requirements.
- B. Inspect each product for damage and defects.
- C. Operate each luminaire after installation and connection to verify proper operation.
- D. Test self-powered exit signs and emergency lighting units to verify proper operation upon loss of normal power supply.
- E. Correct wiring deficiencies and repair or replace damaged or defective products. Repair or replace excessively noisy ballasts as determined by Architect.

### 3.3 ADJUSTING

- A. Aim and position adjustable luminaires to achieve desired illumination as indicated or as directed by Architect. Secure locking fittings in place.
- B. Aim and position adjustable emergency lighting unit lamps to achieve optimum illumination of egress path as required or as directed by Architect or authority having jurisdiction.
- C. Exit Signs with Field-Selectable Directional Arrows: Set as indicated or as required to properly designate egress path as directed by Architect or authority having jurisdiction.
- D. Aim and adjust fixtures as indicated.
- E. Position exit sign directional arrows as indicated.

### 3.4 CLEANING

- A. Clean surfaces according to NECA 500 (commercial lighting), NECA 502 (industrial lighting), and manufacturer's instructions to remove dirt, fingerprints, paint, or other foreign material and restore finishes to match original factory finish.
- B. Clean electrical parts to remove conductive and deleterious materials.
- C. Remove dirt and debris from enclosures.
- D. Clean photometric control surfaces as recommended by manufacturer.
- E. Clean finishes and touch up damage. Also remove all instruction tags.

### 3.5 CLOSEOUT ACTIVITIES

### 3.6 SCHEDULE - SEE DRAWINGS

END OF SECTION

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## SECTION 283100 – FIRE DETECTION AND ALARM SYSTEM

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the contract apply to this section.
- B. The work covered by this section is to be coordinated with related work as specified elsewhere in the specifications. Requirements of the following sections apply:
  - Division 01 General Requirements
  - Division 07 Thermal and Moisture Protection, Section 078413 Penetration Firestopping
  - Division 08 Openings, Section 087100 Door Hardware
  - Division 23 Heating Ventilating and Air Conditioning, Section 23 09 93 Sequence of Operations for HVAC Controls
  - Division 26 Electrical, Section 26 05 00 Common Work Results for Electrical

#### 1.2 SUMMARY

#### 1.3 REFERENCES

##### A. CODES-GENERAL

- 1. All work and materials shall conform to all applicable federal, state and local codes and regulations governing the installation. If there is a conflict between the referenced standards, federal, state or local codes, and this specification, it is the bidder's responsibility to immediately bring the conflict to the attention of the engineer for resolution. National standards shall prevail unless local codes are more stringent.
- 2. The bidder shall not attempt to resolve conflicts directly with the local authorities unless specifically authorized by the engineer.

##### B. FIRE CODE

- 1. The equipment and installation shall comply with the provisions of the following codes and standards unless the authority having jurisdiction has adopted an earlier version:

National Fire Protection Association (NFPA)  
NFPA 70 - 2011 *National Electric Code*®

NFPA 72 - 2010 *National Fire Alarm Code*®  
NFPA 90A - 2012 *Installation of Air-Conditioning and Ventilating Systems*  
NFPA 101- 2012 *Life Safety Code*®

Underwriter's Laboratories, Inc

UL 864 - Control Units for Fire Protective Signaling Systems.  
UL 268 - Smoke Detectors for Fire Protective Signaling Systems.  
UL 521 - Heat Detectors for Fire Protective Signaling Systems.  
UL 228 - Door Closers-Holders, With or Without Integral Smoke Detectors.  
UL 464 - Audible Signaling Appliances.  
UL 38 - Manually Actuated Signaling Boxes for Use with Fire-Protective Signaling Systems  
UL 1971 - Signaling Devices for the Hearing-Impaired.  
UL 1635 - Digital Alarm Communicator System Units  
UL-1638 - Signaling Appliances - Private Mode Emergency and General Utility Signaling

Local codes/standards International Code Council

International Building Code  
International Fire Code  
International Mechanical Code

Federal Codes and Regulations

Americans with Disabilities Act (ADA)

Electrical Industries Association

EIA-232-D: Interface Between Data Terminal Equipment and Data Circuit-Terminating Equipment  
Employing Serial Binary Data Interchange  
EIA-485: Electrical Characteristics of Generators and Receivers for Use in Balanced Digital  
Multipoint Systems

C. DEFINITIONS AND ABBREVIATIONS

ACU: Autonomous Control Unit.  
ADA: Americans with Disabilities Act.  
AFF: Above Finished Floor.  
AHJ: Authority Having Jurisdiction.  
Approved: Unless otherwise stated, materials, equipment or submittals approved by the Authority or AHJ.  
Circuit: Wire path from a group of devices or appliances to a control panel or transponder.  
CCS: Central Control Station.  
CPU: The central computer of a multiplex fire alarm or voice command control system.  
ECS: Emergency Communication System.  
FACP: Fire Alarm Control Panel.  
FCC: Fire Command Center.  
FM: FM Global (Factory Mutual)  
FSCP: Firefighter's Smoke Control Panel.  
HPSA: High Power Speaker Array.  
HVAC: Heating Ventilating and Air Conditioning.

