SUBMIT BID TO:
PROCUREMENT SERVICES
UNIVERSITY OF FLORIDA
971 ELMORE DRIVE
PO BOX 115250
GAINESVILLE, FL 32611
Phone: (352) 392-1331 - FAX: (352) 392-8837
Web Address: https://procurement.ufl.edu/

INVITATION TO BID

Construction Acknowledgment Form

Page 1 of 273 pages	BID WILL BE OPENED: **December 21, 2021 at 3:00 PM** local time and may not be withdrawn within 45 days after such date and time. Mandatory Pre-bid: **November 30, 2021 at 9:30 AM** local time.	**BID NO.: ITB22KO-121**
DATE: 11/19/2021	PROCUREMENT AGENT: KO	BID TITLE: Air Handling Unit Replacement at Gator Corner Dining
VENDOR NAME		
VENDOR MAILING ADDRESS		REASON FOR NOT SUBMITTING BID
CITY - STATE - ZIP CODE		**POSTING OF BID TABULATIONS**
AREA CODE / TELEPHONE NO.		Bid tabulations with intended award(s) will be posted electronically for review by interested parties at https://procurement.ufl.edu/ and will remain posted for a period of 72 hours excluding Saturdays, Sundays, or state holidays. Failure to file a protest in accordance with Board of Governors (BOG) Regulation 18.002 or failure to post the bond or other security as required in the BOG regulations 18.002 and 18.003(3), shall constitute a waiver of protest proceedings.
	FAX NO.	
	WEB ADDRESS EMAIL ADDRESS	

I certify that this bid is made without prior understanding, agreement, or connection with any corporation, firm or person submitting a bid for the same materials, supplies, or equipment and is in all respects fair and without collusion or fraud. I agree to abide by all conditions of this bid and certify that I am authorized to sign this bid for the vendor and that the vendor is in compliance with all the requirements of the Invitation to Bid, including but not limited to, certification requirements. In submitting a bid on behalf of the Board of Trustees, hereinafter known as the University, the vendor offers and agrees that if the bid is accepted the vendor will convey, sell, assign, or transfer to the University all rights, title and interest in and to all causes of action it may now or hereafter acquire under the Anti-trust laws of the United States and the University for price fixing relating to the particular commodities or services purchased or acquired by the University. At the University's discretion, such assignment shall be made and become effective at the time the purchasing agency tenders final payment to the vendor.

AUTHORIZED SIGNATURE (MANUAL)

NAME AND TITLE (TYPED)

GENERAL CONDITIONS

SEALED BIDS: All bid sheets and this form must be executed and submitted in a sealed envelope. (DO NOT INCLUDE MORE THAN ONE BID PER ENVELOPE.) The face of the envelope shall contain, in addition to the above address, the date, and time of the bid opening and the bid number. Bids not submitted on the attached bid form shall be rejected. All bids are subject to the conditions specified herein. Those which do not comply with these conditions are subject to rejection.

1. **EXECUTION OF BID**: Bid must contain an original manual signature of authorized representative in the space provided above. Bid must be typed or printed in ink. Use of erasable ink is not permitted. All corrections to prices made by vendor must be initialed.

2. **NO BID**: If not submitting a bid, respond by returning only this vendor acknowledgment form, marking it "NO BID", and explain the reason in the space provided above. Failure to respond to a procurement solicitation without giving justifiable reason for such failure, nonconformance to contract conditions, or other pertinent factors deemed reasonable and valid shall be cause for removal of the supplier's name from the bid mailing list. NOTE: To qualify as a respondent, vendor must submit a "NO BID", and it must be received no later than the stated bid opening date and hour.

3. **BID OPENING**: Shall be public, on the date, location and the time specified on the bid form. It is the vendor's responsibility to assure that the bid is delivered at the proper time and place of the bid opening. Bids which for any reason are not so delivered will not be considered. A bid may not be altered after opening of the bids. NOTE: Bid tabulations will be posted electronically at https://procurement.ufl.edu/ . Bid tabulations will not be provided by telephone.

4. **PRICES, TERMS AND PAYMENT**: Firm prices shall be bid and will include all packing, handling, shipping charges, and delivery to the destination shown herein.
(a) TAXES: The University does not pay Federal Excise and Sales taxes on direct purchases of tangible personal property or services. The Florida Tax Exempt Number is 11-06-024056-57C. This exemption does not apply to purchases of tangible personal property or services made by vendors who use the tangible personal property or services in the performance of contracts for the improvement of University-owned real property as defined in Chapter 192, F.S.
(b) DISCOUNTS: Vendors are encouraged to reflect trade discounts in the unit prices quoted; however, vendors may offer a discount for prompt payment. Prompt payment discounts will not be considered in the bid award. However, every effort will be made to take the discount within the time offered.
(c) MISTAKES: Vendors are expected to examine the specifications, delivery schedule, bid prices, extensions, and all instructions pertaining to supplies and services. Failure to do so will be at vendor's risk. In case of a mistake in extensions the unit price will govern.
(d) INVOICING AND PAYMENT: Payment will be made by the University of Florida after the items awarded to a vendor have been received, inspected, and found to comply with award specifications, free of damage or defect and properly invoiced. All invoices shall bear the purchase order number. Payment for partial shipments shall not be made unless specified. An original invoice shall be submitted. Failure to follow these instructions may result in delay in processing invoices for payment. Payment shall be made in accordance with Section 215.422 (1) (2) F.S. VENDOR OMBUDSMAN: The University's vendor ombudsman, whose duties include acting as an advocate for vendors may be experiencing problems in obtaining payment from the University, may be contacted at 352-392-1241.
(e) ANNUAL APPROPRIATIONS: The University's performance and obligation to pay under any contract awarded is contingent upon an annual appropriation by the Legislature.
(f) CONDITION AND PACKAGING: It is understood and agreed that any item offered or shipped as a result of this bid shall be a new, current standard production model available at the time of this bid. All containers shall be suitable for storage or shipment, and all prices shall include standard commercial packaging.
(g) SAFETY STANDARDS: Unless otherwise stipulated in the bid, all manufactured items and fabricated assemblies shall comply with applicable requirements of Occupational Safety and Health Act and any standards hereunder.

5. CONFLICT OF INTEREST: The award hereunder is subject to the provisions of Chapter 112, F.S. All vendors must disclose with their bid the name of any officer, director, or agent who is also an employee of the University of Florida. Further, all vendors must disclose the name of any University employee who owns, directly or indirectly, an interest of five percent (5%) or more in the vendor's firm or any of its branches.

6. AWARDS: As the best interest of the University may require, the right is reserved to make award(s) by individual item, group of items, all or none or a combination thereof; to reject any and all bids or waive any minor irregularity or technicality in bids received. When it is determined there is no competition to the lowest responsible vendor, evaluation of other bids are not required. Vendors are cautioned to make no assumptions unless their bid has been evaluated as being responsive.

7. INTERPRETATIONS/DISPUTES: Any questions concerning conditions or specifications shall be directed in writing to Procurement Services. Inquiries must reference the date of bid opening and bid number. No interpretations shall be considered binding unless provided in writing by the University in response to requests in full compliance with this provision.

8. NOTICE OF BID PROTEST BONDING REQUIREMENT; Any person or entity who files an action protesting a decision or an intended decision pertaining to a competitive solicitation shall at the time of filing the formal protest, post with the University a bond payable to the University in an amount equal to: 10% of the estimated value of the protestor's bid or proposal; 10% of the estimated expenditure during the contract term; $10,000.00; or whichever is less. The bond shall be conditioned upon the payment of all costs which may be adjudged against the person or entity filing the protest action. In lieu of a bond, the University may accept a cashier's check, bank official check or money order in the amount of the bond. FAILURE OF THE PROTESTING PERSON OR ENTITY TO FILE THE REQUIRED BOND, CASHIER'S CHECK, BANK OFFICIAL CHECK OR MONEY ORDER AT THE TIME OF THE FILING THE FORMAL PROTEST SHALL RESULT IN DENIAL OF THE PROTEST.

9. GOVERNMENTAL RESTRICTIONS: In the event any governmental restrictions may be imposed which would necessitate alteration of the material, quality, workmanship or performance of the items offered in this bid prior to their delivery, it shall be the responsibility of the successful vendor to notify the purchaser at once, indicating in writing the specific regulation which requires an alteration. The University reserves the right to accept any such alteration, including any price adjustments occasioned thereby, or to cancel the contract at no expense to the University.

10. LEGAL REQUIREMENTS: Applicable provision of all Federal, State, county and local laws, and of all ordinances, rules and regulations shall govern development, submittal and evaluation of all bids received in response hereto and shall govern any and all claims and disputes which may arise between person(s) submitting a bid response hereto and the University, by and through its officers, employees and authorized representatives, or any other person, natural or otherwise: and lack of knowledge by any vendor shall not constitute a cognizable defense against the legal effect thereof.

11. LOBBYING: Vendor is prohibited from using funds provided under any contract or purchase order for the purpose of lobbying the Legislature or any official, officer, commission, board, authority, council, committee, or department of the executive branch or the judicial branch of state government.

12. ADVERTISING: In submitting a bid, the vendor agrees not to use the results therefrom as a part of any commercial advertising. Vendor may not use the names, logos, or trademarks of the University, its employees, or affiliates without the prior written consent of the University.

13. ASSIGNMENT: Any contract or purchase order issued pursuant to this Invitation to Bid and the monies which may become due hereunder are not assignable except with the prior written approval of the purchaser.

14. LIABILITY: The vendor agrees to indemnify and save the University of Florida, the State of Florida and the Florida Board of Governors, their officers, agents, and employees harmless from any and all judgments, orders, awards, costs and expenses, including attorney's fees, and also all claims on account of damages to property, including loss of use thereof, or bodily injury (including death) which may be hereafter sustained by the vendor, its employees, its subcontractors, or the University of Florida, the State of Florida and the Florida Board of Governors, their officers, agents, or employees, or third persons, arising out of or in connection with any contract awarded and which are the result of the vendor's breach of contract or of the negligent acts of the vendor, its officers, agents, and employees. This clause does not apply to contracts between government agencies.

15. FACILITIES: The University reserves the right to inspect the vendor's facilities at any time with prior notice.

16. ADDITIONAL QUANTITIES: For a period not exceeding ninety (90) days from the date of acceptance of any offer by the University of Florida, the right is reserved to acquire additional quantities up to but not exceeding those shown on bid or the bid level at the prices bid in this invitation. If additional quantities are not acceptable, the bid sheets must be noted "BID IS FOR SPECIFIED QUANTITY ONLY".

17. SERVICE AND WARRANTY: Unless otherwise specified, the vendor shall define any warranty service and replacements that will be provided during and subsequent to this contract. Vendors must explain on an attached sheet to what extent warranty and service facilities are provided.

18. SAMPLES: Samples of items, when called for, must be furnished free of expense, on or before bid opening time and date, and if not destroyed, may upon request, be returned at the vendor's expense. Each individual sample must be labeled with vendor's name, manufacturer's brand name and number, bid number and item reference. Request for return of samples shall be accompanied by instructions which include shipping authorization and name of carrier and must be received with the bid. If instructions are not received within this time, the commodities shall be disposed of by the University.

19. INSPECTION, ACCEPTANCE AND TITLE: Inspection and acceptance will be at destination unless otherwise provided. Title and risk of loss or damage of all items shall be the responsibility of the contract supplier until accepted by the University, unless loss or damage results from negligence by the University. The contract supplier shall be responsible for filing, processing and collecting all damage claims. However, to assist him in the expeditious handling of damage claims, the University will:

(a) Record any evidence of visible damage on all copies of the delivering carrier's Bill of Lading.
(b) Report damage (Visible or Concealed) to the carrier and contract supplier confirming such reports in writing within 15 days of delivery, requesting that the carrier inspect the damaged merchandise.
(c) Retain the item and its shipping container, including inner packing material until inspection is performed by the carrier, and disposition given by the contract supplier.
(d) Provide the contract supplier with a copy of the carrier's Bill of Lading and damage inspection report.

20. PATENTS, COPYRIGHTS, TRADEMARKS, ROYALTIES and other Intellectual Property: The vendor, without exception, shall indemnify and save harmless the University and its employees from liability of any nature or kind, including cost and expenses for or on account of any copyrighted, patented, or unpatented invention, process, or article manufactured or used in the performance of the contract, including its use by the University of Florida. If the vendor uses any design, device, or materials covered by letters, patent or copyright, it is mutually agreed and understood without exception that the bid prices shall include all royalties or costs arising from the use of such design, device, or materials in any way involved in the work.

21. CONFLICT BETWEEN DOCUMENTS: If any terms and conditions contained within the documents that are a part of this ITB or resulting contract are in conflict with any other terms and conditions contained therein, then the various documents comprising this ITB or resulting contract, as applicable, shall govern in the following order of precedence: change order, purchase order, addenda, special conditions, general conditions, specifications, departmental description of work, and bid.

22. MANUFACTURERS' NAMES AND APPROVED EQUIVALENTS: Any manufacturer's names, trade names, brand names, information and/or catalog numbers listed in a specification are for information and not intended to limit competition. If bids are based on equivalent products, indicate on the bid form the manufacturer's name and number. Vendor shall submit with the bid, cuts, sketches, and descriptive literature, and/or complete specifications. Reference to literature submitted with a previous bid will not satisfy this provision. The vendor shall also explain in detail the reasons why the proposed equivalent will meet the specifications and not be considered an exception thereto. The University of Florida reserves the right to determine acceptance of item(s) as an approved equivalent. Bids which do not comply with these requirements are subject to rejection. Bids lacking any written indication of intent to quote an alternate brand will be received and considered in complete compliance with the specifications as listed on the bid form.

23. NONCONFORMANCE TO CONTRACT CONDITIONS: Items may be tested and/or inspected for compliance with specifications by any appropriate testing facilities. Should the items fail, the University may require the vendor to reimburse the University for costs incurred by the University in connection with the examination or testing. The data derived from any tests for compliance with specifications are public records and open to examination thereto in accordance with Chapter 119, F.S. Items delivered not conforming to specifications may be rejected and returned at vendor's expense. These items and items not delivered as per delivery data in bid and/or purchase order may result in vendor being found in default in which event any and all reprocurement costs may be charged against the defaulting vendor. Any violation of these conditions may also result in the vendor's name being removed from the University of Florida's vendor file.

24. PUBLIC RECORDS: Any material submitted in response to this Invitation to Bid will become a public document pursuant to Section 119.07 F.S. This includes material which the responding vendor might consider to be confidential or a trade secret. Any claim of confidentiality is waived upon submission, effective after opening pursuant to Section 119.07 F.S.

25. DELIVERY: Unless actual date of delivery is specified (or if specified delivery cannot be met), show number of days required to make delivery after receipt of purchase order in space provided. Delivery time may become a basis for making an award (see Special Conditions). Delivery shall be within the normal working hours of the University of Florida, Monday through Friday, unless otherwise specified.

26. PUBLIC PRINTING - PREFERENCE GIVEN PRINTING WITHIN THE STATE: The University of Florida shall give preference to vendors located within the state when awarding contracts to have materials printed, whenever such printing can be done at no greater expense than, and at a level of quality comparable to, that obtainable from a vendor located outside of the state.

(a) CONTRACTS NOT TO BE SUBLET: In accordance with Class B Printing Laws and Regulations "Printing shall be awarded only to printing firms. No contract shall be awarded to any broker, agent, or independent contractor offering printing manufactured by other firms or persons."

(b) DISQUALIFICATION OF VENDOR: Reasonable grounds for believing that a vendor is involved in more than one bid for the same work will be cause for rejection of all bids in which such vendors are believed to be involved. Any or all bids will be rejected if there is reason to believe that collusion exists between vendors. Bids in which the prices obviously are unbalanced will be subject to rejection.

(c) TRADE CUSTOMS: Current trade customs of the printing industry are recognized unless accepted by Special Conditions or Specifications herein.

(d) COMMUNICATIONS: It is expected that all materials and proofs will be picked up and delivered by the printer or his representative, unless otherwise specified. Upon request, materials will be forwarded by registered mail.

(e) RETURN OF MATERIAL: All copy, photos, artwork, and other materials supplied by the University of Florida must be handled carefully and returned in good condition upon completion of the job. Such return is a condition of the contract and payment will not be made until return is affected.

27. E-VERIFY COMPLIANCE. Agency is obligated to comply with the provisions of Section 448.095, Fla. Stat., "Employment Eligibility." Compliance with Section 448.095, Fla. Stat., includes, but is not limited to, utilization of the E-Verify System to verify the work authorization status of all newly hired employees. Vendor affirms and represents that it is registered with the E-Verify system and are using same, and will continue to use same as required by Section 448.095, Fla. Statute.

END OF SECTION

NOTE: ANY AND ALL SPECIAL CONDITIONS AND SPECIFICATIONS ATTACHED HERETO WHICH VARY FROM THE GENERAL CONDITIONS SHALL HAVE PRECEDENCE.

TABLE OF CONTENTS

I. Bidding Conditions (7 Pages)

00020 Invitation to Bid
00100 Instruction to Bidders
00310 Bid Form
00430 List of Subcontractors

II. Project Manual (255 Pages)

III. Drawings (8 Pages)

IV. Standards, Policies, Regulations, Forms, Guides, Inspection & Closeout and References

https://facilities.ufl.edu/projects/forms-standards/

END OF SECTION

00020 - INVITATION TO BID

The Invitation to Bid shall be in accordance with the University of Florida, Procurement Services "Invitation to Bid Acknowledgement Form" with all relevant information provided therein.

END OF SECTION

00100 - INSTRUCTIONS TO BIDDERS

1.1 RELATED SECTIONS

A. Documents affecting the work of this Section include, but are not necessarily limited to, the General Terms & Conditions and other Sections in Divisions 0 and 1 of these Specifications.

1.2 THE WORK

PROJECT TITLE: Air Handling Unit Replacement at Gator Corner Dining

1.3 SECURING DOCUMENTS

Copies of the proposed Contract Documents may be obtained from:

University of Florida Procurement Services website.
https://procurement.ufl.edu/vendors/schedule-of-bids/

1.4 BID SUBMITTAL

To be considered responsive and responsible, make bids in accordance with the following:

A. Make bids upon the forms provided, properly signed and with all items completed. Do not change the wording of the bid form and do not otherwise alter or add words to the bid form. Unauthorized conditions, limitations, or provisions attached to the bid may be cause for rejection of the bid.

B. Include with bid a completed and signed Invitation to Bid Construction Acknowledgment Form.

C. Include completed Section 00310 - Bid Form.

D. Include list of subcontractors as described in Section 00430 - Subcontractor Listing.

E. **Bids must be submitted no later than December 21, 2021 at 3:00PM, local time**. No bids received after the time fixed for receiving them will be considered. Late bids will be returned to the bidder unopened.

F. Address bids to Karen Olitsky, Procurement Agent III, and deliver to:

University of Florida
Procurement Services
971 Elmore Drive / PO Box 115250
Gainesville, FL 32611-5250

Submit bid in a sealed envelope that includes the bid number, contractor name and date and time of the bid opening on the outside of the envelope. Submit one (1) original bid and one (1) electronic copy on flash drive or CD/DVD. It is the sole responsibility of the bidder to see that bids are received on time. Faxed and/or emailed bids will not be accepted.

1.5 PROOF OF COMPETENCY OF BIDDER

A bidder may be required to furnish evidence, satisfactory to the Owner, that the bidder and the

bidder's proposed subcontractors have sufficient means and experience in the types of work required to assure completion of the Contract in a satisfactory manner.

1.6 WITHDRAWAL OF BIDS

A. A bidder may withdraw their bid, either personally or by written request, at any time prior to the scheduled time for opening bids.

B. No bidder may withdraw their bid for a period of forty-five calendar days after the date set for opening thereof, and bids shall be subject to acceptance by the Owner during this period.

1.7 QUALIFICATION OF BIDDERS

A. A contract will be awarded only to a responsible bidder, qualified by experience and in a financial position to perform the work specified.

B. If the bidder has not been pre-qualified with UF, the bidder may be required to submit the following evidence of eligibility:

1. Evidence that bidder is licensed by the appropriate government agency to perform the work specified.

2. Experience record showing bidder's training and experience in similar work.

3. List a brief description of three to five projects of similar size and/or complexity satisfactorily completed, with location, dates of contracts, names of contracts, and names and addresses of owners.

1.8 SUBCONTRACTS

If the Bidder intends to subcontract any of the Work:

A. A list of all proposed subcontractors shall be provided with the bid for scopes/packages more than $10,000. See Section 00430 - Subcontractor Listing.

B. Each subcontractor performing work more than $10,000 must present evidence of being qualified in and licensed for the applicable trade. Such proof of subcontractor licensure shall be provided by the successful bidder after award, but prior to commencement of Work.

1.9 PERFORMANCE AND PAYMENT BONDS

See General Terms & Conditions, Article 20.

1.10 BID DEPOSIT

Not required.

1.11 AWARD OR REJECTION OF BIDS

The Contract, if awarded, will be awarded to the responsible and responsive bidder who has proposed the lowest Contract Sum, subject to the owner's right to reject any or all bids and to waive informality and irregularity in the bids and in the bidding. Acceptance or rejection of any bid will be at the owner’s

sole discretion.

1.12 MANDATORY PRE-BID MEETING:

A Mandatory Pre-bid Meeting will be held prior to the scheduled bid opening for the purpose of considering questions posed by bidders. This meeting will be held **November 30, 2021 at 9:30AM, local time at Gator Corner Dining, 2021 Stadium Road, Gainesville, FL 32611,** and is open to interested bidders, prospective subcontractors, and any other interested parties. **The meeting will begin outside of the front entrance of Gator Corner Dining.**

Please note: Masks are expected at all times when inside any UF facility.

1.13 EXECUTION OF AGREEMENT

A. A Purchase Order (PO) will be issued for purposes of fiscal encumbrance and payment. The PO itself serves as the form of contract.

B. Upon notice of Bid Award, the bidder to whom the Contract is awarded shall deliver to UF those Certificates of Insurance and Payment & Performance Bonds required by the Contract Documents.

C. Bonds and Certificates of Insurance shall be approved by UF before the successful bidder may proceed with the Work.

1.14 INTERPRETATION OF CONTRACT DOCUMENTS PRIOR TO BIDDING

A. If any person contemplating submitting a bid for construction of the Work is in doubt as to the true meaning of any part of the Contract Documents, or finds discrepancies in or omissions from any part of the Contract Documents, they may submit a written request for interpretation thereof no later than **December 6, 2021 at 5:00PM**, local time, to Karen Olitsky, Procurement Agent III at kolitsk@ufl.edu. The person submitting the request shall be responsible for its prompt delivery.

B. Interpretations or corrections of proposed Contract Documents will be made only by Addendum and will be available on the Procurement Services "Schedule of Bids" webpage https://procurement.ufl.edu/vendors/schedule-of-bids/. The Owner will not be responsible for any other explanations or interpretations of the proposed Contract Documents.

1.15 TIME OF COMPLETION:

A. Date of beginning, rate of progress and time for completion of Work for this Project are ESSENTIAL CONDITIONS of Contract. Successful Bidder hereby agrees that Equipment required by this Contract shall be ordered within ten (10) calendar days after issuance date of written Notice to Proceed; that all insurance and permits will be obtained; that all documents and notices will be filed; that all requirements as specified will be met; and that Work shall be prosecuted regularly, diligently and uninterruptedly at such rate of progress as will insure Substantial Completion of entire Project within 60 calendar days after delivery of Equipment, and shall be finally completed within 14 calendar days after the date of Substantial Completion. UF expects to issue a Purchase Order and Notice to Proceed no later than January 30, 2022. Work shall be completed no later than July 2022.

END OF SECTION

00310 - BID FORMS

BID PROPOSAL

FROM: _____
(Name of Bidder)

TO: UNIVERSITY OF FLORIDA
PROCUREMENT SERVICES
971 Elmore Drive
P.O. Box 115250
Gainesville, Florida 32611-5250

The undersigned, hereinafter called "Bidder", having reviewed the Contract Documents for the Project entitled **ITB22KO-121 Air Handling Unit Replacement at Gator Corner Dining** and having visited and thoroughly inspected the site of the proposed Project and familiarized themself with all conditions affecting and governing the construction of said Project, hereby proposes to furnish all labor, materials, equipment and other items, facilities and services for the proper execution and completion of the Project, in strict compliance with the Contract Documents, Addenda, and all other Documents relating thereto on file in Procurement Services, and, if awarded the Contract, to complete the said Work within the time limits called for in the Documents and as stated herein, for the sums as enumerated on this and the following pages:

BASE BID:

_____Dollars

Figures: $_____

ADDENDA:
Receipt of the following Addenda to the Construction Documents is acknowledged:

ADDENDUM #_____ Dated _____

ADDENDUM #_____ Dated _____

ADDENDUM #_____ Dated _____

COMPLETION DATE:

All Work covered by the Bidding Documents and the foregoing Base Bid shall be completed and ready for Owner's occupancy as specified in the contract documents.

SIGNATURE:

I hereby certify that for all statements and amounts herein made on behalf of

_____
(Name of Bidder)

a (Corporation) (Partnership) (Individual) organized and existing under the laws of the State of Florida, I have carefully prepared this Bid Proposal from Contract Documents described hereinbefore, I have examined Contract Documents and local conditions affecting execution of Work before submitting this Bid Proposal, I have full authority to make the statements and commitment herein and submit this Bid Proposal on their behalf, and all statements are true and correct.

Signed and sealed this_____day of_____, 2021.

_____
(Signature of Bidder)

_____
(Print Name)

_____
(Title)

Witness:

_____
(Signature of Witness)

_____
(Print Name)

Address:

_____

_____
(City) (State) (Zip Code)

END OF SECTION

00430 - SUBCONTRACTOR LISTING

1.1 RELATED SECTIONS

A. Documents affecting the work of this Section include, but are not necessarily limited to, the General Terms & Conditions and other Sections in Divisions 0 and 1 of these Specifications.

1.2 SUBCONTRACTOR LISTS

A. Each bidder shall furnish with its bid a list of all subcontractors for subcontracted scopes/packages of work valued at more than $10,000.

B. This list shall identify – for each subcontracted package in excess of $10,000 – the name and address of the proposed subcontractor and the approximate value of the subcontract.

C. If the bidder does not intend to subcontract portions of the Work in amounts greater than $10,000, then a statement to that affect shall be furnished with the bid.

D. See Section 00100 - Instruction to Bidders regarding subcontractor licensure requirements.

END OF SECTION

UF | UNIVERSITY of FLORIDA
Planning, Design & Construction

PROJECT TITLE: **GATOR CORNER DINING – AHU 1 & 2 REPLACEMENT**

BUILDING NUMBER: **0359**

PROJECT NO.: **MP06423**

DATE: **AUGUST 23, 2021**

PREPARED BY:

CAMPBELL SPELLICY ENGINEERING
Phone: (352) 372-6967
Fax: (352) 372-7232
Certificate of Authorization: 00008813
www.campbellspellicy.com

PROJECT MANUAL

Kevin M. Spellicy, PE, LEED AP
CAMPBELL SPELLICY ENGINEERING

100% CONSTRUCTION DOCUMENTS

CSEI Project No. 21028

GATOR CORNER DINING
BUILDING 0359
AHU 1 & 2 REPLACMENT

UF Project No. MP06423

UF | UNIVERSITY of FLORIDA

Authorized representatives and contact information:

UF PROCUREMENT SERVICES
Karen Olitsky
971 Elmore Drive / PO Box 115250
Gainesville, FL 32611-5250
(352) 294-1163
kolitsk@ufl.edu

Table of Contents

I. Bidding Conditions – NOT APPLICABLE

II. General Terms and Conditions (CM and Design-Bid-Build)

Article 1 – Definitions
Article 2 – Contract Documents
Article 3 – Builder's Reviews and Evaluations
Article 4 – Builder's Duties, Obligations, and Responsibilities
Article 5 – Builder's Personnel, Sub-Contractors, Suppliers, and Site Facilities
Article 6 – Goods, Products, and Materials
Article 7 – Documents and Information
Article 8 – Submittals
Article 9 – Builder's Inspection and Correction of Defective or Incomplete Work
Article 10 – Change Orders and Changes to the Work
Article 11 – Owner's Consultant(s), Professional(s), and Construction Administration
Article 12 – Inspection, Correction of Work, and Project Closeout
Article 13 – Builder's Warranties and Guarantees
Article 14 – Owner's Duties, Obligations, and Responsibilities
Article 15 – Builder's Compensation
Article 16 – Schedule Requirements
Article 17 – Time of Performance
Article 18 – Concealed and Unforeseen Conditions
Article 19 – Proprietary Documents and Confidentiality
Article 20 – Insurance Requirements
Article 21 – General Bond Requirements
Article 22 – Owner's Right To Stop Work
Article 23 – Termination or Suspension of Contract for Construction
Article 24 – Dispute Resolution
Article 25 – Damages and Remedies
Article 26 – Miscellaneous Provisions

III. Division 0 Non-Technical Requirements

00810 Vendor Diversity
00811 Federally Funded Projects – NOT APPLICABLE
00842 Safety Requirements
00902 Public Entity Crimes
00903 Asbestos Policy Statement

IV. Division 1 General Requirements

01014 Contractor's Use of the Premises
01016 Utility Outages and Dig Permits
01060 Regulatory Requirements
01310 Construction Schedules
01352 Requirements for Sustainable Certification – NOT APPLICABLE
01500 Temporary Facilities and Controls
01505 Construction Waste Management
01700 Project Closeout
01800 General Commissioning Requirements – NOT APPLICABLE

V. Forms, Applications, and Illustrations

The following forms or documents can be found on the Planning Design & Construction website at www.facilities.ufl.edu:

- Owner-Contractor Agreement **OR** Agreement for Construction Management Services **OR** Agreement for Design/Build Services
- Application and Certificate for Partial Payment
- Bid Tabulation and Award Forms *(for CM At-Risk or Design-Build projects)*
- Builder Application and Certificate of Partial Payment
- Change Order Form and COP Justification Form
- Utility Outage Request
- UF Project Construction Sign
- Construction Administration and Substantial Completion Guide
- Roads/Sidewalks/Parking Restriction Notification
- Assignment of Antitrust Claims
- Certificate of Non-Segregated Facilities
- Owner Direct Purchase P.O. Requisition
- Building Permit Application
- PPD Utility Rates

The following form can be found on Physical Plant Division Operations Engineering website at www.ppd.ufl.edu/operations-dig.html:

- Dig Permit

The following forms or documents can be found on the Environmental Health & Safety website at www.ehs.ufl.edu/buildcode:

- EH&S Inspection Request Form
- State Fire Marshall Inspection Request Form

VI. TECHNICAL SPECIFICATIONS

DIVISION 21 - FIRE PROTECTION
210005 Fire Protection General
210020 Codes and Standards
210105 Pipes and Pipe Fittings
210160 Fire Protection Identification
210342 Building Sprinkler and Standpipe Systems - Repairs

DIVISION 23 - MECHANICAL
230005 Mechanical General
230020 Codes and Standards
230030 Mechanical Related Work
230105 Pipes and Pipe Fittings
230110 Valves
230115 Electric Motors
230135 Vibration Isolation
230140 Meters and Gauges
230160 Mechanical Identification
230180 Testing, Cleaning, and Sterilization of Piping Systems
230210 Insulation for HVAC Equipment and Piping
230230 Exterior Insulation for Ductwork
230505 Heating Hot Water and Chilled Water Systems
230605 Air Handling Units
230840 HVAC Metal Ductwork
230855 Ductwork Accessories
230885 Air Cleaning Equipment and Ultraviolet Lights
230901 HVAC Controls Pricing
230905 Sequence of Operation
230955 Variable Frequency Drives
230985 Testing and Balancing of Mechanical Systems

DIVISION 26 - ELECTRICAL
260005 Electrical General
260020 Codes and Standards
260030 Electrical Related Work
260100 Basic Materials and Methods
260101 Conductor and Cable Identification
260102 PVC Raceways
260103 General Grounding Electrical Systems
260125 Circuit Breakers, Molded Case
260155 Relays
260170 General Wiring Devices
260535 LED Interior Lighting
260900 Work Required for Equipment Furnished in Other Divisions

GENERAL TERMS and CONDITIONS

for Construction Management At-Risk and Design-Bid-Build Projects

Revised May 2017

Business Affairs
Planning Design & Construction
www.facilities.ufl.edu

TABLE OF CONTENTS

ARTICLE 1 – DEFINITIONS 7
ARTICLE 2 – CONSTRUCTION DOCUMENTS 9
2.1 Quantity and Format of Documents 9
2.2 Minimum Requirements 9
2.3 Owner Disclaimer of Warranty 9
2.4 Conflicts in Documents 9
2.5 Contract Changes 9
ARTICLE 3 – BUILDER'S REVIEWS AND EVALUATIONS 10
3.1 Sufficiency of Construction Documents 10
3.2 Sufficiency of Site 10
ARTICLE 4 – BUILDER'S DUTIES, OBLIGATIONS, AND RESPONSIBILITIES 11
4.1 Performance Of Work 11
4.2 Compliance With Laws 12
4.3 Safety 12
4.4 On Site Records 12
4.5 Bribes and Kick-Backs 12
4.6 Quality Control And Testing 13
4.7 Incident Reporting 13
4.8 Hazardous Substances 13
4.9 Owner's Use Of and Access To The Site 13
4.10 Utilities 14
ARTICLE 5 – BUILDER'S PERSONNEL, SUBCONTRACTORS, SUPPLIERS, AND SITE FACILITIES 14
5.1 Project Staffing 14
5.2 Subcontractor / Supplier Contracts 14
5.3 Resolution of Trade Disputes 15
ARTICLE 6 – GOODS, PRODUCTS, AND MATERIALS 15
6.1 Quality Of Materials 15
6.2 Installation And Use Of Materials 16
6.3 Unsuitable Materials 16
6.4 Substitutions 16
6.5 Construction Manager Responsibility 16
6.6 Security For The Project 17

ARTICLE 7 – DOCUMENTS AND INFORMATION 17
7.1 Information from Owner 17
7.2 Resolution of Questions 17
7.3 Processing of Documents 17
7.4 Sufficiency of Owner Information 17
ARTICLE 8 – SUBMITTALS 18
8.1 Submittal Schedule 18
8.2 Processing of Submittals 18
8.3 Record Documents 18
ARTICLE 9 – BUILDER'S INSPECTION AND CORRECTION OF DEFECTIVE OR INCOMPLETE WORK 18
9.1 Rejection and Correction of Work In Progress 18
9.2 Covered or Concealed Work 19
ARTICLE 10 – CHANGE ORDERS, CHANGES TO THE WORK, AND CHANGED CONDITIONS 19
10.1 Change Order Proposals and Requests 19
10.2 Owner-Directed Changes 20
10.3 Professional-Directed Changes 20
10.4 Administration of Changes 20
10.5 Compensation for Changes 20
10.6 Concealed and Unforeseen Conditions 20
10.7 Performance of Changes 21
10.8 Disputes Regarding Changes 21
10.9 Necessity for Signature Approval 21
ARTICLE 11 – OWNER'S CONSULTANT(S) AND CONSTRUCTION ADMINISTRATION 22
11.1 Owner's Designated Professional Representative 22
11.2 Professional Site Visits 22
11.3 Professional Rejection of Work 22
11.4 Professional Evaluations 22
11.5 Professional Submittal Activities 22
11.6 Professional Interpretations 23
11.7 Professional Pay Application Activities 23
11.8 Professional Relationship to Builder 23
11.9 Commissioning Consultant 23

ARTICLE 12 – SUBSTANTIAL AND FINAL COMPLETION 23
12.1 Substantial Completion 23
12.2 Final Completion 25
ARTICLE 13 – BUILDER'S WARRANTIES AND GUARANTEES 26
13.1 One-Year Warranty 26
13.2 Post-Completion Commissioning Activities 27
13.3 Express Warranties and Guarantees – Builder 27
13.4 Express Warranties and Guarantees – Subcontractors and Suppliers 27
13.5 Non-Exclusivity and Survival 27
13.6 Non-Limitation 28
13.7 Commencement of Obligations 28
ARTICLE 14 – OWNER'S DUTIES, OBLIGATIONS, AND RESPONSIBILITIES 28
14.1 Timely Compensation of Builder 28
14.2 Owner Review of Documents 28
14.3 Status of Owner 28
ARTICLE 15 – BUILDER'S COMPENSATION 28
15.1 Schedule of Values 28
15.2 Unit Prices 29
15.3 Invoicing Procedures 29
15.4 Payment Procedures 30
15.5 Owner's Right to Refuse Payment 30
15.6 Builder's Right to Refuse Performance for Non-Payment 31
15.7 Correction of Past Payments 31
15.8 Invoice Warranties and Guarantees 31
15.9 Builder's Signature 31
15.10 Taxes and Owner Direct Purchase Program 31
15.11 Compensation of Builder's Subcontractors and Suppliers 32
15.12 Retainage 32
15.13 Final Payment 33
ARTICLE 16 – SCHEDULE REQUIREMENTS 33
16.1 Construction Schedule 33
16.2 Delay in Performance 34
16.3 Early Completion 34

16.4 Document Review....35
ARTICLE 17 – TIME OF PERFORMANCE....35
17.1 Time of the Essence....35
17.2 Modifications of Time for Performance....35
17.3 Compensable Delay....36
17.4 Excusable Delay....36
17.5 Critical Delay....36
ARTICLE 18 – PROPRIETARY DOCUMENTS AND CONFIDENTIALITY....36
18.1 Nature and Use of Information....36
18.2 Ownership of Information....36
18.3 Disclosure of Information....37
18.4 Instructions to Employees....37
18.5 Non-Publication....37
ARTICLE 19 – INSURANCE REQUIREMENTS....37
19.1 Basic Insurance Requirements....37
19.2 Certificates of Insurance....39
19.3 Effect of Insurance....40
19.4 Waiver of Subrogation....40
ARTICLE 20 – GENERAL BOND REQUIREMENTS....40
20.1 General Bond Requirements....40
20.2 Delivery of Bonds....40
20.3 Requests for Copies of Bonds....40
ARTICLE 21 – OWNER'S RIGHT TO STOP WORK....40
21.1 Cease and Desist Order....40
ARTICLE 22 – TERMINATION OR SUSPENSION OF CONTRACT FOR CONSTRUCTION....41
22.1 Termination for Cause by Owner....41
22.2 Termination for Cause by Builder....42
22.3 Termination or Suspension for Convenience....43
22.4 Builder's Compensation When Builder Terminates for Cause or Owner Terminates for Convenience....43
22.5 Builder's Compensation When Owner Terminates for Cause....43
22.6 Limitation on Termination Compensation....44
22.7 Builder's Responsibility upon Termination....44
22.8 Lack of Duty to Terminate....44

22.9 Limitation on Termination Claim 44
ARTICLE 23 – DISPUTE RESOLUTION 44
23.1 Mutual Discussion 44
23.2 Facilitative Mediation 44
23.3 Conflicting Dispute Resolution Provisions 45
23.4 Arbitration Preclusion 45
23.5 Performance during Dispute Resolution 45
23.6 Litigation/Administrative Action 46
ARTICLE 24 – DAMAGES AND REMEDIES 46
24.1 Builder's Repair 46
24.2 Reimbursement 46
24.3 General Indemnity 46
24.4 Intellectual Property Indemnity 46
24.5 Non-Exclusivity of Owner's Remedies 46
24.6 Waiver of Damages 47
ARTICLE 25 – MISCELLANEOUS PROVISIONS 47
25.1 Integration 47
25.2 Severability 47
25.3 Waiver 47
25.4 Strict Compliance 47
25.5 Third-Party Beneficiaries 47
25.6 Assignment of Anti-Trust Claims 47
25.7 Drug Free and Tobacco-Free Workplace 47
25.8 Survival 48
25.9 Independent Contractor 48
25.10 Public Records 48
25.11 Governing Law and Venue 48
25.12 Sovereign Immunity 48

ARTICLE 1 – DEFINITIONS

When one of the following capitalized words, terms, or phrases is used in the Contract for Construction, it shall be interpreted or construed first as defined below, second according to its generally accepted meaning in the construction industry, and third according to its common and customary usage.

Authority Having Jurisdiction (AHJ): That person or entity who has the delegated authority to determine, mandate, and enforce building code requirements established by jurisdictional governing bodies. For University of Florida projects, the University's Division of Environmental Health & Safety is normally the primary AHJ.

BIM Execution Plan: A detailed and project-specific guide for the development, sharing, use, and finalization of BIM models and model-related documents and information.

Building Information Modeling (BIM): A process involving the generation and management of digital representations of physical and functional characteristics of a facility through the use of three–dimensional, intelligent design information. The resulting building information models become shared knowledge resources to support decision-making about a facility from the earliest conceptual stages, through design, construction, and the facility's operational life.

Builder: An entity, including but not limited to a general contractor, a trade contractor or a construction manager, engaged directly by the Owner pursuant to a Contract for Construction.

Certificate of Substantial Completion: Document declaring the Work Substantially Complete and suitable for occupancy or beneficial use by the Owner.

Commissioning: A process – normally handled by one or more independent consultants working directly for the Owner – to ensure that particular building systems are planned, designed, installed, tested, optimized, and capable of being operated and maintained to perform in accordance with the Owner's goals and requirements.

Construction Documents: Drawings, specifications, revisions, addenda, and other information which set forth in detail the Work.

Construction Price: The dollar amount for which a Builder agrees to perform the Work set forth in a Contract for Construction.

Construction Schedule: The timetable which sets forth pertinent dates for timely completion of the Work.

Contract for Construction: The entire agreement between Owner and Builder, consisting of the Owner-Builder Agreement and all exhibits thereto; these General Terms and Conditions; special conditions, if any; proposal(s) submitted by the Builder and accepted by Owner, if any; the Construction Documents; any amendments or addenda executed by the Owner and the Builder hereafter; and Owner-approved change order(s) or field orders. Documents not included or expressly contemplated in this definition do not, and shall not, form any part of the Contract for Construction. Without limiting the generality of the foregoing, shop drawings and other submittals from the Builder or its subcontractors and suppliers do not constitute a part of the Contract for Construction.

Final Completion: The stage of construction when the Work has been completed in accordance with the Contract for Construction and the Owner has received all documents and items necessary for closeout of the Work. Final Completion of the Work shall be deemed to have occurred on the later of: (i) the date that the Work passes a Final Completion inspection, or (ii) the date that the Builder has produced all required Final Completion close-out documentation and items. Final Completion shall not be deemed to have occurred and no final payment shall be due the Builder or any of its subcontractors or suppliers until the Work has passed the Final Completion inspection and Builder has provided all required Final Completion closeout documentation and items to the Owner.

Hazardous Substances: The term "Hazardous Substances" means all hazardous or toxic substances, materials, wastes, pollutants and contaminants which are listed, defined, or regulated under applicable laws, rules, regulations, codes, ordinances, orders and directives pertaining or related to health, safety, or the environment, including, but not limited to, the Comprehensive Environmental Response Compensation and Liability Act as amended, (42 U.S.C. § 9601 et seq), the Resource Conservation and Recovery Act as amended, (42 U.S.C. § 6901 et seq), the Federal Water Pollution Control Act (33 U.S.C.A. §§ 1251 to 1387), the Clean Air Act (42 U.S.C.A. §§ 7401 to 7671q), the Emergency Planning and Community Right to Know Act (42 U.S.C.A. §§ 11001 to 11050), the Toxic Substances Control Act (15 U.S.C.A. §§ 2601 to 2692), the Solid Waste Disposal Act (42 U.S.C.A. §§ 6901 to 6992k), the Oil Pollution Act (33 U.S.C.A. §§ 2701 to 2761) and all rules and regulations promulgated pursuant thereto. Without limiting the generality of the foregoing, “Hazardous Substances” shall specifically include polychlorinated biphenyl, asbestos (friable and non-friable), radon, urea formaldehyde, gasoline, diesel, oil, hydrocarbons, petroleum derived constituents, biomedical waste, or hazardous or toxic residue.

Owner: The University of Florida Board of Trustees, a public body corporate of the State of Florida.

Owner’s Related Parties: The Board of Governors and its officers, trustees, and employees; and the Owner and its officers, trustees, and employees.

Professional: An entity, including but not limited to a licensed architect or engineer, engaged directly by the Owner to provide design or engineering services.

Project: Owner’s undertaking to effect the construction, installation, renovation, or demolition of a facility or improvement, as the case may be, that is the subject of the Contract for Construction between Owner and Builder.

Site: The geographical location of a Project, usually defined by legal boundary lines, and the location characteristics including, but not limited to, grades and lines of streets, alleys, pavements and adjoining structures, rights-of-way, restrictions, easements, encroachments, zoning, deed restrictions, existing buildings and improvements, and service and utility lines.

Substantial Completion (or Substantially Complete): The stage of construction when the Owner can occupy or beneficially use satisfactorily completed Work for its intended purpose and a certificate of occupancy has been issued. Substantial Completion of the Work shall be deemed to have occurred on the later of: (i) the date the Work passes all Substantial Completion inspections, (ii) the date Builder has produced the required Substantial Completion documentation and items, or (iii) the date Authorities Having Jurisdiction provide a certificate of occupancy.

Work: Any and all computers, construction machinery, documents, equipment, facilities, fixtures, furnishings, goods, heat, items, labor, licenses, management, materials, permits, products, services, supervision, supplies, systems, taxes, testing, tools, utilities, transportation, vehicles, and water, required to be performed or supplied and/or necessary for proper execution and completion of the Project, or some portion thereof, whether or not incorporated or to be incorporated into the Project; provided, however, that Work does not include performance of pre-construction services by a construction manager.

ARTICLE 2 – CONSTRUCTION DOCUMENTS

2.1 Quantity and Format of Documents

The Owner shall provide the Builder with one printed set of Construction Documents, one set of electronic documents (plans and specifications) in PDF format, and one set of BIM files.

2.2 Minimum Requirements

In every case, requirements established by the Construction Documents shall be considered as the minimum acceptable standard.

2.3 Owner Disclaimer of Warranty

The Owner has requested that its Professional(s) prepare Construction Documents for the Project, including the plans and specifications, which are to be complete, accurate, coordinated, and adequate for bidding, negotiating, and constructing the Work. However, the Owner makes no representation or warranty of any nature whatsoever to the Builder concerning the Construction Documents or BIM documents. The Builder hereby acknowledges and represents that it has not relied, and does not and will not rely, upon any representations or warranties by the Owner concerning such documents, as no such representations or warranties have been or are hereby made.

2.4 Conflicts in Documents

In the event of any conflict, discrepancy, or inconsistency among any of the documents comprising the Contract for Construction, the following shall control:

2.4.1 As between figures given on plans and scaled measurements, the figures shall govern;

2.4.2 As between large-scale plans and small-scale plans, the large-scale plans shall govern;

2.4.3 As between plans and specifications, the requirements of the specifications shall govern;

2.4.4 As between plans or specifications and BIM models, the requirements of the plans or specifications shall govern.

2.4.5 As between architectural drawings and (structural, civil, mechanical, electrical, plumbing, or fire protection) engineering drawings, the engineering drawings shall govern.

2.5 Contract Changes

The Builder understands and agrees that the Contract for Construction – including the Construction Documents – cannot be changed except as provided herein. No act, omission, or course of dealing by the parties shall alter the requirement that modifications of the Contract for Construction must be accomplished by written documents signed by the parties.

ARTICLE 3 – BUILDER'S REVIEWS AND EVALUATIONS

3.1 Sufficiency of Construction Documents

The Builder acknowledges its continuing duty to review and evaluate the Construction Documents during the performance of its services and shall immediately notify the Owner and the Professional(s) of any (i) problems, conflicts, defects, deficiencies, inconsistencies, or omissions it discovers in or between the Construction Documents; and (ii) variances it discovers between the Construction Documents and applicable laws, statutes, building codes, rules, or regulations.

3.1.1 If the Builder performs any Work it knows or should have known involves (i) a recognized problem, conflict, defect, deficiency, inconsistency or omission in the Construction Documents; or (ii) a variance between the Construction Documents and requirements of applicable laws, statutes, building codes, rules, regulations, or the Owner's design and construction standards without notifying the Professional(s) and prior to receiving written authorization to proceed, the Builder shall be responsible for the consequences of such performance.

3.1.2 Drawings are generally drawn to scale; however, the figured dimensions or notes thereon shall govern. Before ordering any materials or doing any Work, the Builder and subcontractors shall verify all measurements at the Site and shall be responsible for the correctness of same. Discrepancies shall be reported in writing to the Professional prior to proceeding with the Work. No extra charge or compensation will be entertained due to differences between actual measurements and dimensions indicated on drawings, if such differences do not result in a change in the scope of Work or if the Professional failed to receive written notice before the Work was performed.

3.2 Sufficiency of Site

Prior to signing the Contract for Construction, the Builder has:

(i) visited the Site and become familiar with local conditions under which the Project is to be constructed and operated; and

(ii) reviewed and familiarized itself with the Site survey and any existing structures on the Site, and gathered all other information necessary for a full understanding of the Work.

In addition, if the Work involves modifications to or remodeling of an existing structure(s) or other man-made feature(s) on the Site, the Builder has also:

(iii) reviewed all as-built and record drawings, plans and specifications of which Owner has informed Builder; and

(iv) thoroughly inspected the structure(s) and man-made feature(s) to be modified or remodeled prior to submission of bid, if any, but in all events prior to signing the Contract for Construction.

Claims resulting from the Builder's failure to familiarize itself with the Site or pertinent documents shall be deemed waived.

ARTICLE 4 – BUILDER'S DUTIES, OBLIGATIONS, AND RESPONSIBILITIES

4.1 Performance Of Work

The Builder shall perform and complete its obligations under the Contract for Construction using its best skill and attention, and covenants with the Owner to furnish management, supervision, coordination, labor, and services (i) which expeditiously, economically and properly complete the Work in the manner most consistent with the Owner's interests and objectives; (ii) which comply with the Contract for Construction; and (iii) which are in accordance with the highest standards currently practiced by persons and entities performing or providing management, supervision, coordination, labor and services on projects similar in size, complexity, and cost to the Project.

4.1.1 The Builder shall not be required to provide professional services which constitute the practice of architecture or engineering, unless provided in the Construction Documents and relating to those divisions of the Work for which it is appropriate for Builder's subcontractors to engage or employ licensed engineers for design associated with the Work, such as trusses.

4.1.2. All services rendered by the Builder for the Project shall be performed by or under the immediate supervision of persons possessing expertise in the discipline of the service being rendered.

4.1.3 The Builder shall, in the course of providing the Work, cooperate and communicate with the Owner, the Professional, the Owner's Commissioning consultants, and all other persons or entities as required for satisfactory completion of the Project.

4.1.4 The Builder understands and acknowledges that the Work referred to in the Contract for Construction may be only part of the Project and that the Project may include the construction of other structures or other construction activities on the same Site. The Builder shall conduct all its activities so as not to interfere with the construction of, or operations within or from, other structures on the Site.

4.1.5 The Builder shall not damage, endanger, compromise, or destroy any part of the Project or the Site, including by way of example and not limitation, work being performed by others on the Site, monuments, stakes, benchmarks and other survey points, utility services, and existing features or structures on the Site. Should the Builder damage, compromise or destroy any part of the Project or the Site, the Builder shall be fully and exclusively responsible for and bear all costs associated therewith.

4.2 Compliance With Laws

4.2.1 The Builder shall comply with all applicable laws, statutes, building codes, rules, regulations, and lawful orders of all governmental, public, and quasi-public authorities and agencies having jurisdiction over the Project.

4.2.2 The Builder shall prepare and file documents required to obtain, and shall obtain, all necessary approvals and permits, including building permit(s), of all governmental authorities having jurisdiction over the Work, provided Owner shall pay all building permit and state fire marshal inspection fees directly.

4.2.3 The Builder shall give all notices required of it by governmental authorities relating to the Project.

4.3 Safety

Safety shall be a prime concern of the Builder at all times. The Builder shall be solely responsible for and have control over the means, methods, techniques, sequences, and procedures for coordinating and constructing the Work, including Site safety and safety precautions and programs.

4.4 On Site Records

4.4.1 The Builder shall maintain at the Site one copy of all drawings, specifications, addenda, approved shop drawings, daily logs, change orders, submittals, other modifications, and all other documents generated throughout the course of the project in good order. The daily logs shall contain detailed information regarding weather conditions, materials delivered, work performed, operating hours, subcontractors working on the Project, and staffing of each subcontractor.

4.4.2 The Builder shall continuously update all drawings and specifications to reflect changes as they occur throughout construction. Such “as-built” plans and specifications shall be available at all times to the Owner, the Professional(s), the Owner’s consultants, and quality control and testing agency personnel. The drawings shall be neatly and clearly marked in color during construction to record all variations made during construction, and the Builder shall include such supplementary notes and details necessary to clearly and accurately represent as-built construction.

4.4.3 Depending on the requirements of the project-specific BIM Execution Plan, the Builder shall also maintain copies of the BIM models that reflect the as-built or as-installed conditions, geometry, and product/equipment information.

4.5 Bribes and Kick-Backs

The Builder shall not by any means:

(i) induce any person or entity employed in the construction of the Project to give up any part of the compensation to which that person or entity is entitled;

(ii) offer or accept any bribes or kick-backs in connection with the Project from or to any individual or entity, including any of its trade contractors, subcontractors, consultants, suppliers, or manufacturers of Project goods and materials; or

(iii) without the express written permission of the Owner in accordance with Owner's policies, call for or by exclusion require or recommend the use of any subcontractor, consultant, product, material, equipment, system, process, or procedure in which the Builder has a direct or indirect proprietary or other pecuniary interest.

4.6 Quality Control And Testing

The Builder shall develop and implement a quality management program to ensure quality construction. Unless otherwise specified in the Contract for Construction, the Builder shall procure the quality control and testing agencies, subject to Owner's written approval. The Builder shall coordinate all tests and inspections required by the Construction Documents, and the Builder shall arrange for tests and inspections to be conducted as necessary to avoid any interference with the progress of Work. No claims for extension of time or extra costs will be allowed on account of any testing, retesting, inspection, re-inspection, or rejection of Work when defective or deficient Work is found. Cost of specified measures and tests required by the Construction Documents and performed by Owner-approved quality control and testing agencies shall be included in the Cost of the Work.

4.7 Incident Reporting

The Builder shall immediately notify the Owner and Professional(s), both orally and in writing, of the nature and details of all incidents which may adversely affect the quality or progress of the Work including, but not limited to, union jurisdictional disputes, accidents, delays, damages to Work, and other significant occurrences.

4.8 Hazardous Substances

The Builder shall immediately notify the Owner and the Professional(s), both orally and in writing, of the presence and location of any physical evidence of, or information regarding, environmental contamination on the Site (including but not limited to Hazardous Substances and petroleum releases) of which it becomes aware. If the Builder encounters environmental contamination (including but not limited to Hazardous Substances), the Builder shall (i) immediately stop performance of Work or that portion of the Work affected by or affecting such contamination; (ii) secure the contaminated area against intrusion; (iii) not disturb or remove the contamination; (iv) not proceed, or allow any subcontractor or supplier to proceed, with any Work or other activities in the area affected by such contamination until directed to do so by the Owner; and (v) take any other steps necessary to protect life and health.

4.9 Owner's Use Of and Access To The Site

The Builder shall perform the Work so as not to interrupt any operations of the Owner on, adjacent to, or near the Site.

4.9.1 The Builder understands and acknowledges that the Owner may need access to or use of certain areas of the Site or Work prior to the Builder's achievement of Substantial Completion, and that such occupancy, access, or use shall not constitute the Owner's acceptance of any Work.

4.9.2 The Builder shall not enter any Owner-occupied area of the Site or Project unless first approved and scheduled by the Owner. The Builder understands and acknowledges that the Owner may incur damages if the Owner's operations on the Site are interrupted or impaired as a result of the Work.

4.9.3 The Builder shall afford the Owner's own forces and other consultants, trade contractors, subcontractors, and suppliers, access to the Site for performance of their activities, and shall connect and coordinate its construction and operations with theirs as required by the Construction Documents.

4.10 Utilities

The Builder shall be responsible for all costs associated with connections to, and consumption of, utilities required for temporary service and construction.

ARTICLE 5 – BUILDER'S PERSONNEL, SUBCONTRACTORS, SUPPLIERS, AND SITE FACILITIES

5.1 Project Staffing

The Builder shall staff the Project with qualified and designated individuals and entities responsible for its obligations and performance.

5.1.1 An authorized representative of the Builder shall be present at all times when Work is being performed.

5.1.2 The Builder shall employ persons skilled in the tasks assigned to them and shall contract with subcontractors and suppliers skilled in the tasks assigned to them and capable of working harmoniously with all trades, crafts and other individuals on the Project. The Builder shall use its best efforts to minimize the likelihood of any strike, work stoppage, or other labor disturbance.

5.1.3 Students, faculty, and staff shall not be harassed, disturbed, or in any way disrupted in their lawful pursuits. The Builder shall immediately remove from the Site, for the duration of the Project, any person making an inappropriate religious, racial, sexual or ethnic comment, statement or gesture toward any other individual. Sexual harassment shall be reported to the University's Title IX Coordinator and Deputy Title IX Coordinator for Students as prescribed elsewhere in the Contract for Construction.

5.1.4 The Builder shall immediately remove from the Site, for the duration of the Project, any person who is incompetent, careless, or not working in harmony.

5.1.5 The Builder shall be responsible to the Owner for the acts and omissions of Builder’s agents and employees, consultants, subcontractors, and suppliers.

5.1.6 Employees of the Builder and its subcontractors shall be screened for – and banned from working on the Owner’s property if found to have committed – certain crimes as described elsewhere in the Contract for Construction. The cost of such screening shall be included in the Construction Price.

5.2 Subcontractor / Supplier Contracts

The Builder shall enter into written contracts with its subcontractors and suppliers, and those written contracts shall be consistent with the Contract for Construction. It is the intent of the Owner and the Builder that the obligations of the Builder’s subcontractors and

suppliers inure to the benefit of the Owner and the Builder, and that the Owner be a third-party beneficiary of the Builder's agreements with its subcontractors and suppliers.

5.2.1 The Builder shall make available to each subcontractor and supplier, prior to the execution of written contracts with any of them, a copy of the pertinent portions of the Contract for Construction, including those portions of the Construction Documents to which the subcontractor or supplier will be bound, and shall require that each subcontractor and supplier shall similarly make copies of applicable parts of such documents available to its respective subcontractors and suppliers.

5.2.2 The Builder shall include in its written contracts with subcontractors and suppliers a provision that includes the acknowledgment and agreement of the subcontractor or supplier that it has received and reviewed the applicable terms, conditions, and requirements of the Contract for Construction included by reference in its written contract with the Builder, and that it will abide by those terms, conditions, and requirements.

5.2.3 The Builder's written contracts with its subcontractors and suppliers shall preserve and protect the rights of the Owner and include the acknowledgment and agreement of each subcontractor or supplier that the Owner is a third-party beneficiary of the contract. The Builder's agreements with its subcontractors and suppliers shall require that in the event of default under, or termination of, the Contract for Construction, and upon request of the Owner, the Builder's subcontractors and suppliers will perform services for the Owner.

5.2.4 Without limitation of the foregoing subsections, the Builder's written contracts with its subcontractors and suppliers shall include the following provision: *"When the Builder receives payment from the Owner for labor, services, or materials furnished by subcontractors and suppliers hired by the Builder for the Project, the Builder shall remit payment due to those subcontractors and suppliers, less the value of any item contested in accordance with the Contract for Construction, within ten (10) days after the Builder's receipt of payment from the Owner. When the payment due the subcontractor is for final payment, including retainage, the subcontractor must include with the invoice for final payment, a conditional release of lien and all required warranties and closeout documentation. When the subcontractor receives payment from the Builder for labor, services, or materials furnished by the subcontractors and suppliers hired by the subcontractor, the subcontractor shall remit payment due to those subcontractors and suppliers, less the value of any item contested in accordance with the Contract for Construction, within ten (10) days after the subcontractor's receipt of payment."*

5.3 Resolution of Trade Disputes

The Builder shall promptly resolve claims, complaints, labor disputes, and disputes over assignment of work tasks by and among its subcontractors and suppliers.

ARTICLE 6 – GOODS, PRODUCTS, AND MATERIALS

6.1 Quality Of Materials

The Builder shall furnish goods, products, materials, equipment, and systems that:

(i) comply with the Contract for Construction;

(ii) conform to applicable specifications, descriptions, instructions, drawings, data, and samples;

(iii) are new (unless otherwise specified or permitted) and without apparent damage;

(iv) are of quality, strength, durability, capacity, or appearance equal to or higher than that required by the Construction Documents;

(v) are merchantable;

(vi) are free from defects; and

(vii) exceed and/or are in addition to those required by manufacturers' or suppliers' specifications where such additional items are required by the Construction Documents.

6.2 Installation And Use Of Materials

All goods, products, materials, equipment, and systems shall, unless specifically stated otherwise, be furnished, used, installed, employed, and protected in strict compliance with the specifications, recommendations, and instructions of the manufacturer or supplier, unless such specifications, recommendations, or instructions deviate from accepted construction practices or the Construction Documents, in which case the Builder shall so inform the Owner and Professional and shall proceed as directed by that Professional, unless otherwise directed by the Owner. The Builder shall coordinate and interrelate all trade contracts and subcontracts to ensure compatibility of goods, products, materials, equipment, and systems – and validity of all warranties and guarantees – required by the Construction Documents for the Work.

6.3 Unsuitable Materials

The Builder shall inform the Owner of goods, products, materials, and equipment or systems the Builder knows are unsuitable or unavailable at the time of bid submission. Claims relating to or arising out of claims that goods, products, materials, equipment, or systems are unsuitable or unavailable shall not be entertained by the Owner unless the Builder, subcontractor, or supplier notified the Owner in writing at the time of bid submission, along with proposed alternatives. Approval by the Owner and the Professional does not mean or imply final acceptance by the Owner and Professional if such items should be defective or not as previously represented. Should the Builder furnish any approved goods, products, materials, equipment, or systems different from or in addition to those required by the Construction Documents which require supplemental materials or installation procedures different from or in addition to those require for specified items, the Builder shall provide such at no increased cost to the Owner.

6.4 Substitutions

There shall be no substitution of products, materials, or equipment unless approved by the Professional in advance of procuring such goods, except as expressly permitted by the Contract for Construction.

6.5 Construction Manager Responsibility

If Builder is acting as a construction manager, Builder shall also inform the Owner and Professional during the various stages of design development if proposed materials or equipment do not conform with the Owner's construction budget, Owner's program and/or project requirements, or Owner's design and construction standards.

6.6 Security For The Project

The Builder shall provide security for the Project, including but not limited to security for Work in progress and for the goods, products, materials, equipment, systems, construction machinery, tools, devices, and other items required, used, or to be used for performing the Work.

ARTICLE 7 – DOCUMENTS AND INFORMATION

7.1 Information from Owner

The Owner shall provide the Builder with information reasonably necessary to assist the Builder in performing its services including, if applicable and available:

(i) the Site legal description and any required survey;

(ii) all written and tangible material of which it informs Builder concerning conditions below ground at the Site;

(iii) if the Project involves an existing structure, all as-built drawings, record drawings, plans, specifications, and structural information; and

(iv) the Owner's pertinent Project dates and key milestone dates.

7.2 Resolution of Questions

The Builder shall resolve all questions concerning the Construction Documents with the Professional(s) who prepared the documents.

7.3 Processing of Documents

When requested to do so by the Owner, the Builder shall process documents and provide other reasonably required drawings, services, and certifications necessary to enable the Owner to (i) obtain permits or other approvals not otherwise required to be obtained by Builder and (ii) represent that the Work complies with the requirements of Authorities Having Jurisdiction.

7.4 Sufficiency of Owner Information

The furnishing of information by the Owner to the Builder shall not relieve the Builder of responsibilities contained elsewhere in the Contract for Construction to evaluate information and documents provided by the Owner. The Builder shall timely notify the Owner in writing of any additional information needed or services required from the Owner in order for the Builder to perform the Work.

ARTICLE 8 – SUBMITTALS

8.1 Submittal Schedule

The Builder shall timely prepare and transmit to the Professional a schedule for provision of all anticipated submittals and shop drawings. The schedule shall (i) include submittals required by the specifications; (ii) be in a format acceptable to the Professional; (iii) be coordinated with the Construction Schedule; and (iv) set forth specific dates for submission of the listed submittals.

8.2 Processing of Submittals

The Builder shall in timely fashion review, approve or reject as necessary, and forward approved submittals to the Professional for review and approval along with such detail and information as the Professional requires. No part of the Work dealt with by a submittal shall be fabricated or performed until such approval has been given.

8.2.1 Submittals and shop drawings shall be provided in electronic format – searchable PDF for product data and other submittals; DWG, RVT, or other Navisworks-compatible software for shop drawings.

8.2.2 The Professional is responsible to the Owner, but not to the Builder, to verify that the submittals conform to the design concept and functional requirements of the plans and specifications, that the detailed design portrayed in shop drawings and proposed equipment and materials shown in submittals are of the quality specified and will function properly, and that the submittals comply with the Contract for Construction.

8.2.3 All Work shall be performed in accordance with approved submittals. Approval of submittals by the Professional shall not relieve the Builder from complying with the Contract for Construction, including all plans and specifications, addenda thereto, and approved Change Orders.

8.2.4 Re-submittals required to correct errors, omissions, or invalid substitutions by the Builder or its subcontractors shall not constitute an excusable or compensable delay.

8.3 Record Documents

The Builder shall provide to Owner final and complete electronic copies of all submittals and shop drawings, updated and annotated as needed to illustrate the products, equipment, and materials actually installed.

ARTICLE 9 – BUILDER'S INSPECTION AND CORRECTION OF DEFECTIVE OR INCOMPLETE WORK

9.1 Rejection and Correction of Work In Progress

During the course of Project, the Builder shall inspect and promptly reject any Work that (i) does not conform to the Construction Documents or (ii) does not comply with any applicable law, statute, building code, rule, or regulation of any governmental, public, and quasi-public authorities or Authorities Having Jurisdiction.

9.1.1 The Builder shall promptly correct or require the correction of all rejected Work, whether observed before or after Substantial Completion and whether or not fabricated, installed, or completed. The Builder shall bear all costs of correcting such Work, including additional testing and inspections and compensation for all services and expenses necessitated by such correction.

9.1.2 The Builder shall bear the cost of correcting destroyed or damaged Work, whether completed or partially completed, of the Owner or other trade contractors or subcontractors caused by the Builder's correction or removal of rejected Work.

9.2 Covered or Concealed Work

If a portion of the Work has been covered, the Builder shall, if notified to do so by the Owner or the Professional, uncover the designated portion for observation and then replace it.

9.2.1 If the designated portion of the Work was covered contrary to the request of the Owner or the Professional, or to requirements specifically expressed in the Construction Documents, the Builder shall receive no additional compensation for the costs of uncovering and replacement or modification of the Construction Schedule.

9.2.2 If the designated portion of the Work was covered prior to a specific request by the Owner or the Professional that it remain uncovered, the Builder shall receive additional compensation for the costs of uncovering and replacement or modification of the Construction Schedule(s) only if the designated portion of the Work was in conformance with the Construction Documents.

ARTICLE 10 – CHANGE ORDERS, CHANGES TO THE WORK, AND CHANGED CONDITIONS

10.1 Change Order Proposals and Requests

Builder may propose, and Owner or the Professional may request, changes to the Work, compensation, or applicable schedules.

10.1.1 With respect to Builder’s proposals for changes, the Builder shall prepare and submit change order proposals to the Professional, together with appropriate back-up documentation.

10.1.2 With respect to Owner’s and/or the Professional’s requests for changes, the Builder shall promptly review and respond to such requests provided by the Owner or the Professional.

10.1.3 When requested to do so, the Builder shall prepare and submit to the Professional drawings, specifications, detailed cost estimates as prescribed below, or other data in support of a change order proposal or request.

10.1.4 Each Builder-submitted change order proposal shall include any and all time and monetary impacts of the change, whether the change order is considered alone or with all other changes during the course of the Project, together with substantiating back-up documentation.

10.2 Owner-Directed Changes

The Owner may unilaterally direct the Builder to implement changes in the Work so long as the Work the Owner is requiring is not outside of the general scope of the Contract for Construction, and the Builder, upon written direction from the Owner, shall proceed with such change.

10.3 Professional-Directed Changes

The Professional, without the Owner's prior approval, may authorize or direct the Builder to make minor changes in the Work that are consistent with the intent of the Construction Documents and which do not involve a change in Project cost, time for construction, scope, or approved design elements. Any such minor changes shall be implemented by written field order or supplemental instruction from the Professional and executed promptly by the Builder.

10.4 Administration of Changes

The Professional will administer and manage all change orders and change order proposals or requests – including claims for additional compensation, time, or both – and will prepare required drawings, specifications, and other supporting data in connection therewith.

10.5 Compensation for Changes

With respect to all change order proposals or requests involving credit to the Owner or additional compensation to the Builder, the Builder shall (i) obtain from subcontractors and suppliers the best possible price quotations; (ii) review such quotations to ascertain whether they are reasonable; (iii) prepare an itemized accounting together with appropriate supporting data, including reasonable expenditures by, and savings to, those performing the Work involved in the proposed change; and (iv) provide a reasonable and detailed price quotation to the Professional.

10.5.1 If Professional determines price quotations for change order proposals or requests are unreasonable, the Builder shall, in writing, justify said quotations or provide additional back-up documentation. If, after review of the additional information, the Professional determines the quotation is unreasonable, the Owner may require the subject Work be performed on a time and material basis.

10.5.2 The Builder and its subcontractors and suppliers shall be allowed no additional compensation for any costs, fees, or expenses incurred in performing services already required by the Contract for Construction, and shall not be entitled to additional reimbursement for home office, other non-jobsite or indirect overhead expenses, or tools necessary for construction.

10.5.3 It is the responsibility of the Builder to review and approve all pricing of additional work required of its subcontractors and suppliers.

10.6 Concealed and Unforeseen Conditions

If (i) the Builder encounters concealed or unforeseen conditions of an unusual nature that affect performance of the Work; or (ii) the conditions vary from those indicated by the Construction Documents; and (iii) such conditions are not ordinarily found to exist or differ materially from those generally recognized as inherent in work of the character provided by the Builder, the Builder shall promptly, but in no event later than seven (7) calendar

days after first observance of the conditions, notify the Professional and the Owner before conditions are disturbed and give the Professional or the Owner opportunity to observe the condition in its undisturbed state.

10.6.1 Owner and Professional shall promptly investigate the conditions. If Owner and Professional determine, within their discretion, that the conditions (i) differ substantially from those indicated in the Construction Documents and (ii) cause a material increase or decrease in the Builder's cost of, or time required for, performance of the Work, then compensation and/or time for performance will be equitably adjusted.

10.6.2 All adjustments in compensation or extensions of time shall be by change order. Change order proposals or requests shall be submitted within fourteen (14) calendar days of the date of observation of the changed or unknown conditions.

10.6.3 The Builder's failure to notify the Professional and Owner as provided in this Article shall constitute a waiver of any claim arising out of or relating to such concealed or unknown condition.

10.7 Performance of Changes

Upon Builder’s receipt of an executed change order or approved change order proposal, changes in the Work shall be promptly performed. All changes in the Work shall be performed under applicable conditions of the Construction Documents.

10.8 Disputes Regarding Changes

10.8.1 Regardless if there is a dispute (i) that a change has occurred; (ii) whether a change in the Work will result in adjustment of compensation or applicable schedules; or (iii) as to the amount of any adjustment of compensation or applicable schedules, the change shall be carried out if the Owner so directs. No claim shall be prejudiced by performance of the Work so long as the Owner is notified of the claim in writing prior to performance of the Work which is the subject of the dispute and the party disputing the decision of the Owner recites the reasons for its dispute in the written notice. Failure to notify the Owner in writing shall constitute a waiver of any claim resulting from the change.

10.8.2 In the event a change order proposal is approved by the Owner in the absence of an agreement as to cost, time, or both, the Professional will (i) receive and maintain all documentation pertaining thereto; (ii) examine such documentation on the Owner's behalf; (iii) take such other action as may be reasonably necessary or as the Owner may request; and (iv) make a written recommendation to the Owner concerning any appropriate adjustment in the Construction Price or time.

10.9 Necessity for Signature Approval

No act, omission, or course of dealing shall alter the requirement that change orders shall be in writing and signed by the Owner, and that change orders are the exclusive method for effecting any adjustment to compensation or applicable schedules. The Builder understands and agrees, on behalf of itself and its subcontractors and suppliers, that neither compensation nor applicable schedules can be changed by implication, oral agreement, or unwritten change order.

ARTICLE 11 – OWNER'S CONSULTANT(S) AND CONSTRUCTION ADMINISTRATION

11.1 Owner's Designated Professional Representative

Unless otherwise directed by the Owner, the Professional shall act as the Owner's agent for design-related issues, interpretation of the Construction Documents, and other matters described in these General Terms & Conditions.

11.1.1 The Professional will be the Owner's design representative during performance of the Work and will consult with and advise the Owner on all design and technical matters.

11.1.2 The Professional will act as initial interpreter of the requirements of the Contract for Construction and as the Owner's advisor on claims.

11.2 Professional Site Visits

The Professional will visit the Site with sufficient frequency for familiarization with the progress and quality of the Work and to inspect the Work to determine compliance of the Work with (i) the Contract for Construction; (ii) approved shop drawings and other submittals; (iii) the Construction Schedule; and (iv) applicable laws, statutes, building codes, rules, or regulations of all governmental, public, and quasi-public authorities or Authorities Having Jurisdiction.

11.3 Professional Rejection of Work

The Professional may disapprove or reject Work which does not comply with (i) the Contract for Construction; (ii) approved shop drawings and other submittals; or (iii) applicable laws, statutes, building codes, rules, or regulations of any governmental, public, and quasi-public authorities and Authorities Having Jurisdiction.

11.4 Professional Evaluations

11.4.1 The Professional will review and evaluate the results of all inspections, tests, and written reports required by the Contract for Construction and by any governmental entity having or asserting jurisdiction over the Project. The Professional will take appropriate action, if necessary, arising from such evaluations, including acceptance, rejection, requiring additional testing or corrective work, or such other action deemed appropriate by the Professional. The Professional will promptly reject Work which does not conform to and comply with testing requirements.

11.4.2 The Professional may require inspection or testing of any Work in addition to that required by the Contract for Construction or governmental entities having or asserting jurisdiction over the Project when such additional inspections and testing is necessary or advisable, whether or not such Work is then fabricated, installed, or completed. The Professional will take appropriate action on all such special testing and inspection reports, including acceptance, rejection, requiring additional testing or corrective work, or such other action deemed appropriate by the Professional.

11.5 Professional Submittal Activities

The Professional will review and approve, reject, or take other appropriate action on submittals such as shop drawings, product data, samples, proposed equal materials or

equipment, and requested substitutions not more than fourteen (14) calendar days after receipt, and will not approve any submittals unless such submittals conform to the Construction Documents. The Professional's review of submittals shall not constitute final acceptance of materials or equipment furnished or installed if such materials or equipment prove to be defective or not as represented by approved submittals or as otherwise required by the Construction Documents. The Builder remains responsible for details and accuracy, for confirming and correlating all quantities and dimensions, for selecting fabrication processes, for techniques of assembly, and for performance of the Work.

11.6 Professional Interpretations

The Professional will, when requested to do so in writing by the Builder, promptly and so as to cause no unnecessary delay, render written or graphic interpretations and decisions necessary for the proper execution of the Work. The Professional's interpretations and decisions relating to aesthetic or artistic effect shall be final if not inconsistent with the Contract for Construction.

11.7 Professional Pay Application Activities

The Professional will review applications for payment, including such accompanying data, information, and schedules as the Professional requires, to verify the amounts due to the Builder and shall authorize payment by the Owner to the Builder in writing. After the Work is determined to be Finally Complete by the Professional, the Professional will certify to the Owner in writing that the Builder is entitled to final payment and submit the pay application to the Owner for final approval.

11.8 Professional Relationship to Builder

The duties, obligations, and responsibilities of the Builder under the Contract for Construction shall not be changed, abridged, altered, discharged, released, or satisfied by any duty, obligation, or responsibility of any Professional. The Builder shall not be a third-party beneficiary of any agreement by and between the Owner and any Professional. The duties of the Builder to the Owner shall be independent of, and shall not be diminished by, any duties or obligations of any Professional to the Owner.

11.9 Commissioning Consultant

The Owner may also employ an independent Commissioning consultant to verify performance and/or quality of certain building systems or components. The Builder shall coordinate the Work and its schedule and activities with the Commissioning consultant and shall act upon the observations and recommendations of same, provided such action does not conflict with the Contract for Construction or specific direction by the Owner or the Professional.

The Builder shall perform functional performance testing of items being commissioned under the supervision of the Owner's Commissioning consultant.

ARTICLE 12 – SUBSTANTIAL AND FINAL COMPLETION

12.1 Substantial Completion

12.1.1 When the Builder believes that the Work is Substantially Complete, it shall notify the Owner and the Professional that the Work is ready for a Substantial Completion inspection. The Builder shall endeavor to give the Owner and the

Professional notice two (2) weeks prior to the predicted Substantial Completion inspection date(s).

12.1.2 Upon receipt of notification from the Builder, the Professional will coordinate with the Owner and the Builder date(s) for inspection(s) of the Work to determine whether the Work is Substantially Complete.

12.1.3 Prior to such inspections, the Builder shall develop a comprehensive list of known discrepancies, deficiencies, or incomplete Work (i.e., the “punchlist”).

12.1.4 At inspection(s) to determine whether the Work is Substantially Complete, the Professional, the Commissioning consultant(s), the Owner, and other governing or concerned entities will:

(i) inspect the Work;

(ii) create or append punchlists;

(iii) review the overall status of the Work and any outstanding or deficient issues; and

(iv) determine whether Substantial Completion of the Work has occurred.

12.1.5 If the Work is determined not to be Substantially Complete, the Work shall be prosecuted until the Work is Substantially Complete and the inspection process shall be repeated at no additional cost to the Owner until the Work is determined to be Substantially Complete. Builder will be responsible for costs of the Owner’s consultants associated with premature or failed inspections.

12.1.6 On or prior to the required date of Substantial Completion, the Builder shall deliver to Owner reports, extra materials, and other necessary documents and items for the Owner’s occupancy and use of the Work for its intended purpose. These documents and items are enumerated on the Owner’s website (www.facilities.ufl.edu). The Professional will review such documentation and items, and will inform the Owner and the Builder of any deficiencies.

12.1.7 When the Owner, the Builder, and the Professional agree that the Work has passed Substantial Completion inspection(s) and the Builder has produced the required Substantial Completion documentation and items, they shall each sign the Owner’s standard Certificate of Substantial Completion form, declaring the Work Substantially Complete and establishing the actual date of Substantial Completion. The Certificate of Substantial Completion shall also be accompanied by a final, consolidated punchlist.

12.1.8 If the Work is commissioned through the services of a Commissioning consultant, such Commissioning – including functional performance tests – shall be completed as a pre-requisite to the Work being declared Substantially Complete, provided Builder shall not be responsible for delays in Commissioning not the fault of Builder.

12.1.9 The Builder shall provide the Owner with operation and maintenance documents not less than forty-five (45) calendar days prior to the required date of Substantial Completion to allow adequate time for review, correction, and training of the Owner's personnel prior to Commissioning and the Owner's occupancy of the Project.

12.1.10 The Builder shall meet with the Owner's personnel prior to the required date of Substantial Completion to familiarize and train them with respect to maintenance and use of the Project. All training sessions shall be recorded (audio and visual), with copies provided to the Owner.

12.1.11 The date of Substantial Completion shall fix the commencement date of warranties and guaranties and allocate between the Owner and the Builder responsibility for security, utilities, damage to the Work, and insurance.

12.2 Final Completion

12.2.1 When the Builder believes the Work has achieved Final Completion (including correction of all punchlist items), the Builder shall notify the Owner and the Professional that the Work is ready for Final Completion inspection.

12.2.2 Upon receipt of such notification from the Builder, the Professional will coordinate with the Owner and the Builder a date for inspection of the Work to determine whether the Work has achieved Final Completion.

12.2.3 At the Final Completion inspection, the Owner and the Professional will:

(i) inspect the Work;

(ii) determine whether all punchlist items have been satisfactorily completed and corrected;

(iii) determine whether the Work complies with (a) the Contract for Construction; (b) applicable laws, statutes, building codes, rules, or regulations of all governmental, public, and quasi-public authorities or Authorities Having Jurisdiction; and (c) applicable installation and workmanship standards;

(iv) determine whether required inspections and approvals by the official(s) having or asserting jurisdiction over the Project (including, but not limited to, the AHJ) have been satisfactorily completed; and

(v) confirm receipt of the deliverables listed below.

12.2.4 If Final Completion has not been achieved, the Builder shall continue to prosecute the Work, and the inspection process shall be repeated at no additional cost to the Owner, until Final Completion is achieved.

12.2.5 On or prior to the date of Final Completion, the Builder shall deliver to the Owner the following documentation and items:

(i) Certificate of Final Completion – executed on Owner's standard form;

(ii) all operation and maintenance manuals not previously produced;

(iii) one (1) set of as-built plans and specifications;

(iv) record copies of BIM files as required by the project-specific BIM Execution Plan, if applicable;

(v) certification and affidavit that all insurance required of the Builder beyond final payment, if any, is in effect and will not be canceled or allowed to expire without notice to the Owner;

(vi) written consent of the surety(ies), if any, to final payment;

(vii) full, final, and unconditional waivers of mechanics or construction liens, from each contractor, subcontractor, supplier, or other person or entity who has or might have a claim;

(viii) full, final, and unconditional certification and affidavit that all of the Builder's obligations to contractors, subcontractors, suppliers, and other third parties for payment for labor, materials or equipment related to the Project have been paid or otherwise satisfied;

(ix) all written warranties and guarantees relating to the labor, goods, products, materials, equipment, and systems incorporated into the Work, endorsed, countersigned, and assigned as necessary;

(x) affidavits, releases, bonds, waivers, permits, and other documents necessary for final close-out of Work;

(xi) a list of any item(s) due but unable to be delivered and the reason for non-delivery; and

(xii) any other documents reasonably and customarily required or expressly required herein for full and final close-out of the Work, including those items enumerated on the Owner's website (www.facilities.ufl.edu).

12.2.6 The Professional will review and determine the sufficiency of all such documentation and items and will immediately inform Owner and the Builder of any deficiencies and omissions.

ARTICLE 13 – BUILDER'S WARRANTIES AND GUARANTEES

13.1 One-Year Warranty

In addition to the warranties and guarantees set forth elsewhere in the Contract for Construction, the Builder, upon request by the Owner or the Professional, shall promptly correct all failures or defects in the Work for a period of one year after the actual date of Substantial Completion, or the date of acceptance by the Owner, whichever is later.

13.1.1 The Builder shall schedule, coordinate, and participate in a walk-through inspection of the Work one month prior to the expiration of the one-year correction period, and shall notify the Owner, the Professional, and any necessary subcontractors and suppliers of the date of, and request their participation in, the walk-through inspection. The purpose of the walk-through inspection is to determine if there are defects or failures requiring correction.

13.1.2 Should the Builder fail to promptly correct any failure or defect, the Owner may take whatever actions it deems necessary to remedy the failure or defect and the Builder shall promptly reimburse the Owner for any expenses or damages it incurs as a result of the Builder 's failure to correct the failure or defect.

13.2 Post-Completion Commissioning Activities

The Builder and its subcontractors shall participate in Commissioning activities following Substantial Completion as prescribed in the Construction Documents, the purpose of which is to confirm and optimize performance of the commissioned systems. Such participation may include the need for the Builder to perform corrective work if deficiencies in the Work are revealed.

13.3 Express Warranties and Guarantees – Builder

In addition to the warranties and guarantees set forth elsewhere herein, the Builder expressly warrants and guarantees to the Owner:

(i) that the Work will comply with the Construction Documents and all applicable laws, statutes, building codes, rules, and regulations of all governmental, public, and quasi-public authorities or Authorities Having Jurisdiction;

(ii) that all goods, products, materials, equipment, and systems incorporated into the Work will conform to applicable specifications, descriptions, instructions, drawings, data, and samples;

(iii) that all goods, products, materials, equipment, and systems incorporated into the Work will be new (unless otherwise specified or permitted) and without apparent damage or defect; of quality equal to or higher than that required by the Construction Documents; and merchantable; and

(iii) that all management, supervision, labor, and services required for the Work will comply with the Contract for Construction and will be performed in a workmanlike manner.

13.4 Express Warranties and Guarantees – Subcontractors and Suppliers

The Builder shall require that all of its subcontractors and suppliers provide written warranties, guarantees, and other undertakings to the Owner and the Builder in a form identical to the warranties, guarantees, and other undertakings set forth in the Contract for Construction, including the warranties, guarantees, and undertakings set forth in this Article, which warranties, guarantees, and undertakings shall run to the benefit of the Owner as well as the Builder.

13.5 Non-Exclusivity and Survival

The warranties and guarantees set forth in this Article shall be in addition to all other warranties – express, implied, or statutory – and shall survive the Owner’s payment,

acceptance, inspection of or failure to inspect the Work, and review of the Construction Documents.

13.6 Non-Limitation

Nothing contained in Paragraph 13.1 shall be construed to establish a period of limitation with respect to the Builder's obligations under the Contract for Construction. Paragraph 13.1 relates only to the Builder's specific obligations with respect to the Work, and has no relationship to the time within which the Builder's contractual obligations under the Contract for Construction may be enforced, nor to the time within which proceedings may be commenced to establish the Builder's liability with respect to any contractual obligations pursuant to Paragraph 13.1 or contained elsewhere herein.

13.7 Commencement of Obligations

Unless otherwise specified, all of the Builder's warranty and guaranty obligations, including the time period(s) for all written warranties and guarantees of specifically designated equipment required by the Construction Documents, shall begin on the actual date of Substantial Completion or the date of acceptance by the Owner, whichever is later.

ARTICLE 14 – OWNER'S DUTIES, OBLIGATIONS, AND RESPONSIBILITIES

14.1 Timely Compensation of Builder

The Owner shall, in a timely manner, compensate the Builder in accordance with the Contract for Construction.

14.2 Owner Review of Documents

The Owner shall review documents prepared by the Builder in a timely manner and in accordance with schedule requirements. Review by the Owner shall be solely for the purpose of determining whether such documents are generally consistent with the Owner's intent. No review of such documents shall relieve the Builder of any of its responsibilities. In addition, the Owner's review of documents for purposes of issuing a building permit shall not relieve the Builder of any of its responsibilities.

14.3 Status of Owner

The Owner shall not have control of, or responsibility for, construction means, methods, techniques, sequences, procedures, or safety precautions and programs in connection with the Work, nor shall the Builder, for any of the foregoing purposes, be deemed the agent of the Owner.

ARTICLE 15 – BUILDER'S COMPENSATION

15.1 Schedule of Values

15.1.1 Prior to submitting its first application for payment for the Work, the Builder shall prepare and present to the Owner and Professional for approval a schedule of values (SOV) using the Owner's form.

15.1.2 For construction management projects, this SOV shall be based on the draft schedule of values submitted with the GMP proposal, adjusted to account for the final subcontract award amounts.

15.1.3 Allowances for un-awarded trade subcontracts may be included in the SOV.

15.1.4 The Builder shall not imbalance or artificially inflate any element in the SOV.

15.1.5 Upon the Owner's acceptance, the SOV shall be used to process and pay the Builder's payment requests.

15.1.6 The Builder shall comply with the Trench Safety Act (Chapter 553, Part VI, Florida Statutes), which requires that builders delineate in their Schedules of Values the cost of compliance with applicable trench safety standards.

15.2 Unit Prices

If any portion of the Construction Price is determined by the application of unit prices, the number of units contained in the Schedule of Values is an estimate only, and compensation to the Builder shall be determined by the actual number of units incorporated in, or required by, the Work.

15.3 Invoicing Procedures

In accordance with the procedures and requirements set forth in the Owner's policies, the Builder shall invoice the Owner and the Owner shall pay the Builder the amount due subject to the following and the Contract for Construction.

15.3.1 The Builder shall submit invoices to the Professional requesting payment for labor and services rendered during the preceding thirty calendar days. Each invoice shall contain such detail and be backed up with whatever supporting information the Owner or the Professional requests and shall at a minimum state:

(i) the total original Construction Price and total current Construction Price;

(ii) the amount due for properly provided labor, materials, and equipment properly incorporated into the Project; and with respect to amounts invoiced for materials or equipment necessary for the Project and properly stored at the Site (or elsewhere if offsite storage is approved in writing by the Owner), be accompanied by written proof that the Owner has title to such materials or equipment and that such material and equipment is fully insured against loss or damage;

(iii) a breakdown of the various phases, bid packages, or parts of the Work as related to the Construction Price in accordance with standard Construction Specifications Institute (CSI) format;

(iv) the value of the various phases, bid packages, or parts of the Work actually performed;

(v) previously invoiced amounts and credit payments made;

(vi) the total amount due, less any agreed retainage; and

(vii) a summary of change orders to date.

Applications for payment shall also include such lien waivers and other documentation verifying the Builder's payment to subcontractors and suppliers as the Owner or Professional may request.

15.3.2 Goods and materials procured through the Owner Direct Purchase process shall be invoiced separately in accordance with Owner's policies.

15.4 Payment Procedures

15.4.1 Within seven (7) days of receipt, the Professional will review the Builder's applications for payment, including such accompanying data, information, and schedules as the Professional requires, to determine the amounts due to the Builder and, based upon such review, together with its inspections of the Work, shall authorize payment by the Owner to the Builder in writing. Such authorization will constitute the Professional's certification to the Owner that:

(i) the Work described in the Builder's invoice has progressed to the level indicated and has been performed in accordance with the Contract for Construction;

(ii) all necessary and appropriate lien waivers have been submitted;

(iii) the "as-built" record documents are current and up-to-date; and

(iii) the amount requested is currently due and owing to the Builder.

15.4.2 In the case of unit price work, the Professional's recommendations for payment will constitute a final determination of quantities and classifications of such work.

15.5 Owner's Right to Refuse Payment

The Professional's approval of the Builder's invoice shall not preclude the Owner from exercising any of its remedies under the Contract for Construction. In the event of a dispute, payment shall be made within the timeframe(s) prescribed herein for amounts not in dispute, subject to any exceptions claimed by the Owner. The Owner shall have the right to refuse to make payment and, if necessary, may demand the return of all or a portion of the amount previously paid to the Builder due to:

(i) the Builder's failure to perform the Work in compliance with the requirements of the Contract for Construction or any other agreement between the parties;

(ii) the Builder's failure to correctly and accurately represent the Work performed in a payment request, or otherwise;

(iii) the Builder's performance of the Work at a rate or in a manner that, in the Owner's opinion, is likely to result in the Project or any portion of the Project being inexcusably delayed;

(iv) the Builder's failure to use funds previously paid the Builder by the Owner to pay the Builder's Project-related obligations including, but not limited to, the Builder's subcontractors, materialmen, and suppliers;

(v) claims made, or likely to be made, against the Owner;

(vi) loss caused by the Builder or the Builder's subcontractors or suppliers; or

(vii) the Builder's failure or refusal to perform any of its obligations to the Owner.

15.6 Builder's Right to Refuse Performance for Non-Payment

If – within twenty (20) calendar days of Owner's receipt of the Builder's application for payment properly prepared in accordance with Owner's policies and approved and executed by the Professional – the Owner, without cause or basis hereunder, fails to pay the Builder any amounts then due and payable to the Builder, the Builder shall have the right, in addition to all other rights and remedies contained herein, to cease performance of the Work until receipt of proper payment after first providing fourteen (14) calendar days written notice to the Owner of its intent to cease work.

15.7 Correction of Past Payments

All prior payments, whether based on estimates or otherwise, may be corrected and adjusted in any subsequent payment and shall be corrected and adjusted in the final payment. In the event that any invoice contains a defect or impropriety which would prevent payment by the date due, the Owner shall notify the Builder in writing of such defect or impropriety. Any disputed amounts determined by the Owner to be payable to the Builder shall be due thirty (30) calendar days from the date the dispute is resolved.

15.8 Invoice Warranties and Guarantees

The Builder expressly warrants and guarantees to the Owner that:

(i) title to all goods, products, materials, equipment, and systems covered by an invoice will pass to the Owner either by incorporation into the Work, or upon receipt of payment by the Builder, whichever occurs first;

(ii) all goods, products, materials, equipment, and systems covered by an invoice are free and clear of liens, claims, security interests, or encumbrances; and

(iii) no goods, products, materials, equipment, or systems covered by an invoice have been acquired by the Builder or its subcontractors or suppliers, subject to an agreement under which an interest therein or an encumbrance thereon is retained by the seller or otherwise imposed by the Builder or its subcontractors or suppliers.

15.9 Builder's Signature

The signature of the Builder on any invoice constitutes the Builder's certification to the Owner that (i) the Builder's services listed in the invoice have progressed to the level indicated and have been performed as required by the Contract for Construction; (ii) the Builder has paid its subcontractors and suppliers their proportional share of all previous payments received from the Owner; (iii) the amount requested is currently due and owing; and (iv) all subcontractors performing the Work for which payment is made hold all necessary State of Florida licenses.

15.10 Taxes and Owner Direct Purchase Program

15.10.1 The Builder shall incorporate into the Construction Price, and pay, all sales, consumer, use, and similar taxes for goods, products, materials, equipment, and

systems incorporated into the Work that were legally required at the time of execution of the Contract for Construction, whether or not yet effective or merely scheduled to go into effect.

15.10.2 For construction management projects, the Owner may elect to implement a direct purchase program, whereby eligible materials or equipment included in a subcontractor's bid are purchased by the Owner directly from the supplier in order to achieve sales tax savings.

15.10.3 Such direct purchases shall not relieve the Builder and/or its subcontractors of their responsibility to ensure the materials and equipment meet the specifications and requirements of the Contract for Construction.

15.10.4 When Builder's Risk insurance is furnished by the Builder (see Article 19), such insurance shall name the Owner as the insured or an additional insured and shall include coverage of such materials in transit or stored offsite. Builder shall in any case be responsible for safeguarding such materials on the project Site on the Owner's behalf.

15.10.5 The Owner's written policy on direct purchases shall govern. See www.facilities.ufl.edu.

15.11 Compensation of Builder's Subcontractors and Suppliers

15.11.1 Not less than forty-five (45) days after satisfactory completion of their portion of the Work, subcontractors may invoice Builder for remaining unpaid Work, including the full value of the retainage related to such Work less the value of any contested item(s), and provided each such subcontractor has provided Builder with all required close-out documentation. Builder shall include subcontractor pay requests in the Builder's application for payment. No later than ten days (10) after receipt of payment from the Owner, the Builder shall pay each of its subcontractors and suppliers out of the amount received by the Builder on account of such subcontractor's or supplier's portion of the Work, the amount to which each entity is entitled, reflecting percentages actually retained from payments to the Builder on account of such entity's portion of the Work, if any.

15.11.2 The Owner shall have no obligation to pay, and shall not be responsible for payments to, the Builder's subcontractors or suppliers. However, the Owner reserves the right, but has no duty, to make payment jointly to the Builder and to any of its subcontractors or suppliers in the event that the Owner becomes aware that the Builder fails to pay or unreasonably withholds payment from one or more of those entities. Such joint check procedure, if employed by the Owner, shall create no rights in favor of any person or entity beyond the right of the named payees to payment of the check and shall not be deemed to commit the Owner to repeat the procedure in the future.

15.12 Retainage

Subject to other provisions herein, and pursuant to Section 255.078, Florida Statutes, Owner will withhold and release retainage from each payment to Builder in accordance with the following:

15.12.1 Owner will withhold as retainage from each progress payment made to the Builder an amount equal to ten percent (10%) of the payment until the Work is fifty percent (50%) complete.

15.12.2 After the Work is fifty percent (50%) complete, Owner shall reduce the amount of retainage withheld from each subsequent progress payment made to the Builder to five percent (5%) of the amount of the payment.

15.12.3 After the Work is fifty percent (50%) complete, the Builder may present to the Owner a payment request for up to one-half of the retainage held by Owner, and Owner shall make payment to the Builder unless the Owner has grounds for withholding the payment of retainage (e.g., all or a portion of the retainage is the subject of a good faith dispute or a claim brought by Owner).

15.12.4 After the Work is fifty percent (50%) complete, the Builder may elect to withhold retainage from payments to its subcontractors at a rate higher than five percent (5%). The specific amount to be withheld must be determined on a case-by-case basis and must be based on the Builder's assessment of the subcontractor's past performance, the likelihood that such performance will continue, and the Builder's ability to rely on other safeguards. The Builder shall notify the subcontractor, in writing, of its determination to withhold more than five percent (5%) of the progress payment and the reasons for making that determination, and the Builder may not request the release of such retained funds from the Owner.

15.13 Final Payment

Prior to being entitled to receive final payment, and as a condition precedent thereto, the Builder must achieve Final Completion. The Owner shall, subject to its rights set forth above in this Article, make final payment of all sums due the Builder within twenty (20) calendar days of Owner's receipt of the Builder's application properly prepared in accordance with Owner's policies and approved and executed by the Professional.

ARTICLE 16 – SCHEDULE REQUIREMENTS

16.1 Construction Schedule

The Construction Schedule shall include all pertinent dates and periods for timely completion of the Work.

16.1.1 Unless otherwise directed and approved by the Owner, the Builder shall – within fourteen (14) calendar days of the "Notice To Proceed" – prepare a critical path method schedule with separate divisions for each major portion of the Work or operations. The Construction Schedule shall include and properly coordinate dates for performance of all divisions of the Work, including completion of offsite requirements and tasks, so that the Work can be completed in a timely and orderly fashion consistent with the required dates of Substantial Completion and Final Completion. When preparing the schedule, Builder shall consider and account for Owner's operational needs on the Site and adjacent thereto, particularly with regard to utility interruptions and access restrictions.

16.1.2 The Construction Schedule shall depict all activities necessary for, or incidental to, performance of the Work, showing the logic (sequence, dependency), duration,

and “float” of each activity, with the critical path highlighted and shall include (i) the required dates of commencement, Substantial Completion, and Final Completion; (ii) any guideline and milestone dates required by the Owner; (iii) any applicable subcontractor and supplier sub-schedules; (iv) coordination with the submittal schedule which allows sufficient time for review of documents and submittals; (v) allowances for procurement, fabrication, and delivery of materials, especially “long lead” items; (vi) the complete sequence of construction by activity, with dates for beginning and completion of each element of construction; (vii) the time required for testing, inspections, and Commissioning, if applicable; (viii) time for schedule constraints, such as holidays and events on Owner’s property and adverse weather conditions which are normal and may be reasonably anticipated; and (ix) required decision dates.

16.1.3 By reviewing the Construction Schedule, the Owner and Professional do not assume any of the Builder’s responsibility (i) that the Construction Schedule be coordinated or complete; or (ii) for timely and orderly completion by the required dates of Substantial Completion, Final Completion, or any milestone dates required by the Owner.

16.1.4 The Builder shall periodically and in all instances when the Builder anticipates that performance of the Work will be delayed or in fact has been delayed, but not less frequently than monthly, prepare a revised Construction Schedule and show actual progress of the Work through the revision date, projected completion of each remaining activity, activities modified since previous submittal, major changes in scope, and other identifiable changes. The updated Construction Schedule shall be accompanied by a narrative report which (i) states and explains any modifications of the critical path schedule, including any changes in logic; (ii) defines problem areas and lists areas of anticipated delays; (iii) explains the anticipated impact the problems and delays will have on the schedule and scheduled activities; (iv) reports corrective action taken or proposed; and (v) states how problems anticipated by projections shown on the schedule will be resolved to avoid delay in delivering the Work by the required dates of Substantial Completion and Final Completion, and other milestone dates required by the Owner, if any.

16.2 Delay in Performance

If at any time the Builder anticipates that performance of the Work will be delayed or in fact has been delayed, the Builder shall (i) immediately notify the Owner and Professional of the probable cause of and effect from the delay, and possible alternatives to minimize the delay; and (ii) take all corrective actions reasonably necessary to deliver the Work by the required dates of Substantial Completion and Final Completion, and other milestone dates required by the Owner, if any.

16.3 Early Completion

The Builder may attempt to achieve Substantial Completion before the required date of Substantial Completion. However, such planned early completion shall be for the Builder’s sole convenience and shall not create any additional Builder rights or Owner obligations under the Contract for Construction, nor shall it change the required dates of Substantial Completion or Final Completion. The Owner shall not pay the Builder any additional compensation for achievement of Substantial Completion or Final Completion prior to the required dates nor will the Owner owe the Builder any compensation should the Owner

cause the Builder not to achieve Substantial Completion earlier than the required date of Substantial Completion or Final Completion earlier than the required date of Final Completion.

16.4 Document Review

The Builder shall provide documents to the Owner and Professional(s) for review in accordance with schedule requirements and with sufficient lead time to allow the Owner and Professional reasonable time for review.

ARTICLE 17 – TIME OF PERFORMANCE

17.1 Time of the Essence

The parties hereto mutually understand and agree that time is of the essence in the performance of the Contract for Construction and that the Owner will incur damages if the Work is not completed on time. The Builder shall at all times carry out its duties and responsibilities as expeditiously as possible and shall begin, perform, and complete its services so that (i) the Work progresses in accordance with the Construction Schedule; (ii) the Work is Substantially Completed by the required date of Substantial Completion; and (iii) the Work is Finally Complete by the date of Final Completion.

17.2 Modifications of Time for Performance

The Builder may submit delay claims or otherwise propose modifications to the dates for Substantial Completion, Final Completion, or other milestones required by the Owner, if any. However, such claims shall be submitted in writing and supported by evidence that the delay was excusable, critical, and, if applicable, compensable. The Builder shall determine and promptly notify the Owner and the Professional in writing when it believes such adjustments are necessary, but no such adjustments shall be effective unless approved in writing by the Owner and Professional.

17.2.1 Extensions of time will be granted only to the extent that equitable time adjustments for the impacted activity or activities exceed the total float along the network paths involved. Such claims shall include an estimate of cost, if any, and substantiate the projected impact on the overall critical path schedule of the Project. In the case of a continuing delay, only one claim is necessary.

17.2.2 Modification(s) of the required dates of Substantial Completion or Final Completion shall be accomplished only by duly authorized and accepted change order stating the new date(s) with specificity and reciting that all references in the Contract for Construction to the required dates of Substantial Completion or Final Completion shall thereafter refer to the date(s) as modified, and all rights and obligations, including the Builder's liability for actual damages, delay damages and liquidated damages, shall be determined in relation to the date(s) as modified.

17.2.3 If adverse weather conditions are the basis for a delay claim, the claim shall be documented by data substantiating that: the weather conditions were abnormal for the given location and period of time; the weather conditions could not have been reasonably anticipated; and that the weather conditions had an adverse effect on the overall critical path of the schedule. Delays caused by adverse weather conditions are not compensable.

17.3 Compensable Delay

If the Builder is delayed at any time in the progress or performance of the Work by (i) acts or omissions of the Owner or Professional; (ii) major changes ordered by the Owner in the scope of Work; or (iii) any other cause which the Owner determines may justify the compensation of the Builder for the delay, the Builder's compensation shall be equitably adjusted to cover the Builder's actual and direct increased costs attributable to such delay.

17.4 Excusable Delay

If the Builder is delayed at any time in the progress or performance of the Work by (i) acts or omissions of the Owner or Professional; (ii) major changes ordered by the Owner in the scope of Work; (iii) fire; (iv) unusual delays in transportation; (v) adverse abnormal weather conditions that Builder could not have reasonably anticipated; (vi) unavoidable casualties; (vii) causes beyond the Builder's control which the Owner agrees in writing are justifiable; or (viii) any other cause that the Owner determines may justify the delay, Owner may extend the time for performance to allow for a demonstrated increase in overall construction duration, which may or may not be equal to the length of such delay, but only if (a) such delay is not concurrent with other, inexcusable delay(s); (b) such delay impacts the critical path; (c) such delay is not in any way caused by default or collusion on the part of the Builder or by any cause which the Builder could reasonably control or circumvent; (d) the Builder would have otherwise been able to timely perform all of its obligations under the Contract for Construction but for such delay; and (e) immediately but not later than fourteen (14) calendar days after the beginning of any such delay the Builder gives notice of its delay claim to the Owner. Such delay claims shall be submitted as a change order proposal. All such claims will be reviewed by the Professional within seven (7) days of submission. Delay caused by labor disputes, picketing, employee boycotts, or the like which directly or indirectly involves employees of the Builder or its subcontractors and suppliers is not the responsibility of the Owner and will result in time extensions only if agreed to in writing by the Owner at the time such events arise.

17.5 Critical Delay

Additional work, unforeseen conditions, and other factors may result in one or more schedule activities being delayed. If, however, the critical path is not impacted and the overall construction duration and completion date(s) remain the same, the delay is not critical.

ARTICLE 18 – PROPRIETARY DOCUMENTS AND CONFIDENTIALITY

18.1 Nature and Use of Information

All information, documents, and electronic media furnished by the Owner to the Builder (i) belong to the Owner; (ii) are proprietary and confidential; (iii) are furnished solely for use on the Owner's Project; (iv), shall be kept confidential by the Builder; and (v) shall not be used by the Builder on any other project or in connection with any other person or entity, unless disclosure or use thereof in connection with any matter other than services rendered to the Owner hereunder is specifically authorized in writing by the Owner in advance or is required by law. The Owner hereby grants to the Builder a limited license to use and reproduce applicable portions of the Construction Documents necessary for execution of the Work. All copies made under this license shall bear the statutory copyright notice, if any, shown on the documents.

18.2 Ownership of Information

All information, documents, and electronic media prepared by or on behalf of the Builder for the Project are the sole property of the Owner, free of any retention rights of the Builder. The Builder hereby grants to the Owner an unconditional right to use, for any purpose whatsoever, any information, documents or electronic media prepared by or on behalf of the Builder for the Project, free of any copyright claims, trade secrets, or other proprietary rights with respect to such documents.

18.3 Disclosure of Information

The Builder shall not disclose any information it receives from the Owner to any other person or entity except to the extent necessary to allow it to perform its duties under the Contract for Construction or as required by law.

18.4 Instructions to Employees

Because it is difficult to separate proprietary and confidential information from that which is not, the Builder shall instruct its employees and agents to regard all information not in the public domain as information that is proprietary and confidential.

18.5 Non-Publication

Submission or distribution of documents to meet official regulatory requirements or for other required purposes in connection with the Project is not to be construed as publication in derogation of the Owner's common law copyrights or other reserved rights.

ARTICLE 19 – INSURANCE REQUIREMENTS

19.1 Basic Insurance Requirements

The Builder shall obtain and maintain the policies of insurance set forth in this Article with a company or companies lawfully authorized to do business in Florida, and with an A.M. Best Rating of no less than A, XV. All insurance policies shall be issued and countersigned by duly authorized representatives of such companies and shall be written on ISO standard forms or their equivalents. The insurance policies shall require that the insurer shall provide at least thirty (30) days written notice to Owner if a policy is to be canceled or the coverage thereunder reduced before the expiration date thereof and Builder shall provide Owner with a copy of an endorsement to the policy evidencing the same. The insurance required hereunder shall be carried by Builder at least until the Project has achieved Final Completion and has been accepted by Owner. At the Owner's sole discretion, the Owner may require the Builder and/or its subcontractors to carry additional types and amounts of insurance it deems appropriate given the nature and size of a particular Project. In such case, Owner shall notify Builder within a reasonable period of time prior to the commencement of the Work of such additional requirements.

19.1.1 **Liability Insurance**

19.1.1.1 **Commercial General Liability Insurance**.

The Builder shall obtain and maintain a commercial general liability insurance policy with limits of not less than the following:

- $1,000,000 each occurrence and $2,000,000 project aggregate for bodily injury, property damage, personal and advertising injury liability
- $1,000,000 each occurrence and $2,000,000 project aggregate for products and completed operations liability
- $50,000 fire legal liability

Builder's commercial general liability policy must include coverage for contractual liability, independent contractors, and contain no exclusions for explosion, collapse, or underground damage. The University of Florida Board of Trustees and its officials, employees, and volunteers shall be covered as an additional insured with a form *CG-20-26-04-13 Additional Insured – Designated Person or Organization* or equivalent endorsement. The Builder's insurance coverage shall be primary insurance with respect to the Owner, its officials, employees, and volunteers. Any insurance or self-insurance maintained by the Owner, its officials, employees, or volunteers shall be in excess of Builder's insurance and shall be non-contributory. Builder's insurance policy shall protect Builder from claims which may arise whether such claims may arise out of the operations of the Builder or by anyone directly or indirectly employed by the Builder. If Builder is performing asbestos-related work, the policy shall also contain a pollution liability endorsement with limits of not less than $1,000,000 per occurrence.

19.1.1.2 **Automobile Liability Insurance**.
Builder shall obtain and maintain automobile liability coverage, including coverage for all Owned vehicles, hired, and non-owned vehicles, for bodily injury and property damage with not less than a $500,000 combined single limit for each accident. The University of Florida Board of Trustees shall be covered as an additional insured with a form *CA-20-48* or similar endorsement on such policy.

19.1.1.3 **Deductibles**.
Deductibles under these liability policies shall not exceed $25,000. Owner shall not be liable for amounts that may represent a deductible in any insurance policy. The payment of such deductible shall be the sole responsibility of the Builder and/or subcontractor providing such insurance.

19.1.2 **Worker's Compensation**
Builder shall obtain and maintain worker's compensation coverage applicable to all Builder's employees at statutory limits in compliance with applicable state and federal laws. If any operations are to be undertaken on or about navigable waters, coverage must be included in accordance with the US Longshoremen & Harbor Workers Act.

Such coverage shall include employer's liability limits of not less than $100,000 each accident, $500,000 disease policy limit, and $100,000 disease each employee.

The Builder and its insurance carrier waive all subrogation rights against the Owner for all losses, damages, and/or events that occur while the Contract for Construction is in effect, regardless of whether suit is actually brought during such period or at a later date. The Owner requires all worker's compensation policies to be endorsed with form *WC00-03-13 Waiver of Right to Recover from Others* or equivalent.

19.1.3 **Builder's Risk Insurance**
The Builder shall obtain and maintain builder's risk insurance, at replacement cost, covering the full value of the construction being performed, including where applicable, the existing structure. Such policy shall be written on an all-risk

coverage form including flood and windstorm coverage, and shall include coverage for reasonable compensation for the Professional's services and expenses required as a result of such insured loss. This insurance shall insure the interests of the Builder, subcontractors, and sub-subcontractors in the Work. Property covered by the insurance shall include temporary building(s) or structure(s) at the Project Site, other than any of Builder's office trailer(s). In addition, such insurance shall cover portions of the Work stored offsite (if Owner approves such storage) and materials and equipment in transit. The University of Florida Board of Trustees shall be named as an additional insured on such policy. The policy shall include a waiver of subrogation endorsement and a severability of interests endorsement, and shall also include a waiver of occupancy clause allowing the Owner to occupy the subject facility during construction, if necessary.

The deductible under the policy shall not exceed $25,000. Owner shall not be liable for amounts that may represent a deductible in any insurance policy. The payment of such deductible shall be the sole responsibility of the Builder.

When the Work includes the repair, removal, installation, and/or testing of live steam boilers, valves, pipes, or lines, or mechanized, pressurized, or electrical equipment, then such insurance shall include boiler and machine/equipment breakdown coverage, written on an ISO form or its equivalent.

A loss or losses insured under this insurance policy shall be adjusted by the Builder and its insurance company. The Builder shall repair or replace the damaged property with the proceeds from the builder's risk policy. The Builder shall be responsible for all damages and necessary repairs whether or not the loss is covered by the builder's risk policy.

Alternatively, the Owner may elect to obtain and directly pay for Builder's Risk insurance through Owner's statewide program.

19.2 Certificates of Insurance

19.2.1 Certificates of insurance and/or evidence of insurance for all insurance policies required under this Article, together with certified copies of the insurance policies (including required endorsements), shall be filed with and approved by the Owner prior to commencement of the Work.

19.2.2 Such certificates of insurance shall be dated and show the name of the insurer, the number of the policy, its effective date, and its termination date.

19.2.3 Certificates of insurance evidencing the renewal of all insurance required to be carried under this Article shall be provided to Owner at least thirty (30) days prior to the date each applicable insurance policy is scheduled to expire.

19.2.4 Certificates must provide for thirty (30) days' prior written notice to Owner of any policy cancellation or material change in coverage.

19.2.5 Owner's review, inspection, or approval of Builder's insurance shall not relieve Builder of its responsibility for providing the insurance required hereby nor constitute a waiver of any such requirements.

19.2.6 Owner will not issue a “Notice To Proceed” for the Work until Builder has complied with this Article and Builder shall not be entitled to an extension of time or to compensation which may result from delays in the issuance of a “Notice to Proceed” caused by its failure to provide the foregoing certificates and policies in a timely manner.

19.3 Effect of Insurance

Compliance with insurance requirements shall not relieve the Builder of any responsibility to indemnify the Owner for any liability to the Owner as specified in any other provision of the Contract for Construction, and the Owner shall be entitled to pursue any remedy in law or equity if the Builder fails to comply with the contractual provisions of the Contract for Construction. Indemnity obligations specified elsewhere in the Contract for Construction shall not be negated or reduced by virtue of any insurance carrier's (i) denial of insurance coverage for the occurrence or event which is the subject matter of the claim; or (ii) refusal to defend any named insured.

19.4 Waiver of Subrogation

The Builder’s insurers shall agree to waive all rights of subrogation against the Owner and the Owner’s Related Parties. The Builder hereby releases and discharges the Owner and the Owner’s Related Parties of and from all liability to the Builder, and to anyone claiming by, through, or under the Builder, by subrogation or otherwise, on account of any damage or loss, whether to persons or property, however caused.

ARTICLE 20 – GENERAL BOND REQUIREMENTS

20.1 General Bond Requirements

Recognizing the Project is a public project with a Construction Price which exceeds $200,000, and as such is required to be bonded pursuant to 255.05, Florida Statutes, the Builder shall furnish payment and performance bonds on Owner’s standard form covering the full and faithful performance of the Contract for Construction and the payment of obligations arising hereunder. Such bonds shall, in all respects, comply with Section 255.05, Florida Statutes.

20.2 Delivery of Bonds

The Builder shall deliver required bonds and powers of attorney to the Owner prior to commencement of the Work.

20.3 Requests for Copies of Bonds

Upon the request of any person or entity appearing to be a potential beneficiary of bonds covering payment of obligations arising under the Contract for Construction, the Builder shall promptly furnish a copy of the bonds or shall permit a copy to be made.

ARTICLE 21 – OWNER’S RIGHT TO STOP WORK

21.1 Cease and Desist Order

If the Builder fails or refuses to perform or fails to correct defective Work as required, or persistently fails to carry out the Work in accordance with the Contract for Construction,

the Owner may, by written notice, order the Builder to cease and desist in performing the Work or any portion of the Work until the cause for the order has been eliminated to the satisfaction of the Owner. Upon receipt of such instruction, the Builder shall immediately cease and desist as instructed by the Owner and shall not proceed further until the cause for the Owner's order has been corrected, no longer exists, or the Owner instructs that the Work may resume.

21.1.1 The Builder shall not be entitled to an adjustment in the time for performance or the Construction Price under this clause since such stoppages are considered to be the fault of the Builder.

21.1.2 The right of the Owner to stop Work shall not give rise to a duty on the part of the Owner to exercise this right for the benefit of the Builder or others.

21.1.3 In the event the Owner issues instructions to cease and desist, and in the further event that the Builder fails and refuses with seven calendar days to provide adequate assurance to the Owner that the cause of such instructions will be eliminated or corrected, then the Owner shall have the right, but not the obligation, to carry out the Work or any portion of the Work with its own forces, or with the forces of another builder, and the Builder shall be responsible for the cost of performing such Work by the Owner.

21.1.4 The rights set forth herein are in addition to, and without prejudice to, any other rights or remedies the Owner may have against the Builder.

ARTICLE 22 – TERMINATION OR SUSPENSION OF CONTRACT FOR CONSTRUCTION

22.1 Termination for Cause by Owner

22.1.1 The Owner may terminate the Contract for Construction for cause if the Builder materially breaches the Contract for Construction by:

(i) refusing, failing, or being unable to properly manage or perform on any Project;

(ii) refusing, failing, or being unable to supply the Project with sufficient numbers of workers, properly skilled workers, proper materials to maintain applicable schedules;

(iii) refusing, failing, or being unable to make prompt payment to subcontractors or suppliers;

(iv) disregarding laws, ordinances, rules, regulations, or orders of any public authority or quasi-public authorities or Authorities Having Jurisdiction;

(v) refusing, failing, or being unable to substantially perform in accordance with the terms of the Contract for Construction as determined by the Owner, or as otherwise defined elsewhere herein; or

(vi) refusing, failing, or being unable to substantially perform in accordance with the terms of any other agreement between the Owner and Builder.

22.1.2 Upon the occurrence of any of the events described in Paragraph 22.1.1, the Owner may give written notice to the Builder setting forth the nature of the default and requesting cure within seven calendar days from the date of notice. At any time after issuance of such notice, if the Builder fails to initiate the cure or if the Builder fails to expeditiously continue such cure until complete, the Owner may give written notice to the Builder of immediate termination, and the Owner, without prejudice to any other rights or remedies, may take any or all of the following actions:

(i) complete all or any part of the Work, including supplying workers, material and equipment which the Owner deems expedient to complete the Work;

(ii) contract with others to complete all or any part of the Work, including supplying workers, material, and equipment which the Owner deems expedient to complete the Work;

(iii) take such other action as is necessary to correct such failure;

(vi) take possession of all materials, tools, construction equipment, and machinery on the Site owned or leased by the Builder;

(v) directly pay the Builder's subcontractors and suppliers compensation due to them from the Builder;

(vi) finish the Work by whatever method the Owner may deem expedient; and

(vii) require the Builder to assign the Builder's right, title and interest in any or all of Builder's subcontracts or orders to the Owner.

22.1.3 If the Owner terminates the Contract for Construction for cause, and the Owner takes possession of all materials, tools, construction equipment, and machinery on the Site owned or leased by the Builder, the Builder's compensation shall be increased by fair payment, either by purchase or rental at the election of the Owner, for any materials, tools, construction equipment, and machinery items retained, subject to the Owner's right to recover from the Builder the Owner's damages resulting from the termination.

22.1.4 If the Owner terminates the Contract for Construction for cause, and it is subsequently determined by a court of competent jurisdiction that such termination was without cause, then in such event, said termination shall be deemed a termination for convenience as set forth in Paragraph 22.3.

22.2 Termination for Cause by Builder

22.2.1 The Builder may terminate the Contract for Construction for cause if the Owner materially breaches the Contract for Construction by:

(i) refusing, failing, or being unable to make prompt payment to the Builder without just cause;

(iv) disregarding laws, ordinances, rules, regulations or orders of any public authority of quasi-public authority or Authorities Having Jurisdiction; or

(v) refusing, failing, or being unable to substantially perform in accordance with the terms of the Contract for Construction.

22.2.2 Upon the occurrence of any of the events described in Paragraph 22.2.1, the Builder may give written notice to the Owner setting forth the nature of the default and requesting cure within seven calendar days from the date of notice. If the Owner fails to cure the default within seven calendar days, the Builder, without prejudice to any rights or remedies, may give written notice to the Owner of immediate termination.

22.3 Termination or Suspension for Convenience

The Owner may at any time give written notice to the Builder terminating the Contract for Construction or suspending the Project, in whole or in part, for the Owner's convenience and without cause. If the Owner suspends the Project for convenience, the Builder shall immediately reduce its staff, services and outstanding commitments in order to minimize the cost of suspension.

22.4 Builder's Compensation When Builder Terminates for Cause or Owner Terminates for Convenience

If the Contract for Construction is (i) terminated by the Builder pursuant to Paragraph 22.2; (ii) terminated by the Owner pursuant to Paragraph 22.3; or (iii) suspended more than three months by the Owner pursuant to Paragraph 22.3, the Owner shall pay the Builder specified amounts due for Work actually performed prior to the effective termination date and reasonable costs associated with termination. The Owner may agree to additional compensation, if any, due to the Builder. Absent agreement on the additional amount due the Builder, the Owner shall pay the Builder:

(i) reasonable costs incurred in preparing to perform the terminated portion of the Work, and in terminating the Builder's performance, plus a fair and reasonable allowance for overhead and profit thereon (such profit shall not include anticipated profit or consequential damages); provided, however, that if it appears that the Builder would not have profited or would have sustained a loss if the Work had been completed, no profit shall be allowed or included, and the amount of compensation shall be reduced to reflect the anticipated rates of loss, if any; and

(ii) reasonable costs of settling and paying claims arising out of the termination of subcontracts or supplier orders. These costs shall not include amounts paid in accordance with other provisions hereof.

22.5 Builder's Compensation When Owner Terminates for Cause

If the Contract for Construction is terminated by the Owner for cause pursuant to Paragraph 22.1, no further payment shall be made to the Builder until Final Completion of the Project. At such time, the Builder shall be paid the remainder of the Construction Price less all costs and damages incurred by the Owner as a result of the default of the Builder,

including liquidated damages applicable thereto. The Builder shall additionally reimburse the Owner for any additional costs or expenses incurred.

22.6 Limitation on Termination Compensation

Irrespective of the reason for termination or the party terminating, the total sum paid to the Builder shall not exceed the Construction Price, as properly adjusted, reduced by the amount of payments previously made and penalties or deductions incurred pursuant to any other provision of the Contract for Construction, and shall in no event include duplication of payment.

22.7 Builder's Responsibility upon Termination

Irrespective of the reason for termination or the party terminating, if the Contract for Construction is terminated, the Builder shall, unless notified otherwise by the Owner,

(i) immediately stop work;

(ii) terminate outstanding orders and subcontracts;

(iii) settle the liabilities and claims arising out of the termination of subcontracts and orders; and

(iv) transfer title and deliver to the Owner such completed or partially completed Work, and, if paid for by the Owner, materials, equipment, parts, fixtures, information and such contract rights as the Builder has.

22.8 Lack of Duty to Terminate

The right to terminate or suspend the Work shall not give rise to a duty on the part of either the Owner or the Builder to exercise that right for the benefit of the Owner, the Builder or any other persons or entities.

22.9 Limitation on Termination Claim

If the Builder fails to file a claim within one year from the effective date of termination, the Owner shall pay the Builder only for services actually performed and expenses actually incurred prior to the effective termination date.

ARTICLE 23 – DISPUTE RESOLUTION

23.1 Mutual Discussion

In case of any dispute, claim, question or disagreement arising from or relating to the Project or arising out of the Contract for Construction or the breach thereof, the parties shall first attempt resolution through mutual discussion.

23.2 Facilitative Mediation

If the parties cannot resolve any dispute, claim, question, or disagreement arising from or relating to the Project or arising out of the Contract for Construction or the breach thereof through mutual discussion, the parties may in good faith participate in private, non-binding facilitative mediation seeking a just and equitable solution satisfactory to all parties.

23.2.1 All parties to a mediation shall promptly provide all other parties to the mediation with copies of essential documentation relevant to the support or defense of the matter being mediated.

23.2.2 The parties shall not be required to mediate for a period greater than ninety-one calendar days unless otherwise agreed to in writing by the parties. The parties shall share equally any administrative costs and fees of such proceedings, but shall each be responsible for their own expenses otherwise incurred.

23.2.3 In the event that the statute of limitations would run during the required mediation period, either party may institute litigation so as to avoid the running of such statute upon the condition that such party immediately seek a stay of such litigation pending the conclusion of the mediation period.

23.2.4 During the course of mediation, any party to the mediation may apply for injunctive relief from any court of competent jurisdiction until the mediation period expires or the dispute is otherwise resolved.

23.2.5 The Owner, the Professional, the Builder, and any other parties involved in any way in the design or construction of the Project are bound, each to each other, by this requirement to mediate prior to commencement of any litigation or administrative action, provided that they have signed the Contract for Construction or an agreement that incorporates the Contract for Construction by reference or signed any other agreement which binds them to mediate. Each such party agrees that it may be joined as an additional party to a mediation involving other parties under any such agreement. In the case where more than one mediation is begun under any such agreement and any party contends that the mediations are substantially related, the mediations may be conducted by the mediator selected in the first mediation which was commenced.

23.2.6 The mediation shall be conducted in Alachua County, Florida, unless agreed otherwise by the parties.

23.3 Conflicting Dispute Resolution Provisions

Neither party to the Contract for Construction shall enter into any contract with regard to the Project which directly or indirectly gives the right to resolve any dispute with, involving, or affecting the other to any other person or legal entity which is in conflict with the dispute resolution procedures required by this Article.

23.4 Arbitration Preclusion

In case of a dispute relating to the Project, or arising out of the Contract for Construction, no party to the Contract for Construction shall be required to participate in or be bound by, any arbitration proceedings.

23.5 Performance during Dispute Resolution

The Owner and the Builder agree that pending the resolution of any dispute, controversy, or question, the Owner and the Builder shall each continue to perform their respective obligations without interruption or delay, and the Builder shall not stop or delay the performance of the Work.

23.6 Litigation/Administrative Action

Disputes, claims, questions or disagreements involving monetary claims of $200,000.00 or less may be conducted, at the Owner's option, pursuant to the Administrative Procedures Act, Chapter 120 Florida Statutes. All other claims, disputes and other matters shall be determined under the judiciary system of the State of Florida.

ARTICLE 24 – DAMAGES AND REMEDIES

24.1 Builder's Repair

The Builder shall, at its expense, promptly correct, repair, or replace all goods, products, materials, systems, labor and services which do not comply with the warranties and guarantees set forth in the Contract for Construction, or any other applicable warranty or guarantee.

24.2 Reimbursement

The Builder shall promptly reimburse the Owner for any expenses or damages incurred by the Owner as a result of (i) the Builder 's failure to substantially perform in accordance with the terms of the Contract for Construction; (ii) deficiencies or conflicts in the Construction Documents attributable to the Builder or of which the Builder was or should have been aware; (iii) breach of the warranties and guarantees set forth in the Contract for Construction or any other applicable warranty or guarantee; or (iv) other acts or omissions of the Builder. Reimbursements to the Owner made in accordance with this Article are separate and distinct from the assessment of liquidated damages, if any, as defined elsewhere in the Contract for Construction.

24.3 General Indemnity

Pursuant to Section 725.06(2), Florida Statutes, the Builder shall indemnify and hold Owner (including its officers and employees) and Owner's Related Parties harmless from and against all liabilities, damages, losses, and costs, including but not limited to, reasonable attorney's fees, to the extent caused by the negligence, recklessness, or intentional wrongful conduct of the Builder and persons employed or utilized by the Builder in the performance of the Work or under the Contract for Construction.

24.4 Intellectual Property Indemnity

To the fullest extent permitted by law, the Builder shall defend, protect, hold harmless, and indemnify the Owner and Owner's Related Parties from and against any and all liability, loss, claims, demands, suits, costs, fees and expenses (including actual fees and expenses of attorneys, expert witnesses, and other consultants), by whomsoever brought or alleged, for infringement of patent rights, copyrights, or other intellectual property rights, except with respect to designs, processes or products of a particular manufacturer expressly required by the Owner or Professional(s) in writing. However, if the Builder has reason to believe the use of a required design, process, or product is an infringement of a patent, copyright, or other intellectual property right, the Builder shall defend, protect, hold harmless, and indemnify the Owner and Owner's Related Parties as stated above, unless the Builder promptly notifies the Owner of that belief.

24.5 Non-Exclusivity of Owner's Remedies

The Owner's selection of one or more remedies for breach of the Contract for Construction contained herein shall not limit the Owner's right to invoke any other remedy available to the Owner under the Contract for Construction or by law.

24.6 Waiver of Damages

The Builder shall not be entitled to, and hereby waives, any monetary claims for or damages arising from or related to, lost profits, lost business opportunities, unabsorbed overhead, or any indirect or consequential damages.

ARTICLE 25 – MISCELLANEOUS PROVISIONS

25.1 Integration

The Contract for Construction represents the entire and integrated agreement between the Owner and the Builder, and supersedes all prior negotiations, representations or agreements, either written or oral, for the Project. The Contract for Construction may be amended only by written instruments signed by both the Owner and the Builder.

25.2 Severability

If any provision of the Contract for Construction, or the application thereof, is determined to be invalid or unenforceable, the remainder of that provision and all other provisions shall remain valid and enforceable.

25.3 Waiver

No provision of the Contract for Construction may be waived except by written agreement of the parties. A waiver of any provision on one occasion shall not be deemed a waiver of that provision on any subsequent occasion, unless specifically stated in writing. A waiver of any provision shall not affect or alter the remaining provisions of the Contract for Construction.

25.4 Strict Compliance

No failure of the Owner to insist upon strict compliance by the Builder with any provision of the Contract for Construction shall operate to release, discharge, modify, change or affect any of the Builder's obligations.

25.5 Third-Party Beneficiaries

The Contract for Construction shall inure solely to the benefit of the parties hereto and their successors and assigns, and, except as otherwise specifically provided in the Contract for Construction, nothing contained in the Contract for Construction is intended to or shall create a contractual relationship with, or any rights or cause of action in favor of, any third party against either the Owner or the Builder.

25.6 Assignment of Anti-Trust Claims

In consideration for the Contract for Construction, the Builder hereby conveys, sells, assigns and transfers to the Owner all of its right, title and interest in and to any and all causes of action it may now have or may hereafter acquire under the antitrust laws of the United States and the State of Florida for price fixing, relating to the goods or services purchased or acquired by the Owner under the Contract for Construction.

25.7 Drug Free and Tobacco-Free Workplace

Pursuant to 440.102(15), Florida Statutes, Builder shall implement, and cause its applicable subcontractors to implement, a drug-free workplace program. Additionally, the Builder shall enforce the Owner's tobacco-free policy.

25.8 Survival

All provisions of the Contract for Construction which contain continuing obligations shall survive its expiration or termination.

25.9 Independent Contractor

Builder is an independent contractor to Owner.

25.10 Public Records

Any books, documents, records, correspondence, or other information kept or obtained by the Owner or furnished by Builder to Owner in connection with the services contemplated herein are property of Owner.

25.10.1 Builder acknowledges and agrees that any and all such books, documents, records, correspondence or other information may be public records under Chapter 119, Florida Statutes

25.10.2 Builder agrees to promptly comply with any order of a Court having competent jurisdiction that determines that records maintained by Builder are "public records," which must be available to the public.

25.10.3 Builder acknowledges and agrees that any and all such books, documents, records, correspondence, or other information may also be subject to inspection and copying by members of the public pursuant to Chapter 119, Florida Statutes.

25.10.4 The Contract for Construction may be unilaterally canceled by the Owner for refusal by the Builder 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 Builder in conjunction herewith.

25.11 Governing Law and Venue

The Contract for Construction shall be governed by, and construed under, the laws of the State of Florida, without regard to its choice of law provisions, and venue shall lie in the courts of Alachua County, Florida.

25.12 Sovereign Immunity

Builder acknowledges and agrees that nothing contained in the Contract for Construction shall be construed or interpreted as (i) denying to Owner any remedy or defense available to it under the laws of the State of Florida; (ii) consent of the Owner or the State of Florida or their agents and agencies to be sued; or (iii) a waiver of sovereign immunity of the Owner or of the State of Florida beyond the limited waiver provided in section 768.28, Florida Statutes.

00810 Vendor Diversity

1.1 The University of Florida is an equal opportunity institution and, as such, encourages the use of small businesses, woman-owned businesses, and minority-owned businesses in the provision of construction-related services. Such businesses should have a fair and equal opportunity to compete for dollars spent by the University of Florida to procure construction-related services. Competition ensures that prices are competitive and a broad vendor base is available.

1.2 The Builder shall use good faith efforts to ensure opportunities are available to small, woman-owned, and minority-owned businesses on the Project.

1.3 Contact the UF Division of Small Business and Vendor Diversity Relations for more information.

END OF SECTION

00811 Federally Funded Projects – NOT APPLICABLE

1.1 Buy American Act Compliance

A. Builder shall comply with sections 2 through 4 of the Act of March 3, 1933 (41 U.S.C. 10a-10c, popularly known as the "Buy American Act"). The recipient should review the provisions of the Act to ensure that expenditures made under this award are in accordance with it.

B. It is the sense of the Congress of the United States that only American-made equipment and products should be purchased with financial assistance provided under this award.

1.2 Davis-Bacon Wages

A. The Builder and all subcontractors shall comply with the provisions of the Davis-Bacon Act (40 USC 276a to a7) and as supplemented by Department of Labor Regulation (29 CFR). Under this Act, Builders are required to pay wages to laborers and mechanics at a rate not less than the minimum rates in the wage determination. A current wage determination will be issued, if required, during bidding.

B. Builder shall provide certified copies of weekly payroll indicating the Davis-Bacon job classification and that wage rates are those in effect at the time the work is performed.

1.3 Records

A. The Builder agrees to allow duly authorized representatives of the Owner, the Department of Community Affairs, the Auditor General of the State of Florida, U.S. Department of Energy, or the Comptroller General of the United States access to any books, documents, paper and records of the Builder which are directly pertinent to this Contract for the purpose of making audits, excerpts, and examinations.

B. The Builder shall retain all required records for three years after grantees or sub-grantees make final payments and all other pending matters are closed.

1.4 Environmental and Energy

A. Builder shall comply with all applicable standards, orders, or requirements issued under section 306 of the Clean Air Act (42 U.S.C. 1857(h), section 506 of the Clean Water Act (33 U.S.C. 1368), Executive Order 11738, and Environmental Protection Agency regulations (40 CFR Part 15) for contracts, subcontracts, and sub-grants of amounts in excess of $100,000.

B. Builders and all subcontractors are subject to the mandatory standards and policies relating to energy efficiency which are contained in the State Energy Conservation

Plan issued in compliance with The Energy Policy and Conservation Act (Pub. L. 94-163).

C. Builder shall not use as a replacement any equipment which uses CFCs (R-11, R-12, etc.) as a refrigerant.

1.5 Equal Employment

Builder shall comply with Executive Order 11246 dated September 24, 1965, entitled "Equal Employment Opportunity," as amended by Executive Order 11375 dated October 13, 1967, and supplemented by Department of Labor regulation 41 CFR, Part 60. This applies only to contracts awarded in excess of $10,000.

1.6 Notice and Assistance Regarding Patent, Technical Data, and Copyright Infringement

A. The Builder shall report to the Owner and Architect, promptly and in reasonable written detail, each notice or claim of patent or copyright infringement based on the performance of this contract of which the Builder has knowledge.

B. In the event of any claim or suit against the Owner on account of an alleged patent or copyright infringement arising out of the performance of this contract or out of the use of any supplies furnished or work or services performed under this contract, the Builder shall furnish to the Owner all evidence and information in possession of the Builder pertaining to such suit or claim. Such evidence and information shall be furnished at the expense of the Owner except where the Builder has agreed to indemnify the Owner.

C. The Builder agrees to include, and require inclusion of, this clause in all subcontracts at any tier for supplies or services, including construction and architect-engineer subcontracts and those for material, supplies, models, samples, or design or testing services.

1.7 Miscellaneous Provisions

A. The Builder and all subcontractors are subject to the provisions for compliance with the Copeland Anti-Kick Back Act (18 USC 874) as supplemented in 29 CFR, Part 3.