IDC: Initiating Device Circuit.  
LCD: Liquid Crystal Display.  
LED: Light Emitting Diode.  
LOC: Local Operating Console.  
MN: Mass Notification.  
MNEC: Mass Notification Emergency Communications.  
NAC: Notification Appliance Circuit.  
NFPA: National Fire Protection Association.  
NICET: National Institute for Certification in Engineering Technologies  
NRTL: Nationally Recognized Testing Laboratory  
PTR: Printer.  
RCP: Remote Control Panel  
SLC: Signaling Line Circuit.  
Style 1: As defined by NFPA 72, Class B.  
Style 4: As defined by NFPA 72, Class B.  
Style 6: As defined by NFPA 72, Class A.  
Style 7: As defined by NFPA 72, Class A.  
Style B: As defined in NFPA 72, Class B.  
Style D: As defined in NFPA 72, Class A.  
Style Y: As defined in NFPA 72, Class B.  
UL or ULI: Underwriters Laboratories, Inc.  
UL Listed: Materials or equipment listed and included in the most recent edition of the UL Fire Protection Equipment Directory.  
Zone: Combination of one or more circuits or devices in a defined building area, i.e. 3 speaker circuits on a floor combined to form a single zone.

#### 1.4 SYSTEM DESCRIPTION - FIRE

##### A. GENERAL FIRE

1. The system supplied under this specification shall be modifications to an existing UL Listed modular fire alarm panel.
2. The system shall be designed, inspected, tested and approved to provide occupant notification audibility levels of 15 dBA over ambient conditions.
3. The system shall interface with other building systems as required by the fire codes.
4. The system shall transmit required signals to a central monitoring station.

##### B. FIRE ALARM PERFORMANCE

###### 1. GENERAL REQUIREMENTS

- a. Comply with the provisions of nfpa 72 and the operational requirements of this specification.
- b. The system shall identify all off normal conditions. and log each condition into the system as an

event.

- i. The system shall automatically display on the control panel Liquid Crystal Display (LCD) the first (oldest) event of the highest priority. The event priority shall be alarm, supervisory, trouble, and monitor.
  - ii. Labeled, color coded indicators shall be provided for each type of event: alarm - red, supervisory - yellow, trouble - yellow, monitor - yellow. When an unseen event exists for a given type, the indicator shall be lit.
  - iii. For each event, the display shall include the number of active and disabled points, the type of event, the time the event occurred and up to a 40 character custom user description.
  - iv. The user shall be able to review the event queue by using the scrolling keys (up-down).
  - v. New alarm, supervisory, or trouble events shall sound a distinct, silenceable audible signal at the control panel.
  - vi. The LCD shall show the system time and the number of active and disabled points in the system.
  - vii. Specific input/output devices shall operate in accordance with the alarm, supervisory, trouble, monitor sections that follow and the input/output matrix.
  - viii. All critical systems, sub-systems and circuits shall be monitored for integrity. System faults shall be annunciated.
- c. Strobes shall be synchronized on each floor.
- d. Batteries shall be sized to support the system for 24 Hrs. of standby operation followed by 5 minutes of alarm operation at the end of the 24 Hour period.
- e. Off premises reporting of the loss of AC mains power to any system component shall be automatically delayed for a period of time acceptable to the AHJ to reduce traffic at the central monitoring station due to wide-area power failures.
- f. The system shall provide "one man" testing of the system. Both silent and audible modes shall be available. Zones not under test shall go directly into alarm if activated.
- g. Event processing and display shall be prioritized as follows:
- i. Fire alarms
  - ii. Supervisory events
  - iii. Trouble events
  - iv. Monitor events

## 2. ALARM OPERATION

- a. Upon the alarm activation of any area smoke detector, heat detector, manual pull station, the following functions shall automatically occur:
- b. The system shall remain in the alarm mode until all initiating devices are reset and the fire alarm panel is manually reset and restored to normal.
- c. The internal audible device shall sound at the control panel.
- d. Activate all visual strobes notification appliances on the fire floors (zones).

Or

- a. Sound the ANSI 117-1 signal with synchronized audibles and synchronized strobes throughout the facility.
- b. Audible alarm signals shall be silenced from the fire alarm control panel by an alarm silence switch. Visual signals shall be programmable to flash until system reset or alarm silencing, as required.
- c. The notification appliance dedicated to sprinkler system water flow alarm shall not be silenced while the sprinkler system is flowing at a rate of flow equal to a single head.
- d. Transmit signal to the central monitoring station with point identification.