B. Builder shall comply with Sections 103 and 107 of the Contract Work Hours and Safety Standards Act (40 U.S.C. 327-330) as supplemented by U.S. Department of Labor regulations (29 CFR Part 5). This applies to all construction contracts in excess of $2,000.

C. Builder and subcontractors shall certify they are not subject to debarment, suspension, ineligibility, and voluntary exclusion for all lower tier covered transactions exceeding $25,000.

D. The Builder shall report to the Owner and Architect, promptly and in reasonable written detail, any direct royalty payments made to facilitate the grant work called for in this Contract.

E. The Builder agrees to indemnify the Owner, and its agents, and employees against liability, including costs and expenses, for infringement upon any United States patent arising out of performing this contract or out of the use or disposal by or for the account of the Owner of supplies furnished or work performed under this contract.

END OF SECTION

00842 Safety Requirements

1.1 Health and Safety Requirements

A. Builders shall ensure that all activities carried out on behalf of the University or on University property are in compliance with all applicable Federal, state and local regulations (OSHA, EPA, FDEP) pertaining to worker and site safety.

B. The Builder shall have a written health and safety program that outlines safe work practices and procedures expected to be followed by workers and shall have it available for review by the University's project manager or by representatives of the Environmental Health and Safety division upon request. Project managers and superintendents/supervisors shall have obtained an OSHA 30-hour Construction Safety Outreach Training card within 5 years of the date of the applicable project. The Builder is solely responsible for ensuring that all workers have received any required safety-related training. Training documentation shall be made available for review upon request.

C. The Builder shall have a competent person or persons as defined by OSHA 29CFR1926.32(f) on the job site to monitor hazardous work activities such as, but not limited to, crane operations, electrical safety, excavations, fall protection, scaffolding, and confined space entry.

D. The Builder shall have an updated Safety Data Sheet (SDS) for all chemical products used on the job site. The SDSs shall be readily accessible to all project workers and to University staff on request. If the use of any chemical product has the potential for harmful exposure to University of Florida staff, students or visitors, UF Environmental Health and Safety (EH&S) shall be notified and exposure controls will be discussed prior to the use of that chemical product.

1.2 Hazardous Substances

Refer to the General Terms & Conditions.

1.3 Trench Safety Act

It is the responsibility of the Builder to comply with F.S. 553.60.

END OF SECTION

00902 Public Entity Crimes

1.1 Per F.S. 287.133, any person or affiliate who has been placed on the convicted vendor list by the Florida Department of Management Services may not submit a bid on a contract to provide any goods or services – including construction, repairs, or leases – and may not be awarded or perform work as a contractor (Builder), supplier, subcontractor, or consultant for the University of Florida for a period of 36 months from the date of being placed on the convicted vendor list. A "person" or "affiliate" includes any natural person or any entity, including predecessor or successor entities or an entity under the control of any natural person who is active in its management and who has been convicted of a public entity crime.

END OF SECTION

00903 Asbestos

1.1 Background

Asbestos is a confirmed human carcinogen that was previously used in many different types of building materials. It is important to note that asbestos in an undisturbed state is not considered hazardous. Due to the potential hazards associated with asbestos exposure if the material becomes airborne, Federal and State regulations are in place to control activities impacting asbestos containing materials. Various asbestos products can still be found in University of Florida buildings.

1.2 Surveys

A. An asbestos survey meeting the requirements of Federal and State regulations shall be completed prior to the commencement of any renovation, remodeling, or demolition project involving a University-owned building, a component of a University-owned building, or a building scheduled to be purchased by the University. A survey is required regardless of the age of the building. Asbestos surveys must be conducted by a Florida Licensed Asbestos Consultant (LAC) or their appointed representative.

B. All surveys are required to be submitted to EH&S for review prior to the start of a construction project. EH&S reserves the authority to reject a survey based on incomplete content or failure to follow regulatory requirements.

C. A limited survey, based on a review of the project scope of work, may be authorized by UF Environmental Health and Safety (EH&S).

D. A copy of the completed asbestos survey must be kept on site for the duration of a construction project.

1.3 Asbestos Removal

A. Any removal or altering of asbestos containing material must be completed by a licensed asbestos abatement contractor.

B. Asbestos-containing roofing may be removed by a State-certified or registered roofing contractor provided that all removal activities are performed under the direction of an onsite roofing supervisor. The supervisor must remain on site at all times while removal activities are taking place. The supervisor is required to have completed an approved asbestos roofing course prior to engaging in the removal of asbestos containing roofing materials, and copies of training documentation shall be provided to EH&S before job commencement.

C. All activities involving the removal of asbestos containing materials require the submission of an Asbestos Project Notification Form (APNF) to Environmental Health and Safety at least ten days prior to the start of an asbestos project.

D. The asbestos abatement contractor or demolition contractor actually performing the work is responsible for submitting an additional notification to the designated regulatory authority, typically either the Florida Department of Environmental Protection or the Florida Department of Business and Professional Regulation.

END OF SECTION

01014 Builder's Use of the Premises

PART 1 – GENERAL

1.1 RELATED SECTIONS

A. Documents affecting the work of this Section include other elements of the Contract for Construction, including the Owner/Builder Agreement or Owner/Design-Builder Agreement, the General Terms & Conditions, other sections of the Division 0 and Division 1 non-technical specifications, and the technical plans and specifications.

B. Refer to section 01016 for information regarding utility outages and dig permits.

C. Refer to section 01310 for requirements regarding the coordination of work with the University of Florida Schedule.

D. Refer to section 01500 for requirements related to Temporary Facilities & Controls.

1.2 DESCRIPTION OF WORK INCLUDED

This Section applies to situations in which the Builder or his representatives including, but not necessarily limited to, suppliers, subcontractors, employees, and field engineers, enter upon the Owner's property.

1.3 QUALITY ASSURANCE

A. Promptly upon award of the Contract, notify all pertinent personnel regarding requirements of this Section.

B. Require that all personnel who will enter upon the University's property certify their awareness of and familiarity with the requirements of this Section.

C. Builder shall strictly enforce the University’s **Tobacco Free** policy.

1.4 TRANSPORTATION FACILITIES

A. See section 01500 for information on the maintenance of safe and accessible paths of travel in and around the job site.

B. Builder’s Vehicles:

1. Builder's vehicles, vehicles belonging to employees or subcontractors of the Builder, and all other vehicles entering the Owner's property in performance of the Work shall only use agreed-upon access route(s).
2. All vehicles parked on campus (including construction sites) must have a valid parking permit issued through Transportation and Parking Services in accordance with University of Florida Police Department (UFPD) requirements. Permits – for remote/offsite worker parking, onsite staff parking, and

remote/offsite storage containers – shall be requested through the University Project Manager.

(a) Remote/offsite worker parking is provided at a paved lot near the Hilton on SW 34th Street. See map on the "Forms & Standards" page of the Planning Design & Construction website (www.facilities.ufl.edu).

(b) Trailer/storage containers parked in an assigned/approved remote/offsite by permit shall be clearly marked with the following information: Project Number, Project Name, Company Name, and Phone Number.

(c) Remote parking and trailer/storage container area must be kept clean and free of debris at all times. All trailers/storage containers must be removed prior to completion of the projects.

(d) See part 1.10 of this Specification regarding home football game weekends.

(e) Vehicles not following this policy may be ticketed or towed.

3. Within the University approved fenced-in construction site area, the Builder shall manage all site use, including parking by construction staff and employees (if approved). Do not permit vehicles to park on any street or other area of the Owner's property except in areas designated by the University.
   (a) Within the approved fenced area, the number of vehicles will be limited and be a function of the size of the project. The number of vehicles allowed will be discussed as part of the site utilization plan with the UF Project Manager and in consultation with the University Transportation & Parking Services and Facilities Services Grounds Department.

4. Absolutely no parking is permitted outside the designated construction site area and all University regulations regarding parking and accommodations for pedestrian use shall be strictly enforced.

5. Exceptions for temporary parking for construction delivery and construction access on curb side, walkways, vehicular parking, roadways and service drives that restricts or impedes normal traffic flow or use must be obtained from UF Transportation & Parking Services through the University Project Manager. This exception is granted only for construction vehicles, not for private passenger vehicles. Any temporary use of pedestrian pathways that exceeds 24 hours duration will require provision for equal alternate pathways around the impediments and UFPD review. In addition, any temporary use of the site (exceeding 24 hours duration) that impedes building occupant egress must be reviewed by UF Environmental Health & Safety (EH&S) prior to implementation.

6. The University Project Managers shall not seek waivers of any sort for ticketed and towed vehicles in violation of the University parking regulations. Knowledge of the University Parking Regulations is the personal responsibility every individual who commutes to and works on campus.
7. Provide adequate protection for curbs, sidewalks, pavers and landscape

over which trucks and equipment must pass to reach the job site.

1.5 INSPECTIONS and TESTS

A. Facilities Services inspections shall be requested by 7 am the day of inspection through Facilities Services Operations Engineering. The inspection request form and supporting checklists can be found on the "Forms & Standards" page of the Planning Design & Construction website (www.facilities.ufl.edu). Inspection checklists shall be tailored by the Owner and Builder to the specific requirements of the project.

B. Environmental Health & Safety (EH&S) inspections shall be requested 24 hours in advance. Also see section 01060.

C. Office of Information Technology (OIT): Contact Telecommunications and Infrastructure (TNI) 24-48 hours in advance to request inspections for all telecom, cabling, and network infrastructure work. The inspection checklist – with notification timeframes and contact information – can be found on the "Forms & Standards" page of the Planning Design & Construction website (www.facilities.ufl.edu).

D. HealthNet: For Health Science Center projects only, contact HealthNet 24-48 hours in advance to request inspections for all telecom, cabling, and network infrastructure work. The inspection checklist – with notification timeframes and contact information – can be found on the "Forms & Standards" page of the Planning Design & Construction website (www.facilities.ufl.edu).

E. Office of Academic Technology (OAT): Where applicable, contact OAT 48 hours or more in advance to request inspections for all work related to classroom audio/visual systems. The inspection checklist – with notification timeframes and contact information – can be found on the "Forms & Standards" page of the

F. University of Florida Police Department (UFPD): UFPD must verify construction fencing, exterior lighting, landscaping, and other items during construction and closeout.

G. Engineer inspections – Provide 48 hours notice for all inspections/site visits.

H. Tests

1. The Builder shall notify Facilities Services and EH&S of all scheduled tests at least 48 hours in advance.

2. Properly completed test reports shall be provided at the conclusion of each test. It is the responsibility of the Builder to maintain such reports through Final Completion, at which point they shall be submitted with other closeout materials, such as Operation & Maintenance manuals.

1.6 SECURITY

A. Construction sites located on the University of Florida campus fall under the jurisdiction of the UFPD. Any incident requiring police service should be immediately reported to the UFPD at (352) 392-1111.

B. Builders and employees are to obey all laws and rules of the State of Florida and the University of Florida when on University property.

C. Students, faculty, and staff shall not be harassed, disturbed, or in any way disrupted in their lawful pursuits. Sexual harassment shall be reported to the University's Title IX Coordinator and Deputy Title IX Coordinator for Students as per the following policy: https://titleix.ufl.edu/

D. Restrict the access of all persons entering upon the Owner's property in connection with the Work to the access route and to the actual site of the Work. Employees are not permitted to enter University buildings unless such entry is directly related to their job duties.

E. Restrict activities of employees to authorized areas. Employees shall not be allowed to mingle in student or public areas.

F. Builders and employees shall secure all property to reduce theft or damage to equipment or property. Builders shall work with the UFPD as necessary and participate in crime prevention efforts.

G. The Builder shall at all times guard against damage or loss to the property of the University or other vendors or contractors and shall be held responsible for replacing or repairing any such loss or damage. The University may withhold payment or make such deductions as deemed necessary to ensure reimbursement or replacement for loss or damaged property through negligence of the successful bidder or his agents The Builder shall provide identification badges for all personnel working on the site and shall require continuous use (wearing) of same at all times. Badge shall display photograph, name of employee, and company for which employee works.

H. The Builder shall keep a daily log of all employees, visitors, and other personnel that enter the Project site. Said log shall be accessible to UFPD upon request.

I. Items that could be used as projectiles, rocks, bricks, other masonry, should be stored in a secure location.

1.7 PERSONNEL SCREENING

The following requirements are to be met by Builders and their subcontractors and vendors while engaged in construction projects at the University of Florida:

A. A criminal history check shall be performed on all jobsite personnel, including subcontractors and temporary day laborers, at least once every two years. Prior to personnel entering the Project site, an initial criminal history background check shall be submitted to and performed by a private company trained to perform employment screening. The results of each criminal history check shall be reported to the Builder, which shall screen the results for the following disqualifying offenses to determine a person's eligibility to work on the University of Florida campus.

1. Drug distribution activity or felony drug possession
2. Sexual offenses, including, but not limited to, indecent exposure and voyeurism
3. Crimes of violence involving physical injury to another person
4. Murder
5. Kidnapping
6. Felony theft

B. The following searches shall be performed to document types of convictions listed above that will render an individual ineligible to perform work on campus unless a waiver is granted:

1. SSN Trace plus address history
2. Sexual Offender database check
3. National Criminal Database search
4. 7-year County Court Check in the employee's County of residence

C. Entities seeking to use an employee with one or more revealed convictions must apply for a written waiver from the UFPD Chief at (352) 392-1111 or updinfo@admin.ufl.edu.

D. The UFPD Chief will consider the following factors when determining whether or not a waiver will be granted:

1. The nature and gravity of any criminal offense(s);
2. The individual's age at the time of the offense(s);

3. The number and type of offense (felony, misdemeanor, traffic violations, etc.);
4. The sentence or sanction for the offense and compliance with the sanction(s);
5. The amount of time that has passed since the offense and/or completion of the sentence(s);
6. Whether there is a pattern of offenses;
7. Whether the offense arose in connection with the individual's prior employment or volunteer activities;
8. Information supplied by the individual about the offense(s);
9. Work record and references after the offense(s);
10. Subsequent criminal activity; and
11. Truthfulness of the individual in disclosing the offense(s).

E. Builders shall certify that all personnel have been subject to a criminal background check and shall continuously track, monitor, and re-certify throughout construction as new trades and personnel begin work.

F. The cost of the criminal background check shall be borne by the Builder, but is compensable as a General Conditions expense for CMs and D/Bs.

G. The Builder shall maintain copies of background checks at their home office, with background checks electronically accessible at the Project site. The names and pertinent information of all screened and approved employees shall be posted to the PD&C Sharepoint site at: https://uflorida.sharepoint.com/sites/pdc/prj/Lists/Background%20Checks/AllItems.aspx

1.8 WORK HOURS

A. Regular work hours shall be between 7:00 AM and 5:00 PM, Monday through Friday, excluding holidays.

B. Work outside these hours must be requested in writing and approved by the Owner.

1.9 UNMANNED AIRCRAFT

A. The use of unmanned aircraft systems (e.g., drones or model aircraft) over University property is prohibited without the written approval of UF EH&S.

B. For a complete explanation of the policy, procedures, and requirements, see http://www.ehs.ufl.edu/?s=unmanned+aircraft+systems&sa.x=0&sa.y=0

1.10 HOME FOOTBALL GAME WEEKENDS

A. Approximately 100,000 people converge upon the campus on each of 6-7 Fall weekends for Gator football games. To safeguard both the public and the Work,

jobsites on campus shall be secured, left clean, and free of safety hazards by 4:00 PM Friday on such weekends, with no work taking place on or around the site until Monday morning.

B. Likewise, remove all vehicles parked at the paved remote lot near the 34th Street Hilton by 4:00 PM Friday on such weekends and do not permit parking there again until Monday morning.

C. See www.gatorzone.com for the football game schedule and incorporate these dates into the construction schedule.

D. The Builder may request special exceptions to this policy with written justification at least one week in advance, but the Owner is under no obligation to approve such requests.

1.11 PRE-CONSTRUCTION MEETING

A. Prior to commencing Work at the site, the Builder shall attend a pre-construction conference with the University Project Manager, the Design Professional(s), other UF officials, and external agency representatives, if applicable (such the District Engineer on a Federally-funded project).

B. Builder attendees shall include all field staff (project manager, superintendent(s), project engineer(s), and clerical assistants), plus major trade subcontractors as directed by the University Project Manager.

C. The parties will discuss the administrative, logistic, fiscal, and procedural requirements for the Work, and for work in general at the University of Florida.

D. The template agenda for the meeting shall be provided by the University Project Manager, who shall also arrange for attendance by other UF officials and outside agencies, if any. The Builder shall record and distribute minutes.

END OF SECTION

01016 Utility Outages and Dig Permits

PART 1 – GENERAL

1.1 RELATED SECTIONS

A. Documents affecting the work of this Section include other elements of the Contract for Construction, including the Owner/Builder Agreement or Owner/Design-Builder Agreement, the General Terms & Conditions, other sections of the Division 0 and Division 1 non-technical specifications, and the technical plans and specifications.

B. Refer to Section 01310, Construction Schedule for related requirements regarding the coordination of utility outages with the University of Florida Schedule.

1.2 UTILITIES OUTAGES

A. Planned utility outages are occasionally required for repairs, maintenance or construction. In order to avoid unexpected inconveniences, property damage, safety hazards, or loss of information or research, the Facilities Services Division has instituted a utility outage notification system.

B. When the Work requires an outage, the Builder shall submit – at least ten (10) business days for major project outages and five (5) business days for minor project outages. – a written request to Facilities Services via the University Project Manager on an Owner-furnished form. Outages shall not proceed until authorized by Facilities Services.

C. Utility outages will be performed by Facilities Services Systems personnel. The project will pay the applicable costs. However, the costs associated with an outage that becomes necessary to correct deficient work performed during a previous outage will be back-charged to the Builder. Contact Facilities Services Operations Engineering as necessary to determine these costs.

D. Unplanned utility outages occur on occasion as the unwelcome result of repair, maintenance, or construction activities. Report all unplanned utility outages immediately to the Facilities Services Work Management Center (Telephone: 392-1121) and to the University Project Manager.

E. For any projects within the Health Science Center, IFAS, Housing Divisions, the construction manager shall coordinate well in advance of 10 days prior to any outage request with the project manager and the appropriate divisions and coordinate those planned outages.

1.3 DIG PERMITS

A. All trenching, excavation, digging operations, or other penetration of the ground within the confines of the University campus or in any area for which

the University has responsibility, requires the Builder to obtain a Dig Permit, Facilities Services Form 611, which can be retrieved from the Facilities Services website at www.facilitiesservices.ufl.edu .

B. The person, Builder, agency, or organization that will be performing the trenching, excavation, digging, or other ground-penetrating activity is responsible for requesting and obtaining permission to perform that activity.

C. All Dig Permits shall be applied for 72 hours prior to the start of any work that penetrates the ground. Contact the Dig Permit Office at (352) 392-5781 located at Utilities and Energy Services 902 Magnolia Drive, Building 702, Rm 130G in the Utilities Department, Gainesville, Florida 32611-7700. The CM Representative will need to meet with a Line Locate Technician to discuss the exact request and to present a sketch or picture what is being requested to determine if a permit will be required or what other steps may be needed.

If a permit is required, the construction manager will need to call the Sunshine State One-Call (811) with the dig information. Sunshine State One-Call (811) will coordinate with the Dig Permit Office to locate utilities not under control of the Dig Permit Office and they will notify the Dig Permit Office of their utilities information.

The Dig Permit Office will have 2-3 business days to respond to this request. Once notification has been received from Sunshine State One-Call (811), the Dig Permit Office will send an email notification with application and requirement information to the construction manager. The construction manager shall read the Dig Permit Procedures for complete definitions and procedures.
To complete the Dig Permit application, the construction manager shall have the sunshine state ticket number that was provided when called available for this application in order to complete the Dig Permit application form. This form is available electronically and the form will need to be signed and submitted electronically with a valid digital signature. Facilities Services is no longer accepting handwritten applications. Please note that the application is not a valid permit until it is signed by the Dig Permit Office. The Line Locate Technician will mark the location and will complete the application form and email it to the contact information provided. Construction manager will need to call the Dig Permit office to meet at the jobsite prior to the work beginning. The Dig Permit must be visible at all times at the work site.

D. Sunshine State One-Call (800-432-4770) shall be utilized for utilities owned by others, including Cox Cable, and Gainesville Regional Utilities (GRU) and others communications firms.

END OF SECTION

01060 Regulatory Requirements

PART 1 – GENERAL

1.1 RELATED SECTIONS

A. Documents affecting the work of this Section include other elements of the Contract for Construction, including the Owner/Builder Agreement or Owner/Design-Builder Agreement, the General Terms & Conditions, other sections of the Division 0 and Division 1 non-technical specifications, and the technical plans and specifications.

1.2 BUILDING CODE ENFORCEMENT PROGRAM

A. TITLE XLVIII (Florida K-20 Education Code) and Chapter 553.80(6) F.S. assign responsibility to the State University System for the enforcement of the Florida Building Code and the Florida Fire Prevention Code during building construction and renovation at State universities. At the University of Florida, the Environmental Health and Safety Division (EH&S) has been assigned the responsibility to implement and administer the Building Code Permit and Inspection Program. Program compliance requires that construction plans/specifications and permit application documents be submitted to the UF Building Code Administrator (EH&S) for review. Construction shall not begin on the project until a building permit has been issued by EH&S and the permit posted at the construction site.

B. A more complete description of the University of Florida's Building Code Enforcement Program may be obtained from the University's Building Code Administrator.

EH&S Building Code Enforcement
Building 179, 916 Newell Drive, P.O. Box 112190, Gainesville, FL, 32611-2200
Phone: (352) 392-1591; Fax (352) 392-3647
Internet: www.ehs.ufl.edu

C. RESPONSIBILITIES

1. The duly licensed State of Florida contractor shall apply to the UF Division of Environmental Health & Safety for a building permit. At the time of application for a permit, the Builder shall provide two sets of signed and sealed construction documents and specifications, a list of all subcontractors with appropriate license numbers and proof of Worker’s Compensation insurance, and the "letter of code compliance" indicating the plans have been reviewed by EH&S and all outstanding code and safety-related items have been resolved. If a "letter of code compliance" has not been issued by EH&S, two copies of the final construction (bid) documents and specifications must

accompany the application. A building permit will be issued after the documents have been reviewed for code compliance by the Building Code Administrator/staff. One of the submitted sets of plans and specifications will be returned with the building permit placard and shall be stamped by EH&S stating "Reviewed for Code Compliance." This set of documents shall be protected and kept on site by the contractor for use by EH&S code enforcement.

2. When the contractor has completed the project per the permit documents and submitted all required tests and reports, their authorized representative shall request in writing a certificate of completion or certificate of occupancy from the UF/EH&S Building Code Administrator as required by the Florida Building Code.

1.3 LIFE SAFETY & FIRE SAFETY PLAN REVIEW

A. In conjunction with review of plans for Building Code Compliance EH&S has been assigned the duty of life safety & fire safety plan review and inspection of UF construction projects.

B. Plan review shall be conducted as each project is submitted for building code compliance review. A separate submission will not be required for this review phase as it will be conducted simultaneously with the building code compliance review.

C. Inspections of life safety items shall be scheduled through EH&S's normal inspection process.

D. Prior to issuance of the certificate of occupancy or completion EH&S's fire plans reviewer and inspector shall certify that the project meets or exceeds all life and fire safety minimum codes and standards.

1.4 FLORIDA PRODUCT APPROVAL

As required by Florida Statutes, the Builder shall provide information on certain structural and building envelope products and components. See "Florida Product Approval Info Sheet" on the "Forms" page of the EH&S Building Code Enforcement website (www.ehs.ufl.edu/buildcode).

END OF SECTION

01310 Construction Schedules

PART 1 – GENERAL

1.1 RELATED SECTIONS

A. Documents affecting the work of this Section include other elements of the Contract for Construction, including the Owner/Builder Agreement or Owner/Design-Builder Agreement, the General Terms & Conditions, other sections of the Division 0 and Division 1 non-technical specifications, and the technical plans and specifications.

B. Refer to Section 01016, Utility Outages, for related requirements regarding the pre- planning of utility outages.

C. Comply with pertinent provisions of technical specifications.

1.2 QUALITY ASSURANCE

A. Employ, if necessary, a scheduler who is thoroughly trained and experienced in compiling construction schedules, and in preparing and issuing periodic reports as required.

PART 2 – PRODUCTS

2.1 CONSTRUCTION ANALYSIS

A. Graphically show by bar chart the order and interdependence of all activities necessary to complete the Work, and the sequence in which each activity is to be accomplished, as planned by the Builder in coordination with all subcontractors whose work is shown on the diagram.

B. Highlight the “critical path” through the schedule to illustrate those inter-dependent activities that cannot be delayed without impacting the overall completion time.

C. Builder shall coordinate the Work with the University of Florida schedule. The Work shall be scheduled and carried out such that the normal operations of the University are given first priority. This applies particularly to outages of utilities and restrictions of access. The University may require such construction operations to be executed outside of normal working hours and by overtime, weekend, and holiday working. It shall be the Builder's responsibility to provide for this in the Cost of Work.

D. See Section 01014 for information on home football game restrictions, and account for same in the construction schedule.

E. Incorporate commissioning requirements and milestones.

F. Provide amplifying information as needed, such as reports on "float," or as requested by the Owner or Professional.

END OF SECTION

01352 Requirements for Sustainability Certification - NOT APPLICABLE

PART 1 – GENERAL

1.1 RELATED SECTIONS

A. Documents affecting the work of this Section include other elements of the Contract for Construction, including the Owner/Builder Agreement or Owner/Design-Builder Agreement, the General Terms & Conditions, other sections of the Division 0 and Division 1 non-technical specifications, and the technical plans and specifications.

1.2 SUMMARY

A. Seeking high performance, energy-efficient, and sustainable buildings, and in compliance with State law (F.S. 255.252), the University of Florida requires new construction and certain addition or renovation projects to be designed and constructed to achieve certification by one of (3) "green" rating systems:

1. Leadership in Energy and Environmental Design (LEED) by the United States Green Building Council (USGBC)
2. Green Globes by the Green Building Initiative
3. Florida Green Building Coalition (FGBC)

B. Each of these rating systems provide a complete framework for assessing building performance and meeting sustainability goals, with a specific focus on strategies for site development, water savings, energy efficiency, material specifications and procurement, and indoor environmental quality.

C. This section includes general requirements and procedures for compliance with certain prerequisites and credits needed to obtain certification under any of the (3) rating systems listed above.

1. Certain prerequisites and/or credits needed to obtain certification depend upon material selection and procurement. Compliance with requirements needed to obtain certification prerequisites and/or credits should be considered in the evaluation of substitution requests or comparable product requests.

2. Certain other prerequisites and/or credits needed to obtain certification depend upon the design professionals' design; established systems and protocols at the University of Florida; and other aspects that are not part of the Work.

3. Owner shall register the project with, apply for certification to, and pay all registration and certification fees owed to, the certifying entity.

4. Owner will administer the certification process.

5. Builder shall assign a representative – preferably someone with sustainability certification experience and/or accreditation – to serve as the primary point of contact, “champion,” and coordinator of all construction-phase certification efforts by the builder and its subs.

6. Builder shall participate in sustainability certification-related meetings with the Owner and design professional(s) monthly during construction, or as needed.

7. Builder shall communicate all certification-related requirements to potential subcontractors and bidders as part of the pre-qualification, selection, and procurement process.

8. Builder shall review certification requirements, milestones, and action items with its sub-contractors during weekly sub-contractor meetings.

9. Failure to provide timely submittals related to certification may result in additional retainage being withheld.

10. Builder shall compile, document, calculate, and otherwise complete all construction-related certification documentation prior to Owner’s determination of project Final Completion. This includes providing electronic copies of certification-related submittals, reports, and other documents via Sharepoint and other online platforms such as LEED Online as needed to quantify and illustrate construction-phase credits.

11. Owner will provide certification-related training for the Builder and its subs as needed and requested.

1.3 DEFINITIONS

A. Chain-of-Custody Certificates: Certificates signed by manufacturers certifying that wood used to make products was obtained from forests certified by an FSC-accredited certification body to comply with FSC STD-01-001, "FSC Principles and Criteria for Forest Stewardship." Certificates shall include evidence that manufacturer is certified for chain of custody by an FSC-accredited certification body.

B. Environmental Product Declaration (EPD): A transparent and objective report that communicates what a product is made of and how it impacts the environment across its entire life cycle. EPDs are required to meet one of the following standards ISO 14021-1999, ISO 14025-2006, or ISO 21930-2007.

C. Extended Producer Responsibility: Measures undertaken by the maker of a product to accept its own and sometimes other manufacturers products as

postconsumer waste at the end of the products useful life. Producers recover and recycle the materials for use in new products of the same type.

D. Forest Stewardship Council (FSC – www.fscus.org): Non-profit organization devoted to encouraging the responsible management of the world's forests.

E. Health Product Declaration: The end use product has a published and complete and full disclosure of known hazards in compliance with the Health Product Declaration open Standard.

F. Lifecycle Assessment (LCA): A cradle to grave or cradle to cradle analysis technique to assess environmental impacts associated with all states of a project's life, which is from raw materials extraction through materials processing, manufacture, distribution, and use. LCA provide global impact results including potentials in acidification, eutrophication, global warming, ozone depletion, smog formation, etc. Consider use of software such as Athena or Tally (REVIT plug-in) to conduct an LCA.

G. Rapidly Renewable Materials: Materials made from plants that are typically harvested within a 10-year or shorter cycle. Rapidly renewable materials include products made from bamboo, cotton, flax, jute, straw, sunflower seed hulls, vegetable oils, or wool.

H. Regional Materials: Materials that have been extracted, harvested, or recovered, as well as manufactured, within a certain distance from the project site (distance varies depending on the rating system). If only a fraction of a product or material is extracted/harvested/recovered and manufactured locally, then only that percentage (by weight) shall contribute to the regional value. Mechanical, electrical, plumbing, and specialty items shall be excluded from this calculation.

I. Recycled Content: The percentage by weight of constituents that have been recovered or otherwise diverted from the solid waste stream, either during the manufacturing process (pre-consumer), or after consumer use (post-consumer).

1. "Post-consumer" material is defined as waste material generated by households or by commercial, industrial, and institutional facilities in their role as end users of the product, which can no longer be used for its intended purpose.

2. "Pre-consumer" material is defined as material diverted from the waste stream during the manufacturing process. Specifically, discarded materials from one manufacturing process that are used as constituents in another manufacturing process. Excluded is reutilization of materials such as rework, regrind, or scrap generated in a process and capable of being reclaimed within the same process that generated it.

3. Recycled content value is determined by multiplying the recycled fraction of the assembly (by weight) by the cost of assembly.

J. Red List Building Materials: Organized through the International Living Future Institute (ILFI), the Red List contain chemicals that have been designated as harmful to living creatures, including humans, or the environment. These products are expected to be phased out of production due to health concerns. Consider utilizing the Declare Product Database to identify if a product contains any red list materials.

1.4 SUBMITTALS

A. General: Provide additional submittals as required by other sections, highlighting or annotating as needed to illustrate the sustainability-related information.
01352-4

B. Certification-related submittals may be in addition to other submittals. Reference and comply with guides published for the particular certification being pursued (LEED, Green Globes, or FGBC).

C. Project Materials Cost Data: Provide a statement indicating the total cost for materials used (excluding labor, overhead, and profit). Include breakout of costs for the following categories of items:
1. Fixed/permanent furnishings
2. Plumbing
3. Mechanical
4. Electrical
5. Specialty items such as elevators and equipment
6. Wood construction materials

D. Environmental Product Declarations (EPD): Provide at least 20 EPDs for the building assembly and interiors to include any of the following options
a. Industry wide (Generic) EPDs: 3rd party verified Type III EPDs
b. Product Specific Declaration: 3rd party verified Type III EPDs
c. 3rd party certified life cycle product assessment based upon ISO 14040 and 14044, including a cradle to gate scope
d. 3rd party certifications based upon a multiple attribute standard developed by a consensus based process from an approved standard development organization (i.e. NSF sustainability assessment standards, UL Environment sustainability standards, sustainable forestry certifications, etc.)

E. Health Product Declarations (HPD): Provide at least 20 HPDs for the building assembly and interiors to include any of the following options
a. HPD Open Standard documentation
b. Cradle to Cradle certification
c. Declare product label as either Red List Free or Declared
d. ANSI/BIFMA e3 Furniture Sustainability Standard
e. NSF/ANSI 336: Sustainability Assessment for Commercial Furnishings Fabric

F. Progress Reports: Concurrent with each application for payment, submit a report explaining the status of certification-related efforts and documents.

PART 2 – PRODUCTS
A. To reduce a building's carbon footprint, regionally extracted, assembled and manufactured building materials are expected to have a precedent over other non-regional building materials.

2.1 RECYCLED CONTENT OF MATERIALS

A. Provide building materials with recycled content such that post-consumer recycled content plus one-half of pre-consumer recycled content constitutes a minimum of 25 percent of cost of materials used for the Work.

1. Cost of post-consumer recycled content of an item shall be determined by dividing weight of post-consumer recycled content in the item by total weight of the item and multiplying by cost of the item.

2. Cost of pre-consumer recycled content of an item shall be determined by dividing weight of pre-consumer recycled content in the item by total weight of the item and multiplying by cost of the item.

3. Do not include furniture, plumbing, mechanical and electrical components, and specialty items such as elevators and equipment in the calculation.

2.2 CERTIFIED WOOD (may or may not be applicable)

A. If applicable, provide a minimum of 50 percent (by cost) of wood-based materials that are produced from wood obtained from forests certified by an FSC-accredited certification body to comply with FSC STD-01-001, "FSC Principles and Criteria for Forest Stewardship."

1. Wood-based materials include, but are not limited to, the following materials when made from wood, engineered wood products, or wood-based panel products:

(a) Rough carpentry
(b) Miscellaneous carpentry
(c) Heavy timber construction
(d) Wood decking
(e) Metal-plate-connected wood trusses
(f) Structural glued-laminated lumber
(g) Finish carpentry
(h) Architectural woodwork
(i) Wood paneling
(j) Wood veneer wall covering
(k) Wood flooring
(l) Wood lockers
(m) Wood cabinets

2.3 LOW-EMITTING MATERIALS

A. Internal and external building materials are expected to minimize materials off gassing of chemicals that cause harm to both building occupants and construction tradespeople.

1. PERFORMANCE: Volatile organic chemical (VOC) limits, measured in grams/liter (g/l), have been established based on the product use type:

1. Adhesives and Sealants – Reduce VOC limits below SCAQMD Rule 1168, Adhesive and Sealant Applications emission requirements.
2. Carpet, Carpet adhesives, Flooring, and Floor Coverings - VOC not more than 50 g/L.
3. Interior Paints and Coatings – Reduce VOC content below California Air Resources Board (CARB) 2007, Suggested Control Measure (SCM) for Architectural Coatings, or the South Coast Air Quality Management District (SCAQMD) Rule 1113,
4. Do not use composite wood (including structural wood) or agrifiber products or adhesives that meet California Air Resources Board ATCM for formaldehyde requirements for ultra-low-emitting formaldehyde (ULEF)
5. Use building insulation materials that are formaldehyde free

2. PRESCRIPTION Alternatively, products can obtain 3rd party certification showing compliance to predetermined indoor air quality standards including the following;

i. EcoLogoM (Pains & Adhesives) – Environmental Choice
1. EcoLogo Standard for Adhesives – CCD-046
2. EcoLogo Standard for Paints – Architectural Surface Coatings CCD-047
3. EcoLogo Standard for Recycled Paints – Architectural Surface Coatings – Recycled Water-bourne CCD-048

ii. Green Seal ® (Paints & Adhesives)
1. Green Seal Environmental Standard for Paints and Coatings, GS-11
2. Green Seal Environmental Standard for Commercial Adhesives, GS-36

iii. GREENGUARD Environmental Institute
1. "Program Manual for GREENGUARD product Certification Programs" GG.PM.01.2009
2. GREENGUARD Environmental Institute: Standard Method for Measuring and Evaluating Chemical Emissions From Building Materials, Finishes and Furnishings Using Dynamic Environmental Chambers (GGTM.P066.R8 10-29-2008)

iv. Indoor Advantage Gold ™ - Scientific Certification systems.
1. California Department of Health Services Standard Practice for the Testing of Volatile Organic Emissions Sources Using Small Scale Environmental Chambers (CA/DHS/EHLB/R-174, July 15,2004 with Addendum 2004-01)
2. SCS-EC10.2-2007, Environmental Certification Program – Indoor Air Quality Performance, May, 2007

v. Carpet & Rug Institute's "Green Label Plus" program for floor coverings

vi. Floorscore Certification for hard flooring surfaces

PART 3 – EXECUTION
3.1 CONSTRUCTION WASTE MANAGEMENT

A. All construction projects are to develop a project specific construction waste management plan. Include at least 5 different waste streams to divert from our local landfills. This plan is to highlight either an onsite separation or commingled collection approach. The plan ought to include opportunities for source reduction such as prefabrication, modular construction or incorporate standard material lengths or sizes into project's design to eliminate waste.

B. If project scope includes demolition, conduct a walkthrough with project manager and include a list of materials to be salvaged for
1. Reuse – either through UF's Property Surplus services or shared with other UF department
2. Repurpose – collected and be donated to local non-profit or governmental entity
3. Recycled – large amounts of single type material to be shipped back to company for recycling (approximately 30,000sf of used carpet squares, approximate 16,000sf of acoustic ceiling tile)

C. Recycle and/or salvage at least 75% of construction, demolition, and land-clearing waste. Track and record waste streams by weight, and otherwise comply with Section 01505. A waste-to-energy incineration is not considered a viable approach.

3.2 SITE DISTURBANCE

A. Implement the erosion & sedimentation control plan required by the drawings and/or specification section 01500 and provide photos of in-place measures.

B. Limit site disturbance – including earthwork and clearing of vegetation – to 40 feet beyond the building perimeter, 5 feet beyond primary roadway curbs, walkways and main utility branch trenches, and 25 feet beyond constructed areas with permeable surfaces.

3.3 INDOOR-AIR-QUALITY MANAGEMENT DURING CONSTRUCTION

A. Develop and implement an Indoor Air Quality (IAQ) Management Plan to protect the HVAC system, control pollutant sources, and interrupt contamination pathways for the construction and pre-occupancy phases of the building.
01352-8

1. Meet or exceed the recommended approaches of the Sheet Metal and Air Conditioning National Contractors Association (SMACNA) IAQ Guideline for Occupied Buildings under Construction, 1995, Chapter 3.

2. Sequence the installation of materials to avoid contamination of absorptive materials such as insulation, carpeting, ceiling tile and gypsum wall board.

3. Protect stored on-site or installed absorptive materials from moisture damage.

4. Control and remove contaminants on the work site, including dust, dirt, spills, and other accumulated moisture.

5. If air handlers must be used during construction, filtration media with a Minimum Efficiency Reporting Value (MERV) of 8 shall be used at each return air grill, as determined by ASHRAE 52.2-1999. The use of this filtration will be inspected during Facilities Services inspections.

6. Replace all AHU filtration media immediately prior to occupancy. Filtration media shall be the same as used in the AHU's by Facilities Services.

a) . If the equipment has been contaminated with dust, moisture or other contaminates, all HVAC equipment must be steam cleaned and soft surfaces, such as duct work, must be brushed, dusted and vacuumed.

7. Provide 18 photographs (six photographs taken on three different occasions during construction), along with identification of the SMACNA approach featured by each photograph, in order to show consistent adherence to the protection requirements.

3.4 INDOOR-ENVIRONMENTAL-QUALITY TESTING

A. For new projects, major renovations, or remodel projects involving modifications to the HVAC system, projects are expected to meet EH&S Indoor Environmental Quality Policy OR comply with building flush-out requirements.

1. Indoor Air Quality Testing - Allocate enough time in construction schedule for indoor air quality testing and testing results to be presented prior to obtaining either a certificate of occupancy or temporary certificate of occupancy. Area testing may include multiple test per project size.

2. Building Flush-out - Specific requirements for building flush-out can be found in 3rd party sustainable building certification. To prove adequate flush out has occurred, ensure building automated system is trending points for outdoor air temperature, outdoor air humidity, outside are damper position, outdoor air flow rate, supply air temperature, and supply air humidity.

END OF SECTION

name CSEI number

01500 Temporary Facilities and Controls

PART 1 – GENERAL

1.1 RELATED SECTIONS

A. Documents affecting the work of this Section include other elements of the Contract for Construction, including the Owner/Builder Agreement or Owner/Design-Builder Agreement, the General Terms & Conditions, other sections of the Division 0 and Division 1 non-technical specifications, and the technical plans and specifications.

B. Utility outages and dig permits are covered in Section 01016. Permanent installation and hookup of the utility lines are described in the University of Florida Design and Construction Standards.

1.2 DESCRIPTION

A. WORK INCLUDED

Provide temporary facilities and controls needed for the Work, including, but not necessarily limited to:

1. Temporary utilities such as water, electricity, and telephone;

2. Field offices and sanitary facilities for the Builder's personnel;

3. Enclosures such as tarpaulins, barricades, and canopies; traffic control and pedestrian control devices;

4. Erosion control measures; and

5. Directional and informational signage.

B. WORK NOT INCLUDED

1. Except for the requirement that equipment furnished by subcontractors shall comply with pertinent safety regulations, such equipment as normally furnished by the individual trades in execution of their own portions of the Work, is not part of this Section.

2. The permanent installation and hookup of utility lines are described in other sections and are not part of this Section except as related to the metered cost of such utilities once established.

1.3 PRODUCT HANDLING

Maintain temporary facilities and controls in proper and safe condition throughout progress of the Work.

1.4 SUBMITTALS

A. The Builder shall present a jobsite management plan in the form of a scaled, marked-up site plan for the Owner's review at or prior to the Pre-Construction Conference. This drawing shall identify, at a minimum:

1. Temporary fencing with gated point(s) of access
2. Materials delivery & storage areas
3. Field office or storage trailers
4. Temporary accessibility features including paved or unpaved roads, sidewalks, bicycle paths, ramps, curb cuts, canopies, barricades, or other means of maintaining safe and ADA-accessible routes through or around the site
5. Waste collection (dumpsters)
6. Signage and striping
7. Paths for emergency egress
8. Onsite staff parking
9. Tree protection
10. Restricted access routes for vehicles and equipment belonging to the Builder and its subcontractors, vendors, and employees entering upon the UF Campus

B. As construction progresses, the Builder shall identify any required disruptions or restrictions of roads, sidewalks, bicycle lanes, or other means of access. Approval for such disruptions shall be secured prior to scheduling related work by submitting a written request to the University project manager. This request shall be accompanied by a site sketch, start and end dates, an explanation of the reasons(s) for the request, and an illustration or description of the temporary controls to be used to maintain safe access. The full closing of vehicular roads (i.e., all lanes) on the UF campus shall be planned several weeks in advance of panned scheduled restrictions and has gone through the approval process by the University project manager.

C. A formal traffic control plan – including credentials of plan developer – shall be submitted for review when lane closures are anticipated. See paragraph 3.1 of this section.

PART 2 – PRODUCTS

2.1 TEMPORARY UTILITIES

A. USAGE, ESTABLISHMENT, and COST

1. The Builder shall include in the Cost of Work both the installation of any temporary utilities and the (monthly) usage fees for same. This includes, but

is not limited to: potable water for drinking and/or construction trailers; water for cleaning, construction, flushing, commissioning, and testing of plumbing and mechanical systems; convenience power for tools, lighting, and/or construction trailers; temporary power for construction and testing; telecommunications lines for phone, fax, or Internet service. Current Facilities Services utility rates can be viewed at https://www.facilitiesservices.ufl.edu/information/rates.shtml.

2. For use of University-owned utilities, the Builder shall establish an account with Facilities Services by contacting Facilities Services Billing at (352) 294-0628 to learn the process for creating the account.

3. Prior to beginning work that involves connections to the University's utilities systems, the Builder shall submit – at least 48 hours in advance – a work request to Facilities Services Work Management (392-1121) for installation of temporary meter(s) by Facilities Services Utility Services.

B. WATER

1. The point(s) of connection shall be designated by Facilities Services.

2. A temporary potable water meter will be furnished and installed by Facilities Services Water Distribution group when water connection is to a Fire Hydrant.

3. All other water connections will be billed off existing meters.

4. Builder shall furnish and install all necessary temporary piping and water supply and, upon completion of the Work, remove same.

C. ELECTRICITY

1. The point(s) of connection shall be designated by Facilities Services.

(a) **PLEASE NOTE:** Any remodeling/renovation or project that requires Temporary Power for contractor's trailers onsite it is Mandatory that Facilities Services Utilities Department shall be contacted for requirements for metering, no other entity shall decide or grant if meter is required!

2. A temporary electric meter will be furnished by Facilities Services Utility Services, which shall also energize service, but installed by the Builder. Allow 14 days lead time for the Owner-furnished meter. The Builder shall furnish and install all necessary related accessories (CTs, compatible meter socket/can, etc.).

(a) All Accessories (CT's, Compatible meter socket/can) to be designated exclusively any Facilities Services Meter Department prior to installation of any electric metering equipment.

3. Builder shall furnish and install all necessary temporary wiring and, upon completion of the Work, remove same.

   (a) Facilities Services Meter Department shall be notified prior to temp Electric meter being removed from service and once removed shall be returned to Facilities Services Meter Department

   (b) All temporary wiring provided by the Builder must conform to the requirements of the National Electric Code (NEC), the Industrial Safety Commission, and local requirements. In addition, all wire used shall be fused to adequately protect that wire according to the NEC.

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

   (d) Where temporary lighting is used, outlets shall consist of a weatherproof socket properly insulated and provided with a locking type wire guard.

   (e) All devices shall be properly grounded.

4. Provide area distribution boxes located such that the individual trades may furnish and use extension cords 100 feet in length (maximum) to obtain power and lighting at points where needed for work, inspection, and safety.

5. Temporary electric facilities shall be inspected and approved by Facilities Services and EH&S prior to energizing by Facilities Services Utility Services.

6. In keeping with UF sustainability policies, and to minimize the cost of utility services, the Builder shall minimize the use of temporary or permanent lighting, particularly when the jobsite is inactive. The use of energy efficient lamps is encouraged if the energy savings justifies any additional expense.

D. TELEPHONE and INTERNET

1. The Builder shall make arrangements with UF Information Technology (UF IT) or HealthNet – as applicable – or the local utility for temporary phone, fax, and/or Internet service lines.

E. SANITARY FACILITIES

1. Furnish and install temporary sanitary facilities for use by all construction personnel.

2. The Builder shall provide and maintain in a neat and sanitary condition such accommodations for the use of employees and subcontractors as may be necessary to comply with the regulations of the State Board of

Health.

3. Unless expressly allowed by the Own`````er, existing sanitary facilities may not be used by construction personnel, subcontractors, or vendors.

2.2 PERMANENT (BUILDING) UTILITIES

Once permanent power, chilled water, and other permanent metered utilities are established, the cost of such utilities shall be borne by the Builder as a cost of the Work.

Utility services will not be provided until new meters are installed and certified to be operating properly by Facilities Services Utility Services.

2.3 FIELD OFFICES AND SHEDS

A. TRAILERS – Office and Storage

1. Provide stairs and railings as required by OSHA.

2.4 ENCLOSURES

A. GENERAL: Provide and maintain for the duration of construction all scaffolds, tarpaulins, canopies, steps, platforms, bridges, and other temporary construction necessary for proper completion of the Work in compliance with pertinent safety and other regulations.

B. DUMPSTER ENCLOSURES: For all projects requiring dumpsters, where the dumpster is located within the geographical area of campus bounded by SW 13th Street, West University Avenue, Gale Lemerand Drive, and Stadium Road, the dumpster shall be enclosed by a solid wooden fence installed around the entire perimeter. This fence shall be a minimum of 6' high and shall be constructed of vertical 1 x 6's on a 2 x 4 frame. Pre-fabricated sections are acceptable.

1. Protection of all hardscape and landscape must be provided for the storage and removal of all dumpsters.

C. TREE PROTECTION: See tree protection guidelines, Appendix I, University of Florida Construction Standards, Volume 1. Tree protection applies for all trees, weather they are inside or outside any fenced areas.

2.5 TEMPORARY FENCING

A. Provide and maintain for the duration of construction a temporary fence to prevent entry of the public into the jobsite. Fencing shall be six-foot high chain link fencing with dark green-colored inlaid fabric mounted on fixed posts of metal for temporary parking and work area. Open trenches and other hazards shall be enclosed in a fixed wire fence with flashing lights.

B. Maintain the security, lighting and appearance of fencing throughout construction.

2.6 EROSION and SEDIMENTATION CONTROL

A. The Builder shall develop a “Sedimentation and Erosion Control Plan” per the UF Design & Construction Standards (Appendix C).

B. This plan shall be submitted for review and approval prior to beginning any onsite work or applying for dig permits.

C. The Builder shall erect and maintain control measures as outlined in the plan throughout construction. Such measures may include gravel “wash-down
stations” at jobsite entry and exit points, silt fencing, and temporary grass seeding.

D. See Section (insert applicable Div. 2 spec section #) for more information.

2.7 SIGNAGE

A. Install and maintain the appearance of the standard University of Florida Board of Trustees Project Sign in a location directed by the University Project Manager.

B. Florida Statutes 812.014 and 810.09 require that construction fences be adorned with the following sign: "**WARNING** *(red on white)* - **This area is a designated construction site. Anyone trespassing on this property shall, upon conviction, be guilty of a felony**." *(black on white)* Signs shall be approximately 14" x 18".

C. Post the following notice on each leg of construction fencing:
"Immediately report sexual harassment from anyone at this construction site. Students contact the Deputy Title IX Coordinator for Students (352.392.1261). All others contact the Title IX Coordinator (352) 273-1094**)."**

D. Provide way-finding, directional, and other informational signage as needed to safely accommodate the public's need to pass around or through the Work. This shall include, as needed, directional assistance for ADA-compliant paths of travel throughout the duration of construction.

E. No other signs or advertisements are permitted.

2.8 CLEANLINESS

The Builder shall keep the premises free from accumulation of waste material and rubbish, and shall remove from the premises all rubbish, implements, surplus materials, and temporary facilities provided during the course of the Work, leaving spaces broom clean.

PART 3 – EXECUTION

3.1 INSTALLATION

A. The Builder shall not mobilize and/or erect temporary facilities until the jobsite management plan has been reviewed and approved by the Owner.

B. Prior to erection of fencing, the Builder shall review the proposed fencing plan onsite with the University Project Manager and representatives of EH&S, UFPD, Facilities Services and the Americans with Disabilities Act Office.

C. Directional signage shall be installed simultaneously with fencing and/or temporary roads or paths.

D. Traffic maintenance devices and procedures (signage, barricades and cones, flagmen, etc.) shall be per Florida Department of Transportation (FDOT) standards (2003 Edition, Manual on Uniform Traffic Control Devices (MUTCD), with Revision No. 1 Incorporated, dated November 2004). Work zone traffic control schemes and devices shall only be implemented or installed in the field by or under the direct supervision of a person who has satisfactorily completed the training requirements prescribed by FDOT Topic No: 625-010-010-f, "MAINTENANCE OF TRAFFIC TRAINING," Work Zone Traffic Control and Maintenance of Traffic Intermediate or Advanced Level as appropriate for the project. All flagmen shall have successfully completed the Work Zone Traffic Control and Maintenance of Traffic - Basic Level.

3.2 WEATHER PROTECTION

A. Take necessary precautions to ensure that roof openings and other critical openings in the building are secured. Take immediate actions required to seal off such openings when rain or other detrimental weather is imminent, and at the end of each workday. Ensure that the openings are completely sealed off to protect materials and equipment in the building from damage.

B. When a warning of gale force (or higher) winds is issued, take precautions to minimize danger to persons, and protect the work and nearby Owner property. Precautions shall include, but are not limited to, closing openings; removing loose materials, tools, and equipment from exposed locations; removing or securing scaffolding and other temporary work; and arranging for all dumpsters to be emptied.

3.3 MAINTENANCE AND REMOVAL

A. Maintain temporary facilities and controls as long as needed for safe, compliant, and proper completion of the Work.

B. Remove temporary facilities and controls as rapidly as progress of the Work will permit, or as directed by the Owner.

C. Replace any trees, shrubs, lawns, or plantings damaged by Builder or its subcontractors or vendors during work of this project within two (2) weeks of occurrence.

D. Grassed areas generally have irrigation systems below grade; verify location of these systems and all underground utilities in work or staging areas prior to start of construction.

E. Repair utilities damaged by work of this project.

END OF SECTION

01505 Construction Waste Management

PART 1 – GENERAL

1.1 RELATED SECTIONS:

A. Documents affecting the work of this Section include other elements of the Contract for Construction, including the Owner/Builder Agreement or Owner/Design-Builder Agreement, the General Terms & Conditions, other sections of the Division 0 and Division 1 non-technical specifications, and the technical plans and specifications.

B. Comply with LEED requirements, if applicable. See specification section 01352.

1.2 HAZARDOUS SUBSTANCES

A. The builder is responsible for proper management of hazardous substances used, stored, handled, generated, or disposed of by his own construction activities (e.g., excess or unwanted hazardous construction-related materials, including, but not limited to: equipment lubricants, used oil filters, aerosols, paints, activators, adhesives, caulks, and other hazardous wastes). In no case shall such construction hazardous waste be commingled with demolition hazardous waste. In no case shall such construction hazardous waste be commingled with non-hazardous construction or demolition waste.

B. For renovation or demolition projects, hazardous wastes shall be segregated, collected, labeled, and disposed of via UF Environmental Health & Safety (EH&S). These include light fixture ballasts (PCB and non-PCB), mercury thermostats, and batteries. See www.ehs.ufl.edu/programs/chemrad_waste.

C. Evaluation, on-site storage, transportation, disposal and other aspects of Hazardous Waste Management shall comply with applicable Federal, State, and local laws.

D. Refer to the General Terms & Conditions for requirements related to the discovery of environmental contamination, including, but not limited to, Hazardous Substances.

1.3 CONSTRUCTION WASTE MANAGEMENT

NOTE: This section only applies to projects with a construction cost of $500,000 or more.

In support of Florida Statute 403.7032 and the University's Zero-Waste Goal, the University of Florida requires that its builders maximize the diversion of construction and

demolition (C&D) material from landfills. Faculty and students from the UF School of Building Construction and the College of Design, Construction, and Planning may interact with the Builder to facilitate, coordinate, and document such efforts and/or to conduct research.

A. Beyond the provisions for such work in either the basic scope of work or bid alternates, the builder shall salvage materials for reuse, resale, or recycling to the maximum extent possible. Typical designated waste streams include land clearing debris, concrete and masonry, metals and appliances, dimensional wood & lumber, wooden pallets, gypsum wallboard (unpainted), paper and cardboard, packaging, and asphalt roofing shingles. Depending on the project, other large volume wastes may be included (e.g., bricks, asphalt, carpeting and pad, plastic, glass, beverage containers).

B. For projects seeking a 3rd-party sustainable building certification, the Builder shall establish and adhere to program-specific waste diversion and recycling goals.

C. Prior to mobilization, the Builder shall submit a project-specific Solid Waste Management Plan to the University Project Manager for review by the University Solid Waste Coordinator and Sustainable Building Coordinator. This plan shall include the following elements:

1. An explanation of how C&D waste will be recycled or reused – by source separation, time-based separation, or commingled for delivery to an offsite separation facility.

2. A list of materials targeted for recycling and reuse, their estimated quantities, and the predicted end use of the recycled materials, along with a separate list of recyclable or otherwise recoverable materials that must be landfilled.

3. The overall diversion goal (percentage of waste to be diverted from land- filling or incineration).

4. The facilities to be used, both landfills and recycling facilities, indicating which of the targeted wastes are to be received, projected quantities, facility addresses and phone numbers, and documentation of the facilities' permit status.

D. Builder shall designate an onsite representative to distribute and implement the approved plan, instruct workers, and provide instruction and supervision on separation, handling, and recovery methods. The onsite representative shall also ensure proper labeling of waste collection receptacles and otherwise monitor compliance with the project-specific Solid Waste Management Plan.

E. Reporting

1. Submit monthly progress reports using Owner's form (see sample Waste Reporting Log at the end of this specification) to quantify the total amount of collected waste and the percentage recycled.

2. Maintain accurate records of the final destination of all waste, including manifests, weight tickets, and receipts. Manifests shall be from recycling and disposal site operators who can legally accept the materials for the purpose of reuse, recycling, or disposal. Submit all such records at the end of construction or upon request.

1.4 RECYCLING INITIATIVES

For renovation and demolition projects, the builder and its subcontractors shall cooperate with, and participate in, materials-specific recycling initiatives hosted or supported by the University as required by the UF Design & Construction Standards. See plans and/or technical specifications for more information.

END OF SECTION

UF Waste Reporting Log

Project Name:							Date:							
			RECYCLED WASTE											
MONTH	Landfilled Waste (tons)		Paper and Cardboard (tons) white and craft	Metals (tons) metal and wire	Concrete, Asphalt, Masonry (tons) asphalt, concrete, brick, CMU, etc.	Comingled Cans & Bottles (tons)	Land Clearing Debris (tons) trees, limbs, landscape, sod, rocks etc	Pallets (tons)	Wood (tons) recyclable products	E-Waste (tons) controls, panels, machinery	MISC. (tons) shingles, dry wall, ceiling tile, plastics etc			
January	0.00		0.00											
February	0.00		0.00											
March	0.00		0.00											
April	0.00		0.00											
May	0.00		0.00											
June	0.00		0.00											
July	0.00		0.00											
August	0.00		0.00											
September	0.00		0.00											
October	0.00		0.00											
November	0.00		0.00											
December	0.00		0.00											
													Total Recycled Tons	Total Waste Tons	Percent Recycled
Total	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00	0.00	#DIV/0!
Minimum 75% required per F.S. 403.7032															
Builder shall submit this form on or around the 15th of each month to PPD Grounds (damorris@ufl.edu and amasters@ufl.edu), with a copy to the UF PM.															

01700 Project Closeout

PART 1 – GENERAL

1.1 RELATED SECTIONS:

Documents affecting the work of this Section include other elements of the Contract for Construction, including the Owner/Builder Agreement or Owner/Design-Builder Agreement, the General Terms & Conditions, other sections of the Division 0 and Division 1 non-technical specifications, and the technical plans and specifications.

1.2 CERTIFICATE OF OCCUPANCY

Prior to occupancy of a new building, the Division of Environmental Health & Safety (EH&S) shall issue a Certificate of Occupancy (CO). The CO will state the building is complete, constructed in accordance with the plans and specifications, and meets the minimum code requirements at the time of issuance of the building permit. Project must achieve at least a temporary CO in order to achieve this requirement for the Substantial Completion.

1.3 SUBSTANTIAL COMPLETION

Separate and distinct from completion requirements related to life safety and building codes is the contractual obligation to achieve Substantial Completion on or before the specified date. Refer to the “Construction Inspection and Closeout” link under “Forms & Standards” on the Planning Design & Construction website (www.facilities.ufl.edu). Checklists and forms related to closeout shall be tailored by the Owner and design professional (A/E) to the specific needs of the project.

1.4 AS-BUILT DOCUMENTS

See the General Terms & Conditions and certain technical specifications for more information regarding as-built / record documents.

1.5 O&M MANUALS

A. Builder shall provide draft operation and maintenance (O&M) manuals and other documents for review by UF (Facilities Services), the A/E, and the CxA prior to manufacturer startups, Cx Functional Performance Testing, and Owner training.

B. Builder shall tailor the O&M documents to the project, excluding or striking through models/types not installed and otherwise including only information pertinent to the products, materials, equipment, or components actually installed. Builder shall clearly identify each item, with references to the construction documents as needed.

C. Builder shall augment O&M documents with the final approved versions of any submittals, shop drawings, or other system/product data not already included.

D. Builder shall finalize turnover/closeout documents (including O&Ms) by addressing review comments and incorporating missing or finalized documents, test reports, and other relevant information.

E. See 1.9 below for content and format requirements.

F. Asset Tagging – Builder shall identify and work with UF to ensure all assets are in Owner CMMS prior to Substantial Completion.

1.6 UTILITY VIDEOS

When required by the technical specifications, television camera videos of underground utility lines shall be provided to the engineer of record and the Owner in MPEG or AVI format.

1.7 OWNER TRAINING

A. Training on building systems, equipment, and materials, the specific requirements for which are outlined in the technical specifications, shall be completed prior to Substantial Completion, at which point the Owner assumes the responsibility for operation and maintenance of the facility.

B. Builder shall coordinate the schedule for training with UF and provide a comprehensive schedule for all training sessions at least 30 calendar days prior to the first scheduled session.

C. Builder shall provide – at least two weeks in advance of each scheduled session – a syllabus, outline, or agenda for each training session for review by UF, the A/E, and (for commissioned systems) the CxA.

D. Training shall be conducted with the (draft) O&M manuals in hand – preferably in conjunction with commissioning activities – and shall be videotaped and turned over to the Owner in MPEG format.

1.8 ATTIC STOCK

Coordination of the physical storage location of “attic stock” items shall be made with the building operation & maintenance entity prior to Substantial Completion, and the items and quantities of same (as outlined in the technical specifications) shall be on hand as a requirement of Substantial Completion. The Builder shall develop a spreadsheet itemization of attic stock and other items to be turned over to the Owner, tracking the type and quantity of material, date(s) of turnover, and other relevant information.

A. If attic stock is used during the closeout or warranty period. The Builder must replace these materials prior to the 12 month warranty sign off.

1.9 ENERGY REBATE PROGRAM

Builder shall gather product data and other information as needed to assist Owner with its application for energy rebates based on the materials and products installed in the facility.

1.10 PRE-CONCEALMENT PHOTOS

A. For all new construction and for renovation major projects involving utility/systems infrastructure that will ultimately be concealed behind walls, above removable or hard ceilings, or beneath raised flooring – digital photographs of the infrastructure shall be taken prior to concealment as part of the completion / closeout documents. This will be determined in a project by project basis, but by default, it shall be included unless told otherwise.
   1. Images shall be captured after all infrastructure work for the area being photographed is complete and inspected, prior to concealment

B. Images shall be captured for each room constructed or renovated, including common & support spaces, corridors, stairwells, etc.
   1. For areas that cannot be captured with a single image, multiple images or panoramic views shall be provided.

C. Images shall be named, organized, and correlated with floor plans as needed to make clear what each image is actually depicting. Alternatively, images may be linked from to the as built design model or 2D (PDF) floor plan(s).

1.11 CLOSEOUT DOCUMENTS and OTHER DELIVERABLES

A. The final version of all O&M manuals and other turnover/closeout documents shall be provided in electronic (searchable PDF) form prior to Final Completion, including a Table of Contents for each discreet manual. Provide these to UF, the A/E, and the CxA on CD-ROM or through a file-sharing platform (e.g., Sharepoint), assembled and organized in electronic folders as follows:

   010000 – General Requirements *(with subfolders for pre-concealment photos and other general information such as a complete list of subcontractors with contact information, a list/inventory of attic stock, and a final list/inventory of all colors & finishes)*

   210000 -- Fire Protection
   220000 – Plumbing
   230000 – HVAC
   250000 – BAS/Controls
   260000 – Electrical
   283000 – Fire Detection & Alarm

B. Other than 010000, each e-folder listed above, where applicable, shall include the following sub-folders to consistently organize the documents and material:

1. IOM Documents and Product Data
   {NOTE: IOM = Installation Operations & Maintenance}
2. Shop Drawings
3. Training *(including training agendas, sign-in sheets, and videos)*
4. Warranty Documents
5. Other *(e.g., test reports, underground utility videos, Master UL labels, meter data sheets, 3rd party certifications or inspections.*

END OF SECTION

01800 General Commissioning Requirements – BY OWNER

PART 1 – GENERAL

1.1 RELATED SECTIONS and DOCUMENTS

A. Documents affecting the work of this Section include other elements of the Contract for Construction, including the Owner/Builder Agreement or Owner/Design-Builder Agreement, the General Terms & Conditions, other sections of the Division 0 and Division 1 non-technical specifications, and the following technical plans and specifications:

(1) Division 3 – Concrete
(2) Division 4 – Masonry
(3) Division 7 – Thermal and Moisture Protection
(4) Division 8 – Doors and Windows
(5) Division 9 – Finishes
(6) Division 22 – Plumbing
(7) Division 23 – HVAC
(8) Division 25 – BAS / Controls
(9) Division 26 – Electrical
(10) Division 28 – Security and Access Control

B. A project-specific Commissioning Plan is typically developed upon completion of the submittal and shop drawing process, but a template/example Commissioning Plan may be made available to bidders upon request.

1.2 DEFINITIONS

A. **Acceptance Phase**: Phase of construction after startup and initial checkout when FPT, O&M documentation review, and facility and user training occurs.

B. **Basis of Design (BOD)**: Documentation of the primary assumptions and rationale behind design decisions that are made to meet the Owner's intent and project requirements. The BOD describes the assumptions used for sizing and selecting systems and components; site and environmental conditions or constraints; and other factors that led to decisions (e.g., codes, standards, operating conditions, functional goals, interior environmental criteria).

C. **Building Envelope**: The assembly of floor, wall/skin, and roof system components that are designed and intended to reduce the transfer of thermal energy and water vapor and to help eliminate water intrusion.

D. **Commissioning (Cx)**: (*per the National Conference on Building Commissioning*) A systematic process of assuring by verification and documentation, from the design stage to a minimum of one year after construction, that facility systems perform interactively in accordance with the design documentation and intent, and in accordance with the owner's operational needs, including preparation of operation personnel.

E. **Commissioning Consultant (CC)**: The professional consultant responsible to UF for facilitating the Cx program, directing/coordinating day-to-day Cx activities, and verifying that the design intent of the facility is satisfactorily achieved.

F. **Commissioning Plan (CP)**: The project-specific document prepared by the CC that describes all aspects of the commissioning process including roles & responsibilities, documentation requirements, and communication structures. At least two CPs shall be developed – one for building envelope systems and one for MEP systems.

G. **Deferred FPT**: FPT performed after Substantial Completion due to conditions that preclude the test from being performed in normal sequential order of project delivery.

H. **Design Professional (A/E)**: The team of design professionals responsible to the Owner for creating the Basis of Design and translating it into Construction Documents.

I. **Functional Performance Test (FPT)**: System-level test to verify integration, functionality, and/or operation using direct observation or other monitoring methods to assess system performance in comparison with the Basis of Design. The CC develops FPT procedures and coordinates, witnesses, and documents the testing, which is typically performed by the installing subcontractor or vendor after pre-functional checklists and start-ups are complete. *NOTE: FPTs are tailored to the actual equipment and products to be installed, so their development is contingent upon completion of the submittal review process.*

J. **Construction Checklist (CL)**: List of tasks and elementary component tests that must be completed to ensure proper installation of products and equipment. CLs
– which are prepared by the CC, completed by the installing subcontractor or vendor, verified by the Builder, and reviewed by the CC – are primarily static inspections and procedures to prepare equipment or systems for initial operation, coordinated to represent the efforts of the Builder and all subcontractors. CLs shall include manufacturer startup checklists where applicable.

K. **Systems Manual**: The Systems Manual provides operating staff information needed to understand and optimally operate commissioned MEPF

(Mechanical, Electrical, Plumbing, Fire Protection) systems. The Systems Manual focuses on operation, rather than maintenance, at a systems level – particularly the interactions between equipment.

1.3 SUMMARY and DESCRIPTION OF WORK INCLUDED

A. The University of Florida's use of commissioning recognizes the integrated nature of building systems and the importance of a waterproof building envelope in
today's complex facilities. The performance of these systems impacts operating cost, efficiency and sustainability, indoor air quality, comfort and productivity in the workplace or classroom/lab, and security. The goal of commissioning is to help deliver facilities that meet or exceed expectations for these factors.
Strategies include periodic direct observation of envelope system construction and operation of dynamic building systems through their full range of intended and failure-mode operation.