### 3. TROUBLE OPERATION

- a. Upon activation of a trouble condition or signal from any device or internal system integrity monitoring function on the system, the following functions shall automatically occur:
  - b. The internal panel audible device shall sound at the control panel.
  - c. Display the event on the control panel annunciator.
  - d. Transmit a trouble signal to the central monitoring station with point identification.

## 1.5 SUBMITTALS

### A. SUBMITTAL GENERAL

1. The contractor shall not purchase any equipment for the specified system until the owner has approved the project submittals in their entirety and has returned them to the contractor.
2. Approved submittals allow the contractor to proceed with the installation and shall not be construed to mean that the contractor has satisfied the requirements of these specifications.
3. Each submittal shall include a detailed list of variations that the submittal may have from the requirements of the contract documents.
4. The contractor shall provide specific notation on each shop drawing, sample, data sheet, installation manual, etc. submitted for review and approval, of each variation.
5. Any conflicts in the contract documents and/or with Authority Having Jurisdiction (AHJ) requirements shall be submitted to the owner in writing 7 days prior to bid.
6. Submittals shall be approved by authorities having jurisdiction prior to submitting them to the Architect.

### B. SUBMITAL BOOKS

1. Submit for approval no less than three (3) copies of a submittal book to the consulting engineer for review and comment.
2. Submittal books shall meet the following requirements:
  - a. Shall be a 3-ring binder with a cover that shows the project address, system type, and contractor.

b. Shall use labeled dividers for major sections.

c. Shall include:

- i. Cover sheet
- ii. Table of contents

Provide a list of all types of equipment and components provided. This shall be incorporated as part of a table of contents, which will also indicate the manufacturer's part number, the description of the part, and the part number of the manufacturer's product datasheet on which the information can be found.

d. Product data sheets, as detailed elsewhere in this specification

e. Provide description of operation of the system (sequence of operation), similar to that provided in Part 2 of this section of the specifications. The description shall be specific to this project, and shall provide individual sequences for every type of alarm, or trouble condition, which may occur as part of normal or off-normal system use.

f. B-size (black line) reduced shop drawings, as detailed elsewhere in this specification.

g. System calculations, as detailed elsewhere in this specification.

h. Installation instructions.

i. Copies of all licenses, documents and certifications, as detailed elsewhere in this specification.

Additional copies may be required at no additional cost to the project.

### C. PRODUCT DATA

1. System components proposed in this specification shall be UL listed to operate together as a system. The supplier shall provide evidence, with his submittal, of listings of all proposed equipment and combinations of equipment.

For each product submitted provide the following information:

- a. Manufacturer's catalog data, to include material description, agency approvals, operating characteristics, electrical characteristics, dimensions, mounting requirements and accessories.

Product data sheets for system components shall be highlighted to indicate the specific products, features, or functions required to meet this specification.

Alternate or as-equal products submitted under this contract shall provide a detailed line-by-line comparison of how the submitted product meets, exceeds, or does not comply with this specification.

- b. Manufacturer's product installation sheets: A copy of the documentation that is required to be

shipped with all listed products by UL.

D. DESIGN CALCULATIONS

1. Battery Capacity
2. Provide battery capacity calculations for each power supply that uses batteries for secondary power. Identify all loads. Identify any loads shed during alarm operation. Use the manufacturer's recommended methods and/or forms.
3. 24 VDC Notification Appliance Circuits
4. For each 24VDC NAC, provide worst case voltage drop calculations. The load shall be treated as a lump sum at the end of the circuit. *Worst case power supply terminal voltage shall include all applicable internal power supply losses.* Using 85% of nominal circuit voltage (20.4VDC) shall not be accepted as lowest terminal voltage without manufacturer's published documentation stating there are no internal losses in the power supply.

E. SHOP DRAWINGS

1. Submit for approval three (3) sets of shop drawings to the consulting engineer for review and comment. Drawings shall be either D-size or E-size blue line drawings and of a sufficient resolution to be completely read. Drawing sets shall be bound. Additional copies may be required at no additional cost to the project.
2. Contained in the title block of each drawing shall be symbol legends with device counts, wire tag legends, circuit schedules for all addressable and notification appliance circuits, the project name/address, and a drawing description which corresponds to that indicated in the drawing index on the coversheet drawing. A section of each drawing title block shall be reserved for revision numbers and notes.
3. Shop drawings shall meet the following requirements:
  - a. Shop drawings shall be prepared by persons with the following qualifications:
    - i. Trained and certified by the manufacturer of the submitted equipment in fire-alarm system design.
  - b. Coversheet with project name, address and drawing index.
  - c. General notes drawing with peripheral device backbox size information, part numbers, device mounting height information, and the names, addresses, point of contact, and telephone numbers of all contract project team members.
  - d. Provide device floor plans for all areas served by the fire alarm system. Utilize the CAD Files provided by the consulting engineer in the preparation of the floor plans. Floor plans shall indicate accurate locations for all control and peripheral devices. Drawings shall be NO LESS THAN 1/8-INCH SCALE. If individual floors need to be segmented to accommodate the 1/8" scale requirements, KEY PLANS and BREAK-LINES shall be provided on the plans in an orderly and professional manner.
    - i. All devices shall be shown.

- ii. Identify all notification appliances with a circuit and item number. Coordinate the circuit and item number with the same device shown on the riser diagram.
  - iii. Show all raceways, marked for size, conductor count with type and size, showing the percentage of allowable National Electric Code fill used.
  - iv. Areas required to meet intelligibility requirements shall be clearly identified. Wide area mass notification system plot drawings shall identify all project areas that must meet intelligibility requirements as well as environmentally sensitive areas on or off of the project site where system output shall be minimized.
- e. Device riser diagram, which individually depict all control panels, annunciators, devices, and notification appliances. Shall include a specific, proposed device description above each addressable device. Drawings shall provide wire specifications, and wire identification for all conductors depicted on the riser diagram. All circuits shall have identifiers that shall correspond with those required on the control panel and floor plan drawings. End-of-line resistors (and values) shall be depicted.
- f. Control panel drawing(s) shall show internal component placement and all internal and field terminations. Provide details indicating where conduit connections shall be made to avoid conflicts with internally mounted batteries. For each additional fire alarm panel, a separate drawing which clearly indicated the panel designation, service and location of the control enclosure.
- g. Provide typical device wiring diagrams that show all system components, and the respective field wiring. Wire type, gauge, and jacket shall be indicated. End-of-line resistors (and values) shall be shown.
- h. Provide a fire alarm system function matrix that illustrates alarm input/out events in association with initiation devices. Matrix summary shall include system supervisory and trouble output functions.
- i. System Calculations as detailed elsewhere in this specification.

Upon receipt of approved drawings from the Authority Having Jurisdiction, the supplier shall immediately forward two sets of drawings to the owner. These drawings shall either be stamped approved or a copy of the letter stating approval shall be included.

#### F. CLOSEOUT

1. Two (2) copies of the following documents shall be delivered to the building owner's representative at the time of system acceptance.
  - a. Project specific operating and maintenance manuals covering the system as installed. The manuals shall contain a description of the system architecture, inputs, notification signaling, auxiliary functions, annunciation, sequence of operations, expansion capability, application considerations and limitations. A generic instruction and operation manual shall not be acceptable.



- b. Technical literature (manufacturer's data sheets and installation manuals/instructions) for all parts of the system, including control panels, smoke detectors, batteries, manual stations, alarm notification appliances, power supplies, and remote alarm transmission means.
2. Drawings
  - a. Provide "As Built" drawings of record of all the shop drawings used in the installation of the system.
  - b. Refer to the Submittals - Shop Drawings section of this specification for drawing requirements.
3. Record of Completion
  - a. System supplier and contractor shall provide a certified test report to verify that the system and all components functioned properly and as intended.
  - b. A filled out Record of Completion similar to NFPA 72, 2007 edition figure 4.5.2.1 shall be provided.
4. Warranty
  - a. Provide copies of the warranty documentation as detailed in the Warranty section of this specification.
5. Service Organization
  - a. Provide the name, address and telephone of the authorized factory representative.
6. Training
  - a. Conduct the required training as detailed in the Startup and Commissioning - Training section of this specification.

## 1.6 QUALITY ASSURANCE

### A. QUALIFICATIONS OF SUPPLIER

1. The system supplier shall have a minimum of 10 years of experience in distribution and service of the proposed equipment brand.
2. The supplier shall have successfully designed and installed similar system fire detection, evacuation voice and visual signaling control components on a previous project of comparable scope, size and complexity.
3. The supplier shall have in-house engineering and project management capability consistent with the requirements of this project. The project shall be supervised by personnel certified by NICET as fire alarm Level IV technicians.
4. The supplier shall employ qualified and manufacturer certified system designers to perform the detailed engineering design, system calculations, for all the system equipment and programming.

5. The supplier shall produce all panel and equipment drawings, submittals, and operating manuals, as detailed elsewhere in this specification.
6. The supplier shall be responsible for providing qualified on site representative(s) for coordination of system installation, and final system testing and commissioning in accordance with these specifications.

B. QUALIFICATIONS OF INSTALLER

1. Before commencing work, submit evidence showing that the equipment installer has successfully installed systems of the similar scope, type and design as specified.
2. The contractor/installer shall submit copies of all required Licenses and Bonds as required in the State having jurisdiction.
3. The contractor/installer shall be responsible for retaining qualified and authorized representative(s) of the system manufacturer (The Supplier) specified for detailed system design and documentation, coordination of system installation requirements, and final system testing and commissioning in accordance with these specifications.
4. The contractor/installer shall employ on staff a minimum of one NICET level II technician or a professional engineer, registered in the State of the installation.
5. Contractors unable to comply with the provisions of Qualification of Installers shall present proof of engaging the services of a subcontractor qualified to furnish the required services.