B. The specific building systems to be commissioned on this project are:

(1) HVAC (including air handling units, VFDs, associated or supporting equipment, and TAB)
(2) ELECTRICAL (lighting controls)

1.4 SUBMITTALS

A. The CC shall be provided with one copy of all submittals, shop drawings, operation and maintenance (O&M) manuals, Test Adjust & Balance (TAB) reports, other tests conducted outside of the Cx process, and Owner training plans related to the systems being commissioned for review concurrent with the design professionals (A/E).

B. The Builder shall provide documentation required for Cx activities to CC at least two work days in advance of scheduled Cx activity and include same in O&M manuals. Such project-specific documentation shall include manufacturer and
model number of all equipment and components, manufacturer's printed installation and detailed start-up procedures, full sequences of operation, O&M data, performance data, any performance test procedures, control drawings,

startup plan(s), installation & checkout materials shipped inside equipment, and checkout forms used by factory or field technicians.

PART 2 – PRODUCTS

2.1 TEST EQUIPMENT

A. The Builder or its subcontractors shall provide all specialized tools, test equipment, and instruments required to execute startup, checkout, and FPT of systems and equipment.

B. Test equipment shall be of sufficient quality and accuracy to test and/or measure system performance according to specified tolerances.

(1) Test instruments shall bear a valid NIST-traceable calibration stamp.
(2) Frequency of calibration shall be in accordance with applicable NEBB or AABC requirements.
(3) See the technical specifications for amplifying information.

PART 3 – EXECUTION

3.1 ROLES and RESPONSIBILITIES

A. The CC shall:

(1) develop the CP(s);
(2) develop a spreadsheet-form itemized list of all products and equipment comprising the systems to be commissioned;
(3) review and respond to Cx-related Requests For Information concurrently with the A/E design professionals;
(4) review completed CLs, perform random verification of checklist items, and make recommendation to Owner to proceed with FPT;
(5) write, oversee execution of, and document FPTs;
(6) recommend acceptance of performance and functionality or remedial action and retesting;
(7) maintain and distribute lists of deficiencies and/or action items related to Cx activities;
(8) review, along with the design engineer(s), Owner training plan(s) provided by the Builder;
(9) produce draft and final Cx reports;

(10) plan, coordinate, and oversee periodic post-construction Cx testing, inspection, and troubleshooting – typically on a quarterly basis – during the 12-month "warranty" period following Substantial Completion; and
(11) produce the Systems Manual.

B. The Builder and its subcontractors shall:

(1) provide submittals and other documents as outlined below;
(2) provide samples and/or mockups as required by the technical specifications;
(3) verify installation, documenting via CLs as construction progresses;
(4) perform equipment start-up;
(5) verify the functional readiness of systems to be tested prior to scheduling FPTs;
(6) schedule FPTs by submitting completed CLs;
(7) conduct FPT in the presence of the CC;
(8) troubleshoot and correct deficiencies;
(9) perform FPT retests as needed (note: the costs for such retests, including those incurred by the CC, design A/E, and Owner, shall be borne by the Builder and not charged to the Owner);
(10) coordinate Cx activities with Building Automation System work and/or other tests related to the systems being commissioned, such as HVAC Test & Balance, tests by factory representatives, or envelope-related tests;
(11) finalize the products/equipment list drafted by the CC, augmenting the spreadsheet to indicate each component's manufacturer and model/type, dates for submittal approval and startup, and other relevant information;
(12) prepare an Owner training plan to include the time & date, duration, content, and proposed instructors for each session;
(13) conduct Owner training; and
(14) participate in the post-construction Cx activities outlined above and perform corrective measures as required.

3.2 MEETINGS

A. At least (one) onsite Cx kickoff meetings shall be conducted by the CC and Builder for the purpose of reviewing the purpose, extent, and procedures for commissioning with the Builder, its subcontractors, the design professionals (A/E), and the Owner. These kickoff meetings shall be held upon completion of the submittal review process.

B. Other Cx meetings for coordination, clarification of requirements & procedures, or problem resolution shall be chaired by the CC and held periodically as determined by the CC. Attendance by the Builder and its subcontractors is mandatory.

3.3 SCHEDULE

A. The Builder and its subcontractors shall account for startup, Cx activities, testing, and training in the schedule.

B. As per the UF General Terms & Conditions, satisfactory completion of commissioning and training activities is a pre-requisite for overall project Substantial Completion.

3.4 CONSTRUCTION CHECKLISTS (CLs)

A. Pre-functional checklists provide a means to confirm that equipment and systems are completely installed, integrated with other building components and systems, and operational. They ensure that functional performance testing may proceed without unnecessary delays. Pre-functional testing for a given system must be successfully completed prior to functional performance testing of the equipment or subsystems of that given system.

3.5 FUNCTIONAL PERFORMANCE TESTS (FPTs)

A. By Owner

3.6 O&M MANUALS

A. CC Review and Approval: Prior to Owner training and Substantial Completion, the CC will review the Operation and Maintenance (O&M) manuals, documentation, “redline” as-builts, and warranty information for all commissioned systems. Deficiencies will be communicated to UF and the A/E for consolidation with other review comments and resolution/correction by the Builder.

3.7 SYSTEMS MANUAL

A. The CC facilitates and coordinates the development of the Systems Manual and its contents, but the A/E, Owner, Builder, and subcontractors shall actively participate in the development of this manual. Specific Builder and subcontractor deliverables and responsibilities include, but are not limited to:

(1) Equipment start-up, shutdown, and restarting instructions (*mechanical, BAS, and electrical subcontractors*).
(2) As-built single-line diagrams for all commissioned systems (*mechanical, BAS, and electrical subcontractors*).
(3) Record documents of Building Automation System, including Sequences of Operation, a list of as-built set points, descriptions of set point purpose(s), recommended adjustable ranges, and reset schedules (*BAS subcontractor*)
(4) Building automation logic flow diagram or code flow diagram (*BAS subcontractor*).
(5) Trending checklist with a list of all points trended, including sample rates (*BAS subcontractor*).
(6) Recommended re-commissioning interval, including set-points assessment, operational schedule assessments, and testing schedules (*BAS subcontractor*).
(7) Equipment manufacturer's recommended schedule and instructions for recalibration of sensors, transmitters, and actuators (*mechanical, BAS, and electrical subcontractors*).
(8) List of diagnostic tools for systems commissioned to maintain efficient operation of the equipment and system (*mechanical, BAS, and electrical subcontractors*).

END OF SECTION

SECTION 210005 / FIRE PROTECTION GENERAL

1. GENERAL

1.1. The work covered by this division consists of providing all labor, equipment and materials and performing all operations necessary for the installation of the fire protection work as herein called for and shown on the drawings.

1.2. Related Documents:

1.2.1. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification sections, apply to work of this section.

1.2.2. This is a Basic FIRE PROTECTION Requirements Section. Provisions of this section apply to work of all Division 21 sections.

1.2.3. Review all other contract documents to be aware of conditions affecting work herein.

1.2.4. Definitions:

1.2.4.1. Provide: Furnish and install, complete and ready for intended use.

1.2.4.2. Furnish: Supply and deliver to project site, ready for subsequent requirements.

1.2.4.3. Install: Operations at project site, including unloading, unpacking, assembly, erection, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, and similar requirements.

1.3. Permits and Fees: Contractor shall obtain all necessary permits, meters, and inspections required for his work and pay all fees and charges incidental thereto.

1.4. Verification of Owner's Data: Prior to commencing any work the Contractor shall satisfy himself as to the accuracy of all 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 data, he shall immediately notify the Architect/Engineer in order that proper adjustments can be anticipated and ordered. Commencement by the Contractor of any work shall be held as an acceptance of the data by him after which time the Contractor has no claim against the Owner resulting from alleged errors, omissions or inaccuracies of the said data.

1.5. Delivery and Storage of Materials: Materials delivered to site shall be inspected for damage, unloaded, and stored with a minimum of handling. All material shall be stored to provide protection from the weather and accidental damage.

1.6. Extent of work is indicated by the drawings, schedules, and the requirements of the specifications. Singular references shall not be constructed as requiring only one device if multiple devices are shown on the drawings or are required for proper system operation.

1.7. Field Measurements and Coordination:

1.7.1. The intent of the drawings and specifications is to obtain a complete and satisfactory installation. Separate divisional drawings and specifications shall not relieve the Contractor or subcontractors from full compliance of work of his trade indicated on any of the drawings or in any section of the specifications.

1.7.2. Verify all field dimensions and locations of equipment to insure close, neat fit with other trades' work. Make use of all contract documents and approved shop drawings to verify exact dimension and locations.

1.7.3. Coordinate work in this division with all other trades in proper sequence to insure that the total work is completed within contract time schedule and with a minimum cutting and patching.

1.7.4. Locate all apparatus symmetrical with architectural elements. Install to exact height and locations when shown on architectural drawings. When locations are shown only on fire protection drawings, be guided by architectural details and conditions existing at job and correlate this work with that of others.

1.7.5. Install work as required to fit structure, avoid obstructions, and retain clearance, headroom, openings and passageways. Cut no structural members without written approval. Provide sleeves at all concrete penetrations.

1.7.6. Carefully examine any existing conditions, piping, and premises. Compare drawings with existing conditions. Report any observed discrepancies. It shall be the Contractor's responsibility to properly coordinate the work and to identify problems in a timely manner. Written instructions will be issued to resolve discrepancies.

1.7.7. Because of the small scale of the drawings, it is not possible to indicate all offsets and fittings or to locate every accessory. Drawings are essentially diagrammatic. Study carefully the sizes and locations of structural members, wall and partition locations, trusses, and room dimensions and take actual measurements on the job. Locate piping, ductwork, equipment and accessories with sufficient space for installing and servicing. Contractor is responsible for accuracy of his measurements and for coordination with all trades. Contractor shall not order materials or perform work without such verification. No extra compensation will be allowed because field measurements vary from the dimensions on the drawings. If field measurements show that equipment or piping cannot be fitted, the Architect/Engineer shall be consulted. Remove and relocate, without additional compensation, any item that is installed and is later found to encroach on space assigned to another use.

1.8. Guarantee:

1.8.1. The Contractor shall guarantee labor, materials and equipment for a period of one (1) year from Substantial Completion, or from Owner's occupancy, whichever is earlier. Contractor shall make good any defects and shall include all necessary adjustments to and replacement of defective items without expense to the Owner.

1.8.2. Owner reserves right to make emergency repairs as required to keep equipment in operation without voiding Contractor's Guarantee Bond nor relieving Contractor of his responsibilities during guarantee period

1.9. Approval Submittals:

1.9.1. When approved, the submittal control log and submittals shall be an addition to the specifications herewith, and shall be of equal force in that no deviation will be permitted except with the approval of the Architect/Engineer.

1.9.1.1. Shop drawings, product literature, and other approval submittals will only be reviewed if they are submitted in full accordance with the General and Supplementary Conditions and Division 1 Specification sections and the following.

1.9.1.1.1. Submittals shall be properly organized in accordance with the approved submittal control log.

1.9.1.1.2. Submittals shall not include items from more than one specification section in the same submittal package.

1.9.1.1.3. Submittals shall be properly identified by a cover sheet showing the project name, Architect and Engineer names, submittal control number, specification section, a list of products or item names with model numbers in the order they appear in the package, and spaces for approval stamps. A sample cover sheet is included at the end of this section.

1.9.1.1.4. Submittals shall have been reviewed and approved by the General Contractor (or Prime Contractor). Evidence of this review and approval shall be an "Approved" stamp with a signature and date.

1.9.1.1.5. Submittals that include a series of fixtures or devices (such as plumbing fixtures or valves) shall be organized by the fixture number or valve type and be marked accordingly. Each fixture must include all items associated with that fixture regardless of whether or not those items are used on other fixtures.

1.9.1.1.6. The electrical design shown on the drawings supports the fire protection equipment basis of design specifications at the time of design. If fire protection equipment is submitted with different electrical requirements, it is the responsibility of the fire protection contractor to resolve all required electrical design changes (wire and conduit size, type of disconnect or overload protection, point(s) of connection, etc.) and clearly show the new electrical design on the fire protection submittal with a written statement that this change will be provided at no additional cost. Submittals made with no written reference to the electrical design will be presumed to work with the electrical design. Any corrections required will be at no additional cost.

1.9.2. If the shop drawings show variation from the requirements of contract because of standard shop practice or other reasons, the Contractor shall make specific mention of such variation in writing in his letter of transmittal and on the submittal cover sheet in order that, if acceptable, Contractor will not be relieved of the responsibility for executing the work in accordance with the contract.

1.9.3. Review of submittals, product literature, catalog data, or schedules by the Engineer shall not relieve the Contractor from responsibility for deviations from contract drawings or specifications, unless he has in writing called to the attention of the Architect/Engineer each such deviation in writing at the time of submission, nor shall it relieve him from responsibility for errors of any sort in shop drawings, product literature, catalog data, or schedules. Any feature or function specified but not mentioned in the submittal shall be assumed to be included per the specification.

1.9.4. Submit shop drawings and any other drawings specifically called for in other sections after award of the contract and before any material is ordered or fabricated. Shop drawings shall consist of plans, sections, elevations and details to scale (not smaller than ¼" per foot), with dimensions clearly showing the installation. Direct copies of small-scale project drawings issued to the Contractor are not acceptable. Drawings shall take into account equipment

furnished under other sections and shall show space allotted for it. Include construction details and materials. Shop submittals will be called “working plans.” Working plans shall be approved by the General Contractor prior to submission to the “Authority Having Jurisdiction.” Submission of working plans shall be part of the fire protection contractor’s work unless other arrangements have been made.

1.10. Test Reports and Verification Submittals: Submit test reports, certifications and verification letters as called for in other sections. Contractor shall coordinate the required testing and documentation of system performance such that sufficient time exists to prepare the reports, submit the reports, review the reports and take corrective action within the scheduled contract time.

1.11. Test Reports: The fire protection contractor shall complete the “Contractors Material and Test Certificate for Underground Piping” and “Contractors Material and Test Certificate for Aboveground Piping.” These completed documents shall be included with the “Riser Room Documents,” O&M manuals and included near the riser placard sealed in plastic.

1.12. O&M Data Submittals: Submit Operation and Maintenance (O&M) data as called for in other sections. Submit a draft of the O&M manuals at the 50% construction requisition. When a copy of approval submittals is included in the O&M Manual, only the final “Approved” or “Approved as Noted” copy shall be used. Contractor shall organize these data in the O&M Manuals tabbed by specification number. Prepare O&M Manuals as required by Division 1 and as described herein. Submit manuals at the Substantial Completion inspection. Submit O&M manuals in electronic format on a disk separate from the "As-Built" drawings.

2. PRODUCTS

2.1. All materials shall be new or Owner-supplied reused as shown on the drawings, the best of their respective kinds, suitable for the conditions and duties imposed on them at the building and shall be of reputable manufacturers. The description, characteristics, and requirements of materials to be used shall be in accordance with qualifying conditions established in the following sections.

2.2. Equipment and Materials:

2.2.1. Shall be new and the most suitable grade for the purpose intended. Products installed shall be approved by Engineer and Owner’s representative. Equipment furnished under this division shall be the product of a manufacturer regularly engaged in the manufacture of such items for a period of three years. Where practical, all of the components shall be products of a single manufacturer in order to provide proper coordination and responsibility. Where required, Contractor shall furnish proof of installation of similar units or equipment.

2.2.2. Each item of equipment shall bear a name plate showing the manufacturer's name, trade name, model number, serial number, ratings and other information necessary to fully identify it. This plate shall be permanently mounted in a prominent location and shall not be concealed, insulated or painted.

2.2.3. The label of the approving agency, such as UL, IBR, ASME, ARI, AMCA, by which a standard has been established for the particular item shall be in full view.

2.2.4. The equipment shall be essentially the standard product of a manufacturer regularly engaged in the production of such equipment and shall be a product of the manufacturer's latest design.

2.2.5. A service organization with personnel and spare parts shall be available within two hours for each type of equipment furnished.

2.2.6. Install in accordance with manufacturer's recommendations. Place in service by a factory trained representative where required.

2.2.7. Materials and equipment are specified herein by a single or by multiple manufacturers to indicate quality, material and type of construction desired. Manufacturer's products shown on the drawings have been used as basis for design; it shall be the Contractor's responsibility to ascertain that alternate manufacturer's products, or the particular products of named manufacturers, meet the detailed specifications and that size and arrangement of equipment are suitable for installation.

2.2.8. Model Numbers: Catalog numbers and model numbers indicated in the drawings and specifications are used as a guide in the selection of the equipment and are only listed for the contractor's convenience. The contractor shall determine the actual model numbers for ordering materials in accordance with the written description of each item and with the intent of the drawings and specifications.

2.3. Requests for Substitution:

2.3.1. Where a particular system, product or material is specified by name, consider it as standard basis for bidding, and base proposal on the particular system, product or material specified.

2.3.2. Requests by Contractor for substitution will be considered only when reasonable, timely, fully documented, and qualifying under one or more of the following circumstances.

2.3.2.1. Required product cannot be supplied in time for compliance with Contract time requirements.

2.3.2.2. Required product is not acceptable to governing authority, or determined to be non-compatible, or cannot be properly coordinated, warranted or insured, or has other recognized disability as certified by Contractor.

2.3.2.3. Substantial cost advantage is offered Owner after deducting offsetting disadvantages including delays, additional compensation for redesign, investigation, evaluation and other necessary services and similar considerations.

2.3.3. All requests for substitution shall contain a "Comparison Schedule" and clearly and specifically indicate any and all differences or omissions between the product specified as the basis of design and the product proposed for substitution. Differences shall include but shall not be limited to data as follows for both the specified and substituted products:

Principal of operation.
Materials of construction or finishes.
Thickness of gauge of materials.
Weight of item.
Deleted features or items.
Added features or items.
Changes in other work caused by the substitution.
Performance curves.

If the approved substitution contains differences or omissions not specifically called to the attention of the Architect/Engineer, the Owner reserves the right to require equal or similar

features to be added to the substituted products (or to have the substituted products replaced) at the Contractor's expense.

3. EXECUTION

3.1. Workmanship: All materials and equipment shall be installed and completed in a first-class workmanlike manner and in accordance with the best modern methods and practice. Any materials installed which do not present an orderly and reasonably neat and/or workmanlike appearance, or do not allow adequate space for maintenance, shall be removed and replaced when so directed by the Architect/Engineer.

3.2. Coordination:

3.2.1. The Contractor shall be responsible for full coordination of the fire protection systems with shop drawings of the building construction so the proper openings and sleeves or supports are provided for piping, ductwork, or other equipment passing through slabs or walls. Contractor shall be responsible for coordination with the Commissioning Agent for submittal review, fire protection installation verification, and functional performance testing.

3.2.2. Any additional steel supports required for the installation of any fire protection equipment, piping, or ductwork shall be furnished and installed under the section of the specifications requiring the additional supports.

3.2.3. It shall be the Contractor's responsibility to see that all equipment such as valves, dampers, filters and such other apparatus or equipment that may require maintenance and operation are made easily accessible, regardless of the diagrammatic location shown on the drawings.

3.2.4. All connections to fixtures and equipment shown on the drawings shall be considered diagrammatic unless otherwise indicated by detail. The actual connections shall be made to fully suit the requirements of each case and adequately provide for expansion and servicing.

3.2.5. The contractor shall protect equipment, material, and fixtures at all times. He shall replace all equipment, material, and fixtures which are damaged as a result of inadequate protection.

3.2.6. Prior to starting and during progress of work, examine work and materials installed by others as they apply to work in this division. Report conditions which will prevent satisfactory installation.

3.2.7. Start of work will be construed as acceptance of suitability of work of others.

3.3. LEED Coordination:

3.3.1. Coordination Requirements for LEED Certification:

3.3.1.1. Follow scheduling provided by the General Contractor (GC) to sequence the materials of construction installation.

3.3.1.2. Provide Volatile Organic Compounds (VOC) listings to the GC, each submitted product containing VOC’s. Fill in the monthly summary sheets from invoices of product stored at the job site. Product returned from the site shall be accounted for and deducted from the final monthly summary.

3.3.1.3. Store all products used for this project out of the weather. Postpone shipments to the site until products are to be installed during scheduled period.

3.3.1.4. Fill out the IAQ Inspection Checklist on a weekly basis and before unit start-up, before Substantial Completion, and at Final Completion. Provide details of remediation required, if any.

3.3.1.5. Provide photographs during the following phases of the project. Photographs may be computer memory transferrable to be downloaded.

3.3.1.5.1. At Substantial Completion of equipment and representative room spaces

3.4. Interruption of Service: Before any equipment is shut down for disconnecting or tie-ins, arrangements shall be made with the Architect/Engineer and this work shall be done at the time best suited to the Owner. This will typically be on weekends and/or holidays and/or after normal working hours. Services shall be restored the same day unless prior arrangements are made. All overtime or premium costs associated with this work shall be included in the base bid.

3.5. Phasing: Provide all required temporary valves, piping, ductwork, equipment and devices as required. Maintain temporary services to areas as required. Remove all temporary material and equipment on completion of work unless Engineer concurs that such material and equipment would be beneficial to the Owner on a permanent basis.

3.6. Cutting and Patching: Notify General Contractor to do all cutting and patching of all holes, chases, sleeves, and other openings required for installation of equipment furnished and installed under this section. Utilize experienced trades for cutting and patching. Obtain permission from Architect/Engineer before cutting any structural items.

3.7. Equipment Setting: Bolt equipment directly to concrete pads or vibration isolators as required, using hot-dipped galvanized anchor bolts, nuts and washers. Level equipment.

3.8. Painting: Touch-up factory finishes on equipment located inside and outside shall be done under Division 15. Obtain matched color coatings from the manufacturer and apply as directed. If corrosion is found during inspection on the surface of any equipment, clean, prime, and paint, as required.

3.9. Clean-up: Thoroughly clean all exposed parts of apparatus and equipment of cement, plaster, and other materials and remove all oil and grease spots. Repaint or touch up as required to look like new. During progress of work, contractor is to carefully clean up and leave premises and all portions of building free from debris and in a clean and safe condition.

3.10. Start-up and Operational Test: Start each item of equipment in strict accordance with the manufacturer's instructions; or where noted under equipment specification, start-up shall be done by a qualified representative of the manufacturer. Alignment, lubrication, safety, and operating control shall be included in start-up check.

3.11. Record Drawings:

3.11.1. During the progress of the work the Contractor shall record on their field set of drawings the exact location, as installed, of all piping, ductwork, equipment, and other systems which are not installed exactly as shown on the contract drawings.

3.11.2. Upon completion of the work, record drawings shall be prepared as described in the General Conditions, Supplementary Conditions, and Division 1 sections.

3.12. Acceptance:Punch List: Submit written confirmation that all punch lists have been checked and the required work completed.

3.12.2. Instructions: At completion of the work, provide a competent and experienced person who is thoroughly familiar with project, for one day to instruct permanent operating personnel in operation of equipment and control systems. This is in addition to any specific equipment operation and maintenance training.

3.12.3. Operation and Maintenance Manuals: Furnish four complete manuals bound in ring binders with Table of Contents, organized, and tabbed by specification section. Manuals shall contain:

Detailed operating instructions and instructions for making minor adjustments.
Complete wiring and control diagrams.
Routine maintenance operations.
Manufacturer's catalog data, service instructions, and parts lists for each piece of operating equipment.
Copies of approved submittals.
Copies of all manufacturer's warranties.
Copies of test reports and verification submittals.

3.12.4. Record Drawings: Submit record drawings.

3.12.5. Acceptance will be made on the basis of tests and inspections of job. A representative of firm that performed test and balance work shall be in attendance to assist. Contractor shall furnish necessary mechanics to operate system, make any necessary adjustments and assist with final inspection.

3.12.6. Control Diagrams and Piping Diagram: Frame under glass and mount on equipment room wall.

PROJECT NAME

PROJECT NUMBER

ARCHITECT/ENGINEER: Campbell Spellicy Engineering, Inc.

CONTRACTOR: XYZ Construction

SUBCONTRACTOR: ABC Fire Protection Contractor

SUPPLIER: Jones Supply Co.

MANUFACTURER: Various

DATE: 2/15/15

SECTION: 15545/Hydronic Specialties

This is a sample cover sheet. Use one for each shop drawing.

Use whatever standard headings you want here

SAMPLE

1.Vent valves - Hoffman No. 62

List each item separately

2.In-line air separators - Bell & Gossett RL-4

Typical - list mfr name & model number

3.Diaphragm type compression tanks - Bell & Gossett B-200

CSEI will list all comments on this sheet and will only stamp approvals on this sheet

4.Pump suction diffusers - Bell & Gossett ED-3

5.Triple duty valves - Bell & Gossett 3D-4S

6.Shot feeders - J. Woods No. 2

Leave space after each individual item for CSEI comments

7.Pressure relief valves - Watts No. 6

General Contractor's APPROVAL stamp must be on this sheet.

8.Pressure reducing valves - Bell & Gossett No. 7

END OF SECTION

PAGE LEFT INTENTIONALLY BLANK

SECTION 210020 / CODES AND STANDARDS

1. GENERAL

1.1. The work covered by this division consists of providing all labor, equipment and materials and performing all operations necessary for the installation of the fire protection work as herein called for and shown on the drawings.

1.2. This is a Basic Fire Protection Requirements section. Provisions of this section apply to work of all Division 21 sections.

2. CODES

2.1. All work under Division 21 shall be constructed in accordance with the codes listed herein. The design has been based on the requirements of these codes; and while it is not the responsibility of the Contractor to verify that all work called for complies with these codes, he shall be responsible for calling to the Architect/Engineer's attention any drawings or specifications that are not in conformance with these or other codes prior to ordering equipment or installing work.

2.2. Comply with regulations and codes of utility suppliers.

2.3. Where no specific method or form of construction is called for in the contract documents, the Contractor shall comply with code requirements when carrying out such work.

2.4. Where code conflict exists, generally the most restrictive requirement applies. Comply with current code edition, unless noted.

2.5. Additional codes or standards applying to a specific part of the work may be included in that section.

2.6. The following codes govern the work.

2.6.1. Florida Building Code, 2020 with all Supplements.

2.6.2. Florida Fire Prevention Code 2013

2.6.3. NFPA 13 (2010) Standard for Installation of Sprinkler System

3. STANDARDS

All fire protection materials, installation and systems shall meet the requirements of the following standards, including the latest addenda and amendments, to the extent referenced:

3.1. Underwriters' Laboratories (UL)

3.2. American National Standards Institution (ANSI)

3.3. American Society of Testing Materials (ASTM)

3.4. National Fire Protection Association (NFPA)

3.5. National Electrical Manufacturers Association (NEMA)

3.6. University of Florida Design & Construction Standards

END OF SECTION

PAGE LEFT INTENTIONALLY BLANK

SECTION 210105 / PIPES AND PIPE FITTINGS

1. GENERAL

1.1. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.

1.2. This section is a Division-21 Basic Fire Protection Materials and Methods section, and is part of each Division-21 section making reference to pipes and pipe fittings specified herein.

1.3. Extent of pipes and pipe fittings required by this section is indicated on drawings and/or specified in other Division-21 sections.

1.4. Codes and Standards:

1.4.1. Welding: Qualify welding procedures, welders and operators in accordance with ASME B31.1, or ASME B31.9, as applicable, for shop and project site welding of piping work.

1.5. Test Report and Verification Submittals:

1.5.1. Submit welding certification for all welding installers.

2. PRODUCTS

2.1. Piping Materials: Provide pipe and tube of type, joint type, grade, size and weight (wall thickness or Class) indicated for each service. Where type, grade or class is not indicated, provide proper selection as determined by Installer for installation requirements, and comply with governing regulations and industry standards.

2.2. Pipe/Tube Fittings: Provide factory-fabricated fittings of type, materials, grade, class and pressure rating indicated for each service and pipe size. Provide sizes and types matching pipe, tube, valve or equipment connection in each case. Where not otherwise indicated, comply with governing regulations and industry standards for selections, and with pipe manufacturer's recommendations where applicable.

2.3. Piping Materials/Products:

2.3.1. Pipe Thread Tape: Teflon tape.

2.3.2. Gaskets for Flanged Joints: ANSI B16.21; full-faced for Cast-Iron flanges; raised-face for steel flanges, unless otherwise noted.

2.3.3. Welding Materials: Comply with Section II, Part C, ASME Boiler and Pressure Vessel Code for welding materials. Materials shall be determined by installer to comply with installation requirements.

2.4. Steel Pipes and Pipe Fittings

2.4.1. Pipes:

2.4.1.1. Black Steel Pipe: ASTM A-53 or A795E, Grade B, Standard Weight, Type ERW or seamless, Schedule 40.

2.4.1.2. Galvanized Steel Pipe: ASTM A-53 or A-120, seamless, Schedule 40.

2.4.2. Pipe Fittings:

2.4.2.1. Threaded Pipe Plugs: ANSI B16.14.

2.4.2.2. Steel Flanges/Fittings: ANSI B16.5, including bolting and gasketing.

2.4.2.3. Wrought-Steel Buttwelding Fittings: ANSI B16.9, rated to match connected pipe.

2.4.2.4. Pipe Nipples: Fabricated from same pipe as used for connected pipe; except do not use less than Schedule 80 seamless ASTM A-53 pipe where length remaining unthreaded is less than 1 ½ inches, and where pipe size is less than 1 ½ inches, and do not thread nipples full length (no close-nipples).

3. EXECUTION

3.1. Installation

3.1.1. General: Install pipes and pipe fittings in accordance with recognized industry practices which will achieve permanently-leakproof piping systems, capable of performing each indicated service without piping failure. Install each run with minimum joints and couplings, but with adequate and accessible unions for disassembly and maintenance or replacement of valves and equipment. Reduce sizes (where indicated) by use of reducing fittings, not bushings. Align piping accurately at connections, within 1/16" misalignment tolerance.

3.1.2. Comply with ANSI B31 Code for Pressure Piping.

3.1.3. Locate piping runs, except as otherwise indicated, vertically and horizontally (pitched to drain) and avoid diagonal runs wherever possible. Orient horizontal runs parallel with walls and column lines. Locate runs as shown or described by diagrams, details and notations or, if not otherwise indicated, run piping in shortest route which does not obstruct usable space or block access for servicing building and its equipment. Hold piping close to walls, overhead construction, columns and other structural and permanent-enclosure elements of building; limit clearance to ½" where furring is shown for enclosure or concealment of piping, but allow for insulation thickness, if any. Where possible, locate insulated piping for 1" clearance outside insulation.

3.1.4. Concealed Piping: Unless specifically noted as “Exposed” on the drawings, conceal piping from view in finished and occupied spaces, by locating in column enclosures, chases, in hollow wall construction or above suspended ceilings; do not encase horizontal runs in solid partitions, except as indicated.

3.1.5. Electrical Equipment Spaces: Do not run piping through transformer vaults and other electrical, communications, or data equipment spaces and enclosures unless shown. Install drip pan under piping that must run through electrical spaces.

3.1.5.1. Cut pipe from measurements taken at the site, not from drawings. Keep pipes free of contact with building construction and installed work.

3.2. Piping System Joints: Provide joints of the type indicated in each piping system.

3.2.1. Thread pipe in accordance with ANSI B2.1; cut threads full and clean using sharp dies. Ream threaded ends to remove burrs and restore full inside diameter. Apply pipe joint compound, or pipe joint tape (Teflon) where recommended by pipe/fitting manufacturer, on male threads

at each joint and tighten joint to leave not more than 3 threads exposed. Paint exposed threads to retard rusting.

3.2.2. Flanged Joints: Match flanges within piping system, and at connection with valves and equipment. Clean flange faces and install gaskets. Tighten bolts to provide uniform compression of gaskets. Bolts shall project 1/8" to 3/8" beyond nut face when tight.

3.2.3. Weld pipe joints in accordance with recognized industry practice and as follows. Be guided by ANSI B.31.

3.2.3.1. Welding or soldering of pipe inside building will not take place while building is occupied. Welding inside building will include a person on standby with an extinguisher serving as a fire watch. His sole purpose during welding will be to watch for fires.

3.2.3.2. Weld pipe joints only when ambient temperature is above 0°F.

3.2.3.3. Bevel pipe ends at a 37.5° angle where possible, smooth rough cuts, and clean to remove slag, metal particles and dirt.

3.2.3.4. Use pipe clamps or tack-weld joints; 4 welds for pipe sizes to 10". All welds shall be open-butt.

3.2.3.5. Build up welds with root pass, followed by filler pass and then a cover pass. Eliminate valleys at center and edges of each weld. Weld by procedures which will ensure elimination of unsound or unfused metal, cracks, oxidation, blow-holes and non-metallic inclusions.

3.2.3.6. Do not weld-out piping system imperfections by tack-welding procedures; refabricate to comply with requirements.

3.2.3.7. At Installer's option, install forged branch-connection fittings wherever branch pipe is less than 3" and at least two pipe sizes smaller than main pipe indicated; or install regular "T" fitting. Weld-O-Let or equal.Piping Installation:

3.3.1. Install piping to allow for expansion and contraction.

END OF SECTION

PAGE LEFT INTENTIONALLY BLANK

SECTION 210160 / FIRE PROTECTION IDENTIFICATION

1. GENERAL

1.1. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.

1.2. This section is a Division-21 Basic Fire Protection Materials and Methods section, and is part of each Division-21 section making reference to or requiring identification devices specified herein.

1.3. Extent of fire protection identification work required by this section is indicated on drawings and/or specified in other Division-21 sections.

1.4. Refer to Division-26 sections for identification requirements of electrical work; not work of this section. Refer to other Division-21 sections for identification requirements for controls; not work of this section.

1.5. Codes and Standards: Comply with ANSI A13.1 for lettering size, length of color field, colors, and viewing angles of identification devices.

2. PRODUCTS

2.1. General: Provide manufacturer's standard products of categories and types required for each application as referenced in other Division-21 sections. Where more than single type is specified for application, selection is Installer's option, but provide single selection for each product category.

2.2. Painted Identification Materials

2.2.1. Stencils: Standard fiberboard stencils, prepared for required applications with letter sizes generally complying with recommendations of ANSI A13.1 for piping and similar applications, but not less than 1-¼" high letters for ductwork and not less than ¾" high letters for access door signs and similar operational instructions.

2.2.2. Stencil Paint: Standard exterior type stenciling enamel; black, except as otherwise indicated; either brushing grade or pressurized spray-can form and grade.

2.2.3. Identification Paint: Standard identification enamel.

2.3. Plastic Pipe Markers

2.3.1. Pressure-Sensitive Type: Provide manufacturer's standard pre-printed, permanent adhesive, color-coded, pressure-sensitive vinyl pipe markers.

2.3.1.1. Lettering: Manufacturer's standard pre-printed nomenclature which best describes piping system in each instance, as selected by Architect/Engineer in cases of variance with name as shown or specified.

2.3.1.2. Arrows: Print each pipe marker with arrows indicating direction of flow, either integrally with piping system service lettering (to accommodate both directions), or as separate unit of plastic.

2.4. Valve Tags:

2.4.1. Brass Valve Tags: Provide 19-gauge polished brass valve tags with stamp-engraved piping system abbreviation in ¼" high letters and sequenced valve numbers ½" high, and with 5/32" hole for fastener. Provide 1-½" diameter tags, except as otherwise indicated.

2.4.2. Plastic Laminate Valve Tags: Provide manufacturer's standard 3/32" thick engraved plastic laminate valve tags, with piping system abbreviation in ¼" high letters and sequenced valve numbers ½" high, and with 5/32" hole for fastener. Provide 1-½" square black tags with white lettering, except as otherwise indicated.

2.5. Engraved Plastic-Laminate Signs:

2.5.1. General: Provide engraving stock melamine plastic laminate, in the sizes and thicknesses indicated, engraved with engraver's standard letter style of the sizes and wording indicated, punched for mechanical fastening except where adhesive mounting is necessary because of substrate.

2.5.2. Thickness: 1/16" for units up to 20 sq. in. or 8" length; ⅛" for larger units.

2.5.3. Fasteners: Self-tapping stainless-steel screws, except contact-type permanent adhesive where screws cannot or should not penetrate the substrate.

2.6. Stamped Nameplates: Provide equipment manufacturer's standard stamped nameplates for motors, pumps, etc.

3. EXECUTION

3.1. Coordination: Where identification is to be applied to surfaces which require insulation, painting or other covering or finish, including valve tags in finished mechanical spaces, install identification after completion of covering and painting. Install identification prior to installation of acoustical ceilings and similar removable concealment.

3.2. Piping System Identification:

3.2.1. General: Install pipe markers of one of the following types on each system indicated to receive identification, and include arrows to show normal direction of flow:

3.2.1.1. Plastic pipe markers.

3.2.1.2. Stenciled markers, black or white for best contrast.

3.2.2. Locate pipe markers as follows wherever piping is exposed to view in occupied spaces, machine rooms, accessible maintenance spaces and exterior non-concealed locations.

3.2.2.1. Near each valve and control device.

3.2.2.2. Near each branch, excluding short take-offs for fixtures and terminal units; mark each pipe at branch, where there could be question of flow pattern.

3.2.2.3. Near locations where pipes pass through walls, floors, ceilings, or enter non-accessible enclosures.

3.2.2.4. At access doors, manholes and similar access points which permit view of concealed piping.

3.2.2.5. Near major equipment items and other points of origination and termination.

3.2.2.6. Spaced intermediately at maximum spacing of 50' along each piping run, except reduce spacing to 25' in congested areas of piping and equipment.

3.2.2.7. On piping above removable acoustical ceilings, except omit intermediately spaced markers.

3.2.3. The following piping shall be color-coded where exposed in mechanical and electrical rooms by completely painting the piping with the indicated color. Use standard colors where exposed in finished spaces. Use standard identification methods in concealed areas.

Fire protection piping - Fire Engine Red

3.3. Valve Identification: Provide coded valve tag on every valve, cock and control device in each piping system; exclude check valves and valves within factory-fabricated equipment units. Coordinate code with operating instructions.

3.4. Valve Charts: Provide framed, glass covered valve charts in each sprinkler riser of fire pump room. Identify coded valve number, valve function, and valve location for each valve.

3.5. Adjusting and Cleaning:

3.5.1. Adjusting: Relocate any fire protection identification device which has become visually blocked by work of this division or other divisions.

END OF SECTION

PAGE LEFT INTENTIONALLY BLANK

SECTION 210342 / BUILDING SPRINKLER AND STANDPIPE SYSTEM-REPAIRS

1. GENERAL

1.1. Drawings and General provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.

1.2. Division-21 Basic Fire Protection Requirements and Basic Fire Protection Materials and Methods sections apply to work of this section.

1.3. Codes and Standards:

1.3.1. NFPA Compliance: Install fire protection systems in accordance with NFPA 13 2007 Edition and NFPA 14 "Standard for the Installation of Standpipe Systems", 2007 Edition.

1.3.2. UL Compliance: Provide fire protection products in accordance with UL standards; provide UL label on each product.

1.3.3. Screw Thread Connections: Comply with local Fire Department/Fire Marshal regulations for sizes, threading and arrangement of connections for fire department equipment to sprinkler systems.

1.4. Test Reports and Verification Submittals:

1.4.1. Submittals: Provide producer's data sheets and system layout drawings to the Architect/Engineer for general review of pipe and head locations, hangers, etc. prior to fabrication of the systems. The Contractor shall remain the Engineer-of-Record and shall submit shop drawings to the Fire Marshal.

1.4.2. Certificate: Submit certificates of Aboveground and Underground Installation upon completion of fire protection piping work which indicates that work has been tested in accordance with NFPA 13 and 14 and that system is operational, complete, and has no defects.

1.4.3. Tag: Submit a copy of the sprinkler system tag. The installing fire sprinkler contractor shall be licensed in accordance with State Fire Marshal (SFM) Rule 4A-46. At the conclusion of the project and prior to the final inspection by the SFM the Contractor shall tag the standpipe system in accordance with 4A-46.041.

1.5. O&M Data Submittals:

1.5.1. Record Drawings: At project closeout, submit record drawings of installed fire protection piping and products

1.5.2. Maintenance Data: Pipe and fittings.

2. PRODUCTS

2.1. General: Provide materials and factory-fabricated products of sizes, types, pressure ratings, temperature ratings, and capacities as required. Provide proper selection as determined by Installer to comply with installation requirements. Provide sizes and types matching piping and equipment connections; provide fittings of materials which match pipe materials used in fire

protection systems.

2.2. Wet Pipe: Black Steel ERW A135.

3. EXECUTION

3.1. General: Examine areas and conditions under which fire protection materials and products are to be installed. Do not proceed with work until unsatisfactory conditions have been corrected in manner acceptable to Installer. Modify the system per NFPA 13 latest adopted edition and NFPA-14 latest adopted edition and the requirements of the Authority Having Jurisdiction and direction indicated on the drawings. Any installation, modification, or alteration of the standpipe system shall be performed only by a person under a certificate of competency issued by the State Fire Marshal. The Contractor shall coordinate with all other trades for location of pipe, etc. prior to fabrication of the piping system.

END OF SECTION

SECTION 230005 / MECHANICAL GENERAL

1. GENERAL

1.1. The work covered by this division consists of providing all labor, equipment and materials and performing all operations necessary for the installation of the mechanical work as herein called for and shown on the drawings.

1.2. Related Documents:

1.2.1. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification sections, apply to work of this section.

1.2.2. This is a Basic Mechanical Requirements Section. Provisions of this section apply to work of all Division 23 sections.

1.2.3. Review all other contract documents to be aware of conditions affecting work herein.

1.2.4. Definitions:

1.2.4.1. Provide: Furnish and install, complete and ready for intended use.

1.2.4.2. Furnish: Supply and deliver to project site, ready for subsequent requirements.

1.2.4.3. Install: Operations at project site, including unloading, unpacking, assembly, erection, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, and similar requirements.

1.3. Permits and Fees: Contractor shall obtain all necessary permits, meters, and inspections required for his work and pay all fees and charges incidental thereto unless coordinated otherwise with UF.

1.4. Verification of Owner's Data: Prior to commencing any work the Contractor shall satisfy himself as to the accuracy of all 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 data, he shall immediately notify the Architect/Engineer in order that proper adjustments can be anticipated and ordered. Commencement by the Contractor of any work shall be held as an acceptance of the data by him after which time the Contractor has no claim against the Owner resulting from alleged errors, omissions or inaccuracies of the said data.

1.5. Delivery and Storage of Materials: Materials delivered to site shall be inspected for damage, unloaded, and stored with a minimum of handling. All material shall be stored to provide protection from the weather and accidental damage.

1.6. Extent of work is indicated by the drawings, schedules, and the requirements of the specifications. Singular references shall not be constructed as requiring only one device if multiple devices are shown on the drawings or are required for proper system operation.

1.7. Field Measurements and Coordination:

1.7.1. The intent of the drawings and specifications is to obtain a complete and satisfactory installation. Separate divisional drawings and specifications shall not relieve the Contractor or

subcontractors from full compliance of work of his trade indicated on any of the drawings or in any section of the specifications.

1.7.2. Verify all field dimensions and locations of equipment to insure close, neat fit with other trades' work. Make use of all contract documents and approved shop drawings to verify exact dimension and locations.

1.7.3. Coordinate work in this division with all other trades in proper sequence to ensure that the total work is completed within contract time schedule and with a minimum cutting and patching.

1.7.4. Locate all apparatus symmetrical with architectural elements. Install to exact height and locations when shown on architectural drawings. When locations are shown only on mechanical drawings, be guided by architectural details and conditions existing at job and correlate this work with that of others.

1.7.5. Install work as required to fit structure, avoid obstructions, and retain clearance, headroom, openings and passageways. Cut no structural members without written approval. Provide sleeves at all concrete penetrations.

1.7.6. Carefully examine any existing conditions, piping, and premises. Compare drawings with existing conditions. Report any observed discrepancies. It shall be the Contractor's responsibility to properly coordinate the work and to identify problems in a timely manner. Written instructions will be issued to resolve discrepancies.

1.7.7. Because of the small scale of the drawings, it is not possible to indicate all offsets and fittings or to locate every accessory. Drawings are essentially diagrammatic. Study carefully the sizes and locations of structural members, wall and partition locations, trusses, and room dimensions and take actual measurements on the job. Locate piping, ductwork, equipment and accessories with sufficient space for installing and servicing. Contractor is responsible for accuracy of his measurements and for coordination with all trades. Contractor shall not order materials or perform work without such verification. No extra compensation will be allowed because field measurements vary from the dimensions on the drawings. If field measurements show that equipment or piping cannot be fitted, the Architect/Engineer shall be consulted. Remove and relocate, without additional compensation, any item that is installed and is later found to encroach on space assigned to another use.

1.8. Guarantee:

1.8.1. The Contractor shall guarantee labor, materials and equipment for a period of one (1) year from Substantial Completion, or from Owner's occupancy, whichever is earlier. Contractor shall make good any defects and shall include all necessary adjustments to and replacement of defective items without expense to the Owner.

1.8.2. Owner reserves right to make emergency repairs as required to keep equipment in operation without voiding Contractor's Guarantee Bond nor relieving Contractor of his responsibilities during guarantee period.

1.9. Approval Submittals:

1.9.1. When approved, the submittal control log and submittals shall be an addition to the specifications herewith, and shall be of equal force in that no deviation will be permitted except with the approval of the Architect/Engineer.

1.9.1.1. Shop drawings, product literature, and other approval submittals will only be reviewed if they are submitted in full accordance with the General and Supplementary Conditions and Division 1 Specification sections and the following.

1.9.1.1.1. Submittals shall be properly organized in accordance with the approved submittal control log.

1.9.1.1.2. Submittals shall not include items from more than one specification section in the same submittal package.

1.9.1.1.3. Submittals shall be properly identified by a cover sheet showing the project name, Architect and Engineer names, submittal control number, specification section, a list of products or item names with model numbers in the order they appear in the package, and spaces for approval stamps. A sample cover sheet is included at the end of this section.

1.9.1.1.4. Submittals shall have been reviewed and approved by the General Contractor (or Prime Contractor). Evidence of this review and approval shall be an "Approved" stamp with a signature and date.

1.9.1.1.5. Submittals that include a series of fixtures or devices (such as HVAC units or valves) shall be organized by the fixture number or valve type and be marked accordingly. Each fixture must include all items associated with that fixture regardless of whether or not those items are used on other fixtures.

1.9.1.1.6. The electrical design shown on the drawings supports the mechanical equipment basis of design specifications at the time of design. If mechanical equipment is submitted with different electrical requirements, it is the responsibility of the mechanical contractor to resolve all required electrical design changes (wire and conduit size, type of disconnect or overload protection, point(s) of connection, etc.) and clearly show the new electrical design on the mechanical submittal with a written statement that this change will be provided at no additional cost. Mechanical submittals made with no written reference to the electrical design will be presumed to work with the electrical design. Any corrections required will be at no additional cost.

1.9.2. If the shop drawings show variation from the requirements of contract because of standard shop practice or other reasons, the Contractor shall make specific mention of such variation in writing in his letter of transmittal and on the submittal cover sheet in order that, if acceptable, Contractor will not be relieved of the responsibility for executing the work in accordance with the contract.

1.9.3. Review of submittals, product literature, catalog data, or schedules by the Engineer shall not relieve the Contractor from responsibility for deviations from contract drawings or specifications, unless he has in writing called to the attention of the Architect/Engineer each such deviation in writing at the time of submission, nor shall it relieve him from responsibility for errors of any sort in shop drawings, product literature, catalog data, or schedules. Any feature or function specified but not mentioned in the submittal shall be assumed to be included per the specification.

1.9.4. Submit shop drawings and any other drawings specifically called for in other sections after award of the contract and before any material is ordered or fabricated. Shop drawings shall consist of plans, sections, elevations and details to scale (not smaller than ¼" per foot), with dimensions clearly showing the installation. Direct copies of small scale project drawings issued to the Contractor are not acceptable. Drawings shall take into account equipment

furnished under other sections and shall show space allotted for it. Include construction details and materials.

1.10. Test Reports and Verification Submittals: Submit test reports, certifications and verification letters as called for in other sections. Contractor shall coordinate the required testing and documentation of system performance such that sufficient time exists to prepare the reports, submit the reports, review the reports and take corrective action within the scheduled contract time.

1.11. O&M Data Submittals: Submit Operation and Maintenance (O&M) data as called for in other sections. Submit a draft of the O&M manuals at the 50% construction requisition. When a copy of approval submittals is included in the O&M Manual, only the final “Approved” or “Approved as Noted” copy shall be used. Contractor shall organize these data in the O&M Manuals tabbed by specification number. Prepare O&M Manuals as required by Division 1 and as described herein. Submit manuals at the Substantial Completion inspection. Submit O&M manuals in electronic format on a disk separate from the "As-Built" drawings.

2. PRODUCTS

2.1. All materials shall be new or Owner-supplied reused as shown on the drawings, the best of their respective kinds, suitable for the conditions and duties imposed on them at the building and shall be of reputable manufacturers. The description, characteristics, and requirements of materials to be used shall be in accordance with qualifying conditions established in the following sections.

2.2. Equipment and Materials:

2.2.1. Shall be new and the most suitable grade for the purpose intended. Products installed shall be approved by Engineer and Owner’s representative. Equipment furnished under this division shall be the product of a manufacturer regularly engaged in the manufacture of such items for a period of three years. Where practical, all of the components shall be products of a single manufacturer in order to provide proper coordination and responsibility. Where required, Contractor shall furnish proof of installation of similar units or equipment.

2.2.2. Each item of equipment shall bear a name plate showing the manufacturer's name, trade name, model number, serial number, ratings and other information necessary to fully identify it. This plate shall be permanently mounted in a prominent location and shall not be concealed, insulated or painted.

2.2.3. The label of the approving agency, such as UL, IBR, ASME, ARI, AMCA, by which a standard has been established for the particular item shall be in full view.

2.2.4. The equipment shall be essentially the standard product of a manufacturer regularly engaged in the production of such equipment and shall be a product of the manufacturer's latest design.

2.2.5. A service organization with personnel and spare parts shall be available within two hours for each type of equipment furnished.

2.2.6. Install in accordance with manufacturer's recommendations. Place in service by a factory trained representative where required.

2.2.7. Materials and equipment are specified herein by a single or by multiple manufacturers to indicate quality, material and type of construction desired. Manufacturer's products shown

on the drawings have been used as basis for design; it shall be the Contractor's responsibility to ascertain that alternate manufacturer's products, or the particular products of named manufacturers, meet the detailed specifications and that size and arrangement of equipment are suitable for installation.

2.2.8. Model Numbers: Catalog numbers and model numbers indicated in the drawings and specifications are used as a guide in the selection of the equipment and are only listed for the contractor's convenience. The contractor shall determine the actual model numbers for ordering materials in accordance with the written description of each item and with the intent of the drawings and specifications.

2.3. Requests for Substitution:

2.3.1. Where a particular system, product or material is specified by name, consider it as standard basis for bidding, and base proposal on the particular system, product or material specified.

2.3.2. Requests by Contractor for substitution will be considered only when reasonable, timely, fully documented, and qualifying under one or more of the following circumstances.

2.3.2.1. Required product cannot be supplied in time for compliance with Contract time requirements.

2.3.2.2. Required product is not acceptable to governing authority, or determined to be non-compatible, or cannot be properly coordinated, warranted or insured, or has other recognized disability as certified by Contractor.

2.3.2.3. Substantial cost advantage is offered Owner after deducting offsetting disadvantages including delays, additional compensation for redesign, investigation, evaluation and other necessary services and similar considerations.

2.3.3. All requests for substitution shall contain a "Comparison Schedule" and clearly and specifically indicate any and all differences or omissions between the product specified as the basis of design and the product proposed for substitution. Differences shall include but shall not be limited to data as follows for both the specified and substituted products:

Principal of operation.
Materials of construction or finishes.
Thickness of gauge of materials.
Weight of item.
Deleted features or items.
Added features or items.
Changes in other work caused by the substitution.
Performance curves.

If the approved substitution contains differences or omissions not specifically called to the attention of the Architect/Engineer, the Owner reserves the right to require equal or similar features to be added to the substituted products (or to have the substituted products replaced) at the Contractor's expense.

3. EXECUTION

3.1. Workmanship: All materials and equipment shall be installed and completed in a first-class workmanlike manner and in accordance with the best modern methods and practice. Any materials installed which do not present an orderly and reasonably neat and/or workmanlike

appearance, or do not allow adequate space for maintenance, shall be removed and replaced when so directed by the Architect/Engineer.

3.2. Coordination:

3.2.1. The Contractor shall be responsible for full coordination of the mechanical systems with shop drawings of the building construction so the proper openings and sleeves or supports are provided for piping, ductwork, or other equipment passing through slabs or walls. Contractor shall be responsible for coordination with the Commissioning Agent for submittal review, mechanical installation verification, and functional performance testing.

3.2.2. Any additional steel supports required for the installation of any mechanical equipment, piping, or ductwork shall be furnished and installed under the section of the specifications requiring the additional supports.

3.2.3. It shall be the Contractor's responsibility to see that all equipment such as valves, dampers, filters and such other apparatus or equipment that may require maintenance and operation are made easily accessible, regardless of the diagrammatic location shown on the drawings.

3.2.4. All connections to fixtures and equipment shown on the drawings shall be considered diagrammatic unless otherwise indicated by detail. The actual connections shall be made to fully suit the requirements of each case and adequately provide for expansion and servicing.

3.2.5. The contractor shall protect equipment, material, and fixtures at all times. He shall replace all equipment, material, and fixtures which are damaged as a result of inadequate protection.

3.2.6. Prior to starting and during progress of work, examine work and materials installed by others as they apply to work in this division. Report conditions which will prevent satisfactory installation.

3.2.7. Start of work will be construed as acceptance of suitability of work of others.

3.3. Interruption of Service: Before any equipment is shut down for disconnecting or tie-ins, arrangements shall be made with the Architect/Engineer and this work shall be done at the time best suited to the Owner. This will typically be on weekends and/or holidays and/or after normal working hours. Services shall be restored the same day unless prior arrangements are made. All overtime or premium costs associated with this work shall be included in the base bid.

3.4. Phasing: Provide all required temporary valves, piping, ductwork, equipment and devices as required. Maintain temporary services to areas as required. Remove all temporary material and equipment on completion of work unless Engineer concurs that such material and equipment would be beneficial to the Owner on a permanent basis.

3.5. Cutting and Patching: Notify General Contractor to do all cutting and patching of all holes, chases, sleeves, and other openings required for installation of equipment furnished and installed under this section. Utilize experienced trades for cutting and patching. Obtain permission from Architect/Engineer before cutting any structural items.

3.6. Equipment Setting: Bolt equipment directly to concrete pads or vibration isolators as required, using hot-dipped galvanized anchor bolts, nuts and washers. Level equipment.

3.7. Painting: Touch-up factory finishes on equipment located inside and outside shall be done under Division 23. Obtain matched color coatings from the manufacturer and apply as

directed. If corrosion is found during inspection on the surface of any equipment, clean, prime, and paint, as required.

3.8. Clean-up: Thoroughly clean all exposed parts of apparatus and equipment of cement, plaster, and other materials and remove all oil and grease spots. Repaint or touch up as required to look like new. During progress of work, contractor is to carefully clean up and leave premises and all portions of building free from debris and in a clean and safe condition.

3.9. Start-up and Operational Test: Start each item of equipment in strict accordance with the manufacturer's instructions; or where noted under equipment specification, start-up shall be done by a qualified representative of the manufacturer. Alignment, lubrication, safety, and operating control shall be included in start-up check.

3.10. Record Drawings:

3.10.1. During the progress of the work the Contractor shall record on their field set of drawings the exact location, as installed, of all piping, ductwork, equipment, and other systems which are not installed exactly as shown on the contract drawings.

3.10.2. Upon completion of the work, record drawings shall be prepared as described in the General Conditions, Supplementary Conditions, and Division 1 sections.

3.11. Acceptance:

3.11.1. Punch List: Submit written confirmation that all punch lists have been checked and the required work completed.

3.11.2. Instructions: At completion of the work, provide a competent and experienced person who is thoroughly familiar with project, for one day to instruct permanent operating personnel in operation of equipment and control systems. This is in addition to any specific equipment operation and maintenance training.

3.11.3. Operation and Maintenance Manuals: Furnish four complete manuals bound in ring binders with Table of Contents, organized, and tabbed by specification section. Manuals shall contain:

Detailed operating instructions and instructions for making minor adjustments.
Complete wiring and control diagrams.
Routine maintenance operations.
Manufacturer's catalog data, service instructions, and parts lists for each piece of operating equipment.
Copies of approved submittals.
Copies of all manufacturer's warranties.
Copies of test reports and verification submittals.

3.11.4. Record Drawings: Submit record drawings.

3.11.5. Test and Balance Report: Submit four certified copies. The Report shall be submitted for review prior to the Substantial Completion Inspection unless otherwise required by Division 1.

3.11.6. Acceptance will be made on the basis of tests and inspections of job. A representative of firm that performed test and balance work shall be in attendance to assist. Contractor shall furnish necessary mechanics to operate system, make any necessary adjustments and assist with final inspection.

3.11.7. Control Diagrams and Piping Diagram: Frame under glass and mount on equipment room wall.

This is a sample cover sheet. Use one for each shop drawing.

ARCHITECT/ENGINEER: Campbell Spellicy Engineering, Inc.

CONTRACTOR: XYZ Construction

SUBCONTRACTOR: ABC Mechanical Contractor

Use whatever standard headings you want here

SUPPLIER: Jones Supply Co.

MANUFACTURER: Various

DATE: 2/15/15

SECTION: 23545/Hydronic Specialti

SAMPLE

List each item separately

1. Vent valves - Hoffman No. 62
2. In-line air separators - Bell & Gossett RL-4
3. Diaphragm type compression tanks - Bell & Gossett B-200
4. Pump suction diffusers - Bell & Gossett ED-3
5. Triple duty valves - Bell & Gossett 3D-4S
6. Shot feeders - J. Woods No. 2
7. Pressure relief valves - Watts No. 6
8. Pressure reducing valves - Bell & Gossett No. 7

Typical - list mfr name & model number

CSEI will list all comments on this sheet and will only stamp approvals on this sheet

Leave space after each individual item for CSEI comments

General Contractor's APPROVAL stamp must be on this sheet.

END OF SECTION

PAGE LEFT INTENTIONALLY BLANK

SECTION 230020 / CODES AND STANDARDS

1. GENERAL

1.1. The work covered by this division consists of providing all labor, equipment and materials and performing all operations necessary for the installation of the mechanical work as herein called for and shown on the drawings.

1.2. This is a Basic Mechanical Requirements section. Provisions of this section apply to work of all Division 23 sections.

2. CODES

2.1. All work under Division 23 shall be constructed in accordance with the codes listed herein. The design has been based on the requirements of these codes; and while it is not the responsibility of the Contractor to verify that all work called for complies with these codes, he shall be responsible for calling to the Architect/Engineer's attention any drawings or specifications that are not in conformance with these or other codes prior to ordering equipment or installing work.

2.2. Comply with regulations and codes of utility suppliers.

2.3. Where no specific method or form of construction is called for in the contract documents, the Contractor shall comply with code requirements when carrying out such work.

2.4. Where code conflict exists, generally the most restrictive requirement applies. Comply with current code edition, unless noted.

2.5. Additional codes or standards applying to a specific part of the work may be included in that section.

2.6. The following codes govern the work

2.6.1. Florida Building Code, 2020with all Supplements.

2.6.2. National Electrical Code (NFPA 70). See Section 26020 for edition.

2.6.3. Florida Fire Prevention Code 2017

2.6.4. Installation of Air Conditioning and Ventilation Systems (NFPA 90A), 2018 edition.

3. STANDARDS

All mechanical materials, installation and systems shall meet the requirements of the following standards, including the latest addenda and amendments, to the extent referenced:

3.1. Underwriters' Laboratories (UL)

3.2. American National Standards Institution (ANSI)

3.3. American Society of Testing Materials (ASTM)

3.4. National Fire Protection Association (NFPA)

3.5. National Electrical Manufacturers Association (NEMA)

3.6. Air Conditioning and Refrigeration Institute (ARI)

3.7. Sheet Metal and Air Conditioning Contractors' National Association (SMACNA)

3.8. American Society of Heating, Refrigeration, and Air Conditioning Engineers (ASHRAE)

3.9. Air Movement and Control Association (AMCA)

3.10. Standards of the Hydronic Institute (IBR)

3.11. University of Florida Design & Construction Standards

END OF SECTION

SECTION 230030 / MECHANICAL RELATED WORK

1. DIVISION 1 - GENERAL REQUIREMENTS

1.1. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification sections, apply to work of this section.

1.2. This is a Basic Mechanical Requirements section. Provisions of this section apply to work of all Division 23 sections.

1.3. Coordinate with the General Contractor for all cutting and patching. Contractors performing Division 23 work shall inform the General Contractor of all cutting and patching required prior to bidding and shall coordinate installation.

2. DIVISION 3 - CONCRETE

2.1. The following is part of Division 23 work, complying with the requirements of Division .3

2.1.1. Curbs, foundations and pads for mechanical equipment.

2.1.2. Inertia bases.

2.2. Perform the following as part of Division 23 work:

2.2.1. Touch up painting of factory finishes.

2.2.2. Painting of all hangers.

3. DIVISION 26 - ELECTRICAL

3.1. Mechanical contractor shall coordinate the exact electrical requirements of all mechanical equipment being provided with the electrical contractor. Where approval submittals are required, this coordination shall be accomplished prior to making the submittals. The electrical design shown on the drawings supports the mechanical equipment basis of design. If mechanical equipment is submitted with different electrical requirements, it is the responsibility of the mechanical contractor to resolve all required electrical design changes (wire and conduit size, type of disconnect or overload protection, point(s) of connection, etc.) and clearly show the new electrical design on the mechanical submittal with a written statement that this design will be provided at no additional cost. Mechanical submittals made with no written reference to the electrical design will be presumed to work with the electrical design. Any corrections required will be at no additional cost.

3.2. Mechanical contractor shall provide all HVAC control wiring including the Building Automation system sensors, alarms, and input/output signals and all relays, interlocks, warning lights, and control devices, complying with the requirements of Division 26. The intent is for the mechanical contractor to be responsible for the entire HVAC control system, including point-to-point wiring. All control wiring shall be in conduit unless otherwise noted.

3.3. Electrical contractor shall provide disconnect switches, starters, and contactors for mechanical equipment unless specifically noted as being furnished as part of mechanical equipment.

3.4. Electrical contractor shall provide all power wiring, raceway and devices, and make final electrical connections to all mechanical equipment, switches, starters, contactors, controllers,

and similar equipment.

3.5. All duct-mounted smoke detectors shall be furnished and wired by the electrical contractor and installed by the mechanical contractor.

END OF SECTION

SECTION 230105 / PIPES AND PIPE FITTINGS

1. GENERAL

1.1. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.

1.2. This section is a Division-23 Basic Mechanical Materials and Methods section, and is part of each Division-23 section making reference to pipes and pipe fittings specified herein.

1.3. Extent of pipes and pipe fittings required by this section is indicated on drawings and/or specified in other Division-23 sections.

1.4. Codes and Standards:

1.4.1. Welding: Qualify welding procedures, welders and operators in accordance with ASME B31.1, or ASME B31.9, as applicable, for shop and project site welding of piping work.

1.4.2. Brazing: Certify brazing procedures, brazers, and operators in accordance with ASME Boiler and Pressure Vessel Code, Section IX, for shop and job-site brazing of piping work.

1.5. Test Report and Verification Submittals:

1.5.1. Submit welding certification for all welding installers.

1.5.2. Submit brazing certification for all brazing installers.

2. PRODUCTS

2.1. Piping Materials: Provide pipe and tube of type, joint type, grade, size and weight (wall thickness or Class) indicated for each service. Where type, grade or class is not indicated, provide proper selection as determined by Installer for installation requirements, and comply with governing regulations and industry standards.

2.2. Pipe/Tube Fittings: Provide factory-fabricated fittings of type, materials, grade, class and pressure rating indicated for each service and pipe size. Provide sizes and types matching pipe, tube, valve or equipment connection in each case. Where not otherwise indicated, comply with governing regulations and industry standards for selections, and with pipe manufacturer's recommendations where applicable.

2.3. Piping Materials/Products:

2.3.1. Soldering Materials: Solders for domestic water service shall be NSF approved or tested to contain no impurities of lead.

2.3.2. Pipe Thread Tape: Teflon tape.

2.3.3. Protective Coating: Koppers Bitumastic No. 505 or equal.

2.3.4. Gaskets for Flanged Joints: ANSI B16.21; full-faced for Cast-Iron flanges; raised-face for steel flanges, unless otherwise noted.

2.3.5. Welding Materials: Comply with Section II, Part C, ASME Boiler and Pressure Vessel Code for welding materials. Materials shall be determined by installer to comply with installation requirements.

2.3.6. Brazing Materials: B cup with silver content of not less than 5%. ASTM B-32, Grade 96TS. Materials shall be determined by installer to comply with installation requirements.

2.4. Copper Tube and Fittings:

2.4.1. Copper Tube: All copper tubing shall be manufactured in the United States.

2.4.1.1. Copper Tube: ASTM B88; Type K or L as indicated for each service; hard-drawn temper unless specifically noted as annealed.

2.4.2. Fittings:

2.4.2.1. Wrought-Copper Solder-Joint Fittings: ANSI B16.22.

2.4.2.2. Copper Tube Unions: Provide standard products recommended by manufacturer for use in service indicated.

2.4.2.3. Cast-Copper Flared Tube Fittings: ANSI B16.26.

2.5. Steel Pipes and Pipe Fittings

2.5.1. Pipes:

2.5.1.1. Black Steel Pipe: ASTM A-53 or A795E, Grade B, Standard Weight, Type ERW or seamless, Schedule 40.

2.5.2. Pipe Fittings:

2.5.2.1. Threaded Cast Iron: ANSI B16.4.

2.5.2.2. Threaded Malleable Iron: ANSI B16.3; plain or galvanized as indicated.

2.5.2.3. Threaded Pipe Plugs: ANSI B16.14.

2.5.2.4. Flanged Cast Iron: ANSI B16.1, including bolting.

2.5.2.5. Steel Flanges/Fittings: ANSI B16.5, including bolting and gasketing.

2.5.2.6. Wrought-Steel Buttwelding Fittings: ANSI B16.9, except ANSI B16.28 for short radius elbows and returns, rated to match connected pipe.

2.5.2.7. Pipe Nipples: Fabricated from same pipe as used for connected pipe; except do not use less than schedule 80 pipe where length remaining unthreaded is less than 1 ½ inches, and where pipe size is less than 1 ½ inches, and do not thread nipples full length (no close-nipples).

3. EXECUTION

3.1. Installation

3.1.1. General: Install pipes and pipe fittings in accordance with recognized industry practices which will achieve permanently-leakproof piping systems, capable of performing each indicated service without piping failure. Install each run with minimum joints and couplings, but with adequate and accessible unions for disassembly and maintenance or replacement of valves and equipment. Reduce sizes (where indicated) by use of reducing fittings, not bushings. Align piping accurately at connections, within 1/16" misalignment tolerance.

3.1.2. Comply with ANSI B31 Code for Pressure Piping.

3.1.3. Locate piping runs, except as otherwise indicated, vertically and horizontally (pitched to drain) and avoid diagonal runs wherever possible. Orient horizontal runs parallel with walls and column lines. Locate runs as shown or described by diagrams, details and notations or, if not otherwise indicated, run piping in shortest route which does not obstruct usable space or block access for servicing building and its equipment. Hold piping close to walls, overhead construction, columns and other structural and permanent-enclosure elements of building; limit clearance to ½" where furring is shown for enclosure or concealment of piping, but allow for insulation thickness, if any. Where possible, locate insulated piping for 1" clearance outside insulation.

3.1.4. Concealed Piping: Unless specifically noted as “Exposed” on the drawings, conceal piping from view in finished and occupied spaces, by locating in column enclosures, chases, in hollow wall construction or above suspended ceilings; do not encase horizontal runs in solid partitions, except as indicated.

3.1.5. Electrical Equipment Spaces: Do not run piping through transformer vaults and other electrical, communications, or data equipment spaces and enclosures unless shown. Install drip pan under piping that must run through electrical spaces.

3.1.5.1. Cut pipe from measurements taken at the site, not from drawings. Keep pipes free of contact with building construction and installed work.

3.2. Piping System Joints: Provide joints of the type indicated in each piping system.

3.2.1. Solder copper tube-and-fitting joints where indicated, in accordance with recognized industry practice. Cut tube ends squarely, ream to full inside diameter, and clean outside of tube ends and inside of fittings. Apply non-acid water base type solder flux to joint areas of both tubes and fittings. Insert tube full depth into fitting, and solder in manner which will draw solder full depth and circumference of joint. Solder pipes using ASTM B828 methods.

3.2.2. Thread pipe in accordance with ANSI B2.1; cut threads full and clean using sharp dies. Ream threaded ends to remove burrs and restore full inside diameter. Apply pipe joint compound, or pipe joint tape (Teflon) where recommended by pipe/fitting manufacturer, on male threads at each joint and tighten joint to leave not more than 3 threads exposed. Paint exposed threads to retard rusting.

3.2.3. Flanged Joints: Match flanges within piping system, and at connection with valves and equipment. Clean flange faces and install gaskets. Tighten bolts to provide uniform compression of gaskets. Bolts shall project 1/8" to 3/8" beyond nut face when tight.

3.2.4. Weld pipe joints in accordance with recognized industry practice and as follows. Be guided by ANSI B.31.

3.2.4.1. Welding or soldering of pipe inside building will not take place while building is occupied. Welding inside building will include a person on standby with an extinguisher serving as a fire watch. His sole purpose during welding will be to watch for fires.

3.2.4.2. Weld pipe joints only when ambient temperature is above 0°F.

3.2.4.3. Bevel pipe ends at a 37.5° angle where possible, smooth rough cuts, and clean to remove slag, metal particles and dirt.

3.2.4.4. Use pipe clamps or tack-weld joints; 4 welds for pipe sizes to 10". All welds shall be open-butt.

3.2.4.5. Build up welds with root pass, followed by filler pass and then a cover pass. Eliminate valleys at center and edges of each weld. Weld by procedures which will ensure elimination of unsound or unfused metal, cracks, oxidation, blow-holes and non-metallic inclusions.

3.2.4.6. Do not weld-out piping system imperfections by tack-welding procedures; refabricate to comply with requirements.

3.2.4.7. At Installer's option, install forged branch-connection fittings wherever branch pipe is less than 3" and at least two pipe sizes smaller than main pipe indicated; or install regular "T" fitting. Weld-O-Let or equal.

3.2.5. Cast-Iron Joints: Tightly pack joint with joint packing material. Do not permit packing to enter bore of finished joint. Clean joint after packing. Fill remaining joint space with one pouring of lead to indicated minimum depth measured from face of bell. After lead has cooled, calk joint tightly by use of hammer and calking iron. If using compression joints, comply with manufacturer's installation instruction using gaskets and lubricant furnished specifically for this duty.

3.2.6. Hubless Cast-Iron Joints: Comply with coupling manufacturer's installation instructions.

3.2.7. Braze copper tube-and-fitting joints where indicated, in accordance with ANSI B.31.

3.3. Piping Installation:

3.3.1. Install piping to allow for expansion and contraction.

3.3.2. Isolate all copper tubing from steel and concrete by wrapping the pipe at the contact point, and for one inch on each side, with at least two layers of plastic electrical tape. Isolate all copper tubing installed in block walls with a continuous plastic sleeve.

END OF SECTION

PAGE LEFT INTENTIONALLY BLANK

SECTION 230110 / VALVES

1. GENERAL

1.1. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to the work of this section.

1.2. This section is a Division-23 Basic Materials and Methods section, and is part of each Division-23 section making reference to or requiring valves specified herein.

1.3. Extent of valves required by this section is indicated on drawings and/or specified in other Division-23 sections.

1.4. Quality Assurance:

1.4.1. Valve Dimensions: For face-to-face and end-to-end dimensions of flanged or welding-end valve bodies, comply with ANSI B16.10.

1.4.2. Valve Types: Provide valves of same type by same manufacturer.

1.4.3. Valve Listing: For valves on fire protection piping, provide UL listing.

1.4.4. Valves Installed in Boiler Rooms: Comply with ASME Boiler and Pressure Vessel Code.

1.5. Approval Submittals: When required by other Division-23 sections, submit product data, catalog cuts, specifications, and dimensioned drawings for each type of valve. Include pressure drop curve or chart for each type and size of valve. Submit valves with Division-23 section using the valves, not as a separate submittal. Submit valve comparison chart with applicable valves clearly marked if valves other than basis-of-design are to be used. For each valve, identify systems where the valve is intended for use.

1.5.1. Check Valves. Type CK.

1.5.2. Ball Valves. Type BA.

1.5.3. Butterfly Valves. Type BF.

1.6. O&M Data Submittals: Submit a copy of approval submittals. Submit installation instructions, maintenance data and spare parts lists for each type of valve. Include this data in the O&M Manual.

2. PRODUCTS

2.1. General: Provide factory-fabricated valves recommended by manufacturer for use in service indicated. Provide valves of types and pressure ratings indicated; provide proper selection as determined by Installer to comply with specifications and installation requirements. Provide sizes as indicated, and connections which properly mate with pipe, tube, and equipment connections.

2.2. Acceptable Manufacturers: Subject to compliance with requirements, provide valves of one of the producers listed for each valve type. Other valve manufacturers list names are also acceptable. The model numbers are listed for contractor's convenience only. In the case of a model number discrepancy, the written description shall govern.

2.3. Check Valves:

2.3.1. Construction: Construct valves of castings free of any impregnating materials. Construct valves with a bronze regrinding disc with a seating angle of 40º to 45º, unless a composition disc is specified. Provide stop plug as renewable stop for disc hanger, unless otherwise specified. Disc and hanger shall be separate parts with disc free to rotate. Support hanger pins on both ends by removable side plugs.

2.3.2. Comply with the following standards:

Cast Iron Valves: MSS SP-71. Cast Iron Swing Check Valves, Flanged and Threaded Ends.

Bronze Valves: MSS SP-80. Bronze Gate, Globe, Angle and Check Valves.

Steel Valves: ANSI B16.34. Steel Standard Class Valve Ratings.

2.3.3. Types of check (CK) valves:

2.3.3.1. Threaded Ends 2" and Smaller (CK1): Class 125, bronze body, screwed cap, horizontal swing, bronze disc. Apollo 161T. Stockham B-319. Nibco T-413-BY. Crane 1707. Milwaukee 509.

2.3.3.2. Soldered Ends 2" and Smaller (CK2): Class 125, bronze body, screwed cap, horizontal swing, bronze disc. Apollo 161S. Stockham B-309. Nibco S-413-B. Crane 1707S. Milwaukee 1509.

2.3.3.3. Flanged Ends 2½" and Larger (CK3): Class 125, iron body, bronze-mounted, bolted cap, horizontal swing, cast-iron or composition disc. Apollo 910F. Stockham G-931 or G-932 as applicable. Nibco F918-B. Crane 373. Milwaukee F2974 as applicable.

2.3.3.4. Threaded Ends 2" and Smaller (CK4): 200 WWP, bronze body, screwed cap, horizontal swing, regrinding type bronze disc, for fire sprinkler use. Nibco KT-403-W.

2.3.3.5. Flanged Ends 2½" and Larger (CK5): 175 WWP, iron body, bolted cap, bronze mounted, composition disc, UL listed, with ball drip if required. Stockham G-940. Nibco F-908-W.

2.3.3.6. Threaded Ends 2" and Smaller (CK6): Class 200, bronze body, screwed cap, Y-pattern swing, regrinding bronze disc. Stockham B-345. Nibco T-453-B. Crane 36. Milwaukee 518/508.

2.3.3.7. Flanged Ends 2½" and Larger (CK7): Class 250, iron body, bronze mounted, bolted cap, cast-iron disc. Apollo 920F. Stockham F-947. Nibco F-968-B. Crane 39E. Milwaukee F2970.

2.3.3.8. Threaded Ends 2" and Smaller (CK8): Class 300, bronze body, screwed cap, Y-pattern swing, regrinding bronze disc. Apollo 168T. Stockham B-375. Nibco T-473-B. Crane 76E. Milwaukee 517/507.

2.3.3.9. Flanged Ends 2½" and Larger (CK9): Class 300, cast steel body, bolted cap, horizontal swing, seal welded seat rings, chromium stainless disc. Stockham 30-SF. Crane 159.

2.3.3.10. Flanged Ends 2½" and Larger (CK10): Class 125, cast-iron body, ASTM A126, stainless trim, globe style, compact silent check. Mueller Steam 105M-AP or 101M-AP.

2.4. Ball Valves:

2.4.1. General: Select with port area equal to or greater than connecting pipe area, include seat ring designed to hold sealing material.

2.4.2. Construction: Ball valves shall be rated for 150 psi saturated steam and 600 psi non-shock cold water. Pressure containing parts shall be constructed of ASTM B-584 alloy 844, or ASTM B-124

alloy 377. Valves shall be furnished with blow-out proof bottom loaded stem constructed of ASTM B-371 alloy 694 or other approved low zinc material. Provide TFE packing, TFE thrust washer, chrome-plated ball and reinforced teflon seats. Valves 1" and smaller shall be full port design. Valves 1¼" and larger shall be conventional port design. Stem extensions shall be furnished for use in insulated piping where insulation exceeds ½" thickness.

2.4.3. Comply with the following standards:

MSS SP-72. Ball Valves with Flanged or Butt-Welding Ends for General Service.

MSS SP-110. Ball Valves Threaded, Socket-Welding, Solder Joint, Grooved and Flared Ends.

2.4.4. Types of Ball (BA) valves:

2.4.4.1. Threaded Ends 2" and Smaller (BA1): Bronze two-piece full port body with adjustable stem packing and stainless-steel ball and trim. Apollo 77C. Nibco T-585-70. Stockham S216-BR-R-T. Milwaukee BA125. Apollo 77-100.

2.4.4.2. Soldered Ends 2" and Smaller (BA2): Bronze two-piece full port body with adjustable stem packing and stainless-steel ball and trim. Apollo 77C. Nibco S-585-70.

2.4.4.3. Threaded Ends 1" and Smaller (BA3): Bronze two-piece full port body, UL listed (UL 842) for use with flammable liquids and LP gas with lockout rings. Nibco T-585-70-UL. Milwaukee BA400NSF, Apollo 70LF-200, Jomar 175-LWN.

2.4.4.4. Threaded Ends 2" and Smaller (BA4): 175 WWP, bronze two-piece body, UL listed for fire protection service. Nibco KT-585-70-UL and KT-580-70-UL.

2.4.4.5. Threaded Ends 2" and Smaller (BA5): 400 WWP, bronze two-piece body, for fire protection service. Nibco KT-580.

2.4.4.6. Threaded Ends 2½" and Smaller (BA6): 300 WWP, bronze three-piece body, gear operator with handwheel, indicator flag, accepts tamper switch, for fire protection, UL listed. Nibco T-505-4 and G-505-4.

2.4.4.7. Flanged Ends 2½" and Larger (BA7): Class 150, carbon steel full bore two-piece body with adjustable stem packing. Nibco F515-CS series. Apollo 88-240.

2.5. Butterfly Valves:

2.5.1. General: Comply with MSS SP-67, Butterfly Valves. Provide butterfly valves designed for tight shut-off. Where used for terminal or equipment removal or repair, select lug type valves. Select wafer type valves for other applications. Provide gear operators on all butterfly valves 6" and larger.

2.5.2. Types of butterfly (BF) valves:

2.5.2.1. Wafer Type 3" and Larger (BF1): 200 CWP, cast-iron body, lever-operated, cadmium-plated ductile iron disc, Type 410 stainless steel stem, EPT seat. Stockham LG-512. Nibco WD 2011-5. Crane 42-FXZ-TL. Milwaukee MW222E-8416.

2.5.2.2. Lug Type 3" and Larger (BF2): 200 CWP, cast-iron body, lever-operated, cadmium-plated ductile iron disc, Type 410 stainless steel stem, EPT seat. Stockham LG-712. Nibco LD 2110-3. Crane 44-FXB-TL. Milwaukee ML132B-8416.

2.5.2.3. Wafer Type 3" and Larger (BF3): 150/200 CWP, cast-iron body, gear-operated, cadmium-

plated ductile iron disc, Type 410 stainless steel stem, EPT seat. Stockham LG-522 and LG-521. Nibco WD 2110-5. Crane 42-FXB-G. Milwaukee MW 122B-8115.

2.5.2.4. Lug Type 3" and Larger (BF4): 150/200 CWP, cast-iron body, gear-operated, cadmium-plated ductile iron disc, Type 410 stainless steel stem, EPT seat. Stockham LG-722 and LG-721. Nibco LD 2110-5. Crane 44-FXB-G. Milwaukee ML 132B-8115.

2.5.2.5. Wafer Type 4" and Larger (BF5): 175 WWP, cast-iron body, gear-operated, nickel-plated ductile iron disc, Type 410 stainless steel stem, EPT seat, UL listed. Stockham LG-52U. Nibco WD 3510-8.

2.5.2.6. Lug Type 4" and Larger (BF6): 175 WWP, cast-iron body, gear-operated, nickel-plated ductile iron or aluminum bronze disc, Type 410 stainless steel stem, EPT seat, UL listed. Stockham LG-72U. Nibco LD 3510-8.

2.5.2.7. Grooved Type 4" and Larger (BF7): 175 WWP, cast-iron body, gear-operated, nickel-plated ductile iron or aluminum bronze disc, Type 410 stainless steel stem, EPT seat, UL listed. Stockham LG-82U. Nibco GD 1765-2.

2.6. Valve Features:

2.6.1. General: Provide valves with features indicated and, where not otherwise indicated, provide proper valve features as determined by Installer for installation requirements. Comply with ANSI B31.1

2.6.2. Valve features specified or required shall comply with the following:

2.6.2.1. Flanged: Provide valve flanges complying with ANSI B16.1 (cast iron), ANSI B16.5 (steel), or ANSI B16.24 (bronze).

2.6.2.2. Threaded: Provide valve ends complying with ANSI B2.1.

2.6.2.3. Solder-Joint: Provide valve ends complying with ANSI B16.18.

2.6.2.4. Trim: Fabricate pressure-containing components of valve, including stems (shafts) and seats from brass or bronze materials, of standard alloy recognized in valve manufacturing industry unless otherwise specified.

2.6.2.5. Non-Metallic Disc: Provide non-metallic material selected for service indicated in accordance with manufacturer's published literature.

2.6.2.6. Renewable Seat: Design seat of valve with removable disc, and assemble valve so disc can be replaced when worn.

2.6.2.7. Extended Stem: Increase stem length by 2" minimum, to accommodate insulation applied over valve.

3. EXECUTION

3.1. Installation:

3.1.1. General: Install valves where required for proper operation of piping and equipment, including valves in branch lines to isolate sections of piping. Locate valves so as to be accessible and so that separate support can be provided when necessary. Install valves with stems pointed up, in vertical position where possible, but in no case with stems pointed downward below horizontal plane.

3.1.2. Insulation: Where insulation is indicated, install extended-stem valves, arranged in proper manner to receive insulation.

3.1.3. Applications Subject to Corrosion: Do not install bronze valves and valve components in direct contact with steel, unless bronze and steel are separated by dielectric insulator.

3.2. Selection of Valve Ends (Pipe Connections): Except as otherwise indicated, select and install valves with the following ends or types of pipe/tube connections:

3.2.1. Pipe Size 2" and Smaller: Threaded valves.

3.2.2. Pipe Size 2½" and Larger: Flanged valves.

3.3. Non-Metallic Disc: Limit selection and installation of valves with non-metallic disc to locations indicated and where foreign material in piping system can be expected to prevent tight shutoff of metal seated valves.

3.4. Renewable Seats: Select and install valves with renewable seats, except where otherwise indicated.

3.5. Installation of Check Valves: Install in horizontal position with hinge pin horizontally perpendicular to center line of pipe. Install for proper direction flow.

END OF SECTION

PAGE LEFT INTENTIONALLY BLANK

SECTION 230115 / ELECTRIC MOTORS

1. GENERAL

1.1. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specifications Section apply to work of this Section.

1.2. This section is a Division 23 Basic Mechanical Materials and Methods section, and is part of each Division 23 section making reference to motors specified herein.

1.3. Extent of motors required by this section is indicated on drawings and/or specified in other Division-23 sections.

1.4. Comply with the requirements of Division 26.

1.5. UL Compliance: Comply with applicable UL standards pertaining to motors.

1.6. Approval Submittals:

1.6.1. Product Data: When required by other Division-23 sections, submit manufacturers standard product data sheets for each type of motor provided. Submit with Division-23 section using the motors, not as a separate submittal. Mark data sheet with arrows indicating product being supplied and list by unique descriptive name all motors to which each data sheet applies. Clearly indicate type, service factor, rpm, duty cycle, voltage, phase, nominal full load efficiency, power factor and insulation class. Field verify and coordinate mounting and frame requirements for matching the drive.

1.7. O&M Data Submittals: Submit a copy of approval submittals. Submit operation and maintenance data for each type of motor. Include these data in O&M Manual. Submit two copies of nameplate data sheet for each motor. One copy shall be included with the O&M Manual and a second copy shall be inserted in a waterproof pouch or bag and attached to the motor. Nameplate data sheets shall be typed or neatly printed and shall include all data on the motor nameplate plus a unique motor description such as "AHU-3 Fan Motor", "Distribution Pump #1" or similar description.

2. PRODUCTS

2.1. Acceptable Manufacturers: Subject to compliance with requirements, General Electric, Baldor, US Electric, or approved equal.

2.2. General:

2.2.1. Motors shall conform to applicable portions of NEMA Standard MG-1, Motors and Generators.

2.2.2. Motors shall be sized for the application such that when the driven equipment is operated at rated capacity the motor current will not exceed the full-load nameplate current. Service factor shall not be used in normal operation.

2.3. Motor Design:

2.3.1. Integral Horsepower Motors:

2.3.1.1. Motors shall be open drip-proof or totally enclosed fan cooled as shown on the drawings or listed in the Division 23 section requiring motors.

2.3.1.2. Motors shall be three phase, 60 hertz, nominal 1800 rpm, rated at 200 volts for 208 volt systems, 230 volts for 240 volt systems and 460 volts for 480 volt systems. 230/208 volt motors shall not be permitted on 208 volt systems.

2.3.1.3. Motors shall be NEMA Design B and shall have 1.15 service factor or greater at 60 hertz.

2.3.1.4. Insulation Systems

2.3.1.4.1. In fixed speed applications, motors shall have Class B insulation with 80°C rise over 40°C ambient.

2.3.1.4.2. For variable frequency drive (VFD) applications, motors shall have Class F insulation with 105°C rise over 40°C ambient. Motor manufacturer shall identify motors being used for VFD applications by marking the motor with a stainless steel name-plate “Inverter Duty”. Motors shall be provided with one set of thermostatic sensors. Motors to be premium efficiency. Motor nameplate shall be marked “Suitable for Variable Frequency Drive”. Motors 3-horsepower or larger utilizing a VFD shall be provided with bearing protection rings to prevent shaft grounding.

2.3.1.5. Motor efficiencies shall be based on IEEE-112, Test Method B, as specified in NEMA Standard MG1-12.53. NEMA motor efficiency and power factor shall be clearly shown on the motor nameplate. Inverter duty motors shall have a CIV rating based on NEMA.

2.3.1.6. Motors shall be premium efficiency type and shall meet or exceed the following minimum nominal efficiencies at rated voltage.

HORSEPOWER RANGE	MINIMUM NOMINAL EFFICIENCY	MINIMUM ACCEPTABLE POWER FACTOR
1 hp	85.5. pct.	78.0 pct
1.5 hp	86.5 pct.	78.0 pct
2 hp	86.5 pct.	83.0 pct
3 hp	89.5 pct.	80.0 pct
5 hp	89.5 pct.	80.0 pct
7.5 hp	91.7 pct.	81.0 pct
10 hp	91.7 pct.	82.0 pct
15 hp	92.4 pct.	82.0 pct
20 hp	93.0 pct.	86.0 pct
25 hp	93.6 pct.	84.0 pct
30 hp	93.6 pct.	83.0 pct
40 hp	94.1 pct.	86.0 pct
50 hp	94.5 pct.	87.0 pct

2.4. Overload Protection: Properly sized overload protection shall be provided for each motor. This protection shall be an integral part of the motor. Provide three phase protection for all three phase motors. Provide solid state overloads for poly phase motors. Contractors shall set overloads at start-up and be recorded on start up sheets.

3. EXECUTION

3.1. Motor Size and Location:

3.1.1. Size and location of motors shown on the drawings are based on a particular design and may change with a different manufacturer. Submittal of shop drawings or product literature indicating motor sizes or locations different from that designed indicates that Contractor has fully coordinated any required changes to the electrical system with other trades. Approval (if made) is on this basis and no additional cost will be allowed for any changes.

3.1.2. Contractor shall verify and make any necessary adjustments to electrical service, branch circuit wiring, branch circuit protection, overload protection, disconnect and controller (starter), or VFD based on actual nameplate data of the motors supplied prior to installation. Where applicable, connect motor winding thermostat to VFD.

3.2. Motor Voltages: Contractor shall field verify system voltage prior to ordering or installing any motors. Submittal of shop drawings or product literature indicating motor voltages indicates that Contractor has fully coordinated the motor with the electrical system and that any discrepancies have been resolved. Approval (if made) is on this basis and no additional cost will be allowed for any changes.

3.3. Motor Mounting: Adjust motor mounting as required to adjust the drive train for proper belt operation and to accommodate sheave changes or other requirements of the test and balance work.

3.4. Motor Nameplate: All motors shall have a nameplate with voltage, phase, full load amps, service rating, serial number, manufacturer's model number, date of manufacture.

END OF SECTION

PAGE LEFT INTENTIONALLY BLANK

SECTION 230135 / VIBRATION ISOLATION

1. GENERAL

1.1. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.

1.2. This section is a Division-23 Basic Mechanical Materials and Methods section, and is part of each Division-23 section making reference to vibration isolation equipment.

1.3. Extent of vibration isolation required by this section is indicated on drawings and/or specified in other Division-23 sections.

1.4. Approval Submittals: When required by other Division-23 sections, submit product data sheets for each type of vibration isolation equipment including configuration and rating data. Submit with Division-23 section using vibration isolation, not as a separate submittal. Provide calculations showing supported weight, deflection, and isolator size and type for each item of supported equipment. Submit for:

1.4.1. Bases and Frames. Type BF.

1.4.2. Pipe Flexible Connections. Type PF.

1.5. O&M Data Submittals: Submit a copy of approval submittals for each type of vibration isolation equipment. Include this data in O&M Manual.

2. PRODUCTS

2.1. General: Provide factory-fabricated products recommended by manufacturer for use in service indicated. Provide products of types and deflections indicated; provide proper selection as determined by Installer to comply with specifications and installation requirements. Provide sizes which properly fit with equipment. All metal parts installed outside shall be hot dipped galvanized after fabrication.

2.2. Acceptable Manufacturers: Subject to compliance with requirements, provide vibration isolation equipment of: Mason Industries, Keflex, Consolidated Kinetics, Vibration Mountings & Controls, Wheatley or approved equal. All vibration isolators shall be supplied by a single approved manufacturer.

2.3. Equipment Mountings:

2.3.1. Select mountings with the required deflection and fastening means. Provide steel rails or bases as required to compensate for equipment rigidity and overhang.

2.4. Bases and Frames (BF):

2.4.1. Select mounting bases and frames as required for equipment dimensions, service access and fastening means. Provide all fasteners. Coordinate and provide required vibration isolators to match mounting bases and frames.

2.4.2. Types of bases and frames (BF):

2.4.2.1. Steel Base Frame for Floor-Mounted Equipment (BF1): Provide frames consisting of structural steel sections sized, spaced and connected to form a rigid base which will not twist, rack,

deform or deflect in any manner that will negatively affect the operation of the supported equipment or the performance of the vibration-isolation mounts. Frames shall be of adequate size and plan form to support basic equipment units and motors plus any associated pipe elbow or duct elbow supports and electrical control elements or other components closely related and requiring resilient support in order to prevent vibration transfer from equipment to the building structure. Frames shall include side mounting brackets for attachment to vibration isolation floor mounts. The clearance between the underside of any frame or mounted equipment unit and the top of the building structure below shall be at least 2 inches. Basis of Design: Mason Industries WFSL.

2.5. Pipe Flexible Connections:

2.5.1. Select pipe flexible connections suitable for duty indicated with ends to match piping system.

2.5.2. Types of pipe flexible connections (PF):

2.5.2.1. Coil Connections (PF3): Provide stainless steel annular hose with stainless steel braid flexible connectors rated at 175 psig at 250ºF. Connectors shall have ductile iron floating flanged or threaded ends with baked enamel finish. Provide control rods or cables as required for each application. Basis of Design: Keflex KSSPC as required.

3. EXECUTION

3.1. Install vibration isolation devices for the duty indicated and for ease of inspection, adjustment, and proper operation. Install in accordance with the manufacturer's written instructions and coordinate with shop drawings of supported equipment.

3.2. All connections to fixtures and equipment shown on the drawings shall be considered diagrammatic unless otherwise indicated by detail. The actual connections shall be made to fully suit the requirements of each case and adequately provide for expansion and servicing.

3.3. Piping, ductwork and conduit shall not be suspended from one another or physically contact one another. Vibrating systems shall be kept free from non-vibrating systems.

3.4. Bases and Frames:

3.4.1. Unless otherwise indicated, all equipment mounted on vibration-isolated bases shall have a minimum operating clearance of 2 inches between the structural steel frame and the concrete housekeeping pad or floor beneath the equipment. The clearance space shall be checked to ensure that no construction debris has been left to short-circuit or restrict the proper operation of the vibration isolation system.

3.4.2. Coordinate vibration isolation bases for rooftop equipment with equipment suppliers, curb suppliers, and roofing contractor. Install unit to achieve a water-tight, wind-resistant system.

3.5. Pipe Flexible Connections:

3.5.1. Piping connected to vibration isolated equipment shall be installed so that it does not strain or force out of alignment the vibration isolators supporting the basic equipment, nor shall pipes restrict such equipment from "floating" freely on its respective vibration isolation system. Flexible connections shall be used to eliminate transferring vibration along piping.

3.5.2. Flexible connections and hoses shall not be used to compensate for pipe misalignment. Units shall be aligned so that the flexible connection is not distorted perpendicular to the axis of the

piping.

3.5.3. Install flexible connections water coil inlet and outletand where shown on the drawings or required by equipment specifications.

3.5.4. Drain piping connected to vibrating equipment shall not physically contact any building construction or non-isolated systems or components.

3.6. Connections of Ducts: Ducts shall be connected to fan intakes and discharges by means of flexible connectors in accordance with Division-23 section "Ductwork Accessories" so that all vibrating equipment is fully isolated. All flexible duct connections shall meet Specification DDFCD-1199, NFPA 90A, NFPA 90B, and shall only be installed between the AHU and ductwork.

END OF SECTION

PAGE LEFT INTENTIONALLY BLANK

SECTION 230140 / METERS AND GAUGES

1. GENERAL

1.1. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.

1.2. This section is a Division-23 Basic Mechanical Materials and Methods section, and is part of each Division-23 section making reference to or requiring meters and gauges specified herein.

1.3. Extent of meters and gauges required by this section is indicated on drawings and/or specified in other Division-23 sections.

1.4. UL Compliance: Comply with applicable UL standards pertaining to meters and gauges.

1.5. ANSI and ISA Compliance: Comply with applicable portions of ANSI and Instrument Society of America (ISA) standards pertaining to construction and installation of meters and gauges.

1.6. Approval Submittals:

1.6.1. Product Data: When required by other Division-23 sections, submit manufacturer's technical product data for each type of meter and gauge. Submit with Division-23 section using meters and gauges, not as a separate submittal. Include scale range, ratings, and calibrated performance curves, certified where indicated. Submit for:

1.6.1.1. Thermometers

1.6.1.2. Pressure gauges

1.6.1.3. Gauge connector plugs

1.6.1.4. Calibrated balance valves

1.7. O&M Data Submittals: Submit a copy of approval submittals. Submit calibration curves and operating instructions for each type of meter or gauge. Include this data in O&M Manual.

2. PRODUCTS

2.1. Acceptable Manufacturers (Thermometers and Pressure Gauges): Subject to compliance with requirements, Ashcroft, Ernst Gauge Company, Weksler, Marshalltown Instruments, Trerice, Weiss Instruments, Wheatley, Fluidyne or approved equal.

2.2. Glass Thermometers:

2.2.1. General: Provide glass thermometers of materials, capacities, and ranges indicated, designed and constructed for use in service indicated.

2.2.2. Case: Die cast aluminum finished in baked epoxy enamel, glass front, spring secured, 9" long.

2.2.3. Adjustable Joint: Die cast aluminum, finished to match case, 180° adjustment in vertical plane, 360° adjustment in horizontal plane, with locking device.

2.2.4. Tube and Capillary: Organic blue liquid filled, magnifying lens, 1% scale range accuracy, shock mounted.

2.2.5. Scale: Satin faced, non-reflective aluminum, permanently etched markings.

2.2.6. Stem: Copper-plated steel or brass for separable socket, length to suit installation.

2.2.7. Range: Conform to the following:

2.2.7.1. Hot Water: 30° - 240°F with 2°F scale divisions.

2.2.7.2. Chilled Water: 30° - 180°F with 2°F scale divisions.

2.3. Thermometer Wells: Provide thermometer wells constructed of brass or stainless steel, pressure rated to match piping system design pressure. Provide 2" extension for insulated piping. Provide cap nut with chain fastened permanently to thermometer well. Same manufacturer as thermometers.

2.4. Pressure Gauges:

2.4.1. General: Provide pressure gauges of materials, capacities, and ranges indicated, designed and constructed for use in service indicated.

2.4.2. Type: General use, 1% accuracy, ANSI B40.1 grade A, phosphor bronze bourdon type, bottom connection.

2.4.3. Case: Drawn steel or brass, glass lens, 4-½" diameter.

2.4.4. Connector: Brass with ¼" male NPT.

2.4.5. Scale: White coated aluminum with black scale.

2.4.6. Range: Select so that highest possible pressure does not exceed 75% of full scale.

2.5. Pressure Gauge Cocks:

2.5.1. General: Provide ¼" ball valves for use as pressure gauge cocks.

2.5.2. Snubber: ¼" brass bushing with corrosion resistance porous metal disc, through which pressure fluid is filtered. Select disc material for fluid served and pressure rating.

2.6. Gauge Connector Plugs:

2.6.1. Provide temperature gauge connector plugs pressure rated for 500 psi and 200⌒F. Construct of brass and finish in nickel-plate, equip with ½" NPT fitting, with self-sealing valve core type neoprene gasketed orifice suitable for inserting ⅛" O.D. probe assembly from dial type insertion thermometer. Equip orifice with gasketed screw cap and chain. Provide extension, length equal to insulation thickness, for insulated piping. Pete's Plug or approved equal.

2.6.2. Provide pressure gauge connector plugs pressure rated for 500 psi and 200⌒F. construct of brass and finish in nickel-plate, equip with ½" NPT fitting, with self-sealing valve core type neoprene gasketed orifice suitable for inserting ⅛" O.D. probe assembly from dial type insertion pressure gauge. Equip orifice with gasketed screw cap and chain. Provide extension, length equal to insulation thickness, for insulated piping. Pete's Plug or approved equal.

2.6.3. Provide master test kit with one 2-½" test gauge of suitable range, one gauge adapter probe, and one stem pocket testing thermometer (0⌒F-220⌒F).

2.7. Calibrated Balance Valves:

2.7.1. General: Provide as indicated, calibrated balance valves equipped with readout valves to facilitate connecting of differential pressure meter to balance valves. Equip each readout valve with integral EPT check valve designed to minimize system fluid loss Provide sleeves at all

concrete penetrations. during monitoring process. Provide calibrated nameplate to indicate degree of closure of precision machined orifice. Construct balancing valve with internal EPT O-ring seals to prevent leakage around rotating element. Provide balance valves with preformed polyurethane insulation suitable for use on heating and cooling systems.

2.7.2. Acceptable Manufacturers: Bell and Gossett, Taco, Thrush Products.

3. EXECUTION

3.1. Installation of Temperature Gauges:

3.1.1. General: Install temperature gauges in vertical upright position, and tilt so as to be easily read by observer standing on floor.

3.1.2. Locations: Install in the following locations, and elsewhere as indicated:

3.1.2.1. At inlet and outlet of each hydronic coil in air handling units.

3.1.3. Thermometer Wells: Install in piping tee where indicated, in vertical upright position. Thermometers shall have at least 75% of stem in moving fluid.

3.1.4. Temperature Gauge Connector Plugs: Install in piping tee where indicated, located on pipe at most readable position. Secure cap.

3.2. Installation of Pressure Gauges:

3.2.1. General: Install pressure gauges in piping tee with pressure gauge cock, located on pipe at most readable position.

3.2.2. Locations: Install in the following locations, and elsewhere as indicated:

3.2.2.1. At inlet and outlet of each hydronic coil in air handling units.

3.2.3. Pressure Gauge Cocks: Install in piping tee with snubber. Install syphon for steam pressure gauges.

3.2.4. Pressure Gauge Connector Plugs: Install in piping tee where indicated, located on pipe at most readable position. Secure cap.

3.3. Installation of Flow Measuring Meters:

3.3.1. General: Install flow measuring meters on piping systems located in accessible locations at most readable position.

3.3.2. Locations: Install in the following locations, and elsewhere as indicated:

3.3.2.1. At hydronic coil runouts to air handling units.

3.3.3. Calibrated Balance Valves: Install on piping with readout valves in vertical upright position. Maintain minimum length of straight unrestricted piping equivalent to five pipe diameters upstream of valve and two downstream of valve.

3.4. Adjusting and Cleaning:

3.4.1. Adjusting: Adjust faces of meters and gauges to proper angle for best visibility.

3.4.2. Cleaning: Clean windows of meters and gauges and factory-finished surfaces. Replace cracked

or broken windows, repair any scratched or marred surfaces with manufacturer's touch-up paint.

END OF SECTION

SECTION 230160 / MECHANICAL IDENTIFICATION

1. GENERAL

1.1. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.

1.2. This section is a Division-23 Basic Mechanical Materials and Methods section, and is part of each Division-23 section making reference to or requiring identification devices specified herein.

1.3. Extent of mechanical identification work required by this section is indicated on drawings and/or specified in other Division-23 sections.

1.4. Refer to Division-26 sections for identification requirements of electrical work; not work of this section. Refer to other Division-23 sections for identification requirements for controls; not work of this section.

1.5. Codes and Standards: Comply with ANSI A13.1 for lettering size, length of color field, colors, and viewing angles of identification devices.

2. PRODUCTS

2.1. General: Provide manufacturer's standard products of categories and types required for each application as referenced in other Division-23 sections. Where more than single type is specified for application, selection is Installer's option, but provide single selection for each product category.

2.2. Painted Identification Materials:

2.2.1. Stencils: Standard fiberboard stencils, prepared for required applications with letter sizes generally complying with recommendations of ANSI A13.1 for piping and similar applications, but not less than 1-¼" high letters for ductwork and not less than ¾" high letters for access door signs and similar operational instructions.

2.2.2. Stencil Paint: Standard exterior type stenciling enamel; black, except as otherwise indicated; either brushing grade or pressurized spray-can form and grade.

2.2.3. Identification Paint: Standard identification enamel.

2.3. Plastic Pipe Markers

2.3.1. Pressure-Sensitive Type: Provide manufacturer's standard pre-printed, permanent adhesive, color-coded, pressure-sensitive vinyl pipe markers.

2.3.1.1. Lettering: Manufacturer's standard pre-printed nomenclature which best describes piping system in each instance, as selected by Architect/Engineer in cases of variance with name as shown or specified.

2.3.1.2. Arrows: Print each pipe marker with arrows indicating direction of flow, either integrally with piping system service lettering (to accommodate both directions), or as separate unit of plastic.

2.4. Valve Tags:

2.4.1. Brass Valve Tags: Provide 19-gauge polished brass valve tags with stamp-engraved piping system abbreviation in ¼" high letters and sequenced valve numbers ½" high, and with 5/32" hole for fastener. Provide 1-½" diameter tags, except as otherwise indicated.

2.4.2. Plastic Laminate Valve Tags: Provide manufacturer's standard 3/32" thick engraved plastic laminate valve tags, with piping system abbreviation in ¼" high letters and sequenced valve numbers ½" high, and with 5/32" hole for fastener. Provide 1-½" square black tags with white lettering, except as otherwise indicated.

2.5. Engraved Plastic-Laminate Signs:

2.5.1. General: Provide engraving stock melamine plastic laminate, in the sizes and thicknesses indicated, engraved with engraver's standard letter style of the sizes and wording indicated, punched for mechanical fastening except where adhesive mounting is necessary because of substrate.

2.5.2. Thickness: 1/16" for units up to 20 sq. in. or 8" length; ⅛" for larger units.

2.5.3. Fasteners: Self-tapping stainless-steel screws, except contact-type permanent adhesive where screws cannot or should not penetrate the substrate.

2.6. Stamped Nameplates: Provide equipment manufacturer's standard stamped nameplates for motors, AHUs, pumps, etc.

3. EXECUTION

3.1. Coordination: Where identification is to be applied to surfaces which require insulation, painting or other covering or finish, including valve tags in finished mechanical spaces, install identification after completion of covering and painting. Install identification prior to installation of acoustical ceilings and similar removable concealment.

3.2. Ductwork Identification:

3.2.1. General: Identify air supply, return, exhaust, intake and relief ductwork with stenciled signs and arrows, showing ductwork service and direction of flow, in black or white.

3.2.2. Location: In each space where ductwork is exposed, or concealed only by removable ceiling system, locate signs near points where ductwork originates or continues into concealed enclosures, and at 50' spacings along exposed runs.

3.2.3. Access Doors: Provide stenciled signs on each access door in ductwork and housings, indicating purpose of access (to what equipment) and other maintenance and operating instructions, and appropriate and procedural information.

3.3. Piping System Identification:

3.3.1. General: Install pipe markers of one of the following types on each system indicated to receive identification, and include arrows to show normal direction of flow:

3.3.1.1. Plastic pipe markers.

3.3.1.2. Stenciled markers, black or white for best contrast.

3.3.2. Locate pipe markers as follows wherever piping is exposed to view in occupied spaces, machine rooms, accessible maintenance spaces and exterior non-concealed locations.

3.3.2.1. Near each valve and control device.

3.3.2.2. Near each branch, excluding short take-offs for fixtures and terminal units; mark each pipe at branch, where there could be question of flow pattern.

3.3.2.3. Near locations where pipes pass through walls, floors, ceilings, or enter non-accessible enclosures.

3.3.2.4. At access doors, manholes and similar access points which permit view of concealed piping.

3.3.2.5. Near major equipment items and other points of origination and termination.

3.3.2.6. Spaced intermediately at maximum spacing of 50' along each piping run, except reduce spacing to 25' in congested areas of piping and equipment.

3.3.2.7. On piping above removable acoustical ceilings, except omit intermediately spaced markers.

3.4. Valve Identification: Provide coded valve tag on every valve, cock and control device in each piping system; exclude check valves, valves within factory-fabricated equipment units, HVAC terminal devices and similar rough-in connections of end-use fixtures and units. Coordinate code with operating instructions.

3.5. Valve Charts: Provide framed, glass covered valve charts in each mechanical room. Identify coded valve number, valve function, and valve location for each valve.

3.6. Mechanical Equipment Identification: Install engraved plastic laminate sign on or near each major item of mechanical equipment and each operational device. Label shall indicate type of system and area served by zone(s) or room numbers. Provide signs for the following general categories of equipment and operational devices:

3.6.1. Main control and operating valves, including safety devices.

3.6.2. Meters, gauges, thermometers and similar units.

3.6.3. HVAC air handlers.

3.6.4. VFDs, transmitters and control boxes.

3.6.5. Other items as required.

3.7. Stamped Nameplates: Equipment manufacturers to provide standard stamped nameplates on all major equipment items such as motors, pumps, AHUs, etc. Where motors are hidden from view (within equipment casing, or otherwise not easily accessible, etc.), the equipment supplier shall furnish a duplicate motor data nameplate to be affixed to the equipment casing in an easily visible location, unless data is already included on the equipment nameplate.

3.8. Adjusting and Cleaning:

3.8.1. Adjusting: Relocate any mechanical identification device which has become visually blocked by work of this division or other divisions.

3.8.2. Cleaning: Clean face of identification devices, and glass frames of valve charts.

END OF SECTION

PAGE LEFT INTENTIONALLY BLANK

SECTION 230180 / TESTING, CLEANING, AND STERILIZATION OF PIPING SYSTEMS

1. GENERAL

1.1. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.

1.2. This section is a Division-23 Basic Mechanical Materials and Methods section, and is part of each Division-23 section making reference to or requiring the testing and other procedures specified herein.

1.3. Notify the Architect/Engineer when system tests are ready to be witnessed at least 24 hours prior to the test.

1.4. All materials, test equipment, and devices required for cleaning, testing, sterilizing or purging shall be provided by the Contractor.

2. PRESSURE TESTS

2.1. General: Provide temporary equipment for testing, including pump and gauges. Test piping systems before insulation is installed wherever feasible, and remove control devices before testing. Test each natural section of each piping system independently but do not use piping system valves to isolate sections where test pressure exceeds valve pressure rating. Fill each section with indicated medium and pressurize for indicated pressure and time.

2.2. Required test period is twenty-four hours.

2.3. No piping, fixtures, or equipment shall be concealed or covered until they have been tested. The contractor shall apply each test and ensure that it is satisfactory for the period specified before calling the Architect/Engineer to observe the test. Test shall be repeated upon request to the satisfaction of those making the inspection.

2.4. Temperature of water shall be accounted for at time of start of test and at end of test. Record fluid temperatures during start of test and re-check.

2.5. Observe each test section for leakage at the end of the test period. Test fails if leakage is observed or if pressure drop exceeds 5% of the test pressure.

2.6. Check of systems during application of test pressures should include visual check for water leakage and soap bubble or similar check for air and nitrogen leakage.

2.7. During heating and cooling cycles, linear expansion shall be checked at all elbows and expansion joints for proper clearance.

2.8. Repair piping systems sections which fail required piping test. Disassemble and re-install using new materials to extent required to overcome leakage. Do not use chemicals, stop-leak compounds, mastics, or other temporary repair methods.

2.9. Pressure Test Requirements:

2.9.1. Chilled Water, Heating Hot Water: Perform hydrostatic test at 150% of the normal operating pressure, but not less than 150 psig. Gauge shall have a range of 0-300 psig range with 3% accuracy minimum.

2.9.1.1. Pressure Testing: All new piping should be hydrostatically tested before being put into service. Test pressure should be 150 psig, 24-hour duration. Pressure gauges used for testing should have 0-300 psig range, 3%-2%-3% accuracy minimum; gauges should be installed with a gauge cock to facilitate removal; gauge must return to 0 psig upon completion of test. Contact PPD Operations Engineering at Phone: (352) 392-5050 to witness the beginning and ending (24-hour) pressures for approval. PPD Operations Engineering reserves the right to require additional pressure tests as necessary until the system is approved, at no cost to the Owner/project.

3. CLEANING AND STERILIZATION

3.1. General: Clean exterior surfaces of installed piping systems of superfluous materials, and prepare for application of specified coatings (if any). Flush out piping systems with clean water or blowdown with air before proceeding with required tests. Inspect each run of each system for completion of joints, supports and accessory items.

3.2. Flush and drain all water systems at least three times. Reverse flush systems from smallest piping to largest piping. Replace startup strainers with operating strainers.

3.3. Chilled Water, Heating Hot Water Pipe Cleaning: After completion of all work and operational check out of the HVAC installations and prior to acceptance of the project by the Owner, the following shall be accomplished. The completed piping systems shall be thoroughly flushed (reversed flushing) as needed to remove all dirt, debris, and any foreign matter that may have been trapped in the piping systems during construction. After flushing of systems is complete, the Contractor shall clean all main strainers and all strainers at air handlers. A second cleaning of all strainers will be required if requested by the Engineer. Contractor shall furnish and install all valves and piping stub outs in the piping systems as needed to accommodate this flushing operation. Install the valves and stub outs at a location and in a manner that will allow them to remain in place for future flushing operations. The flushing and strainer cleaning operations shall be witnessed and approved by the Engineer and Owner's representative. Contractor shall contact UF Facilities Services to witness the piping system flushing, cleaning, preheating and initial treating and to coordinate identification, determination of chemical type and quantity needed and purchase of water treatment chemicals. See Section 230505.

END OF SECTION

SECTION 230210 / INSULATION FOR HVAC EQUIPMENT AND PIPING

1. GENERAL

1.1. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.

1.2. Division-23 Basic Mechanical Materials and Methods Sections apply to work of this section.

1.3. Approval Submittals:

1.3.1. Product Data: Submit producer's data sheets and installation instructions on each insulation system including insulation, coverings, adhesives, sealers, protective finishes, and other material recommended by the manufacturer for applications indicated. Submit for:

1.3.1.1. Fiberglass pipe insulation

1.3.1.2. Cellular glass pipe above ground insulation

1.3.1.3. Flexible unicellular piping insulation

1.4. O&M Data Submittals: Submit a copy of all approval submittals. Include in O&M Manual.

2. PRODUCTS

.

2.1. Acceptable Manufacturers: Subject to compliance with requirements, provide insulation products by Armstrong, Schuller, Knauf, Owens Corning, Pittsburgh Corning, U.S. Rubber, or approved equal. All products shall be asbestos-free.

2.2. Flame/Smoke Ratings: Provide composite mechanical insulation (insulation, jackets, coverings, sealers, mastics, and adhesive) with a flame-spread rating of 25 or less, and a smoke-developed rating of 50 or less, as tested by ANSI/ASTM E84.

2.3. Pipe Insulation Materials:

2.3.1. Fiberglass Pipe Insulation: ASTM C547, Class 1 unless otherwise indicated. (Preformed sleeving with white all-service jacket, suitable for temperatures up to 450°F)

2.3.2. Cellular Glass Pipe Insulation: ASTM C552, Type II, Class 1. (Uncovered.)

2.3.3. Flexible Unicellular Pipe Insulation: ASTM C534, Type I. (Tubular, suitable for use to 200°F.)

2.3.4. Staples, Bands, Wires, and Cement: As recommended by the insulation manufacturer for applications indicated.

2.3.5. Adhesives, Sealers, Protective Finishes: Products recommended by the insulation manufacturer for the application indicated. Marathon Industries “V1-AC Product No. 550" or other products with similar composition are not allowed.

2.3.6. Bedding Mastic for CHW Systems: Provide products to completely cover the piping or equipment being insulated. Products shall be low odor type. Marathon 405 Sure Joint Sealer or Eco-Joint Sealant 44-05.

2.3.7. Jackets: ASTM C921, Type I (vapor barrier) for piping below ambient temperature, Type II

(vapor permeable) for piping above ambient temperature. Type I may be used for all piping at Installer's option.

3. EXECUTION

3.1. General:

3.1.1. Install thermal insulation products in accordance with manufacturer's written instructions, and in compliance with recognized industry practices to ensure that insulation serves intended purpose.

3.1.2. Install insulation materials with smooth and even surfaces and on clean and dry surfaces. Redo poorly fitted joints. Do not use mastic or joint sealer as filler for gapping joints and excessive voids resulting from poor workmanship.

3.1.3. Maintain integrity of vapor-barrier on insulation and protect it to prevent puncture and other damage. Label all insulation "ASBESTOS FREE".

3.1.4. Do not apply insulation to surfaces while they are hot or wet.

3.1.5. Do not install insulation until systems have been checked and found free of leaks. Surfaces shall be clean and dry before attempting to apply insulation. A professional insulator with adequate experience and ability shall install insulation.

3.1.6. Do not install insulation on pipe systems until acceptance tests have been completed except for flexible unicellular insulation. Do not install insulation until the building is "dried-in".

3.2. Fiberglass Pipe Insulation:

3.2.1. Insulate the following piping systems (indoor locations):

3.2.1.1. Heating hot water: up to 2" pipe - 1½" thick, over 2" pipe 2" thick.

3.2.2. Apply insulation to pipe with all side and end joints butted tightly. Seal longitudinal lap by pressurizing with plastic sealing tool. Apply 3-inch wide self-sealing butt strips to joints between insulation sections. Insulate all fittings, flanges, valves and strainers with pre-molded insulation. Apply coat of insulating cement to fittings and wrap with glass cloth overlapping each wrap 1" and adjacent pipe 2". Finish with heavy coat of general purpose mastic. Pre-molded PVC covers may also be used, but no flexible inserts are allowed.

3.2.3. Provide hanger or pipe support shields of 16 gauge (minimum) galvanized steel over the insulation which extends halfway up the pipe insulation cover and at least 6" on each side of the hanger.

3.2.4. Omit insulation on unions, flanges, strainer blowoffs, flexible connections and expansion joints.

3.3. Cellular Glass Pipe Insulation (Above Ground):

3.3.1. Insulate the following piping systems:

3.3.1.1. Chilled water: 2" thick.

3.3.2. Indoor Exposed: Cut insulation in sections at fittings and carefully fit to the pipe and fittings. No stovepipe or single miter insulation is allowed. Apply cellular glass bedding mastic to the pipe surface to achieve 100% coverage (chilled water piping only). Apply vapor barrier mastic

to all edges of the cellular insulation and between joints in the insulation. Wire the cellular glass in place with stainless steel wire 9 inches on center. Provide hanger or pipe support shields of 16 gauge (minimum) galvanized steel over or embedded in the insulation which extend halfway up the pipe insulation cover and at least 4" on each side of the hanger. Insulate anchors adequately to prevent moisture condensation problems. Finish cellular glass by applying a heavy coat of weather barrier sealant reinforced with white glass fabric to the exterior of the cellular glass. Cover straight piping with 0.016" thickness smooth aluminum jacket fastened with aluminum bands on not over 12" centers. Use factory-made 0.014" aluminum covers for fittings and valves. Provide removable end caps for strainers. Metal jacketing shall be applied with the longitudinal seam positioned to shed water.

3.4. Flexible Unicellular Pipe Insulation:

3.4.1. Insulate the following piping systems:

3.4.1.1. Condensate drains from air conditioning units - ½" thick.

3.4.2. Apply insulation in accordance with the manufacturer's recommendations and instructions. Mitre cut insulation to fit pipe fittings. Use approved cement to seal all joints and ends in the insulation.

3.4.3. Insulation outside the building shall be protected by a 0.016" thickness aluminum jacket with aluminum bands on 12" centers.

END OF SECTION

PAGE LEFT INTENTIONALLY BLANK

SECTION 230230 / EXTERIOR INSULATION FOR DUCTWORK

1. GENERAL

1.1. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.

1.2. Division-23 Basic Mechanical Materials and Methods sections apply to work of this section.

1.3. Approval Submittals:

1.3.1. Product Data: Submit producer's data sheets and installation instructions on each insulation system including insulation, coverings, adhesives, sealers, protective finishes, and other material recommended by the manufacturer for applications indicated. Submit for:

1.3.1.1. Rigid duct insulation

1.3.1.2. Flexible duct insulation

1.4. O&M Data Submittals: Submit a copy of all approval submittals. Include in O&M Manual.

2. PRODUCTS

2.1. Acceptable Manufacturers: Subject to compliance with requirements, provide insulation products by Knauf, Owens-Corning, Schuller, Certainteed.

2.2. Flame/Smoke Ratings: Provide composite mechanical insulation (insulation, coverings, sealers, mastic, and adhesive) with a flame spread rating of 25 or less, and a smoke-developed rating of 50 or less as tested by ANSI/ASTM 84.

2.3. Rigid Fiberglass Insulation Board: ASTM C612, Class 1 (non-load bearing). Boards shall be 3 pcf density R-6 with UL rated aluminum foil vapor barrier (FSK).

2.4. Flexible Fiberglass Insulation: ASTM C553, Type I, Class B-3 (temperature less than 350°F). Duct wrap shall be 1 pcf density R-6 with UL rated aluminum foil vapor barrier (FSK).

2.5. Duct Cement (General Purpose Mastic): Duct cement shall be non-hardening, fiber-reinforced and recommended specifically for cementing fittings, components, and longitudinal seams in ductwork insulation. Duct Cement shall be flexible, water based, designed for use in pressure duct systems listed as SMACNA classes A, B, & C. Cement shall seal water and air and provide a vapor barrier. Product shall be suitable for both interior and exterior use with UV inhibitors. Product shall be non-flammable ASTM E-84 tested with a flame spread of less than 5 and smoke spread of less than 5. Product shall be UL listed 181A-M and 181-B. Product have less than 80 grams/liter volatile organic compounds (VOC). Insulation Contractor shall select product for specific application.

Carlisle	hardcast 181
Childers	CP-148,181
Ductmate	Fiberseal
Fosters	95-90

2.6. Duct Sealant (Vapor Barrier Mastic): Duct sealer shall be flexible, water based, designed for use in pressure duct systems listed as SMACNA classes A, B, & C. Sealer shall seal water and air

and provide a vapor barrier. Product shall be suitable for both interior and exterior use with UV inhibitors. Product shall be non-flammable ASTM E-84 tested with a flame spread of less than 5 and smoke spread of less than 5. Product shall be UL listed 181A-M and 181-B. Product shall have less than 80 grams/liter volatile organic compounds (VOC). Insulation Contractor shall select product for specific application.

Carlisle hardcast	102,550
Childers	CP-146,148
Ductmate	Pro Seal
Fosters	32-17, 32-19

2.7. Adhesives: Adhesive shall be water based and designed for adhering insulation to ductwork. Product shall be suitable for both interior and exterior use with UV inhibitors. Product shall be non-flammable ASTM E-84 tested with a flame spread of less than 5 and smoke spread of less than 5. Product shall meet the requirements of NFPA 90-A & 90-B. Product shall have less than 80 grams/liter volatile organic compounds (VOC). Insulation Contractor shall select product for specific application.

Carlisle	hardcast
Childers	CP-148
Ductmate	
Fosters	85-00,60,62 & 65

2.8. Fiber-Glas Mesh: 10x10 Mesh. Foster Mastafab or equal.

3. EXECUTION

3.1. Insulate all supply, return and outdoor air ductwork exposed in mechanical rooms, mezzanines, fan lofts or in any finished spaces with 2” thick rigid fiberglass insulation with vapor barrier.

3.2. Installation of Rigid Insulation:

3.2.1. Clean and dry ductwork prior to insulating. Butt insulation firmly together to ensure complete and tight fit over surfaces to be covered. Install insulation materials with smooth and even surfaces. Maintain integrity of aluminum vapor barrier wherever possible. Extend insulation without interruption through walls, floors and similar ductwork penetrations except where otherwise indicated.

3.2.2. Adhere insulation to duct with 50 percent coverage using approved insulation adhesive applied in 6-inch wide swaths with 6-inch spaces between swaths. Additionally, secure insulation with perforated pins and Tuff-Bond or by self-sticking pins with a 3/8" self-tapping screw. Space on 12-inch centers and 3 inches from all edges. Ducts up through 24" wide only require one row of pins. Ducts over 24" wide shall have pins spaced as described herein.

3.2.3. Apply open mesh glass fabric embedded in vapor barrier mastic. Then apply a second coat of general purpose mastic with aluminum grey color. This finish shall be complete over all rigid insulation.

3.3. Insulate all supply, return and outdoor air ductwork concealed above ceilings, in chases, or elsewhere, and the backs of all ceiling supply outlets with 2" thick fiberglass blanket insulation with vapor barrier.

3.4. Installation of Flexible Insulation:

3.4.1. Insulate round elbows and fittings with wrap such that thickness is equal to adjoining duct covering. Clean and dry ductwork prior to insulating.

3.4.2. Adhere insulation to duct with 50 percent coverage using approved insulation adhesive applied in 6-inch wide swaths with 6-inch spaces between swaths. Additionally, secure insulation with perforated pins and Tuff-Bond or by self-sticking pins with a 3/8" self-tapping screw or by welded cup head pins. Space on 12-inch centers and 3 inches from all edges. Ducts up through 24" wide only require one row of pins. Ducts over 24" wide shall have pins spaced as described herein.

3.4.3. Lap all joints 2 inches and seal joints with 4-inch wide strips of open mesh glass fabric embedded in two coats of general purpose mastic.

3.4.4. Seal all punctures and breaks in aluminum vapor barrier with open mesh glass fabric and vapor barrier sealant.

3.5. Insulate all existing hood exhaust duct with two (2) layers of 1½" thick fire-rated flexible blanket insulation. Seal joints in the insulation and attach to ductwork in accordance with the Manufacturer's recommendations.

END OF SECTION

PAGE LEFT INTENTIONALLY BLANK

EXTERIOR INSULATION FOR DUCTWORK

230230.4

SECTION 230505 / HEATING HOT WATER AND CHILLED WATER SYSTEMS

1. GENERAL

1.1. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.

1.2. Division-23 Basic Mechanical Materials and Methods sections apply to work of this section.

1.3. Refer to other Division-23 sections for insulation of hydronic piping; not work of this section.

1.4. Refer to other Division-23 sections for hydronic specialties; not work of this section.

1.5. Refer to other Division-23 sections for HVAC pumps, chillers, and boilers; not work of this section.

1.6. Refer to other Division-23 sections for testing, adjusting, and balancing of hydronic piping systems; not work of this section.

1.7. Codes and Standards: Fabricate and install hydronic piping in accordance with ASME B31.3 "Building Services Piping."

1.8. Approval Submittals:

1.8.1. Product Data: Submit manufacturer's product data for:

1.8.1.1. Valves

1.8.1.2. Meters and Gauges

1.8.1.3. Vibration Control

1.8.2. Shop Drawings: Submit scaled layout drawings of piping systems in mechanical rooms and manholes including, but not necessarily limited to, pipe sizes, location, offsets, connections, elevations, and hydronic specialties. Indicate interface and spatial relationship between piping and equipment. Coordinate with all other trades work and existing conditions. Field verify final location of pipe prior to submittal of layout drawings and fabrication.

1.9. Test Reports and Verification Submittals:

1.9.1. Submit welder's certificates.

1.9.2. Submit water treatment test report.

1.10. O&M Manual Submittals: Submit a copy of approval submittals. Include this data in O&M manual.

2. PRODUCTS

2.1. General: Provide piping materials and factory-fabricated piping products of sizes, types, pressure ratings, temperature ratings, and capacities as indicated. Where not indicated, provide proper selection as determined by Installer to comply with installation requirements. Provide materials and products complying with ASME B31.3 Code for Building Services Piping where applicable, base pressure rating on hydronic piping systems maximum design pressures. Provide sizes and types matching piping and equipment connections; provide fittings of materials which match pipe materials used in hydronic piping systems. Where more than one type of materials or products are indicated, selection is Installer's option.

2.2. Basic Identification: Provide identification complying with Division-23 Basic Mechanical

Materials and Methods section "Mechanical Identification."

2.3. Basic Pipes and Pipe Fittings: Provide pipes and pipe fittings complying with Division-23 Basic Mechanical Materials and Methods section "Pipes and Pipe Fittings", in accordance with the following listing:

2.3.1. Pipe Size 2" and Smaller: Black steel pipe; Schedule 40; Class 125 cast-iron fittings with threaded joints.

2.3.2. Tube Size 3" and Smaller: Copper tube; Type L, hard-drawn temper; wrought-copper fittings with soldered joints. Use for runouts to terminal units only. All heating hot water pipe shall be copper only.

2.3.3. Pipe Size 2½" and Larger: Black steel pipe; Schedule 40; wrought-steel buttwelding fittings with welded joints.

2.4. Basic Piping Specialties: Provide piping specialties complying with Division-23 Basic Mechanical Materials and Methods section "Piping Specialties."

2.5. Basic Supports and Anchors: Provide supports and anchors complying with Division-23 Basic Mechanical Materials and Methods section "Supports and Anchors."

2.6. Basic Valves: Provide valves complying with Division-23 Basic Materials and Methods section “Valves” and the following list:

2.6.1. Standard Service Sectional Valves: Type BF1, BF2, BF3, BF4.

2.6.2. Standard Service Shutoff Valves: Type BA1, BF2, BF4.

2.6.3. Standard Service Check Valves: Type CK1,

2.6.4. Standard Service Drain Valves: Type BA1.

2.7. Basic Meters and Gauges: Provide meters and gauges complying with Division-23 Basic Mechanical Materials and Methods section "Meters and Gauges", in accordance with the following listing:

2.7.1. Temperature gauges and fittings.

2.7.2. Pressure gauges and fittings.

2.7.3. Flow measuring meters.

2.8. Basic Vibration Control: Provide vibration control products complying with Division-23 Basic Mechanical Materials and Methods section “Vibration Control” and the following list:

2.8.1. Coil Connections: Type PF3.

3. EXECUTION

3.1. General: Examine areas and conditions under which hydronic piping systems materials and products are to be installed. Do not proceed with work until unsatisfactory conditions have been corrected in manner acceptable to Installer.

3.2. Installation of Hydronic Piping:

3.2.1. General: Install hydronic piping in accordance with Division-23 Basic Mechanical Materials and Methods section "Pipes and Pipe Fittings.” All heating hot water pipe shall be copper.

3.2.2. Install eccentric reducers where pipe is reduced in size in direction of flow, with tops of both pipes and reducer flush. Do not use bushings.

3.2.3. Install piping with 1/32" per foot (¼%) upward slope in direction of flow, or as indicated on the drawings. The intent is to install piping sloped to drains at low points in the system for a drainable system.

3.2.4. Connect branch-feed piping to mains at horizontal center line of mains, connect run-out piping to branches at horizontal center line of branches.

3.2.5. Locate groups of pipes parallel to each other, spaced to permit applying full insulation and servicing of valves.

3.3. Install piping specialties in accordance with Division-23 Basic Mechanical Materials and Methods section "Piping Specialties".

3.4. Install supports and anchors in accordance with Division-23 Basic Mechanical Materials and Methods section "Supports and Anchors".

3.5. Install valves in accordance with Division-23 Basic Mechanical Materials and Methods section "Valves".

3.5.1. Sectional Valves: Install on each branch and riser, close to main, where branch or riser serves 2 or more hydronic terminals or equipment connections, and elsewhere as indicated.

3.5.2. Shutoff Valves: Install on inlet and outlet of each mechanical equipment item, and on inlet and outlet of each hydronic terminal, and elsewhere as indicated.

3.5.3. Drain Valves: Install on each mechanical equipment item located to completely drain equipment for service or repair. Install at base of each riser, at base of each rise or drop in piping system, and elsewhere where indicated or required to completely drain hydronic piping system.

3.5.4. Check Valves: Install on discharge side of each pump, and elsewhere as indicated.

3.6. Install meters and gauges in accordance with Division-23 Basic Materials and Methods section "Meters and Gauges".

3.7. Equipment Connections:

3.7.1. General: Connect hydronic piping system to mechanical equipment as indicated on the drawings, and comply with equipment manufacturer's instructions where not otherwise indicated. Install shutoff valve and union on supply and return and a drain valve on the drain connection. Connections between dissimilar metals shall be made with dielectric devices.

3.7.2.

3.8. Provide sufficient swing joints, expansion loops and devices necessary for a flexible piping system. Install drain valves at all low points of each system to enable complete drainage, and air vents at all high points in the piping system to enable complete air venting.

3.9. Pipe drains from relief valves, strainers, etc., to spill over an open sight drain, floor drain or other acceptable discharge point, and terminate with a plain end (unthreaded pipe) 6" above the drain. Rigidly support all drains.

3.10. Locate and coordinate installation of access doors for all valves and devices in accordance with Division-23 Basic Mechanical Materials and Methods section “Access Doors”.

3.11. Testing, Cleaning, Flushing, and Inspecting: Test, clean, flush, and inspect hydronic piping systems in accordance with requirements of Division-23 Basic Mechanical Materials and Methods section "Testing, Cleaning, and Sterilization of Piping Systems."

3.12. Chemical Treatment: Refill hydronic piping systems. New piping shall be flushed, cleaned and pre-treated as recommended by the current University of Florida water treatment vendor. Contractor shall purchase the necessary chemicals from vendor, and flushing, cleaning, and pre-treatment shall be witnessed by the vendor's representative. Submit test report.

3.13. Chemical Water Treatment:

3.13.1. Chilled, Heating Water: All chilled, heating, and cooling tower water piping shall be flushed, cleaned, pre-treated, and initially treated by the Contractor, in accordance with the procedures of the Water Treatment Vendor under contract with UF at the time the system is put into service. Cost of this initial treatment is to be borne by the Contractor. The Water Treatment Vendor will supply chemicals at the University contract price. The Contractor is required to maintain treatment until the system is connected to the central system, or Substantial Completion, whichever comes first. No equipment shall be put into service prior to initiation of water treatment. All meters shall be operational prior to the system connection to the central plant.

END OF SECTION

SECTION 230605 / AIR HANDLING UNITS

1. GENERAL

1.1. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.

1.2. Division-23 Basic Mechanical Materials and Methods sections apply to work of this section.

1.3. Extent of air handling unit work is indicated on drawings, and schedules, and by requirements of this section.

1.4. Refer to other Division-23 sections for field-applied insulation to air handling units; not work of this section.

1.5. Refer to other Division-23 sections for hot and chilled water piping required in conjunction with air handling units; not work of this section.

1.6. Refer to Division-26 sections for the following work; not work of this section.

1.6.1. Power supply wiring from power source to power connection on unit. Include starters, disconnects, and required electrical devices, except where specified as furnished, or factory installed by manufacturer.

1.7. Control wiring specified as work of Division-23 for Automatic Temperature Controls is work of that section.

1.8. Codes and Standards:

1.8.1. AMCA Compliance: Test and rate air handling units in accordance with AMCA standards.

1.8.2. ARI Compliance: Test and rate air handling units in accordance with ARI 430 "Standard for Central-Station Air Handling Units", and ARI 410 for coils, display certification symbol on units of certified models.

1.8.3. NFPA Compliance: Provide air handling unit internal insulation, adhesives, and coatings having flame spread rating not over 25 and smoke developed rating no higher than 50; and complying with NFPA 90A "Standard for the Installation of Air Conditioning and Ventilating Systems".

1.8.4. UL and NEMA Compliance: Provide electrical components required as part of air handling units, which have been listed and labeled by UL and comply with NEMA Standards.

1.8.5. NEC Compliance: Comply with National Electrical Code (NFPA 70) as applicable to installation and electrical connections of ancillary electrical components of air handling units.

1.8.6. ASHRAE Compliance: Construct and install refrigerant coils in accordance with ASHRAE 23 "Safety Code for Mechanical Refrigeration".

1.9. Approval Submittals:

1.9.1. Product Data: Submit manufacturer's technical product data as follows showing dimensions, weights, capacities, certified ratings, fan performance with operating point clearly indicated, motor electrical characteristics, gauges and finishes of materials, and installation instructions. Submit assembly-type drawings showing unit dimensions, weight loadings, required

clearances, construction details, and field connection details.

1.9.1.1. Air handling units

1.9.1.2. Equipment mountings

1.9.1.3. Pipe flexible connections

1.9.2. Shop Drawings: Submit shop drawings showing the actual installation of each air handling unit in plan and section. Show coil access, filter access, motor access, controls access and access to any other components requiring service. Show coordination with all related structural components of the building and show all unit supports. Show relationship to drains and other equipment. Show every electrical device and control panel with code-required service clearance clearly marked.