1.7 HANDLING

A. DELIVERY AND STORAGE

1. Receiving
  - a. The Contractor shall be responsible for all receiving, handling, and storage of his materials at the job site.
  - b. Overnight storage of materials is limited to the assigned storage area. Materials brought to the work area shall be installed the same day, or returned to the assigned storage area unless previously approved by the Owner.
  - c. The Contractor shall remove rubbish and debris resulting from his work on a daily basis. Rubbish not removed by the Contractor will be removed by the Owner and back-charged to the Contractor.

1.8 PROJECT CONDITIONS

A. RESPONSIBILITY

1. It shall be the contractor's responsibility to inspect the job site and become familiar with the conditions under which the work will be performed.

1.9 WARRANTY

A. INSTALLATION WORKMANSHIP AND PARTS

1. The contractor shall warranty the installation and workmanship for one (1) year and all parts for thirty-six (36) months from date of final acceptance. A copy of the manufacturer's warranty shall be provided with closeout documentation and included with the operation and installation manuals. The full cost of maintenance, labor and materials required to correct any defect during the warranty period shall be included in the submittal bid.
2. The system supplier shall maintain a service organization with adequate spare parts stock within 75 miles of the installation. Provide a telephone response to owner's questions within 4 hours and on-site assistance within 24 hours.
3. Permit the owner's fire alarm technicians to perform temporary bypasses and emergency repairs on the system without voiding the warranty.

1.10 STARTUP AND COMMISSIONING

A. TEST AND INSPECTION - FIRE

1. Testing, general
  - a. In addition to tests required in this section, the contractor shall perform all electrical and mechanical tests required by the equipment manufacturer, the architect and the authority having jurisdiction.
  - b. All equipment, instruments, tools and labor required to conduct the system tests shall be provided by the installing contractor. At a minimum, the following equipment shall be made available testing:
    - i. Ladders and scaffolds as required to reach all installed equipment.
    - ii. Meters for reading voltage, current and resistance.
    - iii. Two-way communication devices.
    - iv. Simulated smoke, heat-producing devices for heat detectors, extension poles for introducing smoke into detectors, as needed.
    - v. Decibel meter.
2. All testing shall utilize a written acceptance test plan for testing the system components and operation in accordance with NFPA 72 and this specification. The contractor shall be responsible for the performance of the acceptance test plan, demonstrating the function of the system and verifying the correct operation of all system components, circuits, and system programming.
  - a. The systems operation matrix created by the equipment supplier shall be used to identify each alarm input and verify all associated output functions.
3. The system test plan shall include but not be limited to the following:
  - a. Visually inspect all wiring.
  - b. Verify the absence of unwanted voltages between circuit conductors and ground. The tests shall be accomplished at the preliminary test with results available at the final acceptance test.
  - c. System wiring shall be tested to demonstrate correct system response for the following conditions:
  - d. Open, shorted and grounded signal line circuits.

- e. Open, shorted and grounded notification appliance circuits.
  4. System indications shall be demonstrated as follows:
    - a. Correct annunciator light for each alarm input.
    - b. Notification appliances shall be demonstrated as follows:
      - i. All alarm notification appliances actuate as programmed
      - ii. Audibility and visibility at required levels. Measure sound levels at 5 ft. above finished floor with the room doors closed.
      - iii. For 24VDC NACS, measure and record the voltage at the most remote appliance on each notification appliance circuit, while operating.
  5. System control functions shall be demonstrated as follows:
    - a. In accordance with the system operation matrix.
  6. System off premises reporting functions shall be demonstrated as follows:
    - a. Correct information received for each alarm and trouble event
  7. Secondary power supply (battery) capacity capabilities shall be demonstrated as follows:
    - a. System battery voltages and charging currents shall be measured and recorded at the fire alarm control panels.
    - b. System primary power shall be disconnected for 24 hours. At the end of that period, an alarm condition shall be created and the system shall perform as specified for a period of 5 minutes.
    - c. System primary power shall be restored for forty-eight (48) hours.
    - d. System battery voltages and charging currents shall again be measured and recorded at the fire alarm control panels.
  8. Verify the "As Built" record drawings are accurate.
- B. Preliminary Testing
1. Conduct preliminary tests to ensure that all devices and circuits are functioning properly. Tests shall meet the requirements of the written test plan. Correct any deficiencies, omissions or anomalies and retest the affected devices to assure proper function per the specification.
- C. Acceptance Testing
1. A final acceptance test shall not be scheduled until the system manuals are provided to and approved by the owner and the following are provided at the job site:
    - a. "As Built" record drawings of the system as actually installed
    - b. A copy of the system operation matrix.
  2. The acceptance inspector shall use the system "As Built" record drawings in combination with the system operation matrix and the written acceptance test plan during the testing to verify system operation.
  3. Should the system not perform to the above criteria it shall not be accepted and the contractor shall

correct all deficiencies and shall re-test the system at contractor's expense in the presence of the architect using the same test criteria.