1.9.2.1. Units mounted in mechanical rooms

1.10. O&M Data Submittals:

1.10.1. Wiring Diagrams: Submit manufacturer's electrical requirements for power supply wiring to air handling units. Submit manufacturer's ladder-type wiring diagrams for interlock and control wiring. Clearly differentiate between portions of wiring that are factory-installed and portions to be field installed.

1.10.2. Maintenance Data: Submit a copy of approval submittals. Submit maintenance instructions, including instructions for lubrication, filter replacement, motor and drive replacement, and spare parts lists. Include these data and wiring diagrams in O&M manuals.

2. PRODUCTS

2.1. Acceptable Manufacturers: Subject to compliance with requirements, provide air handling units of one of the following:

Temtrol
Energy Labs
Approved Equal

General: Provide factory-fabricated and factory-tested air handling units as indicated, of sizes and capacities as scheduled, and as specified herein.

2.2. Casings: Construct casings of 18-gauge minimum mill galvanized steel, designed to withstand specified operating pressures. Provide hinged access panels. Provide casing panels that are easily and quickly removable for inspection and access to internal parts. The casing shall be sectionalized to permit removal from the completed building with no structural modifications. Provide double wall casings with solid galvanized metal interior lining. Interior lining shall seal the insulation so that the unit can be washed internally. No mastic allowed. Unit insulation shall be 2" thick foam injected panels (R-13), complying with NFPA 90A.

2.2.1. Provide reinforced points of support for either setting or hanging units.

2.2.2. Provide double wall, corrosion-resistant stainless steel drain pan, located under fan, cooling coil section extensive enough to catch condensate leaving coil at highest catalogued face velocity. Provide 1-inch thick insulation between pans. Finish inner pan with a coating of corrosion resistant elastomeric based material. Provide for making the drain connection on

either side. Provide IAQ drain pan that is sloped to drain completely. Pans shall extend three feet downstream of coils.

2.2.3. Provide casing and frame of G-90 galvanized steel with finish on both sides. Floors inside the units shall be stainless steel or aluminum, diamond plate non-skid.

2.2.4. Provide hinged access doors with windows for fan section filter section, motors, and coil inlet section. Provide cam lock fasteners and rubber gasket seals on each door. Bolted panels are not allowed

2.2.5. Provide access sections with access doors with sufficient space (12 inches minimum) in coil sections for cleaning coils and installing temperature sensors.

2.3. Coils: Provide stainless steel coil casing with heating and cooling coils of scheduled capacity, mounted in unit in manner permitting removal.

2.3.1. Construct cartridge-type coils with copper tubes and aluminum fins bonded to tubes by method approved by manufacturer. Construct headers of copper, brass, or cast iron. Pitch coils in unit casing for drainage. Minimum tubing thickness shall be 0.025". Maximum fin spacing is 12 fpi.

2.3.2. Provide hydronic coils with threaded connections. Provide chilled water coils with drain and vent connections. Extend connections through cabinet.

2.4. Coil Sections: Provide common or individual casing for coils as required. Casings shall be fabricated of stainless steel. Design internal structure of coil section with tracks to allow for removal of coils from coil connection side, and provide suitable baffles to assure no air bypass around coils. Provide sloped condensate pans and drain connections in cooling coil sections of sufficient size to contain and remove coil condensate. For reheat coils, make provisions to allow simultaneous dehumidification and reheating at maximum cooling face velocity catalogued by manufacturer. For stacked cooling coils, provide intermediate drain pans with drop tubes at both ends to prevent flooding lower coil. Provide sufficient space in coil casings for installation of temperature sensors between coils, unless access sections are provided. Unit coils are not allowed.

2.5. Fan Sections: Provide fans specifically designed and suitable for stable operation at specified conditions and class of service indicated.

2.5.1. Provide adjustable motor base, adjusted with mounting bolts, to provide variation in center distance. Provide locking nuts, or similar devices, to secure base in proper position. Provide totally enclosed fan cooled motors on outdoor units with electrical characteristics as scheduled. Provide high efficiency inverter duty motors on indoor units with electrical characteristics as scheduled.Provide high efficiency motors, as per Division 23, Basic Materials and Methods section, "Motors".

2.5.2. an wheels and scrolls shall be hot dipped galvanized steel or aluminum epoxy coated after fabrication, but prior to balancing.

2.5.3. For variable volume fans for use with variable frequency drives, coordinate with drive supplier.

2.6. Vibration Isolation: Provide vibration isolation in accordance with Division 23 Basic mechanical Materials and Methods section “Vibration Isolation” and the following.

2.6.1. Equipment Mounting (Internal Insolation): Provide vibration isolators internally mounted

within the unit for the fan and drive.

2.6.2. Piping Flexible Connections: Type PF3

2.7. Filter Boxes: Provide filter boxes with hinged access doors and cam lock fasteners at each end. Provide racks to receive filters in either flat or angle type pattern as shown. Provide spacers and a gasketed positive seal for all filters.

2.8. Air Filters: Refer to Division-23 section "Air Cleaning Equipment" for air filters required for air handling units; not work of this section.

2.9. Devices: Each section of an Air Handling Unit meant for access by service personnel shall be provided with at least one light fixture, switch and receptacle. Circuiting for such devices should be separate from other building loads. Switches should be external or other means provided to indicate lamps are left on.

2.10. Insulation:

2.10.1. Indoor Unit Insulation: Insulate entire unit casing from air entrance to coils, to air outlet from unit, including bypass duct if used. Insulate framing angles exposed to air stream. Securely attach insulation, of sufficient thickness and density to prevent condensation from forming on unit casing (2-inch thick foam injected). Protect insulation against deterioration from air currents by using a vinyl or neoprene coating that will not support microbial growth. Provide insulation with fire-retarding characteristics, complying with NFPA 90A.

2.11. UV Lights: Provide UV lights in accordance with Section 23885 and UF Standards. All new air handlers are required to be equipped with appropriately sized UV lights. Safety interlock power switches to automatically disengage power to UV lamps shall be installed on all air handler panels or doors accessing the UV lights-section when the panel or door is opened; install identifying labels at the safety interlock switches. If the dedicated breaker is more than 15 feet from the air handler unit, a power disconnect shall be installed and labeled with air handler (#UV Light Disconnect). This shall be in plain view and within sight of the air handler unit. Label disconnect with all connecting circuits. Install signage on all entries to air handlers where openings contain UV lights stating “this unit contains UV lighting system – disconnect all power sources before opening or entering” and the location of electrical power disconnect and corresponding numbers representing breaker panels and breaker numbers that are associated with the dedicated UV light circuit. Each lamp/ballast shall have a corresponding number and location schedule posted on the air handler to identify lamp/ballast placement within the unit and it will provide warranty dates. Each lamp/ballast shall be warranted to produce UVC light at a wavelength of 200-280 Nanometer within its warranty period.

2.12. Mixing Boxes: Provide mixing boxes of physical size to match basic unit and include equal-sized flanged openings capable of handling full air flow at no more than 1000 fpm veloctiy. Arrange openings as indicated.

3. EXECUTION

3.1. Examine areas and conditions under which air handling units are to be installed. Do not proceed with work until unsatisfactory conditions have been corrected in manner acceptable to Installer.

3.2. General: Install air handling units where indicated, in accordance with equipment manufacturer's published installation instructions, and with recognized industry practices, to

ensure that units comply with requirements and serve intended purposes.

3.3. Coordination: Coordinate with other work, including ductwork, floor construction and piping, as necessary to interface installation of air handling units with other work.

3.4. Access: Provide access space around air handling units for service as indicated, but in no case less than that recommended by manufacturer.

3.5. Support:

3.5.1. Install floor-mounted air handling units on reinforced concrete pads or steel stands as shown on the drawings. Unit base rails or auxiliary drain pans shall not be in contact with concrete. Separate base rail from concrete with neoprene pads. Separate drain pans from concrete with impervious roof membrane material similar to titanium UDL50. Seal seams by overlapping a minimum of 10".

3.6. Vibration Isolation: Mount air handling units on vibration isolators, in accordance with the requirements of Division-23 section “Vibration Isolation” and the manufacturer’s instructions.

3.7. Electrical Wiring: Install electrical devices furnished by manufacturer but not specified to be factory-mounted. Furnish copy of manufacturer's wiring diagram submittal to electrical Installer. Verify that electrical wiring installation is in accordance with manufacturer's submittal and installation requirements of Division-26 sections. Do not proceed with equipment start-up until wiring installation is acceptable to equipment installer.

3.8. Piping Connections: Refer to Division-23 HVAC sections. Provide piping, valves, accessories, gauges and supports as indicated. Eliminate strain on coil headers. Provide trapped, insulated, copper condensate drain piping full size from the drain connection as shown and extend independently to disposal point as part of this section's work.

3.9. Duct Connections: Refer to Division-23 Air Distribution sections. Provide ductwork, accessories, and flexible connections as indicated.

3.10. Brush out fins on all coils.

3.11. Complete the factory (manufacturer) provided start-up check list, noting any deficiencies and providing corrections per the manufacturer’s recommendations. Seal all openings made through the unit casing shall be made air and watertight. Seal all panels and correct any air leakage or sweating problems incurred during installation.

3.12. Testing: Upon completion of installation of air handling units, start-up and operate equipment to demonstrate capability and compliance with requirements. Install final, fixed sheave package. Field correct malfunctioning units, then retest to demonstrate compliance.

END OF SECTION

PAGE LEFT INTENTIONALLY BLANK

SECTION 230840 / HVAC METAL DUCTWORK

1. GENERAL

1.1. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.

1.2. Division-23 Basic Mechanical Materials and Methods Sections apply to work of this section.

1.3. Extent of HVAC metal ductwork is indicated on drawings and in schedules, and by requirements of this section.

1.4. Refer to other Division-23 sections for exterior insulation of metal ductwork.

1.5. Refer to other Division-23 sections for ductwork accessories.

1.6. Codes and Standards:

1.6.1. SMACNA Standards: Comply with SMACNA's "HVAC Duct Construction Standards, Metal and Flexible" for fabrication and installation of metal ductwork, unless otherwise noted.

1.6.2. NFPA 90A Compliance: Comply with NFPA 90A "Standard for the Installation of Air Conditioning and Ventilating Systems".

1.7. Approval Submittals:

1.7.1. Product Data: Submit manufacturer's technical product data and installation instructions for the following.

1.7.1.1. Factory-fabricated ductwork

1.7.1.2. Sealants

1.7.2. Shop Drawings: Submit scaled layout drawings of HVAC metal ductwork and fittings including, but not limited to, duct sizes, locations, elevations, and slopes of horizontal runs, wall and floor penetrations, and connections. Show interface and spatial relationship between ductwork and proximate equipment. Show modifications of indicated requirements, made to conform to local shop practice, and how those modifications ensure that free area, materials, and rigidity are not reduced.

2. PRODUCTS

2.1. Ductwork Materials:

2.1.1. Exposed Ductwork Materials: Where ductwork is indicated to be exposed to view in occupied spaces, provide materials which are free from visual imperfections including pitting, seam marks, roller marks, stains and discolorations, and other imperfections, including those which would impair painting.

2.1.2. Galvanized Sheet Metal: Except as otherwise indicated, fabricate ductwork from galvanized sheet steel complying with ASTM A 527, lockforming quality; with G 90 zinc coating in accordance with ASTM A 525; and mill phosphatized for exposed locations. Stamp gauge and manufacturer's identification on each sheet. Break sheets so that identification is exposed.

2.2. Miscellaneous Ductwork Materials:

2.2.1. General: Provide miscellaneous materials and products of types and sizes indicated and, where not otherwise indicated, provide type and size required to comply with ductwork system requirements including proper connection of ductwork and equipment.

2.2.2. Duct Sealant (Vapor Barrier Mastic): Duct sealer shall be flexible, water based, designed for use in pressure duct systems listed as SMACNA classes A, B, & C. Sealer shall seal water and air and provide a vapor barrier. Product shall be suitable for both interior and exterior use with UV inhibitors. Product shall be non-flammable ASTM E-84 tested with a flame spread of less than 5 and smoke spread of less than 5. Product shall be UL listed 181A-M and 181-B. Product shall be listed suitable for LEED projects and have less than 80 grams/liter volatile organic compounds (VOC). Insulation Contractor shall select product for specific application.

Carlisle	hardcast 102,550
Childers	CP-146,148
DuctmatePro	Seal
Fosters	32-17, 32-19

2.2.3. Ductwork Support Materials: Except as otherwise indicated, provide hot-dipped galvanized steel fasteners, anchors, rods, straps, trim and angles for support of ductwork.

2.2.4. Connections:

2.2.4.1. Return air grille connections shall be straight sided with damper and one-inch high insulation standoff equipment to Crown 724-D5 or Flexmaster FLD-BO.

2.2.4.2. Exhaust air grille connections shall be straight sided with damper equal to Crown 724 or Flexmaster FLD.

2.2.4.3. Where duct height does not permit the use of conical spin-in fittings, use low profile side take-off fittings equal to Crown 3300-DS or Flexmaster STOD-BO.

2.2.5. Spin-In and Side Take-Off Fittings: Provide round branch run-outs as follows.

2.2.5.1. Supply air diffuser connections shall be conical with damper and one -nch high insulation stand-off equal to Crown 3200 DS or Flexmaster CBD-BO.

2.2.6. Fittings: Provide radius type fittings fabricated of multiple sections with maximum 15° change of direction per section. Unless specifically detailed otherwise, use 45° laterals and 45° elbows for branch takeoff connections. Where 90° branches are indicated, provide conical type tees.

2.3. Fabrication:

2.3.1. Shop fabricate ductwork in 4, 8, 10 or 12-ft lengths, unless otherwise indicated or required to complete runs. Preassemble work in shop to greatest extent possible, so as to minimize field assembly of systems. Disassemble systems only to extent necessary for shipping and handling. Match-mark sections for reassembly and coordinated installation.

2.3.2. Shop fabricate ductwork of gauges and reinforcement complying with SMACNA "HVAC Duct Construction Standards". Supply duct between AHU discharge and terminal units shall be minimum 4" pressure class.

2.3.3. Fabricate duct fittings to match adjoining ducts, and to comply with duct requirements as applicable to fittings. Except as otherwise indicated, fabricate elbows with center-line radius

equal to 1½ times associated duct width; and fabricate to include turning vanes in elbows where shorter radius is necessary. Limit angular tapers to 30° for contracting tapers and 20° for expanding tapers.

2.3.4. Fabricate ductwork with accessories installed during fabrication to the greatest extent possible. Refer to Division-23 section "Ductwork Accessories" for accessory requirements.

2.4. Factory-Fabricated Low-Pressure Ductwork (Maximum 2" W.G.):

2.4.1. Material: Galvanized sheet steel complying with ASTM A 527, lockforming quality, with ASTM A 525, G90 zinc coating, mill phosphatized.

2.4.2. Gauge: 28-gauge minimum for round ducts and fittings, 4" through 8" diameter. 26-gauge minimum 9" through 14", 24-gauge minimum 15" through 26".

2.4.3. Elbows: One-piece construction for 90° and 45° elbows 14" and smaller. Provide multiple gore construction for larger diameters with standing seam circumferential joint.

2.4.4. Divided Flow Fittings: 90° tees, constructed with saddle tap spot welded and bonded to duct fitting body.

2.4.5. Acceptable Manufacturers: Subject to compliance with requirements, provide factory-fabricated ductwork by Semco Mfg., Inc. or United Sheet Metal Div., United McGill Corp, or approved equal.

2.5. Factory-Fabricated High-Pressure Ductwork (3" W.G. and Higher):

2.5.1. Round Ductwork: Construct of galvanized sheet steel complying with ASTM A 527 by the following methods and in minimum gauges listed.

Diameter	Minimum Gauge	Method of Manufacture
3" to 14"	26	Spiral Lockseam
15" to 26"	24	Spiral Lockseam
27" to 36"	22	Spiral Lockseam
37" to 50"	20	Spiral Lockseam
51" to 60"	18	Spiral Lockseam
Over 60"	16	Longitudinal Seam

Provide locked seams for spiral duct; fusion-welded butt seam for longitudinal seam duct.

Fittings and Couplings: Construct of minimum gauges listed. Provide continuous welds along seams.

Diameter	Minimum Gauge
3" to 36"	20
38" to 50"	18
Over 50"	16

2.5.2. Optional Ducts and Fittings: At Installer's option, provided that certified tests by Manufacturer show that rigidity and performance is equivalent to SMACNA standard gauge ductwork, provide ducts and fittings as follows:

Ducts: Construct of Manufacturer's standard gauge, with spiral lock seam and intermediate standing rib.

Fittings: Construct by fabricating with spot welding and bonding with neoprene-base cement in lieu of continuous weld seams.

2.5.3. Acceptable Manufacturers: Subject to compliance with requirements, provide factory-fabricated ductwork Semco Mfg., Inc. or United Sheet Metal Div., United McGill Corp., or approved equal.

3. EXECUTION

3.1. General: Examine areas and conditions under which HVAC metal ductwork is to be installed. Do not proceed with work until unsatisfactory conditions have been corrected in manner acceptable to Installer.

3.2. Installation Of Metal Ductwork:

3.2.1. General: Assemble and install ductwork in accordance with recognized industry practices which will achieve air-tight (5% leakage for systems rated 3" and under; 1% for systems rated over 3") and noiseless (no objectionable noise) systems, capable of performing each indicated service. Install each run with minimum number of joints. Align ductwork accurately at connections, within ⅛" misalignment tolerance and with internal surfaces smooth. Support ducts rigidly with suitable ties, braces, hangers and anchors of type which will hold ducts true-to-shape and to prevent buckling. Support vertical ducts at every floor. Seal all duct joints and seams with sealant.

3.2.2. Supports: Install concrete inserts for support of ductwork in coordination with formwork, as required to avoid delays in work. Install self-drilling screw anchors in prestressed concrete or existing work.

3.2.3. Field Fabrication: Complete fabrication of work at project as necessary to match shop-fabricated work and accommodate installation requirements. Seal joints in round or oval ductwork with hard cast or shrink bands, and sheet metal screws.

3.2.4. Routing: Locate ductwork runs, except as otherwise indicated, vertically and horizontally. Avoid diagonal runs wherever possible. Locate runs as indicated by diagrams, details and notations or, if not otherwise indicated, run ductwork in shortest route which does not obstruct useable space or block access for servicing building and its equipment. Hold ducts close to walls, overhead construction, columns, and other structural and permanent enclosure elements of building. Limit clearance to ½" where furring is shown for enclosure or concealment of ducts, but allow for insulation thickness, if any. Where possible, locate insulated ductwork for 1" clearance outside of insulation. In finished and occupied spaces, conceal ductwork from view by locating in mechanical shafts, hollow wall construction or above suspended ceilings, unless specifically noted as "Exposed". Do not encase horizontal runs in solid partitions, except as specifically shown. Coordinate layout with suspended ceiling and lighting layouts and similar finished work.

3.2.5. Electrical Equipment Spaces: Do not route ductwork through transformer vaults or other electrical equipment spaces and enclosures.

3.2.6. Penetrations: Where ducts pass through interior partitions and exterior walls, and are exposed to view, conceal space between construction opening and duct or duct insulation with sheet metal flanges of same gauge as duct. Overlap opening on 4 sides by at least 1½". Fasten to duct and substrate. Where ducts pass through fire-rated floors, walls, or partitions, provide

firestopping between duct and substrate.

3.2.7. Coordination: Coordinate duct installations with installation of accessories, dampers, coil frames, equipment, controls and other associated work of ductwork system.

3.2.8. Installation: Install metal ductwork in accordance with SMACNA HVAC Duct Construction Standards. Fan discharge outlet ducts shall be installed correctly with regard to "system effect" per AMCA Publication 201.

3.3. Leakage Tests: After each duct system is completed, test for duct leakage in accordance with Sections 3 and 5 of the SMACNA HVAC Air Duct Leakage Test Manual. Repair leaks and repeat tests until total leakage is less than 3% of system design air flow for low pressure systems and less than 1% for systems rated over 3".

3.4. Equipment Connections: Connect metal ductwork to equipment as indicated, provide flexible connection for each ductwork connection to equipment mounted on vibration isolators, and/or equipment containing rotating machinery. Provide access doors as indicated.

3.5. Clean ductwork internally free of dust and debris. Clean external surfaces of foreign substances which might cause corrosive deterioration of metal or, where ductwork is to be painted, might interfere with painting or cause paint deterioration. Keep ducts closed with poly during construction to prevent contamination by construction dust and debris.

3.6. Balancing: Refer to Division-23 section "Testing, Adjusting, and Balancing" for air distribution balancing of metal ductwork; not work of this section. Seal any leaks in ductwork that become apparent in balancing process.

3.7. System Adjustment: Adjust the system to provide functional operation to the extent possible, and leave ready for Testing and Balancing work. It is not the intent of this section to provide final testing and balancing, but to leave the system operational with a minimum of noise.

END OF SECTION

PAGE LEFT INTENTIONALLY BLANK

SECTION 230855 / DUCTWORK ACCESSORIES

1. GENERAL

1.1. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.

1.2. Division-23 Basic Mechanical Materials and Methods sections apply to work of this section.

1.3. Extent of ductwork accessories work is indicated on drawings and in schedules, and by requirements of this section.

1.4. Refer to other Division-23 sections for testing, adjusting, and balancing of ductwork accessories; not work of this section.

1.5. Codes and Standards:

1.5.1. SMACNA Compliance: Comply with applicable portions of both SMACNA "HVAC Duct Construction Standards, Metal and Flexible"

1.5.2. NFPA Compliance: Comply with applicable provisions of NFPA 90A "Air Conditioning and Ventilating Systems" pertaining to installation of ductwork accessories.

1.6. Approval Submittals:

1.6.1. Product Data: Submit manufacturer's technical product data for each type of ductwork accessory, including dimensions, capacities, and materials of construction; and installation instructions as follows:

1.6.1.1. Low pressure manual dampers

1.6.1.2. Control dampers

1.6.1.3. Flexible connections

2. PRODUCTS

2.1. Dampers:

2.1.1. Low Pressure Manual Dampers: Provide 16-gauge dampers of single-blade type (12" maximum blade width) or multiblade type. Damper blades to be gang-operated from a single shaft with nylon or ball bearings on each end. Provide indexed locking quadrant. Parallel or opposed blade style is acceptable. Provide 2" standoff on locking quadrant for externally insulated duct. Final damper settings shall be marked in indelible ink or paint.

2.1.2. Control Dampers: Provide dampers with parallel blades for 2-position control or opposed blades for modulating control. Construct blades of 16-gauge steel. Provide heavy-duty molded self-lubricating nylon bearings and 1/2" diameter steel axles spaced on 9" centers. Provide sponge rubber or felt blade edges. Construct frame of 2" x 1/2" x 1/8" steel channel for face areas 25 sq. ft. and under; 4" x 1-1/4" x 16-gauge channel for face areas over 25 sq. ft. Provide galvanized steel finish with aluminum touch-up. Actuators (motors) are provided by control contractor. Damper operators shall have travel stops for making fixed settings for test and balance and final settings shall be marked in indelible ink or paint.

2.1.3. Acceptable Manufacturers: Subject to compliance with requirements, provide dampers by Greenheck, American Warming & Ventilating, Arrow Louver and Damper, Penn Ventilator Co., or Ruskin Mfg. Co.

2.2. Turning Vanes: Provide manufactured or fabricated single wall turning vanes and vane runners, constructed in accordance with SMACNA "HVAC Duct Construction Standards".

2.3. Flexible Connections:

2.3.1. General: Provide flexible duct connections wherever ductwork connects to vibration isolated equipment. Construct flexible connections of neoprene-coated flameproof fabric crimped into duct flanges for attachment to duct and equipment. Make airtight joint. Provide adequate joint flexibility to allow for thermal, axial, transverse, and torsional movement, and also capable of absorbing vibrations of connected equipment. Flexible connections shall comply with NFPA 90A, 90B, and Specification Form DDFCD-11.

2.3.2. Acceptable Manufacturers: Subject to compliance with requirments, provide products by one of the following: Duro Dyne Corp., Flexaust (The) Co., or Ventfabrics, Inc.

3. EXECUTION

3.1. Examine areas and conditions under which ductwork accessories will be installed. Do not proceed with work until unsatisfactory conditions have been corrected in manner acceptable to Installer.

3.2. Installation of Ductwork Accessories:

3.2.1. Install ductwork accessories in accordance with manufacturer's installation instructions, with applicable portions of details of construction as shown in SMACNA standards, and in accordance with recognized industry practices to ensure that products serve intended function.

3.2.2. Install balancing dampers at all main ducts adjacent to units in return air, outside air and where indicated.

3.2.3. Install control dampers in the outside air duct and return air duct for each air handler. Damper operator provided by control contractor.

3.2.4. Install turning vanes in square or rectangular 90° elbows in supply, return, and exhaust air systems, and elsewhere as indicated.

3.2.5. Install flexible connections in ductwork such that the clear length of the connector is approximately two inches. Provide thrust restraints as required. Flexible material shall not be so slack as to take a definite concave or convex shape during fan operation.

3.2.6. Coordinate with other work, including ductwork, as necessary to interface installation of ductwork accessories properly with other work.

3.3. Operate installed ductwork accessories to demonstrate compliance with requirements. Test for air leakage while system is operating. Repair or replace faulty accessories as required to obtain proper operation and leakproof performance.

3.4. Adjusting and Cleaning:

3.4.1. Adjusting: Adjust ductwork accessories for proper settings. Install fusible links in fire dampers

and adjust for proper action.

3.4.2. Final positioning of manual dampers is specified in Division-23 section "Testing, Adjusting, and Balancing". However, the system shall be left functional with all dampers open or throttled.

3.4.3. Cleaning: Clean factory-finished surfaces. Repair any marred or scratched surfaces with manufacturer's touch-up paint.

END OF SECTION

PAGE LEFT INTENTIONALLY BLANK

SECTION 230885 / AIR CLEANING EQUIPMENT AND ULTRAVIOLET LIGHTS

1. GENERAL

1.1. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.

1.2. Division-23 Basic Mechanical Materials and Methods sections apply to work of this section.

1.3. Extent of air cleaning work required by this section is indicated on drawings and schedules, and by requirements of this section.

1.4. Refer to Division-23 air handling units section for filter boxes associated with air handling units; not work of this section.

1.5. Codes and Standards:

1.5.1. NFPA Compliance: Comply with applicable portions of NFPA 90A pertaining to installation of air filters.

1.5.2. UL Compliance: Comply with UL Standards pertaining to safety and performance of air filter units.

1.5.3. ASHRAE Compliance: Comply with provisions of ASHRAE Standard 52 for method of testing, and for recording and calculating air flow rates.

1.6. Approval Submittals:

1.6.1. Product Data: Submit manufacturer's technical product data including dimensions, weights, required clearances and access, flow capacity including initial and final pressure drop at rated air flow, efficiency and test method, fire classification, and installation instructions.

1.6.1.1. Extended surface panel filters (prefilters)

1.6.1.2. Extended surface filters

1.6.1.3. Filter gauges

1.6.1.4. Ultraviolet lights

1.6.2. Shop Drawings: Submit manufacturer's assembly-type shop drawings indicating dimensions, materials, and methods of assembly of components.

1.6.2.1. Filter rack assemblies

1.6.2.2. Ultraviolet light coil cleaner.

2. PRODUCTS

2.1. Acceptable Manufacturers: Subject to compliance with requirements, provide air cleaning equipment of one of the following: American Air Filter Co., Continental Air Filter Co., Cambridge Filter Corp., Farr Co., or approved equal.

2.2. Provide cabinet and framing suitable for equipment being installed. Cabinet shall be shipped

in one piece but allow installation through a standard 3' door. Knock-down and reassembly is required.

2.3. Extended Surface Panel Filters (Prefilters): Provide factory fabricated pleated, dry flat panel; replaceable air filters of sizes indicated, with 2" thick UL Class 2 material. The media shall be bonded to the fiberboard casings to prevent leakage. Provide filters with rated face velocity of 500 fpm, initial resistance of not greater than 0.30" w.g., final rated resistance of 1.0" w.g., average arrestance of 90%, and average dust spot efficiency of 30%. Basis of design: MERV-8.

2.4. Extended Surface Filters: Provide medium efficiency factory-fabricated, dry, supported, extended surface filters with holding frames; where shown, in sizes indicated. Equip with UL Class 1 water resistant fibrous media material formed into 4" deep V-shaped pleats and held by self-supporting wire frames. Construct holding frames of 18-gauge galvanized steel and provide suitable fasteners and gasketing to hold media and media frame and to prevent unfiltered air passing between media frames and holding devices. Design holding frames which are suitable for bolting together into built-up filter banks. Provide filters with rated face velocity of 500 fpm, initial resistance of 0.60" w.g. with 90-95% dustspot efficiency and final rated resistance of 1.2" w.g. Basis of design: MERV-14.

2.5. Provide Magnehilic-type filter gauges for each filter bank graduated to read between 50% and 75% of the scale range when the filters are fully loaded. Provide pressure tips, tubing, gauge connections and mounting bracket.

2.6. U.V. Lights:

2.6.1. Description: Sanuvox Air Purifier or equivalent.

2.6.1.1. An individual Array that will provide a barrier wall of germicidal UV energy that will treat 100% of the air that passes through it.

2.6.1.2. An Array will consist of an outwardly projecting air purifier to be used in an air duct supporting a longitudinal (parallel) airflow.

2.6.1.3. The overall diameter of the Array will not exceed 5.25 inches (18.4cm).

2.6.1.4. The lap assemblies will be positioned that a cylindrical Array of UV assemblies is obtained.

2.6.1.5. An aluminum convex deflector element mounted to the support, so that the airflow is directed over the UV lamp assemblies.

2.6.1.6. The cone diameter shall not exceed 3.5 inches (8.75cm).

2.6.1.7. The wire sets connecting the Array to the ballast box shall be constructed of 18Awg, 10-strand Ul 1716 Teflon wire.

2.6.1.8. The aluminum ballast box shall consist of one ballast for each lamp, a resetable hour accumulating counter, an LED “Lamp On” indicator for each lamp, an audible buzzer to indicate a “Lamp Out” condition.

2.6.1.9. The electrical ballasts shall be instant start, solid state electronic type, 120 volts, high power factor, outdoor rated, maximum current 1.82 amp.

2.6.2. Performance:

2.6.2.1. The UV intensity for each individual lamp shall not be less than; 500 microwatts per/cm^2 at 36

inches for the 50-inch lamps; 620 microwatts per/cm^2 at 36 inches for the 60 inch lamps.

2.6.3. Warranty: The purifier will carry and 1-year warranty on parts, 12,000 hours on the UV lamps. Each lamp ballast shall be warranties to produce UVC light at a wavelength of 200-280 nanometers during the warranty period.

2.6.4. Certification: The purifier must be CSA or UL Certified.

3. EXECUTION

3.1. General: Comply with installation requirements as specified elsewhere in these specifications pertaining to air filters housing/casings, and associated supporting devices.

3.2. Install air filters and holding devices of types indicated, and where shown; in accordance with air filter manufacturer's written instructions and with recognized industry practices; to ensure that filters comply with requirements and serve intended purposes.

3.3. Locate each filter unit accurately in position indicated, in relation to other work. Position unit with sufficient clearances for normal service and maintenance. Anchor filter holding frames securely to substrate.

3.4. U.V. Light Installation:

3.4.1. The Array is to be positioned within the air handler and will contain a plurality of UV lamp assemblies (5), each including a reflector having a generally parabolic inner surface and a UV lamp mounted to the reflector so that the generally parabolic reflector inner surface reflects all the UF radiation emitted by the UV lamps in a radial direction.

3.4.2. The Array can be positioned either in the return side of the coil or in the supply side of the coil.

3.4.3. The inside of the duct where the Array will be installed must be lined with aluminum to reflect the UV intensity back into the duct. The aluminum must have aminimum coefficient of reflection of 8%. Either aluminum sheets of Reflectix, Inc. part number XSBW3 Foil/Bubble or equivalent may be used.

3.4.4. U.V. Lamp:

3.4.4.1. The Array will be available with UV lamp lengths of 40 inches, 50 inches, or 60 inches.

3.4.4.2. The high intensity UVC lamps will be of the low-pressure (3.0 Torr) mercury laden argo-neon type that incorporates a getter assembly to reduce and control the mercury levels.

3.4.4.3. The getter assembly absorbs inner lamp contaminants, which would typically reduce output and have a bearing on overall lamp performance and life.

3.4.4.4. The UVC lamps are pure fused quartz, type 210 sheet, properly doped with Titanium Oxide in order to filter out 99.99% of the 185 nm wavelength.

3.5. Coordinate with other work including ductwork and air handling unit work as necessary to interface installation of filters properly with other work.

3.6. Install filters in proper position to prevent passage of unfiltered air.

3.7. Install air filter gauge pressure tips upstream and downstream of filters to indicate air pressure drop through air filter. Mount filter gauges on outside of filter housing or filter plenum, in accessible position. Adjust and level included gauges for proper readings.

3.8. Construction Filters: No systems that include filters shall be operated at any time unless the complete specified prefilters and final filters are installed. Maintain all filters during construction. Install clean prefilters and final filters just prior to test and balance work.

3.9. Extra Filters: Provide a complete spare set of filters for each system where filters are installed. Where the design includes prefilters and final filters, provide only prefilters. Obtain receipt from Owner that spare filters have been received.

END OF SECTION

SECTION 230901 / HVAC CONTROLS PRICING

1. GENERAL

1.1. Refer to other Division 23 and Division 26 section and drawings for requirements concerning HVAC controls.

1.2. The only acceptable Controls System Subcontractor for the HVAC controls shall be Johnson Controls, Inc. All work including controls, shall be included by the Contractor in the Base Bid for this Project. The Contractor shall be responsible for verifying the Scope of Work for the Control System, which is to be provided by Johnson Controls, Inc. All control work, devices, and programing shall comply with the UF Standards. The Scope of Work for Johnson Controls, Inc. is as follows:

1.2.1. Included in the Scope of Work:

1.2.1.1. DDC Controls for Air Handling Units 1 & 2 as shown on the drawings.

1.2.1.1.1. Chilled water and hot water control valves.

1.2.1.1.2. Installation of duct smoke detectors supplied by the Division 26 contract.

1.2.1.2. Expansion of existing NAE and IOM as required for specified points and sequences

1.2.1.3. Modifications and programing of the Metasys database and updated graphics for UF Front End

1.2.1.4. Control wiring and control conduit. Power wiring to control panel.

1.2.1.5. 1-year Warranty, 4 hours of Owner training, submittals, tax and freight.

1.2.2. Not Included in the Scope of Work:

1.2.2.1. Payment of performance bond.

1.2.2.2. Installation of valves, dampers or other in-line devices.

1.2.2.3. Permits.

1.2.2.4. Dampers of any kind.

1.2.2.5. Starters, disconnects, variable speed drives or their installation.

1.2.2.6. Access doors and/or panels.

1.2.2.7. Duct smoke detectors. Detectors are supplied and wired by the Division 26 Contractor.

1.2.2.8. Johnson Controls, Inc. Open book price for HVAC controls shall be provided to all bidding Contractors and carried by the Contractor in the Base Bid of this Project.

END SECTION

PAGE LEFT INTENTIONALLY BLANK

SECTION 230905 / HVAC SEQUENCE OF OPERATION

1. GENERAL

1.1. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specifications sections, apply to work of this section.

1.1.1. Division-23 Basic Mechanical Materials and Methods sections apply to work of this section.

1.1.2. Sequence of operation is hereby defined as the manner and method by which controls function. Requirements for each type of control system operation are specified in this section.

1.1.3. Operating equipment, devices and system components required for control systems are specified in other Division-23 sections of these specifications.

1.1.4. Control Diagrams: Diagrams are essentially diagrammatic. This specification intends for all necessary devices and components (regardless whether shown on the diagrams or not) to be provided in order to have a complete and working system as described in the sequence of operation.

2. PRODUCTS: (Not applicable)

3. EXECUTION:

3.1. Air Handling Unit Control Sequences:

3.1.1. Safety Controls for All Air Handling Units:

3.1.1.1. Smoke Detectors (S1): Smoke detectors shall be installed in the supply air and return air ducts where shown on the drawings to stop fan and signal the fire alarm.

3.1.1.2. Smoke Dampers(S2): Provide smoke dampers in the supply air and mixed air and where shown on the drawings. Interlock to operate when the fan starts and stops. Provide end switch to prevent fan start until dampers are open.

3.1.1.3. Freezestat (S3): Provide a freezestat (adjustable) serpentined across the downstream side of the cooling coil that is hard-wired to stop the fan and close the outdoor air damper when the temperature falls to 40°F. Manual reset.

3.1.1.4. Freeze Protection (S4): Provide a separate temperature sensor (adjustable) serpentined across the leaving side of the preheat coil. When the temperature falls to 40°F:

3.1.1.4.1. Open preheat valve to the full open position.

3.1.1.4.2. Open the chilled water valve to the 50% open position.

3.1.1.4.3. Reduce fan speed to 50% of full speed.

3.1.1.5. High Static Pressure Limit (S5): Provide separate high static pressure switch (adjustable) in the supply duct upstream of all dampers to stop the fan when static pressure rises to 4.0 in w.g.. Manual reset.

3.1.2. VAV Air Handling Units with Static Pressure Control (AHU-1):

3.1.2.1. Safety Control Sequences: Provide the following safety functions.

3.1.2.2. Smoke Detectors (S1)

3.1.2.3. Smoke Dampers (S2)

3.1.2.4. Freezestat (S3)

3.1.2.5. Freeze Protection (S4)

3.1.2.6. High Static Pressure Limit (S5)

3.1.3. Start - Stop Sequences: Provide the following operational and interlock functions when the air handling unit fan is started and stopped, unless otherwise noted.

3.1.3.1. Outdoor Air Damper: Open damper on fan start. Close damper on fan stop.

3.1.3.2. Chilled Water and Heating Hot Water Valves: Enable controls on fan start. Close valve on fan stop.

3.1.3.3. Electric Heaters: Enable controls on fan start. Interlock off on fan stop.

3.1.3.3.1. Fan Powered VAV Boxes: Provide interlock to enable controls on fan start. Stop fan-powered box fans and close hot water valves on fan stop.

3.1.3.4. Occupied Cycle: When the unit is in the occupied mode in response to the BAS time clock or a manual override, provide the following:

3.1.3.4.1. Start: Initiate the start sequence described in: “Start-Stop Sequences”.

3.1.3.4.2. Outdoor Air Control: Provide air monitor station in the outdoor air duct to modulate the outdoor air damper and return air damper in sequence to maintain constant building pressure based on building pressure sensor in dining room (existing). If return air CO2 exceeds setpoint of 1000 ppm, regardless of building pressure provide the maximum outdoor air volume listed in the air handling unit schedule until CO2 is lowered below 600 ppm. OA quantity shall not be below minimum airflow in schedule regardless of mode, CO2, or building pressure. OA setpoint shall be maintained at setpoint regardless of fan speed or filter loading. With the return air damper open, modulate the outdoor air damper as required. If the outdoor air damper is fully open and the outdoor air volume is below the setpoint, modulate the return damper closed as required.

3.1.3.4.3. Fan Speed Control: Provide static pressure sensor mounted in the supply duct to modulate the variable speed drive to maintain a setpoint of 1.0 in w.g. (adjustable).

3.1.3.4.4. Preheat Control: Provide temperature sensor to modulate the heating hot water valve as required to maintain a supply air temperature of 55°F. Coordinate setpoint with cooling setpoint to prevent simultaneous heating and cooling.

3.1.3.4.5. CHW Cooling Coil Control: Provide temperature sensor to modulate the chilled water valve as required to maintain the supply air temperature. Provide outdoor air temperature sensor in order to reset supply air temperature from 55°F to 62 °F as outdoor varies from 95 to 75. Monitor the air valve position of all associated VAV boxes and provide a discriminator function to select the air valve that is most fully open. If any valve is at maximum, maintain supply air temperature at 55°F. If no air valve is at maximum raise supply air temperature incrementally. Do not exceed 62°F supply air temperature.

3.1.3.5. Unoccupied Cycle: When the unit is in the unoccupied mode in response to the BAS, provide

the following.

3.1.3.5.1. Stop: Initiate the stop sequence described in “Start-Stop Sequences”.

3.1.3.5.2. Setback: Initiate the stop sequence described in “Start-Stop Sequences”. If the room temperature rises above 82°For falls below 62°Fwhile the unit is off, initiate the start sequence described in “Start-Stop Sequences” except leave outdoor air damper closed and return damper open. Operate unit as described in “Occupied Cycle” except leave outdoor air damper closed. Continue operation until room temperature falls to 75°or rises to 70°F. When room temperature is restored to the setback setpoints, initiate the stop sequence described in “Start-Stop Sequences”.

3.1.3.6. Indication: See the BAS Input / Output Schedule on the Drawings.

3.1.3.7. Alarms: See the BAS Input/Output Schedule on the

3.1.4. VAV Air Handling Units for Room Temperature Control (AHU-2):

3.1.4.1. Safety Control Sequences: Provide the following safety functions.

3.1.4.1.1. Smoke Detectors (S1)

3.1.4.1.2. Freezestat (S3)

3.1.4.1.3. Freeze Protection (S4)

3.1.4.1.4. High Static Pressure Limit (S5)

3.1.4.2. Start - Stop Sequences: Provide the following operational and interlock functions when the air handling unit fan is started and stopped, unless otherwise noted.

3.1.4.3. Outdoor Air Damper: Open damper on fan start. Close damper on fan stop.

3.1.4.3.1. Chilled Water and Heating Hot Water Valves: Enable controls on fan start. Close valve on fan stop.

3.1.4.4. Occupied Cycle: When the unit is in the occupied mode in response to the BAS or a manual override, provide the following:

3.1.4.4.1. Start: Initiate the start sequence described in: “Start-Stop Sequences”.

3.1.4.4.2. Outdoor Air Control: Provide air monitor station in the outdoor air duct to modulate the outdoor air damper and return air damper in sequence to maintain the outdoor air volume setpoing regardless of fan speed or filter loading. AHU-2 shall be interlocked with existing EF status point for EFs 2, 7, 8 & 9. OA minimum flow (unoccupied mode and/or zero EFs running) shall be the scheduled minimum flow per the schedule. OA maximum flow (four fans running) shall be the maximum flow listed in the schedule. If two fans are running, provide 2500 cfm OA. If three fans are running, provide 3500 cfm OA. With the return air damper open, modulate the outdoor air damper as required. If the outdoor air damper is fully open and the outdoor air volume is below the setpoint, modulate the return damper closed as required.

3.1.4.4.3. Fan Speed Control: Provide room temperature sensor and an air monitor station in the supply air duct to modulate the variable speed drive to maintain room temperature at the desired setpoint. Do not allow the supply air volume to exceed the maximum value or fall below the minimum value listed in the air handling unit schedule. Coordinate volume control with reheat so that reheat does not start until the supply air volume is at the minimum value listed.

3.1.4.4.4. Preheat Control: Provide temperature sensor to modulate the heating hot water valve as required to maintain a supply air temperature of 55°F. Coordinate setpoint with cooling setpoint to prevent simultaneous heating and cooling.

3.1.4.4.5. CHW Cooling Coil Control: Provide temperature sensor to modulate the chilled water valve as required to maintain the supply air temperature. Provide outdoor air temperature sensor in order to reset supply air cold deck temperature from 55°F to 62°Fa s outdoor varies from 95°Fto 75°F. Monitor the speed of the AHU. If speed is at maximum, maintain supply air temperature at 55°F. If speed is not at maximum raise supply air temperature incrementally. Do not exceed 62°F supply air temperature.

3.1.4.4.6. Reheat Control Provide room temperature sensor to modulate the heating hot water valve to modulate the steam valve to stage the electric heaters as required to maintain room temperature. Coordinate with fan volume control to prevent onset of reheat util fan volume is at the specified minimum setting.

3.1.4.5. Unoccupied Cycle: When the unit is in the unoccupied mode in response to the BAS provide the following.

3.1.4.5.1. Stop: Initiate the stop sequence described in “Start-Stop Sequences”.

3.1.4.5.2. Setback: Initiate the stop sequence described in “Start-Stop Sequences”. If the room temperature rises above 82°For falls below 62°F while the unit is off, initiate the start sequence described in “Start-Stop Sequences” except leave outdoor air damper closed and return damper open. Operate unit as described in “Occupied Cycle” except leave outdoor air damper closed. Continue operation until room temperature falls to 75°For rises to 70°F. When room temperature is restored to the setback setpoints, initiate the stop sequence described in “Start-Stop Sequences”.

3.1.4.6. Indication: See the BAS Input / Output Schedule on the drawings.

3.1.5.2. Alarms: See the BAS Input/Output Schedule on the drawings.

END SECTION

SECTION 230955 / VARIABLE FREQUENCY DRIVES

1. GENERAL

1.1. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.

1.2. Division-23 Basic Mechanical Materials and Methods sections apply to work of this section.

1.3. Extent of variable frequency drive work required by this section is indicated on drawings and schedules, and by requirements of this section. Control sequences are specified in Division-23 section "HVAC Sequence of Operation".

1.4. Refer to other Division-23 sections for installation control work, AHUs, pressure taps, and flow stations in mechanical systems; not work of this section. Coordinate with air handling unit suppliers.

1.5. Refer to Division-26 sections for the following work; not work of this section.

1.5.1. Power supply wiring for power source to power connection on air handling units, drives, controls and/or unit control panels.

1.6. Provide the following electrical work as work of this section, complying with requirements of Division-26 sections: Control wiring and signal wiring between field-installed controls, indicating devices, and unit control panels.

1.7. Codes and Standards:

1.7.1. Electrical Standards: Provide electrical products which have been tested, listed and labeled by UL and comply with NEMA standards.

1.7.2. NEMA Compliance: Comply with NEMA standards pertaining to components and devices for electric control systems.

1.7.3. NFPA Compliance: Comply with NFPA 90A "Standard for the Installation of Air Conditioning and Ventilating Systems" where applicable to controls and control sequences.

1.7.4. NEC Compliance: Comply with NFPA 70 National Electric Code.

1.8. Approval Submittals:

1.8.1. Product Data: Submit manufacturer's technical product data for each type of drive furnished, indicating dimensions, capacities, performance characteristics, electrical characteristics, finishes of materials, and including installation instructions and start-up instructions.

1.9. Test Reports and Verification Submittals:

1.9.1. Submit manufacturer’s representative startup report.

1.10. O&M Data: Submit maintenance instructions and spare parts lists. Include this data, a copy of approval data in O&M manual.

1.11. Warranty: Warranty period shall begin at Substantial Completion for a minimum of two years.

2. PRODUCTS

2.1. General: Provide products in sizes and capacities indicated, consisting of variable frequency drives, bypass devices, disconnects, controllers, sensors, transmitters, and other components as required for a complete installation. Except as otherwise indicated, provide manufacturer's standard system components as indicated by published product information, designed and constructed as recommended by manufacturer.

2.2. Variable Frequency Drives: Provide UL or ETL approved, variable torque, variable frequency drives capable of being used with standard AC induction motors without causing overheating or excessive noises. Drives shall be housed in NEMA 1 enclosures. Outdoor drives shall be house in NEMA 3R enclosures with thermostat, cooling fan and electric heaters for condensate prevention. The supplier shall perform all necessary electric power analyses as required to ensure the drives operate properly in the service indicated. Provide the following performance and construction features:

2.2.1. The drive may be either voltage or current source, but current source drives must incorporate a voltage clamping circuit. Drives must be able to be tested under no-load conditions.

2.2.2. The controller shall accept power as indicated on the drawings and provide a variable frequency output for speed control from 10% to 100% of base speed (1,800 rpm nominal). Provide fused input.

2.2.3. The drive shall produce a variable frequency, adjustable voltage output with a constant input power factor of at least 0.95 and a variable-torque constant volts/Hz ratio. The input stage shall use a full wave diode bridge. Provide DC switching power supply.

2.2.4. The drive shall maintain an overall efficiency from input to output of at least 95% over the full range of operation.

2.2.5. The output stages shall not generate unacceptable line noise, motor noise, or radio frequency interference. Any isolation transformers, filters, or other devices required to prevent these problems, or to enable the drive to function properly with the available utility power shall be provided by the manufacturer. A calculation for VFD and motor contribution for harmonics (including 3-n harmonics up to 1,440 Hz) is to be provided by supplier based on proposed location of equipment. Manufacturer to check and resolve any harmonics issues that may result from installation of this equipment.

2.2.6. All units shall be warranted for a period of 24 months. All drives shall be pretested before shipment.

2.2.7. Drive features:

2.2.7.1. Minimum and maximum speed adjustment.

2.2.7.2. Separately adjustable acceleration and deceleration.

2.2.7.3. Adjustable current limit.

2.2.7.4. Short circuit protection and ground fault protection. Over current protection for driven load shall comply with NEC.

2.2.7.5. 4-20 mA current follower circuitry.

2.2.7.6. Under voltage and over voltage protection.

2.2.7.7. Over temperature protection.

2.2.7.8. Automatic restarting of the drive after a power outage or power dip.

2.2.7.9. Drive status indicator lights and digital display.

2.2.7.10. Mode selector switch (manual, off, automatic).

2.2.7.11. Manual speed potentiometer.

2.2.7.12. Speed indicator and ammeter to indicate full range of operation.

2.2.7.13. Motor starter circuit and drive input disconnect switch complying with NEC Article 430. Also provide disconnect to isolate power to the inverter section while allowing the unit to operate on the bypass.

2.2.7.14. Manual contactor bypass.

2.2.7.15. Phase loss protection (input and output) and surge suppression.

2.2.7.16. Start/stop control in the automatic mode from a remote signal or contact closure.

2.2.7.17. Auxiliary contact indicating run status.

2.2.7.18. Serial interface to allow bidirectional communications with the Johnson Controls Metasys system to allow bidirectional communication with the existing controls system and the web-based ethernet WAN with BACET/IP protocol from the building level controller up to the web-based server operating system.

2.2.7.19. Internal diagnostics displayed on unit panel.

2.2.7.20. Drives shall be able to catch and drive into a spinning load.

2.2.7.21. Points available to the building control system include: Setpoint, Drive Speed (rpm), Frequency (Hz), Motor Current (A), Power (kW), Energy (kWh), Last Fault Number, OK/Faulted Status, Stop/Run Status, and Hand/Off/Auto Status.

2.2.7.22. No load fault protection

2.2.8. Acceptable Manufacturers: Subject to compliance with requirements, provide drives of one of the following:

Danfoss
Eaton
Asea Brown Boveri (ABB)
Yaskawa

2.3. Variable Air Volume Flow Sensors and Transmitters: Refer to Division-23 controls sections for air flow and static pressure sensors and transmitters. Coordinate output of transmitters with input requirements of drives.

3. EXECUTION

3.1. Examine areas and conditions under which variable volume systems are to be installed. Do not proceed with work until unsatisfactory conditions have been corrected in a manner acceptable to Installer.

3.2. Install the variable frequency drives where shown on the drawings in accordance with the manufacturer's printed instructions. If the drive is not located within sight of the motor, provide additional line side disconnect switch complying with the requirements of Division 26

and NEC Article 430.

3.3. Mounting: Provide slotted angles or channel bars with mounting hardware for securing drives to the wall. Combustible materials are not permitted.

3.4. Refer to Division-26 sections for motor connections and testing requirements.

3.5. Variable Air Volume Systems:

3.5.1. Verify that the drives control the air handling unit speeds properly over the full range of operation in response to control signals. Coordinate drive operation with final sheave selection.

3.5.2. System Adjustment: The drive supplier shall coordinate the setting of all adjustments and setpoints for initial operation. Monitor system boxes and AHUs for proper operation. It shall be recognized that final settings and locations of static pressure transmitters will be obtained by trial-and-error by necessity. Call backs to achieve proper settings shall be included in the base bid.

3.6. Start-up: Start-up, test, and adjust variable volume systems in presence of manufacturer's authorized representative. Demonstrate compliance with requirements. Replace damaged or malfunctioning controls and equipment.Owner's Instructions: Provide services of manufacturer's technical representative for 16 hours divided into 4 sessions to instruct Owner's personnel in operation and maintenance of variable volume systems. Schedule instruction with Owner, provide at least 7-day notice to Contractor and Engineer of training date.

3.8. System Verification: The manufacturer's authorized representative shall state in writing to the Engineer that the variable volume system is operating properly, final adjustments and calibrations are complete, and Owner training has been accomplished.

END OF SECTION

SECTION 230970 / START-UP REQUIREMENTS FOR HEATING, VENTILATING, & AIR CONDITIONING (HVAC) SYSTEMS

1. GENERAL

1.1. Intent: It is the intent of this section to require that the startup requirements and report noted herein be performed prior to starting TAB work on each system. Work can be phased with permission of the Engineer.

1.2. Coordination:

1.2.1. The Contractor shall furnish to the TAB Contractor a complete set of plans, specifications, addenda, shop drawings, equipment performance data sheets, change orders, etc. as requested by the TAB Contractor.

1.2.2. The Contractor shall participate in a TAB coordination meeting to discuss interface requirements with the TAB Contractor and to establish a schedule for TAB work prior to start of TAB work.

2. PRODUCTS: None

3. EXECUTION:

3.1. The TAB work shall not commence until the Engineer has received written notice from the Contractor that HVAC systems are 100% complete and are fully operational. Submit Startup Report as described herein.

3.2. The Contractor shall place all HVAC systems and equipment into complete operation during each working day of TAB work.

3.3. The Contractor shall provide access to HVAC systems and equipment by supplying ladders and/or scaffolding, and opening access panels and equipment room doors.

3.4. The TAB Contractor will provide to the Contractor TAB punch lists of non-complying HVAC work as they are discovered. The Contractor shall replace or repair non-complying work as soon as possible in order not to delay completion of TAB work.

3.5. Airside Systems: The Contractor shall provide the following information to the Engineer to substantiate proper start-up and preliminary adjustments of air handler units, belt driven fans, and duct systems.

3.5.1. Verify that duct systems are clean of debris.

3.5.2. Verify that ducts attached with flexible connectors are aligned within ½" and have a uniform gap between ducts of 1"-1.5". Flexible connectors shall not leak and shall be insulated.

3.5.3. Verify that filters are clean and filter spacers are installed.

3.5.4. Verify that balancing dampers at branch ducts are operational and are fully opened.

3.5.5. Verify that smoke dampers are correctly installed and are fully opened.

3.5.6. Verify that fan discharges are appropriate for the outlet ductwork with regards to the "system effect" per AMCA Publication 201. Inappropriate fan discharges will not be accepted.

3.5.7. Verify proper fan rotation.

3.5.8. Verify fan motor overload elements are correctly sized.

3.5.9. Adjust fan sheave until CFM is at or above design CFM. Verify that motor is not overloaded.

3.5.10. Verify that HVAC control systems are fully operational.

3.5.11. Verify outside air requirements have been met. Provide dual settings and readings for damper settings as noted on drawings.

3.6. Hydronic Systems: The Contractor shall provide the following information to the Engineer to substantiate proper start-up and preliminary adjustments of HVAC pumps and piping systems.

3.6.1. Verify that the hydronic systems are properly flushed, filled, vented, purged and chemically treated and that all leaks are repaired. Verify proper air venting.

3.6.2. Verify that the correct strainer screens are clean and installed.

3.6.3. Verify that all balancing valves and circuit setters are fully opened.Verify that test ports, pressure gauges and thermometers are properly installed and are accessible at coils. Extensions to allow for pipe insulation are required. Pressure gauges at pumps must utilize pump taps in order for head measurements to correlate with the pump performance curves.

3.6.5. Verify that HVAC control systems for AHUs are fully operational.Startup Report: The Contractor shall submit the startup information required by this section to the Engineer in a typed report organized as outlined herein. The Startup Report is required to meet the written notice described herein prior to starting TAB work. TAB work will not start until the Startup Report has been submitted and approved.

3.8. After the initial AC unit startup is completed by the AC unit manufacturer (with the Contractor's assistance) the Test and Balance shall be completed. After completion of the Test and Balance work the unit manufacturer shall return to the site and retest and operate the AC equipment and provide a Commissioning Report

END OF SECTION

SECTION 230985 / TESTING AND BALANCING OF MECHANICAL SYSTEMS

1. GENERAL

1.1. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section. Division-23 Basic Mechanical Materials Sections apply to work of this section.

The work of this section is intended to be performed by a test and balance contractor under a separate, stand-alone contract.

1.2. Description of Work:

1.2.1. Extent of testing, adjusting, and balancing work (TAB) is indicated by requirements of this section, and also by drawings and schedules, and is defined to include, but is not necessarily limited to, air distribution systems, hydronic distribution systems and associated equipment and apparatus of mechanical work. The work consists of setting speed and volume (flow) adjusting facilities provided for systems, recording data, conducting tests, preparing and submitting reports, and recommending modifications to work as required.

The work of this section is intended to be performed by a test and balance contractor under a separate, stand-alone contract.

1.2.2. Pretesting: Where required by the drawings or other Division 23 sections, pretest existing HVAC systems as directed and report findings prior to start of demolition work or any other modifications to the existing systems. Results of pretesting shall be reported to the Engineer in a timely manner. Comply with standards for final TAB reports described herein.

1.2.3. Coordination: Coordinate with the General Contractor and Mechanical Contractor responsible for the HVAC system installation as required to complete the TAB work.

1.3. The intent of this specification is to balance HVAC systems within the tolerances listed, maintaining the pressure relationships indicated, with a minimum of noise.

1.3.1. Airflow Tolerances:

1.3.1.1. Air Handling: The supply air, return air and outdoor air quantities shall be balanced within ±5% of design values.

Exhaust Fans: The exhaust fan quantities shall be set as required to maintain the design exhaust terminal flows within ±5% of design values. If no exhaust terminals exist, exhaust fan air quantities shall be balanced within ± 10% of design values.

1.3.1.3. Terminal Units: The air quantities associated with VAV boxes, fan terminal units, and other similar devices shall be balanced within ±5% of design values.

1.3.1.4. Ceiling Diffusers, Supply Registers, Return and Exhaust Inlets: Balance to an air quantity within ±10% of the design values.

1.3.2. Temperature Tolerances:

1.3.2.1. Air Handling Temperatures: The controlled temperatures at AHUs shall be verified to be under control within ±1°F of design values.

1.3.3. Pressure Relationships: Where code or design indicates a specific pressure relationship, the

pressure relationship shall take precedence over airflow tolerances. Airflow tolerances may need to be held tighter than allowed tolerances to meet pressure relationships.

1.3.4. Hydronic Flow: Balance hydronic flow rates to within ±10% of design values.

1.4. Quality Assurance: The TAB Contractor shall be certified as follows:

1.4.1. Tester: A firm certified by National Environmental Balancing Bureau (NEBB) in those testing and balancing disciplines required for this project, who is not the Installer of the systems to be tested and is otherwise independent of the project. Comply with NEBB's "Procedural Standards for Testing, Adjusting and Balancing of Environmental Systems" as applicable to this work.

1.4.2. Industry Standards: Comply with American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc. (ASHRAE) recommendations pertaining to measurements, instruments and testing, adjusting and balancing, except as otherwise indicated.

1.5. Job Conditions:

1.5.1. Do not proceed with testing, adjusting, and balancing work until HVAC work (including Controls) has been completed and is operable. Ensure that there is no residual work still to be completed.

1.5.2. Do not proceed until work scheduled for testing, adjusting, and balancing is clean and free from debris, dirt and discarded building materials.

1.5.3. Do not proceed until architectural work that would affect balancing (walls, ceiling, windows, doors) have been installed.

1.5.4. Testing may proceed system by system, but each HVAC system must be complete as describe herein.

1.5.5. The mechanical contractor shall make any changes in pulleys, belts, and dampers, and/or add dampers as required for correct balancing.

1.6. Approval Submittals:

1.6.1. Submit the name of the proposed test and balance company for the Engineer's approval within thirty (30) days after awarding of contract.

1.7. Test Reports and Verification Submittals:

1.7.1. Submit two (2) copies of a preliminary report two weeks prior to Substantial Completion listing all noted deficiencies. Submit four (4) copies of the dated test and balance report upon completion of TAB work and before the Final Completion Inspection. The report shall include a list of instruments used for the work. The report shall be signed by the supervisor who performed the TAB work.

2. PRODUCTS

2.1. Patching Materials: Except as otherwise indicated, use same products as used by original Installer for patching holes in insulation, ductwork and housings which have been cut or drilled for test purposes, including access for test instruments, attaching jigs, and similar purposes.

2.2. Test Instruments: Utilize test instruments and equipment of the type, precision, and capacity as recommended in the referenced standard. All instruments shall be in good condition and shall have been calibrated within the previous six (6) months (or more recently if required by standard).

3. EXECUTION

3.1. General:

3.1.1. Examine installed work and conditions under which testing is to be done to ensure that work has been completed, cleaned and is operable. Do not proceed with TAB work until unsatisfactory conditions have been corrected in manner acceptable to Tester.

3.1.2. Test, adjust and balance environmental systems and components, as indicated, in accordance with procedures outlined in applicable standards, and as modified or detailed herein. Test and balance shall be performed prior to installation of ceiling tiles.

3.1.3. Test, adjust and balance systems during summer season for air conditioning systems and during winter season for heating systems, including at least a period of operation at outside conditions within 5°F wet bulb temperature of maximum summer design condition, and within 10°F dry bulb temperature of minimum winter design condition. When seasonal operation does not permit measuring final temperatures, then take final temperature readings when seasonal operation does permit. The Contractor shall return for a change of seasons test at no additional cost to the Owner and submit the revised TAB report.

3.1.4. Punch List: Prepare a deficiency (punch)list for the Contractor with a copy of the Engineer that lists all items that are incorrectly installed or are functioning improperly. Provide a retest after all items are corrected.

3.1.5. Prepare TAB report of test results, including instrumentation calibration reports, in format recommended by applicable standards, modified as required to include all data listed herein.

3.1.6. Patch holes in insulation, ductwork and housings, which have been cut or drilled for test purposes, in manner recommended by original Installer.

3.1.7. Mark equipment settings, including damper control positions, valve indicators, fan speed control levers, and similar controls and devices, to show final settings at completion of TAB work. Provide markings with paint or other suitable permanent identification materials.

3.1.8. Include in the TAB report recommendations for correcting unsatisfactory mechanical performances when system cannot be successfully balanced.

3.1.9. Include an extended warranty of ninety (90) days after completion of test and balance work, during which time the Engineer, at his discretion, may request a recheck, or resetting of any component as listed in test report. The TAB company shall provide technicians and instruments and make any tests required by the Engineer during this time period.

3.2. Controls:

3.2.1. Check all HVAC controls for proper location, calibration and sequence of operation.

3.2.2. Check operation of all controllers and controlled devices to verify proper action and direction. Check the operation of all interlocks.

3.2.3. Check all control valves for complete closure and correct action under all operating conditions.

3.3. Air Balancing:

3.3.1. Leakage tests on ductwork must have been completed before air balancing.

3.3.2. Set dampers, volume controls and fan speeds to obtain specified air delivery with minimum noise level. Rebalance as required to accomplish this.

3.3.3. Set grille deflections as noted on plans. Modify deflections if required to eliminate drafts or objectionable air movement.

3.3.4. Record air terminal velocity after completion of balance work.

3.3.5. Record final grille and register deflection settings if different from that specified on contract drawings.

3.3.6. Record all fan speeds.

3.3.7. Variable Volume Systems: Measure static pressure at all major branches. Adjust fan controllers for minimum required static pressure at the end of each branch. Report the value of the minimum static pressure that will provide proper air flow in the TAB Report and set the static pressure controller for this value. Balance outlets. Check at both modulated and full cooling condition. Traverse main supply and return ducts. All branches must be above the minimum required static pressure. The supply fan must track and deliver the proper air quantity with no objectionable noise. The system must be stable and operate properly at 50% flow.

3.4. Water Balancing:

3.4.1. Verify proper operation of all hydronic system devices to ensure the proper flowrate, flow direction and pressure are maintained.

3.4.2. Set balancing cocks and flow control devices to obtain specified water flow rates to all coils. Coordinate with variable speed drives to achieve balance with minimum pump speed. Report the value of the minimum differential pressure that will provide proper flow in the TAB Report and set the differential pressure controller for this value. Pump balancing cocks (if present) shall be fully open. Set maximum speed control for variable speed pumps.

3.5. Data Collection:

3.5.1. In addition to the data required for any specified performance tests, measure and record the temperatures, pressures, flow rates, and nameplate data for all components listed herein.

3.5.2. It is the intent of this section to record data on balanced systems, under normal operating or design conditions.

3.5.3. Temperatures:

3.5.3.1. Outside dry and wet bulb temperatures.

3.5.3.2. Dry bulb temperature in each room and at least one wet bulb temperature in each zone.

3.5.3.3. Inlet and outlet temperature of each heat exchange device - both fluids.

3.5.3.4. Entering and leaving air temperatures (dry bulb and wet bulb) for each air handler.

3.5.4. Pressures:

3.5.4.1. Suction and discharge static pressure of each fan.

3.5.4.2. Water pressure drop through each heat exchanger.

3.5.5. Flow rates:

3.5.5.1. Flow rate through each fan.

3.5.5.2. Flow rate through each coil.

3.5.6. Nameplate Data:

3.5.6.1. Complete nameplate data for all equipment.

3.5.6.2. Motor data to include horsepower, phase, voltage, RPM, full load nameplate current, fuse rating in disconnect switch, number or manufacturer's size designation, and ampere rating of overcurrent and low voltage protection devices in starters.

END OF SECTION

PAGE LEFT INTENTIONALLY BLANK

SECTION 260030 / ELECTRICAL RELATED WORK

1. DIVISION 1 - GENERAL REQUIREMENTS

1.1. All Division 1 Sections apply to all Division 26 Sections.

1.2. Coordinate with the General Contractor for all cutting and patching. Contractors performing Division 26 work shall inform the General Contractor of all cutting and patching required prior to bidding and shall coordinate installation.

2. DIVISION 9 - FINISHES

2.1. Perform the following as part of Division 26 work.

2.1.1. Touch up painting of factory finishes.

3. DIVISION 23 - MECHANICAL

3.1. Mechanical Contractor shall furnish to Electrical Contractor all necessary nameplate data, equipment power requirements, wiring diagrams, etc., pertaining to the electrical phase of mechanical installation, as well as all required motors, on/off switches, warning lights, relays, and control devices.

3.2. Electrical Contractor shall furnish and install all power wiring, starters and contactors, and make final electrical connections to motors, on/off switches, warning lights, relays, and control devices.

3.3. Disconnect switches for mechanical equipment shall be furnished and installed by the Electrical Contractor, unless specifically noted on the Drawings as being furnished as part of mechanical equipment.

3.4. All duct-mounted smoke detectors shall be furnished and wired by the Electrical Contractor and installed by the Mechanical Contractor.

END OF SECTION

PAGE LEFT INTENTIONALLY BLANK

SECTION 260100 / BASIC MATERIALS AND METHODS

1. GENERAL

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

1.2. This Section is a Division-26 Basic Materials and Methods Section, and is part of each Division-26 Section making reference to or requiring products specified herein.

1.3. Submittals: Submit the producer's standard descriptive data sheets for each type of product being provided. Mark the data sheet for the product being provided with an identifying mark or arrow. This shall include submittal for means of support of equipment, if necessary, as indicated below in this section.

2. PRODUCTS

2.1. Acceptable Producers: Allied Tube and Conduit; Anaconda Industries; Appleton Electric; Belden Corporation; W.H. Brady Co.; Carlon; Crouse-Hinds Co.; ETP; Elcen Metal Products Co.; General Cable Co.; General Electric Co.; Hoffman Engineering Co.; Harvey Hubbell, Inc.; Midland-Ross Corporation; Okonite Co.; 0-Z/Gedney; Raco, Inc.; Republic Steel Corporation; 3M; Southwire; Seton Nameplate; Square D Co.; Thomas and Betts; Triangle PWC, Inc.; Walker Parkersburg Textron; Wiremold Co.