4. The building owner's representative shall witness the final tests.
5. The central monitoring station and/or fire department shall be notified before final test in accordance with local requirements.
6. Operate every installed device to verify proper operation and correct annunciation at control panel.
7. Open signaling line circuits and notification appliance circuits in at least 2 locations to verify presence of supervision.

D. Test Reports

A "Fire Alarm System Record of Completion" per the "Documentation" Section of the "Fundamentals of Fire Alarm Systems" Chapter in NFPA72 and the "Inspection and Testing Form" in the "Records" Section of the "Inspection, Testing and Maintenance" Chapter in shall be prepared by the Contractor. Submit three (3) copies to the Architect. The report shall include, but not be limited to:

A list of all equipment installed and wired.

Certification that all equipment is properly installed and functions and conforms with these specifications.

Technician's name, certificate number and date.

E. TRAINING

1. The system supplier shall schedule and present a minimum of two (2) hours of formal site specific instruction for the building owner, detailing the proper operation and maintenance of the installed system.
2. The instruction shall be presented in an organized and professional manner by a person factory trained in the operation and maintenance of the equipment and who is also thoroughly familiar with the installation.
3. The instruction shall cover the schedule of maintenance required by NFPA 72 and any additional maintenance recommended by the system manufacturer.
4. Copies of all training aids, presentations, etc. shall be left with the owner.

F. MAINTENANCE

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. The manufacturer of the system equipment shall be regularly involved in the design, manufacture, and distribution of the products specified in this document.
- B. Approved Products: All panels and peripheral devices shall be of the standard product of single manufacturer and shall display the manufacturer's name of each component.

## 2.2 FIRE ALARM PANEL

- A. The fire alarm panels are existing to remain.

### B. NOTIFICATION APPLIANCE CIRCUITS

#### 1. NOTIFICATION APPLIANCE CIRCUITSIO

##### a. General

- b. All notification circuits shall be supervised and power limited. Non-power limited circuits are not acceptable. All notification appliance circuits shall be Class B (Style "Y").
- c. Initial circuit loading shall not exceed 80% in order to allow for future system expansion.

#### 2. 24 VDC Notification Appliance circuits

- a. Notification appliance circuits shall have a minimum circuit output rating of 2amps @ 24 V<sub>fwr</sub>
- b. 24V<sub>fwr</sub> NACs shall be polarized and provide both strobe synchronization and a horn silence signals on a single pair of wires.

### C. OFF PREMISES COMMUNICATIONS

#### D. DACT

- 1. The off premise communication system is existing

## 2.3 PERIPHERAL COMPONENTS

### A. PHOTOELECTRIC SMOKE DETECTORS

- 1. Provide photoelectric smoke detectors at the locations shown on the drawings.

### B. STANDARD BASE

- 1. Provide standard detector bases suitable for mounting on either North American 1-gang, 3½ or 4 inch octagon box and 4 inch square box, European BESA or 1-gang box.

2. The bases shall utilize a twist-lock design and provide screw terminals for all field wiring connections.

## C. CONVENTIONAL

### 1. MANUAL STATIONS

#### a. DOUBLE ACTION SINGLE STAGE

- i. Provide double action, single stage fire alarm stations at the locations shown on the drawings.
- ii. The manual station shall be suitable for mounting on North American 2 ½ (64mm) deep 1-gang boxes and 1 ½ (38mm) deep 4 square boxes with 1-gang covers. If indicated as surface mounted, provide manufacturer's surface back box.
- iii. The fire alarm station shall utilize red polycarbonate construction with molded, raised-letter operating instructions in a contrasting color; shall show visible indication of operation and incorporate an internal toggle switch.
- iv. The station reset key shall match the control panel key.
- v. Manual pull stations that initiated an alarm condition when opening the unit are not acceptable.
- vi. The double action, single stage manual fire alarm station shall be an Edwards 278B series or approved equal.