2.2. As indicated, products listed herein may be common to various Division 26 Sections for this project.

2.3. All materials and equipment specified herein shall be UL listed or approved according to the requirements of applicable NEC articles.

2.4. Raceways:

2.4.1. Rigid Metal Conduit (NEC Art. 344) shall be galvanized steel, protected inside and outside.

2.4.2. Rigid Nonmetallic Conduit (NEC Art. 352) shall be polyvinyl chloride (PVC), schedule 40 or schedule 80, as indicated on the Drawings.

2.4.3. Liquidtight Flexible Nonmetallic Conduit (NEC Art. 356) shall be flame-resistant nonconductive flexible PVC suitable for direct burial and with smooth inner surface with integral reinforcement within the conduit wall.

2.4.4. Electrical Metallic Tubing (EMT) (NEC Art. 358) shall be steel, protected inside and outside by a coating of approved corrosion-resistant material such as zinc or cadmium.

2.4.5. Flexible Metal Conduit (NEC Art. 348) shall be galvanized steel, protected inside and outside.

2.4.6. Liquid Tight Flexible Metal Conduit (NEC Art. 350) shall be galvanized steel, protected inside and outside with an extruded outer liquid tight, non-metallic, sunlight resistant jacket. Use with standard liquid tight fittings.

2.4.7. Surface Raceways (NEC Art. 386) shall be metal surface race-ways, two-piece, snap on cover type, rectangular, rust resistant undercoat and gray, buff or brown finish. Steel shall be minimum .040 inches.

2.5. Raceway Fittings:

2.5.1. Rigid Metal Conduit shall have threaded fittings, galvanized steel or threadless compression galvanized steel. Fittings shall be rain tight/concrete tight.

2.5.2. Rigid Non-Metallic Conduit shall have polyvinyl chloride (PVC) fittings suited for the purpose and joined together by a method approved for the purpose. Schedule 80 conduit sections may be joined together with threaded fitting connectors.

2.5.3. Electrical Metallic Tubing (EMT) fittings shall be compression type, all zinc plated steel; zinc plated steel body with cadmium plated malleable iron nut or cadmium plated malleable iron body and compression nut. Fittings shall be UL listed for rain tight, concrete tight or rain tight/concrete tight. EMT fittings for sizes 2" and larger may be zinc plated steel, set screw type unless otherwise indicated on the Drawings. Die cast or indenter type fittings shall not be permitted.

2.5.4. Flexible Metal Conduit fittings shall be zinc plated steel or cadmium plated malleable iron screw type with insulated throat and angular wedge fitting between convolutions of conduit.

2.5.5. Liquid-tight Flexible Metal Conduit fittings shall be cadmium plated, malleable iron or steel with compression type steel ferrule and neoprene gasket sealing rings, with insulated throat.

2.5.6. Surface Raceway fittings shall be steel with rust resistant undercoat and finish coat to match the surface raceway. The fittings shall be so designed that the sections can be electrically and mechanically coupled together without subjecting the conductors to abrasion.

2.5.7. Wireway fittings shall be steel with rust resistant undercoat and finish coat to match the wireway. The fittings shall be so designed that the sections can be electrically and mechanically fitted together to form a complete system. Dead ends shall be closed.

2.5.8. Expansion Fittings shall be corrosion protected steel for metal raceways, and PVC for non-metallic raceways. Provide bonding fittings for metal raceways and grounding conductors for PVC raceways.

2.5.9. Materials for Conducting Power such as busways, panelboard busbars, switchboard busbars, wires, conductors, or other cable assemblies (including non-current carrying conductive materials such as grounding conductors and buses and neutral conductors and buses) shall not be made of aluminum unless specifically specified as being comprised of aluminum elsewhere in the Contract Documents.

2.5.10. Couplings and Unions shall be galvanized steel, tapered thread-standard conduit couplings for rigid metal conduit. PVC couplings for rigid non-metallic conduit shall use approved adhesive, and threaded couplings shall be used for schedule 80 conduit. Split couplings shall be galvanized steel. Unions shall be ground joint type galvanized steel.

2.6. Bushings:

2.6.1. Bushings shall be one of the following types:

2.6.1.1. Galvanized steel, threaded or threadless

2.6.1.2. Galvanized-plated steel, threaded or threadless, phenolic insulated with temperature rating of 150°C

2.6.1.3. Cadmium-plated malleable iron, threaded or threadless

2.6.1.4. Cadmium-plated malleable iron, threaded or threadless, phenolic insulated, with temperature rating of 150°C

2.6.1.5. Phenolic with temperature rating of 150°C

2.6.1.6. Zinc-plated steel, or cadmium plated malleable iron; threaded or threadless; non-insulated or insulated with grounding connector or grounding lug

2.6.2. Insulated bushings shall have phenolic insulation molded to the bushing

2.7. Conduit Seals: Conduit Seals shall be galvanized steel, tapered thread for rigid metal conduit with sealing compound and fiber.

2.8. Boxes: All boxes shall be 4" x 4" x 1½" deep or larger.

2.8.1. For indoor work, flush type junction, outlet and switch boxes shall be galvanized pressed steel.

2.8.2. Junction Boxes for exposed work shall be FS or FD type. Boxes shall be threaded, cadmium plated malleable iron with weatherproof galvanized or stainless-steel cover and neoprene cover gaskets.

2.8.3. Boxes for exposed work in indoor finished spaces shall be FS or FD type, with the appropriate covers for the device and location. Surface type pressed steel boxes shall be used in non-finished spaces only.

2.8.4. Fabricated Boxes shall be steel with inside and outside surfaces coated with corrosion-resistant paint or weather resistant coating. Covers shall be hinged or screwed with or without gaskets depending on location.

2.9. Cabinets: Cabinets shall be flush or surface mounted as indicated on the Drawings, and fabricated of code gauge galvanized steel with turned lip on front. Cover shall be flat steel sheet with hinged door (concealed hinges) and flush catch and lock. All cabinets for the project shall be keyed alike. Cover shall be treated with rust-resistant undercoat and grey baked finish coat.

2.10. Low Voltage Conductors:

2.10.1. Conductors shall be 98% conductivity copper, medium or soft drawn. Sizes shall be as indicated on the Drawings. Sizes No. 10 and smaller shall be solid unless noted on the drawings. Sizes No. 8 and larger shall be stranded. Insulation shall be THWN only except SI in switchgear.

2.10.2. Conductor Identification: Ungrounded conductors larger than No. 10 and grounded conductors larger than No. 6 may have factory colored insulation or black insulation with color coded identification tape.

2.10.3. Refer to the section "Conductor and Cable Identification" for color coding and identification of conductors.

2.10.4. Identification tags or labels shall be vinyl coated, with 1/8" minimum height, black characters on white background or stamped brass. Tag or label shall be ¼" wide minimum.

2.10.5. Wire Connectors for 600-volt conductors Size No. 18 to No. 6 AWG shall be pressure type, spring connectors. Use 600-volt splicer-reducer pressure connectors for copper conductors to 500 MCM. Use rectangular, solderless pressure connectors or split bolt copper alloy connectors for copper conductors to 1000 MCM.

2.10.6. Wire Pulling Lubricant shall be a product produced specifically for wire pulling lubrication.

2.11. Ground Rods: Ground rods shall be copper clad steel, ¾" diameter, 10' length minimum or as indicated on the Drawings. Use thermic welding to connect grounding conductor to ground rod.

2.12. Sleeves: Sleeves shall be hot dip galvanized metal flanged type or schedule 40 galvanized steel pipe.

2.13. Concrete Inserts: Concrete inserts shall be hot dip galvanized steel, minimum 14 gauge cut to necessary length for the purpose. Use galvanized hardware.

2.14. Metal Framing System:

2.14.1. Steel channel sections shall be rolled from commercial grade steel.

2.14.2. The cross-sectional width dimension of the channel shall be a minimum of 1½." The depth shall be sized to satisfy the load requirements and deflection.

2.14.3. Channels 1½" in depth or greater shall be rolled from 12-gauge steel. Channels smaller than 1½" in depth may be 14-gauge steel.

2.14.4. Attachment holes shall be factory punched on hole centers equal to the channel cross-sectional width dimension and shall be maximum of 9/16" diameter.

2.14.5. The finish on steel components shall be electro-galvanizing for use in dry locations indoor only, hot dip galvanized elsewhere.

2.14.6. Nuts, bolts, washers, straps, threaded rod and other parts shall be protected with the same finish as the channels.

2.15. Fire Barrier Penetration Seals:

2.15.1. Provide seals for any opening through fire-rated walls, floors, or ceilings used as passage for electrical components such as conduit or electrical boxes.

2.15.2. Cracks, voids, or holes up to 4" diameter shall be filled with putty, caulking, or one-piece intumescent elastomer which is non-corrosive to metal, compatible with synthetic cable jackets, and capable of expanding 10 times when exposed to flame or heat.

2.15.3. For openings 4" or greater use a sealing system capable of passing 3-hour fire test in accordance with ASTM E-814. Sealing system shall consist of wall wrap or liner, partitions, and end caps capable of expanding when exposed to temperatures of 250 to 350°F.

2.16. Painting: Painting products are specified in Division 9 - "Finishes".

2.17. Equipment Identification: Provide nameplate for equipment identification sized as indicated on the Drawings. Nameplate shall be 3" x 1" minimum. Plates shall be laminated plastic (micarta) with white core. Mount plates with a minimum of two stainless steel screws, with round head or filister head. Normal power nameplates shall be Black. Emergency Power nameplates shall be Red.

2.18. Pull Wire and Pull Rope:

2.18.1. Pull wire shall be galvanized steel wire, No. 14 AWG minimum size.

2.18.2. Pull rope shall be ply cord with 2000 lbs. tensile strength, minimum.

3. EXECUTION

3.1. General:

3.1.1. Materials and equipment shall be installed in a neat and workmanlike manner according to the standards of the industry. Materials and equipment installed and not meeting the standards of the industry may be rejected and required to be removed and reinstalled by the Contractor at no additional cost to the Owner.

3.1.2. Contractor is responsible for the safety and conditions of the materials and equipment installed until Owner's beneficial occupancy or acceptance.

3.1.3. Minor location changes from those indicated may be necessary so that work can conform with the building as constructed, to fit work of other trades or to comply with the rules of authorities having jurisdiction.

3.2. Raceways:

3.2.1. Install all wiring in metallic raceway systems including grounding, unless specifically indicated otherwise in other Sections herein or on the Drawings. This shall include all controls wiring, thermostat wiring, occupancy sensor wiring, or any other such controls-voltage or low-voltage wiring – unless specifically indicated otherwise in another part of the Contract Documents.

3.2.2. Refer to structural drawings for framed openings for raceways, etc., in floors and roofs. Contractor shall be responsible for locating and providing proper dimensions for all required electrical openings.

3.2.3. Layout and install raceways with sufficient clearance to permit proper installation.

3.2.4. Install raceways straight and plumb. Squarely cut conduit and properly ream to remove all constriction and burrs before making up joints. Paint exposed threads to retard rusting. Bending of conduit with a pipe tee or vise is prohibited.

3.2.5. EMT conduit shall be installed only in interior spaces. EMT shall not be installed in any slabs on or below grade; however, it is permitted in slabs suspended above grade such as in the floors higher than the ground floor in multistory construction. EMT installed in concrete shall have concrete tight fittings.

3.2.6. Maximum size of EMT shall be 4". Minimum size shall be ½" unless noted otherwise on the Drawings. EMT shall only be used with cables rated 600 volts or less.

3.2.7. Raceways in hazardous areas shall be rigid metal conduit.

3.2.8. Raceways below grade shall be rigid metal conduit or PVC unless noted otherwise. Raceways in concrete slabs-on-grade shall be rigid metal conduit or PVC unless noted otherwise. Raceways in slabs supported above grade (such as the floor slab of the second or higher story of construction) shall be rigid metal conduit or electrical metallic tubing only unless noted otherwise. Raceways penetrating grade or concrete slab-on-grade shall be rigid metal conduit only (conduit and threads shall extend above finished grade or top of slab or contractor shall provide any materials and labor necessary to comply with this requirement); coordinate exact elevations with elevations indicated in contract documents for top of slab. Conduit penetrations of slabs supported above grade shall be rigid metal conduit or electrical metallic tubing only unless noted otherwise. If PVC is used, all elbows in any location and all risers through grade or slab shall be rigid metal conduit only. All rigid metal conduit provided below

grade or inside slab-on-grade shall be protected by two coats of bitumastic to above finished grade or to above finished slab. PVC elbows shall not be permitted. PVC slab or grade penetrations shall not be permitted. All exposed conduit in wet or damp locations shall be rigid galvanized steel conduit only (no exception for painting). If not complied with, no additional compensation will be provided to the contractor for the correction of these or other contract requirements.

3.2.9. Rigid metal conduit installed in concrete or underground shall be made watertight by applying compound to the threads or using concrete-tight thread-less fittings when installed in concrete, or using rain-tight threadless fittings when installed on outside walls or in wet locations.

3.2.10. Rigid metal conduit installed underground or in slab-on-grade shall be painted with two coats of alkali and acid resistant paint such as bitumastic or equal. Coating shall not be diluted.

3.2.11. PVC coated rigid metal conduit may be provided as an option in lieu of the two coats of the alkali and acid resistant paint. The joints shall be protected with PVC tape applied after the joints are made. Tools for the purpose shall be used in making up the joints so as not to damage the coating.

3.2.12. All raceways shall be provided in concealed locations, only, unless noted otherwise on the Drawings or in the Project Manual.

3.2.13. Conduit may be exposed in equipment rooms, vertical chases, mechanical and electrical rooms, other similar spaces not normally habitable or exposed to public view, and where electrical drawings specifically note "exposed conduit."

3.2.14. Raceways shall be supported by approved types of galvanized wall brackets, ceiling trapeze with threaded rod support, or pipe straps. Conduit shall not be supported at any point by wire or wire clips.

3.2.15. Job cut threads shall be wire brushed, degreased and given two coats of cold galvanizing paint before assembly and a touch-up coat as necessary after assembly.

3.2.16. Conduit in masonry shall be installed ahead of the masons.

3.2.17. Cutting of chases is prohibited.

3.2.18. Conduit shall be closed during construction to prevent entrance of foreign material.

3.2.19. Flexible metal conduit shall be installed only in dry locations and shall be of nominal trade size not less than ½" or as permitted by "Exceptions" in NEC. Flexible metal conduit shall be used with UL approved type fittings. Flexible metal conduit shall be used as a raceway for motors, transformers, or other equipment that may be provided with an adjustable mounting or vibration base.

3.2.20. Liquid-tight flexible metal conduit shall be installed in wet locations, in both concealed and exposed work, where required for protection from liquids, vapors or solids. Liquid-tight flexible metal conduit shall be used as a raceway for motors, transformers or other equipment that may be provided with an adjustable mounting or vibration base.

3.2.21. Surface raceway and fittings shall be installed in dry locations.

3.2.22. Wireways and wireway fittings shall be used for exposed work and when installed outdoors or

in wet locations shall be approved weatherproof construction.

3.2.23. Expansion fittings shall be provided for raceways to compensate for thermal expansion and contraction and at building expansion joints. Bonding jumpers shall be provided for electrical continuity of the raceway system at the expansion fittings.

3.2.24. Bushings shall be provided at the end of a conduit to protect the insulation of the conductor. Provide grounding bushings for metal raceways, boxes, cabinets to ensure that all metallic surfaces are effectively grounded. Metallic raceway may be bonded to cabinets, boxes and panelboards by double locknut and bushing to ensure the metallic parts are all effectively grounded.

3.2.25. Conduit or raceways through which moisture may enter and contact energized live parts shall be sealed or plugged at either or both ends with conduit seals where portions of an interior raceway system are exposed to widely different temperatures, e.g., circulation of air from a warmer to a cooler section through the raceway shall be prevented by conduit seals.

3.2.26. Install pull boxes in conduit at intervals of 200 feet or less except when these intervals will place the pull box cover in a finished floor area or non-accessible place, the interval may be extended to a maximum distance of 450 feet. Request for each deviation or extension of interval shall be made and approval granted by the Engineer before proceeding with the installation.

3.2.27. Cleaning: Clean conduit systems by wire rat brush and mandrel.

3.3. Boxes:

3.3.1. Attach boxes to concrete formwork, or to other surrounding building material. Provide additional junction and pull boxes where injury to insulation or deformation of wire would occur due to excessive pulling resistance. When several feeders pass through a common pull box, tag each feeder separately, indicating electrical characteristics and destination.

3.3.1.1. Boxes shall be accurately located. Consult Architectural plans for dimensions.

3.3.1.2. Mount boxes in the course nearest to the height specified when installed in finished block, brick or tile walls.

3.3.2. Recessed Installation: Boxes and covers shall be installed so that the covers are flush with the finished surfaces. Boxes in masonry or tile construction shall have masonry boxes or boxes with square cut tile covers. Do not cut concrete block through its entirety in order to accommodate any type box. "Handy" boxes shall not be used.

3.3.3. Lighting Outlets:

3.3.3.1. Coordinate location of electrical outlets with architectural features of the building and with the equipment of other trades.

3.3.3.2. Paneled or patterned ceilings shall have outlets located according to the ceiling pattern.

3.3.3.3. Boxes mounted between bar joists or "T" bars shall be supported from two bars or joists.

3.3.3.4. Mounting heights of wall lighting outlets shall be as listed below except when otherwise indicated on the Drawings.

General - 7'6" above the finished floor.

Over lavatories - 6" to center above top of mirror.

Over doors - 18" to center above door.

Height may be adjusted to allow wall blocks to be cut to nearest edge.

3.4. Wiring:

3.4.1. General: Conductors shall not be installed until conduit system is complete. Bending radius of insulated wire or cable shall not be less than the minimum recommended by wire or cable manufacturer. Maximum pulling tension of any wire or cable shall not exceed manufacturer's recommended values. Do not injure insulation while installing wire in conduits.

3.4.2. Color Coding: Conductors of size No. 6 and smaller shall have color coded insulation. Sizes larger than No. 6 may have color coded insulation or color-coded tape for the purpose. Should tape be used, cover not less than 2" of conductor within the enclosure.

3.4.3. Switchleg conductors shall be a color other than white, green or the phase or line color.

3.4.4. Green shall be used only as the grounding conductor. White or gray shall be used only as the grounded conductor which is the neutral conductor. The neutral shall not be used as the grounding conductor and the grounding conductor shall not be used as the neutral.

3.4.5. Intercommunications, communications, temperature control, and fire alarm conductors shall be color coded or permanently tagged for identity. If tagged, conductor colors shall not include white, gray or green base color or stripes. Colors shall comply with the Insulated Power Cable Engineers Association (IPCEA) method K-2.

3.4.6. Wiring in motor control, switchboards, panelboards, junction cabinets, etc., shall be neatly formed to present a neat and orderly appearance.

3.4.7. The minimum size of wire shall be No. 12 AWG.

3.4.8. Interconnections of control wiring shall be on identified numbered terminal strips.

3.4.9. Splices: Splices shall be permitted in junction boxes, outlet boxes of other permanently accessible locations where permitted by applicable codes. Conductors No. 6 or smaller shall be spliced with devices approved by Underwriters Laboratories, Inc., as splicing connectors. Splices in conductors larger than No. 6 shall be accomplished with devices approved by Underwriters Laboratories as pressure cable connectors.

3.4.10. Splices made in underground boxes or wet locations shall be made with a commercial, UL approved cast resin splicing kit.

3.5. Wire Pulling Lubrication: Shall be used when any wire is pulled by mechanical means. Wire and cable shall be carefully handled during installation. Soap flakes or vegetable soaps shall not be used for lubrication.

3.6. Equipment Identification: Secure tags and markers to each item of equipment. Secure all cabinet nameplates with self-tapping screws or machine screws and nuts. Do not rely on adhesive mounting. Name tags for equipment operated from normal power shall be "Black." Name tags for equipment operated from emergency power shall be "Red."

3.7. Sleeves, Inserts and Supports:

3.7.1. Equipment Supports: Concrete bases and structural steel to support this Division's equipment and raceways, and not specifically shown on Structural or Architectural Drawings shall be

furnished by Contractor whose equipment or raceways is to be supported. Provide a raised reinforced 4" concrete base for all floor supported equipment, or as indicated on the Drawings.

3.7.2. Support Spacing: Comply with codes and regulations referenced earlier and as follows:

3.7.2.1. Support no electrical work from piping, ductwork, etc. Where metal decking is used, provide supports independent of decking so that loads will not be transferred to decking. Drill through decking and secure supports to concrete slab.

3.7.2.2. Vertical conduit inside building shall be supported at each floor level and at 10'0" intervals.

3.7.2.3. Support conduit within one foot of changes of direction, and within one foot of each enclosure to which it is connected.

3.8. Additional Steel Support Hardware required for the installation of any electrical or other equipment or devices provided shall be provided by the Contractor. Contractor shall provide materials and labor necessary to ensure that all products are rigidly secured to structure pursuant to applicable portions of NEC 300.11. This shall include – but shall not be limited to – providing additional threaded rods, metal framing, and other hardware required to minimize horizontal as well as vertical movement. Means of support shall be clearly indicated and fully described in the submittal for items suspended. Threaded rods shall not be used as sole means of support for suspended raceway unless approved in writing by engineer or unless assembly can be demonstrated to be substantially free from significant horizontal or vertical sway or movement as is required to comply with NEC. Lighting fixtures shall not be supported by threaded rods or chains unless approved in writing by engineer. See Project Manual Section, “Lighting Fixture Supports, Standards and Poles.”

3.9. Caulking and Seals:

3.9.1. Where conduits, wireways, and other electrical raceways pass through fire partitions, fire walls, smoke partitions, or floors, install a fire stop that provides an effective barrier against the spread of fire, smoke and gases in accordance with Division 7 requirements. Fire stop shall be UL listed and NFPA approved for such service. Completely fill and seal clearances between raceways and openings with the fire stop material. Adhere to manufacturer's installation instructions.

3.9.2. At floor, exterior wall, and roof conduit penetrations, completely seal clearances around the conduit and make watertight.

3.10. Painting:

3.10.1. Painting for Division 26 work shall be by the Division 9 finishes contractor and as provided in Division 9 - finishes.

3.10.2. The Division 26 Contractor shall be responsible for coordinating with the Division 9 - Finishes Contractor the painting of the materials and equipment of Division 26.

3.10.3. Refer to the Finish Schedule on drawings for location and type of paint.

3.10.4. NEC Working Space Shall Be Indicated – Areas that pertain to Working Space in Article 110.26 of the NEC shall have yellow striping installed diagonally with stripes being three inches wide and three inches apart. The center of the area shall have the words “Safety Zone” installed with letters at least four inches high. Architect or Engineer shall be consulted for projects in which this area is carpeted, tiled, or otherwise has flooring which is not appropriate for such

painting.

3.10.5. Finish in areas not listed or otherwise noted shall be black enamel.

3.10.6. Hangers, supports, structural steel and equipment that are not factory finished shall be prime coated and finished coated with color to match the area in which it will be located.

3.10.7. Electric cabinets, switchboards, panelboards and equipment that are factory finished and have damaged finish shall be touched up to match the factory finish.

3.10.8. All surfaces that are to be painted shall be free of rust, scale, oil and grease before prime coat is applied.

3.11. Grounding: Ground and bond in accordance with NEC Article 250 and other applicable articles.

3.11.1. Provide an equipment grounding conductor which shall be separate from the electrical system neutral conductor. The equipment grounding conductor shall be colored green. It shall be continuous from a connection at the Service Entrance Equipment Ground to all switchboards, distribution and branch panelboards. Equipment grounding conductors shall be provided in all branch circuits serving convenience outlets, receptacles, portable and permanently installed electrical appliances, equipment apparatus and other miscellaneous metal enclosing bodies including light switch boxes normally within contact of personnel. Branch circuit grounding conductors shall be sized in accordance with the National Electrical Code. Connections at panelboards, outlets, equipment and apparatus shall be made in an approved and permanent manner. Resistance to ground shall not exceed 25 ohms.

3.11.2. Bond bushings of the raceway system to ground lugs in boxes, cabinets, motors and equipment to assure electrical continuity of all metallic components of the electrical systems. Comply with the requirements of NEC.

3.12. Testing:

3.12.1. At the completion of the installation of the conductors or cables into the raceway systems, tests shall be conducted by "megger" to ascertain that the insulation for the conductors or cables has not been damaged. Megger test each feeder and branch circuit conductor or cable with an instrument capable of producing approximately 500 volts for conductors or cables insulated with 600-volt insulation.

3.12.2. The minimum insulation resistance shall be 100 megohms per 1000 feet of 500 KCMIL conductors or smaller insulated with THW or THWN, and 1,000 megohms per 100 feet of 500 KCMIL conductors or smaller insulated with XHHW or other cross-linked insulation.

END OF SECTION

SECTION 260101 / CONDUCTOR AND CABLE IDENTIFICATION

1. GENERAL

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

1.2. This Section is a Division-26 Basic Materials and Methods Section, and is part of each Division-26 Section making reference to or requiring products specified herein.

1.3. This Section provides the requirements for identification of grounded conductors (neutral), grounding conductors, ungrounded conductors and terminals.

1.4. Grounded Conductor (neutral), Size No. 6 AWG or smaller, shall be identified by a continuous outer finish along its entire length which is the color stated below. Sizes larger than No. 6 AWG shall be identified either by a continuous outer finish along its entire length or at the time of installation by a distinctive marking at its terminations, which is the color stated below.

1.5. A continuous white or natural gray covering on a conductor or a termination marking of white or natural gray color shall be used only for the grounded conductor (neutral). See below colors.

1.6. Terminals to which a grounded conductor is to be connected shall be substantially white in color or identified by white markings. Other terminals shall be a different, readily distinguishable color, or by markings in different, readily distinguishable colors.

1.7. Grounding Conductor Size No. 6 AWG or smaller shall be identified by a continuous green outer finish along its entire length. Sizes larger than No. 6 AWG shall be identified either by a continuous green outer finish along its entire length or at the time of installation by a distinctive green marking at its termination.

1.8. Terminals to which grounding conductors are connected shall be green in color.

1.9. A continuous green covering on a conductor or a termination marking of green shall be used only for the grounding conductor.

1.10. Control wiring and data cables shall be identified by heat shrink sleeves at both ends hot stamped with wire numbers coordinated to wiring diagrams. Adhesively attached Brady tag type markers are specifically forbidden. All terminal boards shall be numbered.

2. PRODUCTS

2.1. Comply with the Section 26100, "Basic Materials and Methods."

3. EXECUTION

3.1. Identification of conductors shall follow the format set forth herein for the electrical characteristics as indicated:

3.1.1. 120/208 Volt Three Phase 4 Wire WYE

Neutral	White
Phase A	Black
Phase B	Red
Phase C	Blue

Grounding Conductor Green

3.2. Communication, temperature control and fire alarm conductors shall be color coded or permanently tagged for identification. The colors shall not include white, gray, or green base colors or stripes (tracers) unless these colors are used on grounded conductors or grounding conductors.

3.3. Colors shall comply with the Insulated Power Cable Engineers Association (IPCEA) Method K-2 chart.

3.4. For direct current (DC) systems, Black shall be negative and Red shall be positive.

3.5. Identification shall be provided at terminations of the conductors and at junction boxes, terminals or cabinets when multi conductors are installed at these locations.

3.6. Fire Alarm conductors shall conform with the color code specified in the specification section titled, “Fire Detection and Alarm System.”

3.6.1. Tag or label each conductor with zone numbers at each end and in each junction or pull box in the raceway system. Example Zone 1, Zone 2 etc. Each conductor shall have in addition to the zone number a terminal number at each end.

END OF SECTION

SECTION 260103 / GENERAL GROUNDING ELECTRICAL SYSTEMS

1. GENERAL

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

1.2. This Section is a Division-26 Basic Materials and Methods Section, and is part of each Division-26 Section making reference to or requiring products specified herein.

2. PRODUCTS

2.1. Ground rods shall be copper-clad 3/4"x 10 feet.

2.2. Grounding conductors shall be copper with green insulation.

3. EXECUTION

3.1. Grounding Conductor Size No. 6 AWG or smaller shall be identified by a continuous green outer finish along its entire length. Sizes larger than No. 6 AWG shall be identified by either a continuous green outer finish along its entire length or at the time of installation by a distinctive green marking at its termination.

3.2. Provide an equipment grounding conductor which shall be separate from the electrical system neutral conductor. The equipment grounding conductor shall be colored green. It shall be continuous from a connection at the Service Entrance Equipment Ground to all switchboards, Motor Control Centers; distribution and branch panelboards. Equipment grounding conductors shall be provided in all branch circuits. Branch circuit grounding conductors shall be sized in accordance with the National Electric Code. Connections at panelboards, outlets, equipment apparatus shall be made in an approved and permanent manner. Electrical raceway shall not be used as a grounding conductor.

3.3. All ground connections shall be made on surfaces which have been cleaned of all paint, dirt, oil, etc., so that connections are bare metal to bare metal contact. All ground connections shall be tight, and shall be made with U.L. listed grounding devices fittings, bushings, etc.

3.4. Bond all metallic piping and structural systems to the service entrance ground bus with bonding jumpers the same size as the service grounding electrode conductor.

3.5. Grounding electrodes shall be driven as required. Where rock is encountered, grounding plates may be used in lieu of grounding rods.

3.6. All equipment enclosures, motor and transformer frames, conduits systems, cable armor, and similar items shall be grounded.

3.7. Exposed connections shall be made by means of approved grounding clamps. Exposed connections between different metals shall be sealed with No-Oxide Paint Grade A or approved equal. All connections which are buried, concealed in concrete, or otherwise not accessible for inspection after construction shall be made by welding process equal to Cadweld.

3.8. The Contractor shall exercise care to insure good continuous ground, in particular between the conduit system and equipment frames and enclosures. Where necessary, jumper wires shall be installed.

3.9. Multiple conductors in a single lug are not permitted. Each grounding conductor shall terminate in its own terminal lug.

3.10. Testing: The contractor shall test the ground resistance of the system. All test equipment shall be provided by the Contactor and approved by the Engineer. Dry season resistance of the system shall not exceed 5 ohms. If such resistance cannot be obtained with the system as shown, the Contractor shall provide additional grounding as directed by the Engineer without additional payment.

END OF SECTION

SECTION 260125 / CIRCUIT BREAKERS, MOLDED CASE

1. GENERAL

1.1. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification Sections, apply to work of this Section.

1.2. Division-26 Basic Electrical Materials and Methods Sections apply to work of this Section.

1.3. Submittals: Submit the producer's standard descriptive data sheets for each type of product being provided. Mark the data sheet for the product being provided with an identifying mark or arrow.

2. PRODUCTS

2.1. Acceptable Producers: General Electric, Siemens/ITE, Cutler-Hammer, and Square D. Products shall be furnished by one producer.

2.2. General: Products listed herein may be common to various Divisions and Specification Sections.

2.3. Provide molded case circuit breakers with a minimum AIC rating of 10,000 amperes RMS symmetrical and with higher AIC ratings as indicated on the Drawings. Any circuit breaker provided in an existing panelboard or in an existing switchboard shall have minimum short circuit interrupting ratings (AIC) equal to the highest ratings of any of the existing overcurrent devices in the same panelboard or switchboard at the given voltage of the panelboard or switchboard. All circuit breakers shall be fully rated for the interrupting ratings indicated and shall not be series rated. Every overcurrent device provided shall be UL approved to individually interrupt its rated short circuit current and shall not depend upon operation of another overcurrent device to achieve its rating. Series-rated devices are not acceptable.

2.4. Individual circuit breakers shall be safety dead front units in NEMA Type enclosure.

2.5. Molded case circuit breakers shall have overcenter, trip free, toggle-type operating mechanisms with quick-make, quick-break action and positive handle indication. All breakers shall be bolt-on type.

2.6. Two and three pole circuit breakers shall have a common trip.

2.7. Each circuit breaker shall have a permanent trip unit containing individual thermal and magnetic trip elements in each pole.

2.8. The circuit breaker shall be constructed to accommodate the supply connections at either end.

2.9. Circuit breaker operating handle shall assume a center position when tripped.

2.10. Circuit breakers shall be calibrated for operation in an ambient temperature of 40° C.

2.11. Provide molded case circuit breakers with shunt trip features where indicated on the Drawings.

3. EXECUTION

3.1. Contractor shall coordinate exact electrical requirements and circuit breaker types with that which is required by manufacturers of the equipment supplied – as necessary to maintain

equipment's UL Listing; coordinate with other divisions of this contract. Contractor shall provide HACR-type circuit breakers as required by manufacturers of equipment supplied. See paragraph 3.2.3 of Section 26005 of the Project Manual.

3.2. Provide circuit breakers as specified in the Panelboard Schedules on the Drawings. Ampere ratings and the number of poles are indicated on the Panelboard Schedules.

3.3. Circuit breakers shall be suitable for mounting and operating in any position.

3.4. Circuit breakers shall be UL listed.

3.5. Shunt trip device where required shall operate in conjunction with contact closure of push button, ground fault relay or other pilot device to trip open associated circuit breakers upon command.

3.6. Coils of shunt trip device shall be rated continuous duty and shall include interlock arrangement to clear power from coil after operation.

3.7. Control Power: Where no other source of control power is indicated, energy to actuate tripping devices through action of pilot device shall be 120 volts, 60 Hz as follows:

3.7.1. 120/208 Volt Panelboards: Energy shall be from dedicated branch circuit breaker of panelboard set to trip at not greater than 20 amperes.

3.7.2. Testing: Test all circuit breakers which are rated 200 amps or greater, both main and feeders, using standard tests to verify overcurrent and time delay settings and characteristics. Defective devices shall be replaced and the replacement device tested. All testing shall be performed by and independent electrical testing organization regularly involved in such work. Submit name of testing agency thirty days prior to test and advise engineer of test time and date at least two weeks in advance. Submit four copies of test results, including device operating characteristics plotted on log-log time-current paper and operating and maintenance manuals.

END OF SECTION

SECTION 260155 / RELAYS

1. GENERAL

1.1. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification Sections, apply to work of this Section.

1.2. Division-26 Basic Electrical Materials and Methods Sections apply to work of this Section.

1.3. Submittals: Submit the producer's standard descriptive data sheets for each type of product being provided. Mark the data sheet for the product being provided with an identifying mark or arrow.

2. PRODUCTS

2.1. Acceptable Producers: Allen-Bradley, General Electric Co. and Square D.

2.2. General: See electrical Drawings, Panelboard Schedules and Control Diagrams for numbers and types of relays required. Relays shall be electrically held, unless indicated otherwise on the Drawings.

2.3. Enclosures: Relays may be mounted in panelboards or in NEMA type 1 enclosures adjacent to or above panelboard.

2.4. Poles: Required by circuit controlled or as indicated on Drawings.

2.5. Ratings: Rated for inductive and resistive load, or as indicated on Drawings.

3. EXECUTION

3.1. Mounting: For relays outside panelboards, furnish relays in enclosures. The enclosures shall be mounted on walls to slotted angles or channels with required hardware. Combustible materials for mounting are not permitted.

3.2. Controls: Install as indicated on Drawings.

END OF SECTION

PAGE LEFT INTENTIONALLY BLANK

SECTION 260170 / GENERAL WIRING DEVICES

1. GENERAL

1.1. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification Sections, apply to work of this Section.

1.2. Division-26 Basic Electrical Materials and Methods Sections apply to work of this Section.

1.3. Submittals: Submit the producer's standard descriptive data sheets for each type of product being provided. Mark the data sheet for the product being provided with an identifying mark or arrow.

2. PRODUCTS

2.1. Acceptable Producers: Leviton, General Electric, Hubbell, Pass and Seymour, Sierra, Bryant, or Eagle Electric.

2.2. General: Devices shall be specification grade. Use white finished devices throughout except as hereinafter noted otherwise. Any color selection shall be approved by Architect prior to ordering. See Electrical Drawings for gang switches, receptacles and notes for special wiring devices. All wiring devices, including dimmer switches, shall be rated for 20A, minimum.

2.3. Switches:

2.3.1. Single Pole, 20-amp, 120/277V shall be Hubbell 1221 or approved equal.

2.3.2. Double Pole, 20-amp, 120/277V shall be Hubbell 1222 or approved equal.

2.3.3. Three-Way, 20-amp, 120/277V shall be Hubbell 1223 or approved equal.

2.3.4. Four-Way, 20-amp, 120/277V shall be Hubbell 1224 or approved equal.

2.3.5. Single Pole, 30-amp, 120/277V shall be Hubbell 3031 or approved equal.

2.3.6. Lock Type, same Hubbell catalog numbers above except add suffix "L". Furnish associated key with each lock type device.

2.3.7. Lighted Handle devices with handle lighted in "OFF" position shall be same catalog numbers as above or approved equals except suffixes shall be "IL" for 120V and "IL7" for 277V.

2.3.8. Lighted Handle, toggle type devices with handle lighted "ON" position shall be same catalog numbers as above or approved equals except suffixes shall be "PL" for 120V and "PL7" for 277V.

2.3.9. Narrow Wood or Metal Jambs and Partitions: Devices for installation in narrow wood or metal jambs and partitions shall be Pass and Seymour catalog numbers ACD201-I, ACD203-I or approved equal.

2.3.10. 20-ampere Interchangeable Switches: Provide pass and Seymour No. ACD201-I or approved equal, with identification engraved on cover plate. Engraving shall be 1/8" block letters, black enamel filled.

2.4. Receptacles:

2.4.1. Catalog numbers indicated below are for Hubbell devices. Hubbell catalog numbers are used

to give a standard for bidding purposes. However, approved equals will be accepted as indicated in other sections of these specifications.

Where indicated on the Drawings, the following suffixes shall be added to the Hubbell catalog numbers depending on the required color finish:

I Ivory

R Red

GY Grey

WHI White

No suffix indicates black or brown color finish. Add prefix IG to indicate isolated ground devices. Add prefix GF to indicate ground fault interrupting devices.

2.4.2. Single Receptacle Devices:

20-amp, 2 pole, 3 wire, 125V, NEMA 5-20R Hubbell #5361

30-amp, 2 pole, 3 wire, 125V, NEMA 5-30R Hubbell #9308

50-amp, 2 pole, 3 wire, 125V, NEMA 5-50R Hubbell #9360

20-amp, 2 pole, 3 wire, 250V, NEMA 6-20R Hubbell #5461

30-amp, 2 pole, 3 wire, 250V, NEMA 6-30R Hubbell #9330

50-amp, 2 pole, 3 wire, 250V, NEMA 6-50R Hubbell #9367

30-amp, 2 pole, 3 wire, 277V, NEMA 7-30R Hubbell #9315

50-amp, 2 pole, 3 wire, 277V, NEMA 7-50R Hubbell #9365

20-amp, 3 pole, 4 wire, 125/250V, NEMA 14-20R Hubbell #8410

30-amp, 3 pole, 4 wire, 125/250V, NEMA 14-30R Hubbell #9430

50-amp, 3 pole, 4 wire, 125/250V, NEMA 14-50R Hubbell #9450

60-amp, 3 pole, 4 wire, 125/250V, NEMA 14-60R Hubbell #9460

20-amp, 3 pole, 4 wire, 250V, 3PH, No Neutral NEMA 15-20R Hubbell #8420

30-amp, 3 pole, 4 wire, 250V, 3PH, No Neutral NEMA 15-30R Hubbell #8430

50-amp, 3 pole, 4 wire, 250V, 3PH, No Neutral NEMA 15-50R Hubbell #8450

60-amp, 3 pole, 4 wire, 250V, 3PH, No Neutral NEMA 15-60R Hubbell #8460

2.4.3. Duplex Receptacle Devices:

20-amp, 2 pole, 3 wire, 125V, NEMA 5-20R Hubbell #5362

20-amp, 2 pole, 3 wire, 250V, NEMA 6-20R Hubbell #5462

20-amp, 2 pole, 3 wire, 125V, NEMA 5-20R One boss, 250V,

NEMA 6-20R second boss Hubbell #5492

2.4.4. Locking Type Devices:

20-amp, 2 pole, 3 wire, 125V, NEMA L5-20R Hubbell #2310

30-amp, 2 pole, 3 wire, 125V, NEMA L5-30R Hubbell #2610

20-amp, 2 pole, 3 wire, 250V, NEMA L6-20R Hubbell #2320

30-amp, 2 pole, 3 wire, 250V, NEMA L6-30R Hubbell #2620

20-amp, 2 pole, 3 wire, 277V, NEMA L7-20R Hubbell #2330

30-amp, 2 pole, 3 wire, 277V, NEMA L7-30R Hubbell #2630

20-amp, 2 pole, 3 wire, 480V, NEMA L8-20R Hubbell #2340

30-amp, 2 pole, 3 wire, 480V, NEMA L8-30R Hubbell #2640

20-amp, 3 pole, 4 wire, 125/250V, NEMA L14-20R Hubbell #2410

30-amp, 3 pole, 4 wire, 125/250V, NEMA L14-30R Hubbell #2710

20-amp, 3 pole, 4 wire, 250V, 3PH, No Neutral NEMA L15-20R Hubbell #2420

30-amp, 3 pole, 4 wire, 250V, 3PH, No Neutral NEMA L15-30R Hubbell #2720

20-amp, 3 pole, 4 wire, 480V, 3PH, No Neutral NEMA L16-20R Hubbell #2430

30-amp, 3 pole, 4 wire, 480V, 3PH, No Neutral NEMA L16-30R Hubbell #2730

20-amp, 4 pole, 5 wire, 120/208V, 3PH, NEMA L21-20R Hubbell #2510

30-amp, 4 pole, 5 wire, 120/208V, 3PH, NEMA L21-30R Hubbell #2810

20-amp, 4 pole, 5 wire, 277/480V, 3PH, NEMA L22-20R Hubbell #2520

30-amp, 4 pole, 5 wire, 277/480V, 3PH, NEMA L22-30R Hubbell #2820

2.4.5. Weatherproof receptacles shall be installed in flush weatherproof box with cast gasketed cover and self-closing spring door.

2.5. Plates: Except as noted below, all wiring device plates shall be nylon or fiberglass reinforced with smooth white finish. Any color selections shall be approved by Architect prior to ordering.

2.5.1. Exposed wiring devices shall be provided with galvanized steel plates with rounded corners.

2.5.2. Unless noted otherwise in the Contract Documents, floor outlet cover plates and raceways shall be satin bronze or chrome plated.

2.5.3. Boxes in which no devices are installed shall be equipped with blank plates.

3. EXECUTION

3.1. Outlet box heights shall be considered to be measured to the center-line of the box unless noted otherwise. Unless noted otherwise, light switches shall be provided at one of the following elevations: if the switch is in an area which is required to be compliant with the Accessibility requirements for the Americans with Disabilities Act and if it is above a counter-top or other such permanent obstruction which would prevent the close approach of a wheelchair, then the switch shall be located at an elevation of 45-1/2" above the finished floor; and otherwise, the switch shall be at an elevation of 47-1/2" above the finished floor or grade.

3.2. Determine door swings from architectural documents before installing room switch boxes.

Install switches on latch side of door.

3.3. Contractor shall provide materials and labor necessary to ensure that all spaces in buildings which are larger than 5,000 square feet are provided with occupancy sensors or automatic lighting controls system for the occupancy-sensed or scheduled control, respectively, of all lighting fixtures provided under this contract except for the applicable exceptions specified in the Florida Building Code, as is required by the Florida Building Code. Some of these exceptions in the Florida Building Code are where lighting is designated for 24-hour illumination, where lighting is for security, or where lighting is for areas where automatic control might be dangerous such as in mechanical, electrical, or janitor rooms.

3.4. Provide ground wire (#12 AWG green) in each conduit in addition to phase and neutral wires. Ground wires shall interconnect equipment grounds, receptacle grounds, outlets and exposed equipment conductive surfaces with ground bars in panelboards.

3.5. Furnish template for receptacles, switches and other cutouts in casework to the Millwork supplier.

3.6. Where switches are located in tile wall finish, install them in tile, varying standard mounting height if necessary. Do not mount over 48" above finished floor unless so indicated on the Drawings.

3.7. Where several rows of lights are to be controlled, the switch nearest the door shall control the row nearest the interior wall, and the switch furthest from the door shall control the row furthest from the interior wall.

3.8. Switches that control remote outlets, fans, etc., shall have engraved plastic name tags indicating the outlets, fans, etc. that are controlled.

3.9. A Special Receptacle shall be provided in any mechanical room in which coils are located, unless such a receptacle is found to be existing to remain in that room. This receptacle shall be a NEMA 6-20R receptacle supplied with 208V power, and it shall be located near the door into the room and within 50 feet of any coils. Unless stated otherwise elsewhere in the Contract Documents, provide materials and labor necessary to supply these receptacles from the nearest available power sources with sufficient capacity. Coordinate the exact requirements with field conditions, if coils or air handlers with coils are added to an existing building.

3.10. Receptacle Outlets: Mounting heights for receptacle outlets shall be 18" above finished floor or as indicated on the Drawings.

3.11. Wiring Devices and Plates: Wiring devices shall be rigidly installed properly aligned and plumb with wall and floor lines. A device plate shall be furnished for each device. Plates shall be installed with all four edges in continuous contact with the finish. Plates shall not support the wiring devices. Gaskets shall be installed where necessary to insure watertight and vapor tight construction.

END OF SECTION

SECTION 260535 / LED INTERIOR LIGHTING

1 GENERAL

1.1 Related Documents:

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

1.2 Summary:

1.3 Section Includes:

1.3.1 Interior solid-state luminaires that use LED technology.

1.3.2 Lighting fixture supports.

1.3.3 Related Requirements: Definitions:

1.4.1 CCT: Correlated color temperature.

1.4.2 CRI: Color Rendering Index.

1.4.3 Fixture: See "Luminaire."

1.4.4 IP: International Protection or Ingress Protection Rating.

1.4.5 LED: Light-emitting diode.

1.4.6 Lumen: Measured output of lamp and luminaire, or both.

1.4.7 Luminaire: Complete lighting unit, including lamp, reflector, and housing.

1.5 ACTION SUBMITTALS

1.5.1 Product Data: For each type of product.

1.5.1.1 Arrange in order of luminaire designation.

1.5.1.2 Include data on features, accessories, and finishes.

1.5.1.3 Include physical description and dimensions of luminaires.

1.5.1.4 Include emergency lighting units, including batteries and chargers.

1.5.1.5 Include life, output (lumens, CCT, and CRI), and energy efficiency data.

1.5.1.6 Photometric data and adjustment factors based on laboratory tests, complying with IESNA Lighting Measurements Testing and Calculation Guides, of each lighting fixture type. The adjustment factors shall be for lamps and accessories identical to those indicated for the lighting fixture as applied in this Project IES LM-79 and IES LM-80.

1.5.1.6.1 Manufacturers' Certified Data: Photometric data certified by manufacturer's laboratory with a current accreditation under the National Voluntary Laboratory Accreditation Program for Energy Efficient Lighting Products.

1.5.2 Shop Drawings: For nonstandard or custom luminaires.

1.5.2.1 Include plans, elevations, sections, and mounting and attachment details.

1.5.2.2 Include details of luminaire assemblies. Indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.

1.5.2.3 Include diagrams for power, signal, and control wiring.

1.5.3 Product Schedule: For luminaires and lamps. Use same designations indicated on Drawings.

1.6 Informational Submittals:

1.6.1 Coordination Drawings: Reflected ceiling plan(s) and other details, drawn to scale, on which the following items are shown and coordinated with each other, using input from installers of the items involved:

1.6.1.1 Lighting luminaires.

1.6.1.2 Structural members to which equipment and or luminaires will be attached.

1.6.1.2.1 Sprinklers.

1.6.2 Qualification Data: For testing laboratory providing photometric data for luminaires.

1.6.3 Sample warranty.

1.7 Closeout Submittals:

1.7.1 Operation and Maintenance Data: For luminaires and lighting systems to include in operation and maintenance manuals.

1.7.1.1 Provide a list of all lamp types used on Project; use ANSI and manufacturers' codes.

1.8 Maintenance Material Submittals:

1.8.1 Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1.8.1.1 Lamps: Ten (10) for every 100 of each type and rating installed. Furnish at least one of each type.

1.8.1.2 Diffusers and Lenses: One (1) for every 100 of each type and rating installed. Furnish at least one of each type.

1.9 Quality Assurance:

1.9.1 Luminaire Photometric Data Testing Laboratory Qualifications: Luminaire manufacturer's laboratory that is accredited under the NVLAP for Energy Efficient Lighting Products.

1.9.2 Provide luminaires from a single manufacturer for each luminaire type.

1.9.3 Each luminaire type shall be binned within a three-step MacAdam Ellipse to ensure color consistency among luminaires.

1.10 Delivery, Storage and Handling:

1.10.1 Protect finishes of exposed surfaces by applying a strippable, temporary protective covering before shipping.

1.11 Warranty:

1.11.1 Warranty: Manufacturer and Installer agree to repair or replace components of luminaires that fail in materials or workmanship within specified warranty period.

1.12 Warranty Period: Five (5) years from date of Substantial Completion.

2 PRODUCTS

2.1 Luminaire Requirements:

2.1.1 Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

2.1.2 Bulb shape complying with ANSI C79.1.

2.1.3 Lamp base complying with ANSI C81.61.

2.1.4 CRI of 80 CCT of 4000 K.

2.1.5 Rated lamp life of 50,000 hours.

2.1.6 Lamps dimmable from 0 - 10 percent of maximum light output.

2.1.7 Internal driver.

2.1.8 Nominal Operating Voltage: Universal Voltage.

2.1.8.1 Lens Thickness: At least 0.125-inch (3.175 mm) minimum unless otherwise indicated.

2.1.9 Housings:

2.1.9.1 As specified in Luminaire Schedule

2.2 Materials:

2.2.1 Metal Parts:

2.2.1.1 Free of burrs and sharp corners and edges.

2.2.1.2 Sheet metal components shall be steel unless otherwise indicated.

2.2.1.3 Form and support to prevent warping and sagging.

2.2.2 Doors, Frames, and Other Internal Access: Smooth operating, free of light leakage under operating conditions, and designed to permit re-lamping without use of tools. Designed to prevent doors, frames, lenses, diffusers, and other components from falling accidentally during relamping and when secured in operating position.

2.2.3 Diffusers and Globes:

2.2.3.1 As specified in Luminaire Schedule

2.2.4 Housings:

2.2.4.1 As specified in Luminaire Schedule.

2.2.5 Factory-Applied Labels: Comply with UL 1598. Include recommended lamps. Locate labels where they will be readily visible to service personnel, but not seen from normal viewing angles when lamps are in place.

2.2.5.1 Label shall include the following lamp characteristics:

2.2.5.1.1 "USE ONLY" and include specific lamp type.

2.2.5.1.2 Lamp diameter, shape, size, wattage, and coating.

2.2.5.1.3 CCT and CRI for all luminaires.

2.3 Metal Finishes:

2.3.1 Variations in finishes are unacceptable in the same piece. Variations in finishes of adjoining components are acceptable if they are within the range of approved Samples and if they can be and are assembled or installed to minimize contrast.

2.4 Luminaire Fixture Support Components:

2.4.1 Comply with requirements in Section 26 05 29 "Raceways & Electrical System Supports" for channel and angle iron supports and nonmetallic channel and angle supports.

2.4.2 Single-Stem Hangers: 1/2-inch (13-mm) steel tubing with swivel ball fittings and ceiling canopy. Finish same as luminaire.

2.4.3 Wires: ASTM A 641/A 641 M, Class 3, soft temper, zinc-coated steel, 12 gage (2.68 mm)

2.4.4 Rod Hangers: 3/16-inch (5-mm) minimum diameter, cadmium-plated, threaded steel rod.

3 EXECUTION

3.1 Examination:

3.1.1 Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

3.1.2 Examine roughing-in for luminaire to verify actual locations of luminaire and electrical connections before fixture installation. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 Installation:

3.2.1 Comply with NECA 1.

3.2.2 Install luminaires level, plumb, and square with ceilings and walls unless otherwise indicated.

3.2.3 Install lamps in each luminaire.

3.2.4 Supports:

3.2.4.1 Sized and rated for luminaire weight.

3.2.4.2 Able to maintain luminaire position after cleaning and relamping.

3.2.4.3 Provide support for luminaire without causing deflection of ceiling or wall.

3.2.4.4 Luminaire mounting devices shall be capable of supporting a horizontal force of 100 percent of luminaire weight and vertical force of 400 percent of luminaire weight.

3.2.5 Wall-Mounted Luminaire Support:

3.2.5.1 Attached to a minimum 20 gauge backing plate attached to wall structural members.

3.2.5.2 Do not attach luminaires directly to gypsum board.

3.2.6 Ceiling-Mounted Luminaire Support:

3.2.6.1 As specified in Luminaire Schedule

3.2.7 Suspended Luminaire Support:

3.2.7.1 As specified in Luminaire Schedule

3.2.8 Comply with requirements in Section 26 05 19 "Low-Voltage Electrical Power Conductors and Cables" for wiring connections.

3.3 Identification:

3.3.1 Identify system components, wiring, cabling, and terminals. Comply with requirements for identification specified in Section 26 05 53 "Identification for Electrical Systems."

3.4 Field Quality Control:

3.4.1 Perform the following tests and inspections:

3.4.1.1 Operational Test: After installing luminaires, switches, and accessories, and after electrical circuitry has been energized, test units to confirm proper operation.

3.4.1.2 Test for Emergency Lighting: Interrupt power supply to demonstrate proper operation. Verify transfer from normal power to battery power and retransfer to normal.

3.4.2 Luminaire will be considered defective if it does not pass operation tests and inspections.

3.4.3 Prepare test and inspection reports.

3.5 Startup Service:

3.5.1 Comply with requirements for startup specified in Section 26 09 43.23 "Relay-Based Lighting Controls."

3.6 Adjusting:

3.6.1 Occupancy Adjustments: When requested within 12 months of date of Substantial Completion, provide on-site assistance in adjusting the direction of aim of luminaires to suit occupied conditions. Make up to two visits to Project during other-than-normal hours for this purpose. Some of this work may be required during hours of darkness.

3.6.1.1 During adjustment visits, inspect all luminaires. Replace lamps or luminaires that are defective.

3.6.1.2 Parts and supplies shall be manufacturer's authorized replacement parts and supplies.

END OF SECTION

PAGE LEFT INTENTIONALLY BLANK

SECTION 260900 / WORK REQUIRED FOR EQUIPMENT FURNISHED IN OTHER DIVISIONS

1. GENERAL

1.1. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification Sections, apply to work of this Section.

1.2. Division-26 Basic Electrical Materials and Methods Sections apply to work of this Section.

1.3. Submittals: Submit the producer's standard descriptive data sheets for each type of product being provided. Mark the data sheet for the product being provided with an identifying mark or arrow.

2. PRODUCTS

2.1. Materials for this section are specified in the Section "Basic Materials and Methods."

2.2. Refer to the section "Related Divisions and Sections" for equipment that is furnished in other Divisions.

3. EXECUTION

3.1. Provide raceway boxes, fittings, devices and conductors for the electrical power to equipment furnished and installed in the other Divisions.

3.2. Make connections for the electrical power to equipment furnished and installed in other Divisions.

END OF SECTION

PAGE LEFT INTENTIONALLY BLANK

UNIVERSITY OF FLORIDA GATOR CORNER DINING
AHU 1 & 2 REPLACEMENT BLDG #: 0359

FOR

UNIVERSITY OF FLORIDA

LOCATION

2021 STADIUM RD
GAINESVILLE, FL 32611

DRAWING SHEET INDEX

G0.1 COVER PAGE

M0.1 MECHANICAL LEGEND, NOTES, SCHEDULE AND DETAILS
M1.1 MECHANICAL DEMOLITION PLANS
M2.1 MECHANICAL NEW WORK PLANS
M3.1 CONTROLS DIAGRAMS AND SEQUENCES
M2.2 TEST AND BALANCE FLOOR PLAN

E0.1 ELECTRICAL LEGEND, ABBREVIATIONS, SCHEDULES, & NOTES
E1.1 ELECTRICAL FLOOR PLANS

APPLICABLE CODES

THIS PROJECT WAS DESIGNED IN ACCORDANCE WITH THE FOLLOWING CODES AND STANDARDS:

2020 FLORIDA BUILDING CODE AND ITS SUPPLEMENTAL REFERENCES
NFPA 70 - NATIONAL ELECTRICAL CODE - 2017 EDITION
NFPA 90A - 2018 EDITION
UF DESIGN & CONSTRUCTION STANDARD

CAMPBELL SPELLICY
ENGINEERING
www.CampbellSpellicy.com
Phone: (352) 372-6967
Fax: (352)372-7232
Address: 1489 SW 74th Dr.
Gainesville, FL 32607

KEVIN M. SPELLICY
PE-0076968

UNIVERSITY OF FLORIDA GATOR CORNER DINING
AHU 1 & 2 REPLACEMENT
2021 STADIUM RD
GAINESVILLE, FL 32611

21028

100% CONSTRUCTION DOCUMENTS

ISSUE DATE: 08/23/2021

DESIGN: MAI
QC: KMS

REVISIONS

NO.	REFERENCE	DATE

COVER PAGE

G0.1

MECHANICAL ABBREVIATIONS:

A	AMPS; AREA
AAV	AUTOMATIC AIR VENT
ABV	ABOVE
ACU	AIR CONDITIONING UNIT
AFF	ABOVE FINISHED FLOOR
AHU	AIR HANDLING UNIT
AP	ACCESS PANEL
BD	BALANCING DAMPER
BTU	BRITISH THERMAL UNITS
BTUH	BTU PER HOUR
C	CONDENSATE
CD	CEILING DIFFUSER
CFH	CUBIC FEET PER HOUR
CFM	CUBIC FEET PER MINUTE
CFT	CUBIC FEET (FT)
CH	(AIR-COOLED) CHILLER
CLG	FINISHED CEILING
CU	CONDENSER UNIT
DB	DRY BULB
DEFL	DEFLECTION
DG	DOOR GRILLE
DIA	DIAMETER
EA	EACH
EAT	ENTERING AIR TEMPERATURE
EER	ENERGY EFFICIENCY RATIO
EF	EXHAUST FAN
EG	EXHAUST GRILLE
ENT	ENTERING
ESP	EXTERNAL STATIC PRESSURE
EXH	EXHAUST
EXIST.	EXISTING
°F	DEGREES FAHRENHEIT
FCU	FAN COIL UNIT
FD	FLOOR DRAIN
FPM	FEET PER MINUTE
FT.	FEET
GPM	GALLONS PER MINUTE
H,0	WATER
HD	HEAD
HP	HORSEPOWER; HEAT PUMP
HR	HOUR
ID	INSIDE DIAMETER
IN.	INCHES
IN. WG	INCHES OF WATER, GAUGE
KW	KILOWATTS
KWH	KILOWATT HOUR
LAT	LEAVING AIR TEMPERATURE
LBS	POUNDS
LVG	LEAVING
MA	MIXED AIR
MAX	MAXIMUM
MBH	THOUSANDS OF BTU'S
MCA	MIN CIRCUIT AMPACITY
MD	MOTORIZED DAMPER
MIN	MINUTE; MINIMUM
NIC	NOT IN CONTRACT
NC	NORMALLY CLOSED
NO	NORMALLY OPEN
NTS	NOT TO SCALE
OA	OUTDOOR AIR
OAL	OUTDOOR AIR LOUVER
OC	ON CENTER
OD	OUTSIDE DIAMETER
PH	PHASE
PSI	POUNDS PER SQUARE INCH
PSIA	PSI ABSOLUTE
R	RADIUS
RA	RETURN AIR
RG	RETURN GRILLE
RH	RELATIVE HUMIDITY
RPM	REVOLUTIONS PER MINUTE
RTU	ROOFTOP UNIT
SA	SUPPLY AIR
SP	STATIC PRESSURE
SQ. FT.	SQUARE FEET (FT²)
STL	STEEL
TEMP	TEMPERATURE
TF	THERMA-FUSER
TG	TRANSFER GRILLE
TSP	TOTAL STATIC PRESSURE
TYP	TYPICAL
V	VOLTS
VAR.	VARIABLE
VAV	VAR. AIR VOLUME
VFD	VAR. FEQUENCY DRIVE
VRF	VAR. REFRIGERANT FLOW
WB	WET BULB
WSHP	WATER-SOURCE HEAT PUMP

MECHANICAL LEGEND:

- EXISTING DUCTWORK/EQUIPMENT TO REMAIN
- EXISTING DUCTWORK/EQUIPMENT TO BE REMOVED
- NEW RETURN DUCTWORK WITH EXTERNAL INSULATION - SEE SPECS
- NEW SUPPLY DUCTWORK WITH EXTERNAL INSULATION - SEE SPECS
- 20X12 RG — NEW RETURN GRILLE (RG) (ALUMINUM WITH BAKED WHITE ENAMEL FINISH) - 24" WIDE BY 12" TALL PRICE SERIES 60 OR EQUAL.
- 20X12 SG — NEW SUPPLY GRILLE (RG) (ALUMINUM WITH BAKED WHITE ENAMEL FINISH) - 24" WIDE BY 12" TALL PRICE SERIES 70 OR EQUAL.
- (S) DUCT MOUNTED SMOKE DETECTOR
- (SP) DUCT MOUNTED STATIC PRESSURE SENSOR
- ROUND DUCT SYMBOL
- CONNECT TO EXISTING
- SPIN IN WITH DAMPER
- VOLUME BALANCING DAMPERS (BD)
- MD — MOTORIZED DAMPER
- AAV — AUTOMATIC AIR VENT
- BFP — BACKFLOW PREVENTER
- BALANCING VALVE
- BALL VALVE
- BUTTERFLY VALVE
- CHECK VALVE
- CONCENTRIC REDUCER
- DP — DIFFERENTIAL PRESSURE TRANSMITTER
- ECCENTRIC REDUCER
- FLEX PIPE CONNECTION
- FLOW SWITCH
- GAUGE AND COCK
- HHWR — HOT WATER RETURN
- HHWS — HOT WATER SUPPLY
- IN-LINE STRAINER
- THREE-WAY CONTROL VALVE
- THERMOMETER
- THERMOMETER WELL
- UNION

AIR DISTRIBUTION NOTES:

1. DUCT SIZES ARE CLEAR INSIDE SHEET METAL SIZES. DUCT SIZES AND LOCATIONS ARE APPROXIMATE. AFTER THE START OF CONSTRUCTION THE CONTRACTOR SHALL FIELD VERIFY ALL SIZES AND ROUTING, SHALL RELOCATE AND RESIZE DUCT AS REQUIRED TO FIT MAINTAINING THE SAME DUCT FREE AREA. PRIOR TO FABRICATING DUCTWORK THE CONTRACTOR SHALL SUBMIT SHOP DRAWINGS FOR THE REVISED LAYOUT.
2. VERIFY COLLAR SIZES ON ALL AIR TERMINALS, EQUIPMENT INLETS AND OUTLETS. TRANSITION DUCTWORK AS NECESSARY. EXTERNALLY INSULATE TRANSITIONS AT EQUIPMENT CONNECTIONS.
3. CONTRACTOR SHALL VERIFY CLEARANCE SPACE AVAILABLE. OFFSETS REQUIRED, STRUCTURAL OPENINGS, AND WORK BY OTHER TRADES PRIOR TO FABRICATION OF DUCTWORK. SUBMIT SHOP DRAWINGS ON DUCTWORK LAYOUT. COORDINATE WITH STRUCTURE. PRESSURE TEST ALL DUCTWORK FOR LEAKS. SEE SPECIFICATIONS. RETURN DUCT SHALL BE TESTED UNDER NEGATIVE PRESSURE.
4. PROVIDE DUCT FLEX CONNECTIONS FOR AIR HANDLING UNITS. EXTERNALLY INSULATE FLEXIBLE CONNECTIONS. FLEX CONNECTIONS SHALL MEET SPECIFICATION FORM DDFCD-1199, NFPA 90A, NFPA 90B, AND ONLY BE INSTALLED BETWEEN THE AHU AND THE DUCTWORK.
5. PROVIDE CLEAN FILTERS PRIOR TO TEST AND BALANCE WORK. PROVIDE NEW FILTERS AS REQUIRED PRIOR TO FINAL ACCEPTANCE BY OWNER. PROVIDE OWNER WITH ONE COMPLETE SET FILTERS FOR EACH AHU UNIT INSTALLED.
6. PROVIDE EXTERNAL INSULATION (MINIMAL R-6) FOR ALL SUPPLY, RETURN, AND OUTSIDE AIR DUCTWORK, SEE SPECIFICATIONS.

EQUIPMENT NOTES:

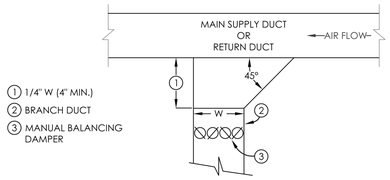
1. PROVIDE FULL SIZE COPPER CONDENSATE DRAINS FROM ALL UNITS TO DISPOSAL POINT INDICATED ON THE DRAWINGS.
2. PROVIDE A "P" TRAP ON ALL CONDENSATE DRAIN OUTLETS. SLOPE ALL CONDENSATE DRAIN PIPING 1/4" INCH PER FOOT. CONDENSATE DRAINS SHALL BE ROUTED OUTSIDE SERVICE CLEARANCE AREAS OF UNITS. PROVIDE CLEANOUT PLUG AT TRAP PER DETAIL THIS SHEET.
3. CONTRACTOR SHALL INSTALL ALL EQUIPMENT, PIPING AND DUCTWORK SUCH THAT MANUFACTURER'S RECOMMENDED CLEARANCES ARE MET FOR ALL ACCESS PANELS, MOTORS, FANS, BELTS, FILTERS, AIR INTAKES, ETC.
4. FLOOR-MOUNTED AHUs SHALL BE INSTALLED ON BASE RAILS AS INDICATED. PROVIDE NEOPRENE PADS BETWEEN UNIT/RAIL AND RAIL/CONCRETE.
5. PROVIDE ACCESS PANELS IN ALL NON-ACCESSIBLE CONSTRUCTIONS (INCLUDING CEILING, WALLS, ETC) SIZED AND LOCATED AS REQUIRED TO PROVIDE PROPER SERVICE ACCESS IN ACCORDANCE WITH THE MANUFACTURERS RECOMMENDATION FOR ALL HVAC EQUIPMENT INCLUDING DAMPERS AND VALVES.

GENERAL NOTES:

1. IT IS THE RESPONSIBILITY OF MECHANICAL CONTRACTOR TO COORDINATE WITH ALL TRADES' WORK INDICATED IN ENTIRE CONSTRUCTION DOCUMENTS, DETAILS ON ALL SHEETS REFLECT CROSS DISCIPLINE ITEMS REQUIRING PRICING AND COORDINATION.
2. CONTRACTOR SHALL PROVIDE PHENOLIC LABELS ON ALL NEW HVAC UNITS, TERMINAL UNITS, MAIN CONTROL DAMPERS AND THERMOSTATS INDICATING NAME, FUNCTION, ETC. CONTRACTOR SHALL PROVIDE STENCILED OR LAMINATED LABELS ON ALL NEW PIPING AND DUCTWORK INDICATING SERVICE. ALL CONTROLS CONDUIT, COUPLINGS, JUNCTION BOXES, ETC. SHALL BE PAINTED WHITE PER UF STANDARDS.