## D. NOTIFICATION APPLIANCES

### a. GENERAL

- i. All appliances supplied for the requirements of this specification shall be UL Listed for Fire Protective Service, and shall be capable of providing the "equivalent facilitation" which is allowed under the Americans with Disabilities Act Accessibilities Guidelines (ADA(AG)), and shall be UL 1971 Listed.
- ii. All appliances shall be of the same manufacturer as the fire alarm control panel specified to insure absolute compatibility between the appliances and the control panels, and to insure that the application of the appliances are done in accordance with the single manufacturer's instructions.
- iii. Any appliances that do not meet the above requirements, and are submitted for use must show written proof of their compatibility for the purpose intended. Such proof shall be in the form of documentation from all manufacturers that clearly states that their equipment (as submitted) is 100% compatible with each other for the purpose intended.
- iv. All strobes shall be provided with lens markings oriented for wall mounting. Exterior mounted devices shall be provided with a weatherproof backbox.
- v. All visual appliances shall be synchronized. Light and audible output levels shall be designed to meet ADA and NFPA requirements

### b. LOW PROFILE

- i. LOW FREQUENCY AUDIBLE SIGNALS

- ii. The low-profile wall-mounted low frequency audible/strobe shall be listed to UL 1971 and UL 464 and for fire protective signaling service. The low frequency audible/strobe shall serve as a primary-signaling notification appliance and comply with the Americans with Disabilities Act requirements for visible signaling appliances, flashing at 1Hz over the strobe lights entire operating voltage range. The strobe light shall have field-selectable candela settings including 15, 30, 75 and 110. The strobe light shall consist of a xenon flash tube.
- iii. The low frequency audible shall comply with UL 464, Section 24.3 for Low Frequency Audible Output. Appliances shall have an option to switch between a temporal three-pattern and a non-temporal (continuous) pattern at standard or low audible output levels. The low frequency audible on low frequency audible-only appliances shall be capable of operating on a coded notification appliance circuit.
- iv. The low frequency strobe shall operate between 32°F and 120°F and be listed to operate on filtered/regulated as well as full-wave rectified Edwards Genesis compatible notification appliance circuits.
- v. Audibles, strobes and Audible/strobes shall all function on one pair of wires. Appliances that require separate wires for strobes and separate wires for audible are not acceptable.
- vi. All audible and visible signals on the same notification appliance circuit and in the same operating zone shall be fully synchronized to within 10 milliseconds.
- vii. The low frequency Audible strobe shall mount to a standard 4 × 4 × 1½-inch back box or appliance manufacturer provided surface-mount back box.

c. SURGE SUPPRESSION DEVICES

The system shall utilize the following electrical surge protection devices to prevent damage and nuisance alarms caused by nearby lightning strikes, stray currents, or voltage transients.

- i. On the AC Input of all fire alarm panels,; Transtector ACO100BWN3, Leviton OEM-120EFI, EFI HWM-120, Ditek DTK-120HW or DTK-120/240 CM. *AC Surge protectors shall be installed at the electrical panel board feeding the fire alarm equipment.* Excess lead length shall be trimmed. The branch circuit conductor shall be formed into a 5-10 turn 1" diameter tie-wrapped coil just downstream of the suppressor connection.
- ii. On each DC fire alarm circuit entering or leaving the building: Transtector TSP8601, Citel American B280 -24V, Edco P264 and P642, Ditek DTKxLVL series, or equal.
- iii. *DC Surge protectors shall be installed on each required circuit at the point of entry into the building.*

PART 3 - EXECUTION

3.1 INSTALLATION

A. GENERAL

1. The entire system shall be installed in a skillful manner in accordance with approved manufacturer's installation manuals, shop drawings and wiring diagrams.
2. All work shall be performed in accordance with the requirements of NFPA 70 and NFPA 72.



3. Coordinate locations of all devices with all other divisions' drawings and specifications.
4. All fire alarm devices shall be accessible for periodic maintenance. Should a device location indicated on the contract drawings not meet this requirement, it shall be the responsibility of the installing contractor to bring it, in writing, to the attention of the Project Engineer.
5. Fasten equipment to structural members of building or metal supports attached to structure, or to concrete surfaces.
6. All systems and system components listed to UL864 Control Units for Fire Protective Signaling Systems maybe installed within a common conduit raceway system, in accordance with the manufacture's recommendations. System(s) or system components not listed to the UL864 standard shall utilize a separate conduit raceway system for each of the sub-systems.
7. No wiring except life safety system circuits and system power supply circuits shall be permitted in the control panel enclosures.
8. Any low-voltage copper wiring that leaves the protection of a building shall be provided with a compatible UL 497B listed transient protection devices where the circuit leaves the building and where it enters the next building.
9. Devices containing end-of-line resistors shall be appropriately labeled. Devices should be labeled such that removal of the device is not required to identify the EOL device.

B. ELECTRICAL

1. BOXES, ENCLOSURES AND WIRING DEVICES

- a. Boxes shall be installed plumb and firmly in position.
- b. Extension rings with blank covers shall be installed on junction boxes where required.
- c. Junction boxes served by concealed conduit shall be flush mounted.
- d. Fire alarm system junction box covers shall be painted red.
- e. Wiring within cabinets, enclosures, boxes, junction boxes and fittings shall be installed in a neat and workmanlike manner, installed parallel with or at right angles to the sides and back of any box, enclosure or cabinet, and routed to allow access for maintenance. All conductors that are terminated, spliced, or otherwise interrupted in any enclosure, cabinet, mounting or junction box shall be connected to terminal blocks. Mark each terminal in accordance with the wiring diagrams of the system. Make all connections with approved pressure type terminal blocks, which are securely mounted. All terminal block screws shall have pressure wire connectors of the self-lifting or box lug type. No more than two conductors shall be installed under one connection. Wire nuts, crimp splices and similar devices shall not be used.

C. CONDUCTORS

1. Each conductor shall be identified as shown on the drawings at terminal points. Permanent wire markers shall be located within 2 inches of the wire termination. Marker text shall be visible with protective doors or covers removed.
2. Maintain a consistent color code for fire alarm system conductor functions throughout the installation.
3. All wiring shall be installed in compliance with the National Electric Code, NFPA 70, and the equipment manufacturer's requirements.

Wiring for Initiating Device Circuit field wiring shall be solid copper, No. 18 AWG twisted pair conductors at a minimum. Speaker circuits; 16 AWG twisted pair at a minimum. Telephone circuits shall be 18 AWG twisted-shielded pair at a minimum. 24VDC visual and audible Notification Appliance Circuits shall be solid copper No. 14 AWG size conductors at a minimum. The wiring sizes listed herein are minimum sizes. Use larger wire sizes when recommended by the manufacturer, based on system configuration and project specific calculations.

Where shielded wiring is used, the shield shall be grounded at only one point, which shall be in or adjacent to the FACP or other control equipment. Shields shall be continuous, treated as a third conductor, and insulated from ground except as noted.

AC power wiring shall be No. 12 AWG solid copper having insulation rated for 600 volts.

Crimp type spade lugs shall be used for terminations of stranded conductors to binder screws or stud type terminals.

4. All wiring shall be checked and tested to insure that there are no grounds, opens or shorts.

#### D. DEVICES

1. All devices and appliances shall be mounted to or in an approved electrical box.

#### E. RACEWAYS

1. Conduits shall be sized according to the conductors contained therein. Cross sectional area percentage fill for system conduits shall not exceed 40%.
2. Install all conductors in rigid metal conduit or electro-metallic tubing, utilizing compression type fittings and couplings, with a minimum diameter 3/4". The use of flexible metal conduit not exceeding a six (6) foot length shall be permitted for initiating device circuits.
3. All fire alarm conduit systems shall be routed and installed to minimize the potential for physical, mechanical or fire damage, and shall not to interfere with existing building systems, facilities or equipment.
4. Run conduit or tubing concealed in finished areas unless specifically shown otherwise on the drawings. Conduit may be exposed in unfinished mechanical/electrical rooms, and basement levels.
4. All system conduits, junction boxes, pull boxes, terminal cabinets, electrical enclosures and device back box locations shall be readily accessible for inspection, testing, service and maintenance.

#### F. FA COMPONENTS

#### G. DEVICES

1. All devices and appliances shall be mounted to or in an approved electrical box.
2. All wall mounted *control equipment* shall comply with requirements defined by the International Building

Code and Acceptance Criteria for Seismic Qualification by Shake-Table Testing of Nonstructural Components and Systems (AC-156) using a seismic component importance factor of 1.5.

a. Manual Pull Stations

- i. Mount stations so that their operating handles are between 42" and 48" above the finished floor.

b. Notification Appliances: Mount assemblies as follows:

- i. All wall mounted audio/visual devices shall be mounted so the entire lens is between 80" and 96" above the finished floor. Where low ceilings exist, devices shall be mounted within 6" of the ceiling.
- ii. Each speaker's (horn) output shall be set to the wattage value indicated for its specific location as shown on the drawings.
- iii. Each strobe's output shall be set to the candela value indicated for its specific location as shown on the drawings.
- iv. Each speaker (horn)-strobe's outputs shall be set to the wattage/candela value indicated for its specific location as shown on the drawings.
- v. Where ceiling height exceeds 30 feet, appliances shall be suspended from the ceiling to a height of 30 feet maximum above the finished floor.
- vi. Appliances installed outdoors shall be UL listed for outdoor use.

c. Smoke Detectors:

- i. Smoke and heat detector heads shall not be installed until after construction clean-up is completed. Detector heads installed prior to construction clean-up shall be cleaned by the manufacturer or replaced.
- ii. Detectors located on the wall shall have the top of the detector at least 4" and not more than 12" below the ceiling.
- iii. On smooth ceilings, detectors shall not be installed over 30 ft. apart in any direction.
- iv. Install smoke detectors no closer than 3 ft. from air handling supply air diffusers or return air openings.
- v. Locate detectors no closer than 12" from any part of a lighting fixture.

d. End-of-Line Resistors

- i. Devices containing end-of-line resistors shall be appropriately labeled.

e. Heat Detectors

- i. Heat detectors shall be installed in strict accordance with their UL listing and the requirements of NFPA 72.

END OF SECTION