HYDRONIC SYSTEMS NOTES:

1. PROVIDE AUTOMATIC AIR VENTS AT HIGH POINTS AND DRAIN VALVES AT LOW POINTS ON ALL PIPING.
2. PIPE INSULATION AND VAPOR BARRIERS SHALL BE CONTINUOUS THROUGH PIPE HANGERS.
3. ALL BLACK STEEL PIPE HANGERS SHALL BE PAINTED PRIOR TO INSTALLATION.
4. WHERE CHILLED WATER PIPING IS ANCHORED, THE INSULATION WITH VAPOR BARRIER SHALL EXTEND ON THE ANCHOR FOR A DISTANCE OF 8 INCHES FROM THE PIPE.

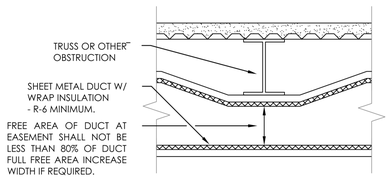


1. 1/4" W (4" MIN.)
2. BRANCH DUCT
3. MANUAL BALANCING DAMPER

NOTE: W = BRANCH DUCT WIDTH

BRANCH DUCT TAKEOFF DETAIL

NOT TO SCALE



DUCT EASEMENT DETAIL

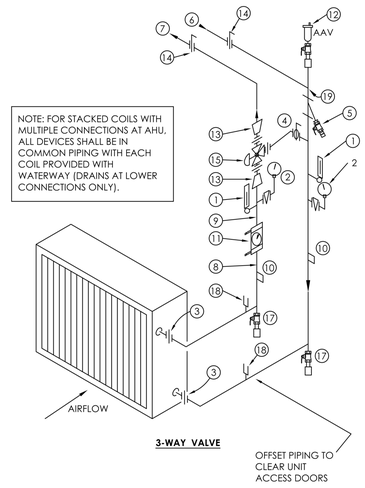
NOT TO SCALE

CHILLED-WATER AHU SCHEDULE

UNIT TAG		AHU-1	AHU-2
MANUFACTURER		TEMPTROL	TEMPTROL
NOTES		①②③④⑤⑥⑦⑧⑨⑩⑪⑫	①②③④⑤⑥⑦⑧⑨⑩⑪⑫
MOTOR HORSE POWER	#-HP	6 - 7.5	4 -5
ELECTRICAL CHARACTERISTICS	V-Ø	208 - 3	460 - 3
TOTAL SUPPLY AIR FLOW	CFM	21,000	13,600
OUTSIDE AIR FLOW (MAX-MIN)	CFM	9500-1500	5500-1500
UNIT STATIC PRESSURE	IN. H₂O	3.41	2.81
EXTERNAL STATIC PRESSURE INCLUDING FILTERS	IN. H₂O	3.50	3.22
TOTAL STATIC PRESSURE	IN. H₂O	6.91	6.03
FAN DIAMETER/FAN TYPE	INCHES/TYPE	16.0 / PLENUM	16.0 / PLENUM
PREFILTERS	DEPTH/EFF	2" / MERV-8	2" / MERV-8
FINAL FILTERS	DEPTH/EFF	4" MERV-14	4" MERV-14
MAXIMUM AIR FLOW VELOCITY THRU FILTERS	FPM	437.5	340.0
FILTER FACE AREA	SQ.FT.	48.0	40.0
OPERATING WEIGHT	LBS.	2,202	1,474
DESIGN TEMPERATURES			
SUMMER OUTDOOR DESIGN TEMPERATURE	°Fdb/°Fwb	96.0 / 80.0	96.0 / 80.0
WINTER OUTDOOR DESIGN TEMPERATURE	°Fdb/°Fwb	25.0 / 20.0	25.0 / 20.0
SUMMER INDOOR DESIGN TEMPERATURE	°Fdb/%RH	75.0 / 63.0	75.0 / 63.0
WINTER INDOOR DESIGN TEMPERATURE	°Fdb/%RH	68.0 / 57.0	68.0 / 57.0
COOLING COIL DATA			
TOTAL CAPACITY	BTU/H	1,232,100	755,500
SENSIBLE CAPACITY	BTU/H	744,600	456,700
MINIMUM FACE AREA / VELOCITY	SQ.FT./FPM	49.50 / 424.24	37.46 / 363.07
NUMBER OF ROWS / FINS PER INCH	#/#	8 / 10	8 / 10
ENTERING AIR TEMP. DB/WB MIXED W/O.A.	°Fdb/°Fwb	85.0 / 71.0	83.0 / 70.0
LEAVING COOLING. COIL AIR TEMP.	°Fdb/°Fwb	52.3 / 52.3	52.1 / 52.1
AIR PRESS. DROP ACROSS COIL	IN. H₂O	0.93	0.72
WATER FLOW	GPM	153.4	94.1
CHILLED WATER TEMPERATURE	ENT-LVG (°F)	46.0 - 62.0	46.0 - 62.0
WATER PRESSURE DROP	FT. H₂0	13.97	13.15
PIPE RUNOUT SIZE (N.O.)	INCHES	2.5	2.5
CONTROL VALVE SIZE (N.O.)	SIZE	2.5" (3-WAY)	2"
HEATING HOT WATER PREHEAT COIL			
SENSIBLE CAPACITY (ALL COILS)	BTU/H	697,000	482,400
MINIMUM FACE AREA / VELOCITY	SQ. FT./FPM	49.50 / 424.24	37.46 / 363.07
NUMBER OF COILS / ROWS / FINS PER INCH	#/#/#	2 / 1 / 6	1 / 1 / 6
ENTERING AIR TEMPURATURE	°F	35.0	35.0
LEAVING AIR TEMPURATURE	°F	65.7	67.8
AIR PRESS. DROP ACROSS COIL	(IN. H20)	0.04	0.03
WATER FLOW	GPM	71.3	49.3
HEATING HOT WATER TEMPERATURE	ENT-LVG (°F)	180 - 160	180 - 160
WATER PRESSURE DROP	FT. H20	3.28	4.58
PIPE RUNOUT SIZE (N.O)	INCHES	2	2
CONTROL VALVE SIZE (N.O)	SIZE	2" (3-WAY)	1.5"
REHEAT COIL			
SENSIBLE CAPACITY (ALL COILS)	BTU/H	-	546,400
MINIMUM FACE AREA / VELOCITY	SQ.FT./FPM	-	19.91 / 683.20
NUMBER OF ROWS / FINS PER INCH	#/#	-	2 / 6
ENTERING AIR TEMPURATURE	°F	-	55.0
LEAVING AIR TEMPURATURE	°F	-	92.2
AIR PRESS. DROP ACROSS COIL	IN. H₂O		0.20
WATER FLOW	GPM	-	55.9
HEATING HOT WATER TEMPURATURE	ENT-LVG (°F)	-	180.0 -160.0
WATER PRESSURE DROP	FT. H₂0	-	3.94
PIPE RUNOUT SIZE (EACH COIL)	INCHES	-	2
CONTROL VALVE SIZE (N.C.)	SIZE	-	1.5"

NOTES:

1. PROVIDE 2-WAY CONTROL VALVE EXCEPT WHERE NOTED OTHERWISE. PROVIDE MEANS FOR MANUAL OVERRIDE FOR CONTROL VALVE.
2. PROVIDE UV LIGHTS AND WINDOW IN UV LIGHT ACCESS DOORS. UV LIGHTS SHALL HAVE SAFETY INTERLOCK UV LIGHT SWITCHES WITH PILOT LIGHTS ON THE ACCESS DOORS WITH IDENTIFYING LABELS.
3. UNIT FOOTPRINT/HEIGHT/CONFIGURATION AND SIZE TO MATCH EXACTLY AS SHOWN ON PLANS.
4. PROVIDE FACTORY MOUNTED MARINE LIGHTS, RECEPTACLES, AND LIGHT SWITCHES IN ALL ACCESS SECTIONS. SWITCHES SHALL BE OUTSIDE.
5. PROVIDE WINDOWS IN FAN AND COIL SECTIONS.
6. PROVIDE MINIMUM 8" HIGH BASERAIL. CONTRACTOR SHALL CUT/CHIP EXISTING CONCRETE PAD OR FLOOR AS REQUIRED TO PROVIDE SUFFICIENT TRAP DEPTH SINCE UNIT HEIGHT (AND BASERAIL HEIGH) IS LIMITED BY ROOM CONSTRAINTS.
7. PROVIDE 3" RIGID FOAM INSULATED PANEL FINISHED CABINET.
8. ALL MOTORS SHALL BE HIGH EFFICIENCY INVERTER DUTY TYPE.
9. PROVIDE SINGLE VFD (WITH BYPASS) FOR CONTROL OF ALL FANS IN EACH AHU. PROVIDE FACTORY MOTOR CONTROLLER MOUNTED ON UNIT FOR INDIVIDUAL DISCONNECTS AND BRANCH WIRING.
10. PROVIDE 1" NEOPRENE/KORFUND PADS BETWEEN UNIT AND BASERAIL AND BETWEEN BASERAIL AND CONCRETE FLOOR/PAD(AT CORNERS AND EVERY 18").
11. PROVIDE DUCT-MOUNTED SMOKE DETECTOR IN THE MAIN SUPPLY DUCT FOR UNIT SHUTDOWN.
12. PROVIDE SLOPED STAINLESS-STEEL DRAIN PAN UNDER ENTIRE COOLING COIL SECTION EXTENDING A MINIMUM OF 3' DOWNSTREAM OF THE COIL FACE. PROVIDE DRAIN PAN IN NEXT UNIT SECTION AS REQUIRED IF COOLING COIL SECTION LENGTH DOES NOT ALLOW 3'.



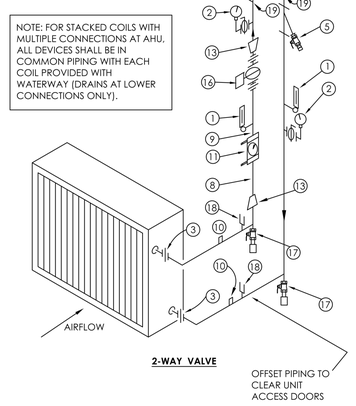
NOTE: FOR STACKED COILS WITH MULTIPLE CONNECTIONS AT AHU, ALL DEVICES SHALL BE IN COMMON PIPING WITH EACH COIL PROVIDED WITH WATERWAY (DRAINS AT LOWER CONNECTIONS ONLY).

EQUIPMENT LIST

1. THERMOMETER-TYPICAL
2. PRESSURE GAUGE COCK - TYPICAL
3. WATERWAY
4. BYPASS VALVE
5. STRAINER WITH BLOWDOWN VALVE & PLUG TYPICAL
6. SUPPLY
7. RETURN
8. 5 PIPE DIAMETERS MIN.
9. 2 PIPE DIAMETERS MIN.
10. GAUGE CONNECTOR PORT
11. CALIBRATED BALANCING VALVE - SELECT SIZE FOR CONTROL ACROSS FULL RANGE OF FLOW.
12. BRASS AUTOMATIC AIR VENT & VALVE PIPED TO DRAIN
13. CONCENTRIC REDUCER
14. ISOLATION BALL VALVE
15. 3-WAY CONTROL VALVE W/ MANUAL OVERRIDE
16. NOT USED
17. 3/4" HOSE END DRAIN WITH VALVE
18. ELECTRONIC TEMPERATURE SENSOR IN THERMAL WELL CONNECTED TO BAS
19. UPRIGHT TEE

AHU COIL PIPING DIAGRAMS (3-WAY VALVE) TYPICAL FOR AHU-1 PREHEAT & COOLING COILS

NOT TO SCALE



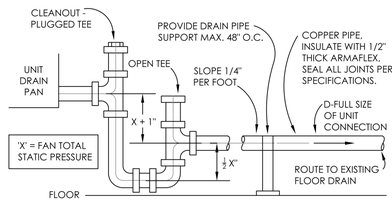
NOTE: FOR STACKED COILS WITH MULTIPLE CONNECTIONS AT AHU, ALL DEVICES SHALL BE IN COMMON PIPING WITH EACH COIL PROVIDED WITH WATERWAY (DRAINS AT LOWER CONNECTIONS ONLY).

EQUIPMENT LIST

1. THERMOMETER IN WELL
2. PRESSURE GAUGE W/ BV STOP - TYPICAL
3. WATERWAY - SEE SPECS
4. STAINLESS BRAIDED FLEX CONNECTOR AT TAP FROM RISER.
5. STRAINER WITH BLOWDOWN VALVE & HOSE END & CAP TYPICAL
6. SUPPLY
7. RETURN
8. 5 PIPE DIAMETERS MIN.
9. 2 PIPE DIAMETERS MIN.
10. PETE'S PLUG
11. CALIBRATED BALANCING VALVE - SELECT SIZE FOR CONTROL ACROSS FULL RANGE OF FLOW.
12. BRASS AUTOMATIC AIR VENT & VALVE PIPED TO DRAIN
13. CONCENTRIC REDUCER
14. BALL VALVE: 2" AND LESS, BUTTERFLY VALVE: 2-1/2" AND LARGER TYPICAL
15. NOT USED
16. 2-WAY ELECTRIC BALL TYPE CONTROL VALVE W/ MANUAL OVERRIDE
17. 3/4" HOSE END DRAIN VALVE WITH NIPPLE & VALVE PLUG
18. ELECTRONIC TEMPERATURE SENSOR IN THERMAL WELL CONNECTED TO DDC CONTROL SYSTEM.
19. UPRIGHT TEE

AHU COIL PIPING DIAGRAM (2-WAY VALVE) TYPICAL FOR ALL OTHER COILS

NOT TO SCALE



AHU CONDENSATE DRAIN DETAIL - TYPICAL

NOT TO SCALE

CAMPBELL SPELLICY
ENGINEERING
www.CampbellSpellicy.com
Phone: (352) 372-6967
Fax: (352)372-7232
Address: 1489 SW 74th Dr.
Gainesville, FL 32607

KEVIN M. SPELLICY
PE-0076968

UNIVERSITY OF FLORIDA GATOR CORNER DINING
2021 STADIUM RD
AHU 1 & 2 REPLACEMENT
GAINESVILLE, FL 32611

21028

100% CONSTRUCTION DOCUMENTS

ISSUE DATE: 08/23/2021

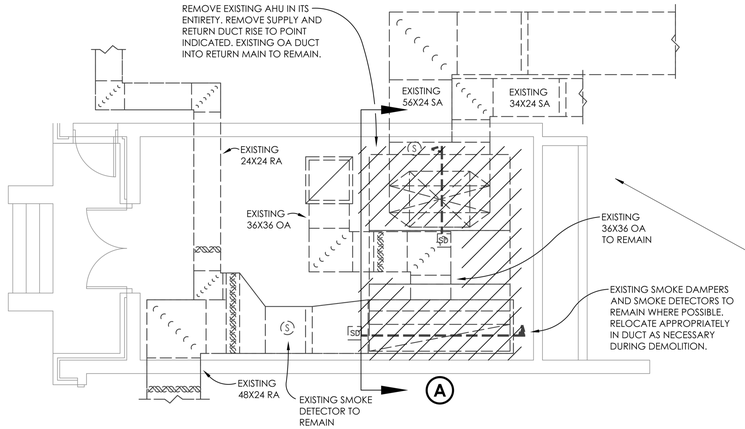
DESIGN: DAD
QC: KMS

REVISIONS

NO.	REFERENCE	DATE

MECHANICAL LEGEND, NOTES, SCHEDULE AND DETAILS

M0.1



N

MECHANICAL ROOM 107 PLAN - DUCTWORK DEMOLITION

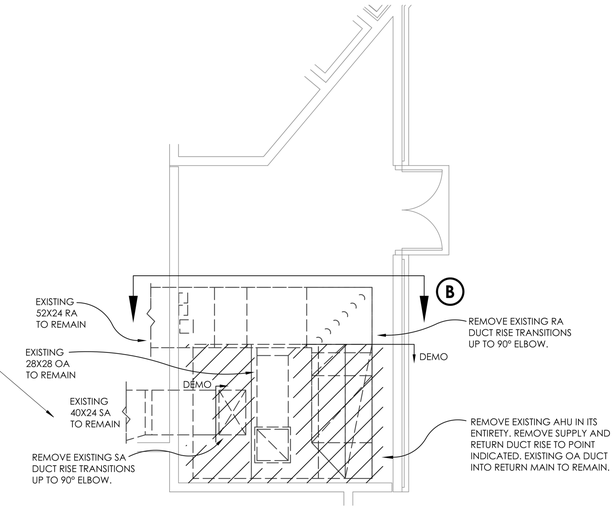
SCALE: 3/16" = 1'-0"

GENERAL FP NOTE:

ALL EXISTING FP PIPING AND UPRIGHT HEADS TO REMAIN EXCEPT WHERE NOTED. PROTECT DURING CONSTRUCTION.

NOTE:

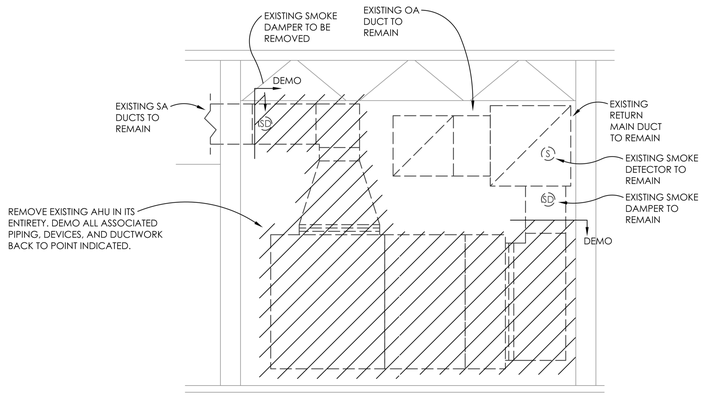
CONTRACTOR SHALL PROVIDE $5,000 TOTAL PROJECT ALLOWANCE FOR NECESSARY MODIFICATIONS TO THE EXISTING FIRE PROTECTION SYSTEMS IN EACH MECHANICAL ROOM INCLUDING RELOCATION OF PIPING, ADDITIONAL SPRINKLER HEADS UNDER OBSTRUCTIONS, AND DEMO/PROTECTION OF EXISTING HEADS AND PIPING DURING THE PROJECT. CONTRACTOR SHALL PROVIDE ALL NEW HEADS AND RELOCATION OF PIPING/HEADS AS REQUIRED FOR COMPLIANCE WITH NFPA 13 GIVEN THE NEW DUCTWORK AND PIPING INSTALLATIONS.



N

MECHANICAL ROOM 128 PLAN - DUCTWORK DEMOLITION

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



A

MECHANICAL ROOM 107 - DUCTWORK DEMOLITION ELEVATION

NOT TO SCALE

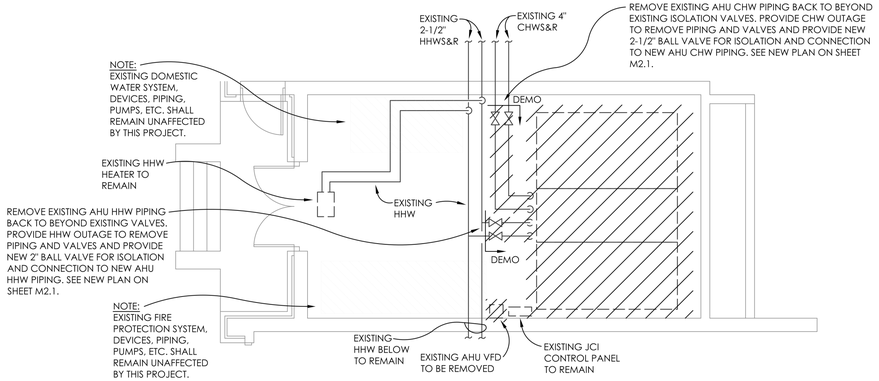
PRETESTING SCOPE:

PRIOR TO DEMOLITION - CONTRACTOR SHALL PROVIDE PRETEST OF EXISTING AHU-1 AND AHU-2 MAX AIRFLOW, MAX CHILLED WATER FLOW, AND MAX HEATING HOT WATER FLOW. PROVIDE REPORT TO ENGINEER AND UF FACILITIES SERVICES PRIOR TO NEW WORK COMMENCING.

B

MECHANICAL ROOM 128 - DUCTWORK DEMOLITION ELEVATION

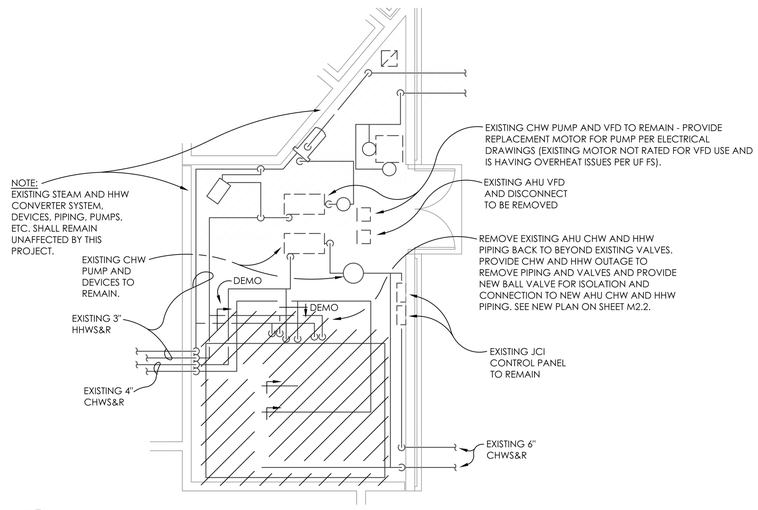
NOT TO SCALE



N

MECHANICAL ROOM 107 PLAN - PIPING DEMOLITION

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



N

MECHANICAL ROOM 128 PLAN - PIPING DEMOLITION

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

CAMPBELL SPELLICY
ENGINEERING
www.CampbellSpellicy.com
Phone: (352) 372-6967
Fax: (352)372-7232
Address: 1489 SW 74th Dr.
Gainesville, FL 32607

KEVIN M. SPELLICY
PE-0076968

UNIVERSITY OF FLORIDA GATOR CORNER DINING
AHU 1 & 2 REPLACEMENT
2021 STADIUM RD
GAINESVILLE, FL 32611

21028

100% CONSTRUCTION DOCUMENTS

ISSUE DATE: 08/23/2021

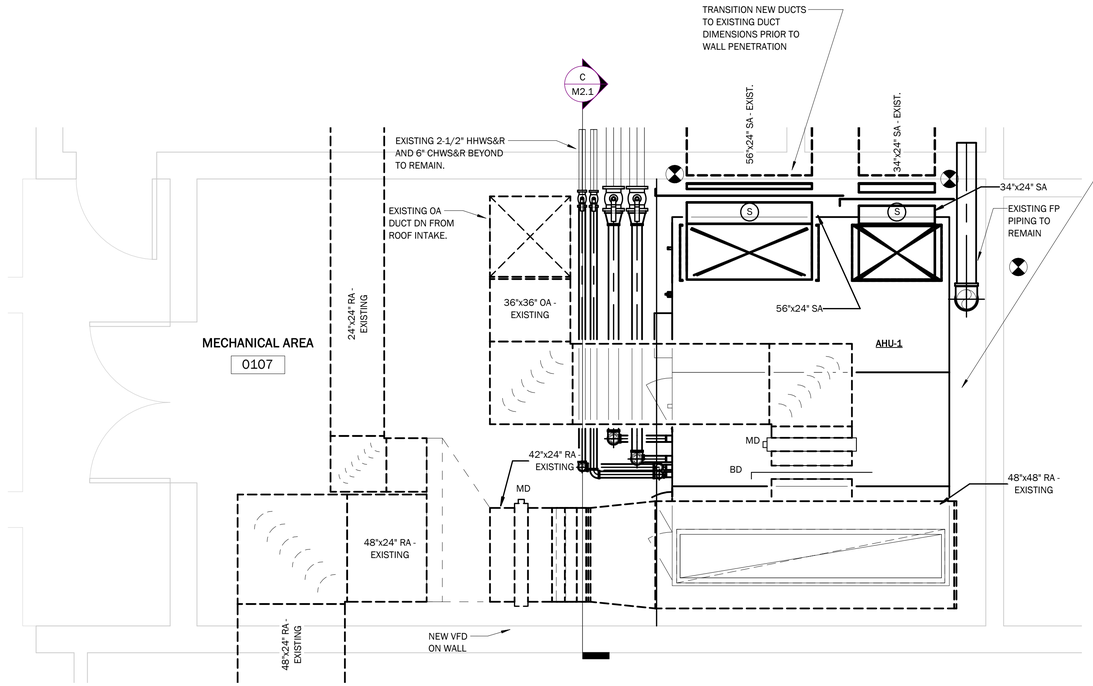
DESIGN: DAD
QC: KMS

REVISIONS

NO.	REFERENCE	DATE

MECHANICAL DEMOLITION PLANS

M1.1

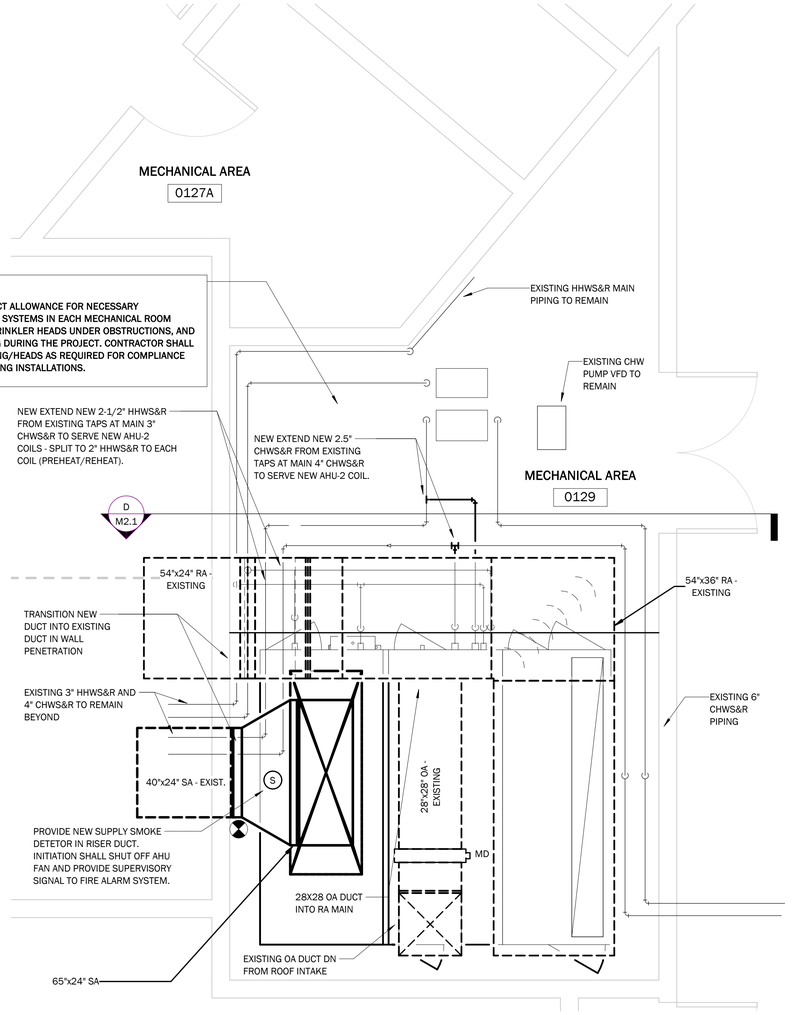


N PARTIAL MECHANICAL FLOOR PLAN - AHU-1 NEW WORK
SCALE: 3/8" = 1'-0"

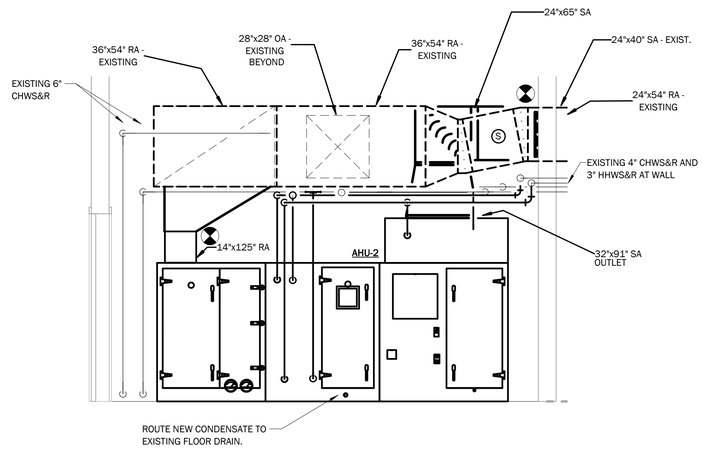
C PARTIAL AHU-1 ELEVATION - NEW WORK
SCALE: 3/8" = 1'-0"

FP SYSTEM GENERAL NOTE:

CONTRACTOR SHALL PROVIDE $5,000 TOTAL PROJECT ALLOWANCE FOR NECESSARY MODIFICATIONS TO THE EXISTING FIRE PROTECTION SYSTEMS IN EACH MECHANICAL ROOM INCLUDING RELOCATION OF PIPING, ADDITIONAL SPRINKLER HEADS UNDER OBSTRUCTIONS, AND DEMO/PROTECTION OF EXISTING HEADS AND PIPING DURING THE PROJECT. CONTRACTOR SHALL PROVIDE ALL NEW HEADS AND RELOCATION OF PIPING/HEADS AS REQUIRED FOR COMPLIANCE WITH NFPA 13 GIVEN THE NEW DUCTWORK AND PIPING INSTALLATIONS.



N PARTIAL MECHANICAL FLOOR PLAN - AHU-2 NEW WORK
SCALE: 3/8" = 1'-0"



D PARTIAL AHU-2 ELEVATION - NEW WORK
SCALE: 3/8" = 1'-0"

CAMPBELL SPELLICY
ENGINEERING
www.CampbellSpellicy.com
Phone: (352) 372-6967
Fax: (352)372-7232
Address: 1489 SW 74th Dr.
Gainesville, FL 32607

KEVIN M. SPELLICY
PE-0076968

UNIVERSITY OF FLORIDA GATOR CORNER DINING
AHU 1 & 2 REPLACEMENT
2021 STADIUM RD
GAINESVILLE, FL 32611

21028

100% CONSTRUCTION DOCUMENTS

ISSUE DATE: 08/23/2021

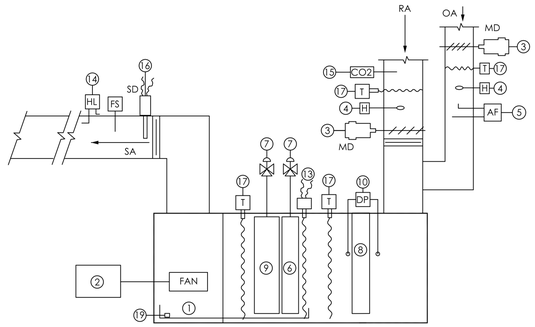
DESIGN: DAD
QC: KMS

REVISIONS

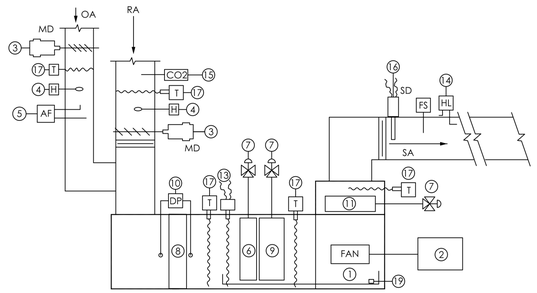
NO.	REFERENCE	DATE

MECHANICAL NEW WORK PLANS

M2.1



AHU-1



AHU-2

1. SUPPLY FAN (FOUR FAN ARRAY)
2. VFD MOTOR CONTROLLER
3. MOTORIZED AIR DAMPER
4. RELATIVE HUMIDITY SENSOR - DUCT MOUNTED
5. VELOCITY SENSOR/AIRFLOW STATION
6. PRE-HEAT COIL
7. DDC CONTROL VALVE - 3-WAY
8. FILTERS
9. COOLING COIL
10. FILTER DIFFERENTIAL PRESSURE SENSOR
11. REHEAT COIL
12. NOT USED
13. FREESTAT SET TO STOP AHU BELOW 40°F MIXED AIR TEMPERATURE
14. HIGH LIMIT STATIC PRESSURE SWITCH TO STOP AHU
15. RETURN AIR CO2 SENSOR
16. DUCT SMOKE DETECTOR BY DIV 26
17. TEMPERATURE SENSOR - AVERAGING SERPENTINE
18. NOT USED
19. FLOAT SWITCH IN PRIMARY DRAIN PAN OF UNIT - SET LEVEL ABOVE CONDENSATE DRAIN TO CLOSE COOLING VALVE IN THE EVENT OF HIGH CONDENSATE LEVEL.

AHU'S SCHEMATIC CONTROLS DIAGRAM

NOT TO SCALE

1. SUPPLY FAN (FOUR FAN ARRAY)
2. VFD MOTOR CONTROLLER
3. MOTORIZED AIR DAMPER
4. RELATIVE HUMIDITY SENSOR - DUCT MOUNTED
5. VELOCITY SENSOR/AIRFLOW STATION
6. PRE-HEAT COIL
7. DDC CONTROL VALVE - 3-WAY
8. FILTERS
9. COOLING COIL
10. FILTER DIFFERENTIAL PRESSURE SENSOR
11. REHEAT COIL
12. NOT USED
13. FREESTAT SET TO STOP AHU BELOW 40°F MIXED AIR TEMPERATURE
14. HIGH LIMIT STATIC PRESSURE SWITCH TO STOP AHU
15. RETURN AIR CO2 SENSOR
16. DUCT SMOKE DETECTOR BY DIV 26
17. TEMPERATURE SENSOR - AVERAGING SERPENTINE
18. NOT USED
19. FLOAT SWITCH IN PRIMARY DRAIN PAN OF UNIT - SET LEVEL ABOVE CONDENSATE DRAIN TO CLOSE COOLING VALVE IN THE EVENT OF HIGH CONDENSATE LEVEL.

AHU'S SCHEMATIC CONTROLS DIAGRAM

NOT TO SCALE

AHU-1 SCHEDULE

	POINT TYPE			ALARMS			
SYSTEM POINT DESCRIPTION	GRAPHIC	HARDWARE INPUT	HARDWARE OUTPUT	HIGH ANALOG LIMIT	LOW ANALOG LIMIT	BINARY ALARM	INSTALLED BY
OUTDOOR AIR TEMPERATURE	X	AI			X		FIELD
OUTDOOR AIR HUMIDITY SENSOR	X	AI					FIELD
OUTDOOR AIR AIRFLOW MONITORING	X	AI					FIELD
OUTDOOR AIR DAMPER POSITION	X	AI	AO				FIELD
RETURN AIR TEMPERATURE	X	AI					FIELD
RETURN AIR HUMIDITY SENSOR	X	AI					FIELD
RETURN AIR DAMPER POSITION	X	AI	AO				FIELD
RETURN AIR CO2	X	AI					FIELD
FILTER DP	X	AI		X			FACTORY
MIXED AIR TEMPERATURE SESNSOR	X	AI			X		FACTORY
FREEZESTAT	X	DI				X	FACTORY
PRE-HEAT HHW VALVE POSITION/CONTROL	X	AI	AO				FIELD
CHILLED WATER VALVE POSITION/CONTROL	X	AI	AO				FIELD
COOLING COIL LEAVING AIR TEMPERATURE	X	AI		X			FACTORY
SUPPLY FAN START/STOP	X		DO			X	FACTORY
SUPPLY FAN SPEED (VFD) (EACH FAN)	X	AI	AO				FACTORY
SUPPLY FAN STATUS	X	DI				X	FACTORY
SUPPLY AIR SMOKE DETECTOR	X	DI				X	FIELD
FLOAT SWITCH STATUS	X	DI				X	FACTORY

AHU-2 SCHEDULE

	POINT TYPE			ALARMS			
SYSTEM POINT DESCRIPTION	GRAPHIC	HARDWARE INPUT	HARDWARE OUTPUT	HIGH ANALOG LIMIT	LOW ANALOG LIMIT	BINARY ALARM	INSTALLED BY
OUTDOOR AIR TEMPERATURE	X	AI			X		FIELD
OUTDOOR AIR HUMIDITY SENSOR	X	AI					FIELD
OUTDOOR AIR AIRFLOW MONITORING	X	AI					FIELD
OUTDOOR AIR DAMPER POSITION	X	AI	AO				FIELD
RETURN AIR TEMPERATURE	X	AI					FIELD
RETURN AIR CO2	X	AI					FIELD
RETURN AIR HUMIDITY SENSOR	X	AI					FIELD
RETURN AIR DAMPER POSITION	X	AI	AO				FIELD
FILTER DP	X	AI		X			FACTORY
MIXED AIR TEMPERATURE SESNSOR	X	AI			X		FACTORY
FREEZESTAT	X	AI	AO				FIELD
PRE-HEAT HHW VALVE POSITION/CONTROL	X	AI	AO				FIELD
CHILLED WATER VALVE POSITION/CONTROL	X	DI				X	FACTORY
COOLING COIL LEAVING AIR TEMPERATURE	X	AI		X			FACTORY
SUPPLY FAN START/STOP	X		DO			X	FACTORY
SUPPLY FAN SPEED (VFD) (EACH FAN)	X	AI	AO				FACTORY
SUPPLY FAN STATUS	X	DI				X	FACTORY
REHEAT HHW VALVE POSITION/CONTROL	X	AI	AO				FIELD
REHEAT COIL LEAVING AIR TEMPERATURE	X	AI					FACTORY
SUPPLY AIR SMOKE DETECTOR	X	DI				X	FIELD

CAMPBELL SPELLICY
ENGINEERING
www.CampbellSpellicy.com
Phone: (352) 372-6967
Fax: (352)372-7232
Address: 1489 SW 74th Dr.
Gainesville, FL 32607

KEVIN M. SPELLICY
PE-0076968

UNIVERSITY OF FLORIDA GATOR CORNER DINING
AHU 1 & 2 REPLACEMENT
2021 STADIUM RD
GAINESVILLE, FL 32611

21028

100% CONSTRUCTION DOCUMENTS

ISSUE DATE: 08/23/2021

DESIGN: DAD
QC: KMS

REVISIONS

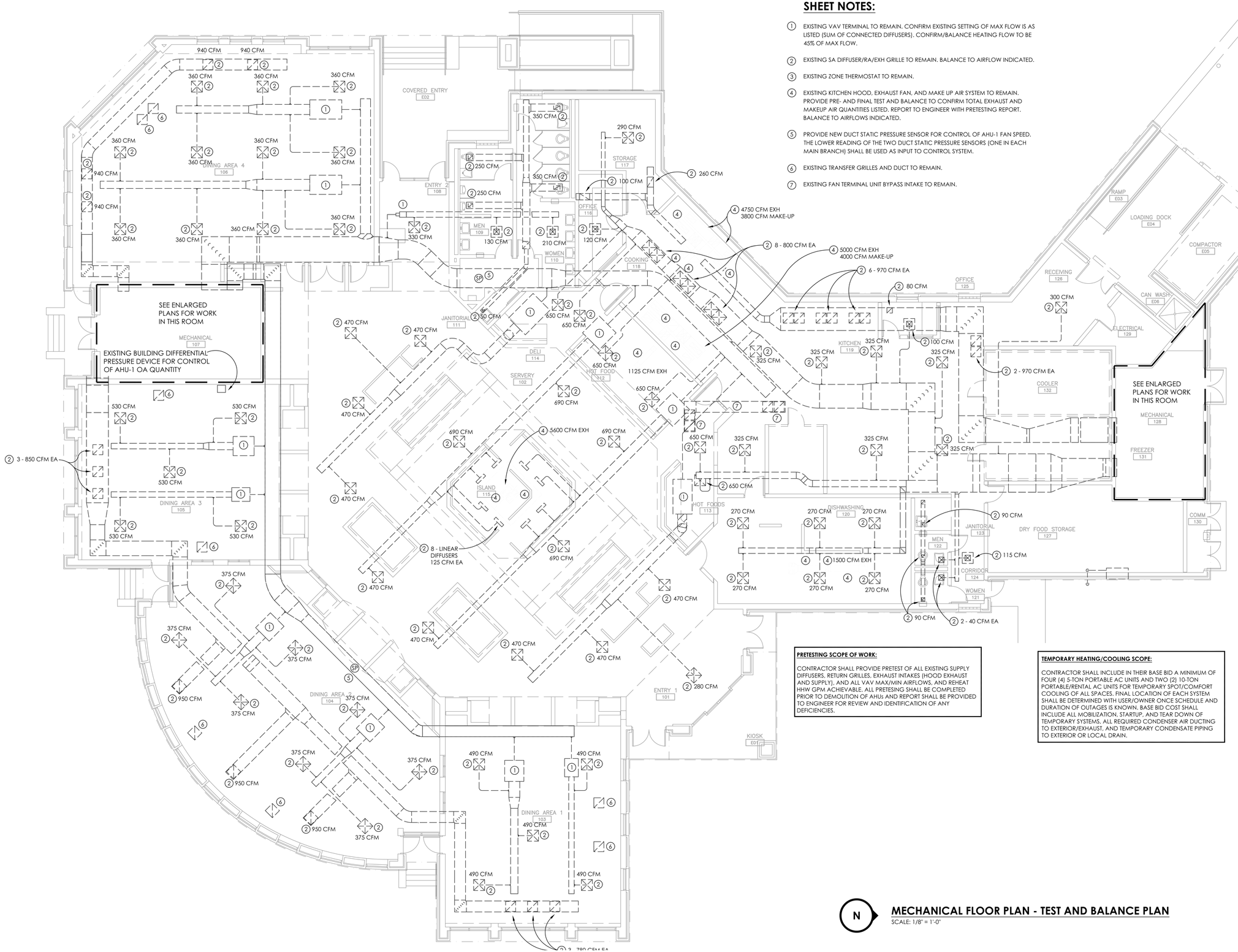
NO.	REFERENCE	DATE

CONTROLS DIAGRAMS AND SEQUENCES

M3.1

SHEET NOTES:

1. EXISTING VAV TERMINAL TO REMAIN. CONFIRM EXISTING SETTING OF MAX FLOW IS AS LISTED (SUM OF CONNECTED DIFFUSERS). CONFIRM/BALANCE HEATING FLOW TO BE 45% OF MAX FLOW.
2. EXISTING SA DIFFUSER/RA/EXH GRILLE TO REMAIN. BALANCE TO AIRFLOW INDICATED.
3. EXISTING ZONE THERMOSTAT TO REMAIN.
4. EXISTING KITCHEN HOOD, EXHAUST FAN, AND MAKE UP AIR SYSTEM TO REMAIN. PROVIDE PRE- AND FINAL TEST AND BALANCE TO CONFIRM TOTAL EXHAUST AND MAKEUP AIR QUANTITIES LISTED. REPORT TO ENGINEER WITH PRETESTING REPORT. BALANCE TO AIRFLOWS INDICATED.
5. PROVIDE NEW DUCT STATIC PRESSURE SENSOR FOR CONTROL OF AHU-1 FAN SPEED. THE LOWER READING OF THE TWO DUCT STATIC PRESSURE SENSORS (ONE IN EACH MAIN BRANCH) SHALL BE USED AS INPUT TO CONTROL SYSTEM.
6. EXISTING TRANSFER GRILLES AND DUCT TO REMAIN.
7. EXISTING FAN TERMINAL UNIT BYPASS INTAKE TO REMAIN.



PRETESTING SCOPE OF WORK:

CONTRACTOR SHALL PROVIDE PRETEST OF ALL EXISTING SUPPLY DIFFUSERS, RETURN GRILLES, EXHAUST INTAKES (HOOD EXHAUST AND SUPPLY), AND ALL VAV MAX/MIN AIRFLOWS, AND REHEAT HHW GPM ACHIEVABLE. ALL PRETESING SHALL BE COMPLETED PRIOR TO DEMOLITION OF AHUs AND REPORT SHALL BE PROVIDED TO ENGINEER FOR REVIEW AND IDENTIFICATION OF ANY DEFICIENCIES.

TEMPORARY HEATING/COOLING SCOPE:

CONTRACTOR SHALL INCLUDE IN THEIR BASE BID A MINIMUM OF FOUR (4) 5-TON PORTABLE AC UNITS AND TWO (2) 10-TON PORTABLE/RENTAL AC UNITS FOR TEMPORARY SPOT/COMFORT COOLING OF ALL SPACES. FINAL LOCATION OF EACH SYSTEM SHALL BE DETERMINED WITH USER/OWNER ONCE SCHEDULE AND DURATION OF OUTAGES IS KNOWN. BASE BID COST SHALL INCLUDE ALL MOBILIZATION, STARTUP, AND TEAR DOWN OF TEMPORARY SYSTEMS. ALL REQUIRED CONDENSER AIR DUCTING TO EXTERIOR/EXHAUST, AND TEMPORARY CONDENSATE PIPING TO EXTERIOR OR LOCAL DRAIN.

N

MECHANICAL FLOOR PLAN - TEST AND BALANCE PLAN

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

CAMPBELL SPELLICY
ENGINEERING
www.CampbellSpellicy.com
Phone: (352) 372-6967
Fax: (352)372-7232
Address: 1489 SW 74th Dr.
Gainesville, FL 32607

KEVIN M. SPELLICY
PE-0076968

UNIVERSITY OF FLORIDA GATOR CORNER DINING
AHU 1 & 2 REPLACEMENT
2021 STADIUM RD
GAINESVILLE, FL 32611

21028

100% CONSTRUCTION DOCUMENTS

ISSUE DATE: 08/23/2021

DESIGN: DAD
QC: KMS

REVISIONS

NO.	REFERENCE	DATE

TEST AND BALANCE FLOOR PLAN

M2.2

ELECTRICAL ABBREVIATIONS:

A	AMPS; AREA
AAV	AUTOMATIC AIR VENT
ABV	ABOVE
ACU	AIR CONDITIONING UNIT
AFF	ABOVE FINISHED FLOOR
AHU	AIR HANDLING UNIT
AICS	AMPS INTERRUPTING CAPACITY SYMMETRICAL
BKR	BREAKER
BPI	BASE POWER IN (FOR MODULAR FURNITURE)
C	CONDUIT
CCR	CORRELATED COLOR TEMPERATURE
CH	(AIR-COOLED) CHILLER
CKT	CIRCUIT
CLG	FINISHED CEILING
CU	CONDENSER UNIT
EA	EACH
EER	ENERGY EFFICIENCY RATIO
EF	EXHAUST FAN
ELEC	ELECTRIC / ELECTRICAL
EMT	ELEC METALLIC TUBING
EWC	ELEC WATER COOLER
EWH	ELEC WATER HEATER
ENT	ENTERING
EX	EXISTING TO REMAIN
EXH	EXHAUST
EXIST.	EXISTING
°F	DEGREES FAHRENHEIT
F	FUSE
F/A	FIRE ALARM
FACP	F/A CONTROL PANEL
FCU	FAN COIL UNIT
FLR	FLOOR
FT.	FEET
GFI	GRD FAULT INTERRUPTER
GRD	GROUND
H2O	WATER
HP	HORSEPOWER; HEAT PUMP
HR	HOUR
IN.	INCHES
KVA	KILO-VOLT AMPS
KW	KILOWATTS
KWH	KILOWATT HOUR
LTG	LIGHTING
LVG	LEAVING
MAX	MAXIMUM
MTD	MOUNTED
MCA	MIN CIRCUIT AMPACITY
MD	MOTORIZED DAMPER
MIN	MINUTE; MINIMUM
NEC	NATIONAL ELECTRICAL CODE
NIC	NOT IN CONTRACT
NC	NORMALLY CLOSED
NO	NORMALLY OPEN
NTS	NOT TO SCALE
P	POLE
PH or Ø	PHASE
PWR	POWER
R	RADIUS
RE	EXISTING TO BE RELOCATED
RECPT	RECEPTACLE
RGS	RIGID GALVANIZED STEEL
RV	EXISTING TO BE REMOVED
RPM	REVOLUTIONS PER MINUTE
RTU	ROOFTOP UNIT
SF	SUPPLY FAN
SQ. FT.	SQUARE FEET
STL	STEEL
TEMP	TEMPERATURE
TV	TELEVISION
TYP	TYPICAL
UL	UNDERWRITERS LABORATORIES
UNO	UNLESS NOTED OTHERWISE
V	VOLTS
VA	VOLTS-AMPERES
VAR.	VARIABLE
V.A.V.	VAR, AIR VOLUME
VFD	VAR, FEQUENCY DRIVE
VRF	VAR, REFRIGERANT FLOW
W	WATTS OR WIRE
WAP	WIRELESS ACCESS POINT
WP	WEATHERPROOF
WSHP	WATER-SOURCE HEAT PUMP
XFMR	TRANSFORMER

ELECTRICAL LEGEND:

GENERAL ELECTRICAL:

(E) **EQUIPMENT CONNECTION OUTLET:** VERIFY LOCATION

DUPLEX RECPT OUTLET WITH GROUND: 18" AFF - NEMA 5-20R

DISTRIBUTION & POWER:

BRANCH CIRCUIT PANELBOARD:
NAME, RATING, & DETAILS INDICATED BY SHEET NOTES

L1-1,3 **HOMERUN TO PANELBOARD:** "L1" INDICATES THE PANELBOARD NUMBER, "1,3" INDICATES THE BRANCH CIRCUIT NUMBERS. HATCH MARKS DENOTE NUMBER OF CONDUCTORS EXCLUDING GROUND CONDUCTOR.

3P, 30A FU 20A **DISCONNECT SWITCH:**
POLES, RATING & FUSING INDICATED BY SHEET NOTES.

FIRE ALARM:

S D SMOKE DETECTOR - "D" DENOTES SAMPLING TUBES IN AIR CONDITIONING DUCTWORK

GENERAL ELECTRICAL NOTES:

1. THE CONTRACTOR SHALL FURNISH ALL LABOR, MATERIALS AND EQUIPMENT NECESSARY FOR THE INSTALLATION OF A COMPLETE AND WORKING ELECTRICAL SYSTEM AS INDICATED WITHIN THESE DRAWINGS.
2. REQUESTS FOR SUBSTITUTION - WHERE A PARTICULAR SYSTEM, PRODUCT OR MATERIAL IS SPECIFIED BY NAME, CONSIDER IT AS STANDARD BASIS FOR BIDDING, AND BASE PROPOSAL ON THE PARTICULAR SYSTEM, PRODUCT OR MATERIAL SPECIFIED. OTHER SYSTEMS, PRODUCTS, EQUIPMENT OR MATERIALS MAY BE ACCEPTED ONLY IF IN THE OPINION OF THE ENGINEER, THEY ARE EQUIVALENT IN QUALITY AND WORKMANSHIP AND WILL PERFORM SATISFACTORILY ITS INTENDED PURPOSE. ALL SUCH SUBSTITUTIONS IN MATERIALS OR EQUIPMENT SHALL BE APPROVED IN WRITING BY THE ENGINEER. IN MAKING REQUESTS FOR SUBSTITUTIONS, THE CONTRACTOR SHALL LIST THE PARTICULAR SYSTEM, PRODUCT, EQUIPMENT OR MATERIAL CONTRACTOR WISHES TO SUBSTITUTE AND AT BID TIME THE CONTRACTOR SHALL STATE THE AMOUNT BEING ADDED OR DEDUCTED FROM THE BASE BID IF THE SUBSTITUTION IS APPROVED BY THE ENGINEER. IF NO DEDUCTION OR ADDITION TO THE BASE BID IS ALLOWED BY THE CONTRACTOR FOR SUCH SUBSTITUTION, IT SHALL BE SO STATED ON THE REQUEST. IF THE APPROVED SUBSTITUTION CONTAINS DIFFERENCES OR OMISSIONS NOT SPECIFICALLY CALLED TO THE ATTENTION OF THE ENGINEER, THE OWNER RESERVES THE RIGHT TO REQUIRE EQUAL OR SIMILAR FEATURES TO BE ADDED TO THE SUBSTITUTED PRODUCTS AT THE CONTRACTOR'S EXPENSE.
3. BOXES - ALL JUNCTION AND PULL BOX COVERS SHALL BE PAINTED PER THE FOLLOWING COLOR CODING.
   - 120/208V : BLACK
   - 120/208V EMERGENCY POWER : BLACK WITH YELLOW STRIPE
   - FIRE ALARM SYSTEMS: RED
   - ACCESS CONTROL SECURITY SYSTEMS: YELLOW
   - TELECOMMUNICATION SYSTEMS: BLUE
   - OTHER SYSTEMS:
     PAINT A UNIQUE COLOR OTHER THAN THOSE ABOVE.
     DO NOT PAINT GREEN OR WHITE.
4. ALL JUNCTION BOX COVERS SHALL BE MARKED USING A PRINTED LABEL OF 3/4" MINIMUM HEIGHT AND LOCATE LABEL SO IT CAN BE READILY IDENTIFIED WITHOUT REMOVAL OF THE COVER PLATE. LABEL PANEL NUMBER AND CIRCUIT FOR BRANCH CIRCUITS; LABEL FEEDING PANEL AND LOAD PANEL FOR FEEDER CIRCUITS.
5. INSTALL OUTLETS FOR EQUIPMENT AS REQUIRED BY THE PARTICULAR ITEM. CONTRACTOR SHALL VERIFY THAT THE PLUG PROVIDED WITH THE EQUIPMENT IS COMPATIBLE WITH THE RECEPTACLE INSTALLED.

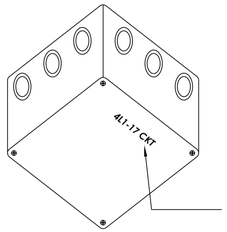
DEMOLITION NOTES:

1. CONTRACTOR SHALL PROVIDE MATERIALS AND LABOR AS NECESSARY TO REMOVE ALL ELECTRICAL ITEMS INDICATED AS EXISTING TO BE REMOVED; TO REMOVE, STORE, CLEAN, AND REINSTALL ALL ELECTRICAL ITEMS INDICATED AS EXISTING TO BE RELOCATED; AND TO NOT DISTURB ANY OTHER ELECTRICAL ITEMS EXCEPT AS NECESSARY TO ACCOMMODATE OTHER WORK SPECIFIED. ALL EXISTING DEVICES, STRUCTURES, EQUIPMENT OR OTHER FEATURES SHALL BE CONSIDERED TO BE EXISTING TO REMAIN UNLESS SPECIFICALLY INDICATED OTHERWISE.
2. CONTRACTOR SHALL PROVIDE MATERIALS AND LABOR AS NECESSARY TO PROTECT ANY EXISTING OR NEW SMOKE DETECTORS, IF ANY, DURING DEMOLITION AND CONSTRUCTION TO ENSURE NO PARTICULATE MATTER MAY ENTER THESE DETECTORS.
3. CONTRACTOR SHALL PROVIDE MATERIALS AND LABOR AS NECESSARY AND SHALL SCHEDULE WORK AS NECESSARY TO ENSURE THAT OUTAGES TO THE SERVICE OF FIRE ALARM DEVICES ARE MINIMIZED. ALL OUTAGES TO SUCH FIRE ALARM SYSTEM COMPONENTS, IF ANY, SHALL BE COORDINATED WITH THE OWNER AND CONDUCTED DURING TIMES SPECIFIED BY OWNER; SEE PROJECT MANUAL DIVISION ONE.
4. CONTRACTOR SHALL PROVIDE MATERIALS AND LABOR AS NECESSARY TO MAINTAIN IN SERVICE DURING DEMOLITION AND CONSTRUCTION THOSE EXISTING FIRE ALARM SYSTEM COMPONENTS WHICH ARE OUTSIDE THE RENOVATION AREA EVEN IF THESE COMPONENTS ARE SUPPLIED BY OR SERVED BY MATERIALS TO BE REMOVED, MATERIALS TO BE RELOCATED, OR OTHER MATERIALS WITHIN THE RENOVATION AREA.
5. CONTRACTOR SHALL REMOVE ALL UNUSED CONDUCTORS BACK TO SOURCE OR TO THE FIRST JUNCTION POINT SUPPLYING EXISTING OR NEW LOADS TO REMAIN.
6. CONTRACTOR SHALL PROVIDE ALL MATERIALS AND LABOR NECESSARY TO RESUPPLY OR TO MAINTAIN IN SERVICE - TO THE ORIGINAL CONDITION, TO THE SATISFACTION OF THE OWNER AND THE ENGINEER - ANY ELECTRICAL ITEMS OUTSIDE OF THE RENOVATION AREA WHICH ARE SERVED BY OR SUPPLIED BY ELECTRICAL ITEMS WITHIN THE RENOVATION AREA.
7. ALL EXPOSED UNUSED CONDUIT SHALL BE REMOVED. ALL UNUSED CONCEALED CONDUIT SHALL BE ABANDONED IN PLACE AFTER INSTALLING A PULLSTRING.
8. DEVICES SHOWN INSIDE THE RENOVATION AREA ARE NOT INTENDED TO REPRESENT ALL DEVICES WITHIN SPACE. ADDITIONAL DEMOLITION WORK MAY BE REQUIRED FOR INSTALLING NEW WORK. CONTRACTOR SHALL ASSUME ADDITIONAL ITEMS NOT INDICATED ARE PRESENT AND SHALL THOROUGHLY INSPECT PROJECT AREA PRIOR TO BIDDING.
9. CONTRACTOR SHALL PROVIDE MATERIALS AND LABOR AS NECESSARY TO REPAIR OR TO REPLACE - TO THE ORIGINAL CONDITION, TO THE SATISFACTION OF THE OWNER AND THE ENGINEER - ANY EXISTING DEVICES, FINISHES, SURFACES, OR EQUIPMENT TO REMAIN WHICH IS DAMAGED DURING DEMOLITION OR CONSTRUCTION WITH NO CHANGE TO THE CONTRACT AMOUNT OR TIME SCHEDULE.
10. DEMOLITION SHALL INCLUDE ANY REMOVAL AND REPLACEMENT OF EXISTING MATERIALS TO MAKE PROVISION FOR NEW FINISHES IF REQUIRED TO ACCOMMODATE WORK BY OTHER DIVISIONS OF THIS CONTRACT.

EQUIPMENT SCHEDULE					
DESIGNATION	VOLT	CONDUCTORS	CONDUIT SIZE	MOCP	DISCONNECT
AHU-1	208	4#2/0, #6G @ 75°	2"	200	PROVIDED BY MECH
AHU-2	208	4#4, #8G @ 75°	1-1/4"	100	PROVIDED BY MECH

ALL JUNCTION AND PULL BOX COVERS SHALL BE PAINTED PER THE FOLLOWING COLOR CODING.

- 120/208V : BLACK
- FIRE ALARM SYSTEMS: RED (CONDUIT AND BOX)
- ACCESS CONTROL SECURITY SYSTEMS: YELLOW
- TELECOMMUNICATION SYSTEMS: BLUE (CONDUIT AND BOX)
- HVAC CONTROLS: WHITE (CONDUIT AND BOX)
- OTHER SYSTEMS: PAINT A UNIQUE COLOR OTHER THAN THOSE ABOVE. DO NOT PAINT GREEN OR WHITE.



LABEL INSIDE OF BOX AND ON COVER WITH BRANCH CIRCUIT INFORMATION - PANELBOARD NAME, FOLLOWED BY CIRCUIT NUMBER(S), FOLLOWED BY ABBREVIATION "CKT". LABELING SHALL NOT BE VISIBLE UNLESS CEILING IS REMOVED. LABELING SHALL BE PRINTED AND BE 3/4 INCH MINIMUM HEIGHT.

JUNCTION BOX DETAIL

TRANSFORMER TX
PRI:480V/SEC:208V
FROM PANEL H2M
EXAMPLE TRANSFORMER LABEL

AHU-15
FED FROM
PANEL 4D
EXAMPLE MECHANICAL EQUIPMENT DISCONNECT LABEL

PANEL 2PA
120/208V
FROM XFMR TX
EXAMPLE PANELBOARD/SWITCHBOARD LABEL

PANEL 4PA
277/480V
FROM 4MD
EXAMPLE PANELBOARD/SWITCHBOARD LABEL

ENGRAVED PLASTIC TAG WITH 1/4" HIGH BLACK LETTERS ON WHITE BACKGROUND. TAG SHALL INCLUDE DEVICE NAME, AND UPSTREAM POWER SOURCE. AT A MINIMUM, TAG SHALL HAVE ALL EDGES BEVELED AND SMOOTH. SECURE TAG WITH 2 CHROME (STAINLESS STEEL FOR WET OR DAMP LOCATIONS) SCREWS, ADHESIVE BACKING, TAPE, ETC IS NOT ALLOWED. 1"X3" DIMENSIONS ARE MINIMUM, TAG SHALL BE LARGER AS REQUIRED TO FIT APPROPRIATE TEXT.

TYPICAL EQUIPMENT LABEL DETAIL

NOT TO SCALE

L2 — 225 A MLO — SCR: 10kA

–		CKT BKR		PHASE LOAD AMP A		PHASE LOAD AMP B		PHASE LOAD AMP C		CKT BKR		SURFACE	
CKT	LOAD	P	TRIP							TRIP	P	LOAD	CKT
1				24.2	4.2					20 A	1	AHU-2 UV LIGHT (2)	2
3	PUMP P-1	3	60 A			24.2	4.2			20 A	1	AHU-2 RCPT & LTG (2)	4
5								24.2	–	–	1	SPACE	6
7				16.7	4.6					20 A	2	COND PUMP	8
9	PUMP P-2	3	30 A			16.7	4.6						10
11								16.7	0				12
13				13	0					30 A	3	MIXER	14
15	HP-1	2	20 A			13	0						16
17	RECIRC, PUMPS PP-1 PP-2	1	20 A					8.8	2.8	20 A	1	EF-2	18
19	EWC'S	1	20 A	8.8	0					20 A	1	MISC	20
21						0	0			20 A	2	GENERATOR HEATER	22
23	PROGRESS ENERGY	3	15 A					0	0				24
25				0	0					30 A	2	PRESSURE WASHER	26
27	EF-3A	1	20 A			9.8	0						28
29	SPACE	1	–					–	–	–	1	SPACE	30
31				0	0					30 A	3	COMPACTOR	32
33	ICE MAKER	3	30 A			0	0						34
35								0	0				36
37				0	0					60 A	3	CARDBOARD BALER	38
39	ICE MAKER	3	30 A			0	0						40
41								0	0				42
43				59.4								SPACE DOES NOT EXIST	44
45	AHU-2 (1) (2)	3	100 A			59.4						SPACE DOES NOT EXIST	46
47								59.4				SPACE DOES NOT EXIST	48
			AMPS:	131 A		132 A		112 A					
			CONNECTED LOAD:	15430 VA		15550 VA		13434 VA					

NOTES:
CONTRACTOR SHALL PROVIDE 30-DAY METERING ON PANEL PER NEC 220.87
LOADS LISTED ABOVE ARE PER 1994 AS-BUILTS
(1) BREAKER FOR AHU-2 IS LOCATED AT THE TOP OF PANEL L2
(2) BREAKER HAS BEEN MODIFIED

PANEL L2 LOAD NOTE:

ADDED LOAD	59.4A
REMOVED LOAD	46.2A
NET LOAD	7.2A

L6 — 400 A MLO — SCR: 10kA

–		CKT BKR		PHASE LOAD AMP A		PHASE LOAD AMP B		PHASE LOAD AMP C		CKT BKR		SURFACE	
CKT	LOAD	P	TRIP							TRIP	P	LOAD	CKT
1	SPACE	1	–	–	9.8					20 A	1	VAV-107	2
3						0	8			20 A	1	VAV-108	4
5	YOGURT MACHINE	2	50 A					0	2	20 A	1	VAV-109	6
7	VAV-101	1	20 A	9.8	16					30 A	1	VAV-110	8
9	VAV-102	1	30 A			16	19.4			30 A	1	VAV-111	10
11	VAV-103	1	20 A					9.8	19.4	30 A	1	VAV-112	12
13	VAV-104	1	20 A	8	9.8					20 A	1	VAV-113	14
15	VAV-105	1	20 A			9.8	7.6			20 A	2	EF-6	16
17	VAV-106	1	20 A					9.8	7.6				18
19				10.6	5.8					20 A	1	EF-1	20
21	EF-4	3	30 A			10.6	33.4						22
23								10.6	33.4	50 A	3	BOOSTER PUMPS	24
25				5.7	33.4								26
27	EF-5	3	20 A			5.7	0			20 A	2	ICE CREAM	28
29								5.7	0				30
31				16.3	0					20 A	2	ICE CREAM	32
33	EF-7/SF-1	3	30 A			16.3	0						34
35								16.3	0				36
37				16.3	0					100 A	2	ICE CREAM OR UAA L6-A	38
39	EF-8/SF-2	3	30 A			16.3	4.2			20 A	1	AHU-1 UV LTG (2)	40
41								16.3	4.2	20 A	1	AHU-1 RCPT & LTG (2)	42
43				128.5								SPACE DOES NOT EXIST	44
45	AHU-1 (1) (2)	3	200 A			128.5						SPACE DOES NOT EXIST	46
47								128.5				SPACE DOES NOT EXIST	48
			AMPS:	271 A		276 A		263 A					
			CONNECTED LOAD:	32407 VA		32978 VA		31514 VA					

NOTES:
CONTRACTOR SHALL PROVIDE 30-DAY METERING ON PANEL PER NEC 220.87
LOADS LISTED ABOVE ARE PER 1994 AS-BUILTS
(1) BREAKER FOR AHU-1 IS LOCATED AT THE TOP OF PANEL L6
(2) BREAKER HAS BEEN MODIFIED

PANEL L6 LOAD NOTE:

ADDED LOAD	128.5A
REMOVED LOAD	74.8A
NET LOAD ADDED	53.7A

CAMPBELL SPELLICY
ENGINEERING
www.CampbellSpellicy.com
Phone: (352) 372-6967
Fax: (352)372-7232
Address: 1489 SW 74th Dr.
Gainesville, FL 32607

KEVIN M. SPELLICY
PE-0076968

UNIVERSITY OF FLORIDA GATOR CORNER DINING
AHU 1 & 2 REPLACEMENT
2021 STADIUM RD
GAINESVILLE, FL 32611

21028

100% CONSTRUCTION DOCUMENTS

ISSUE DATE: 08/23/2021

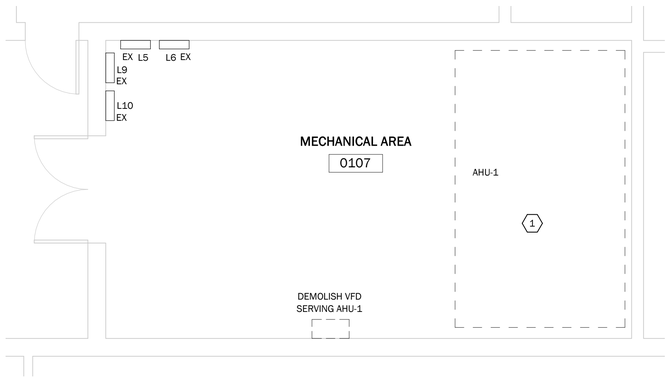
DESIGN: MAI
QC: KMS

REVISIONS

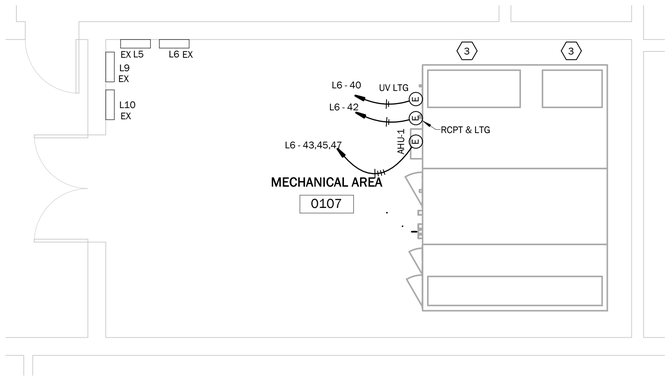
NO.	REFERENCE	DATE

ELECTRICAL LEGEND, ABBREVIATIONS, SCHEDULES, & NOTES

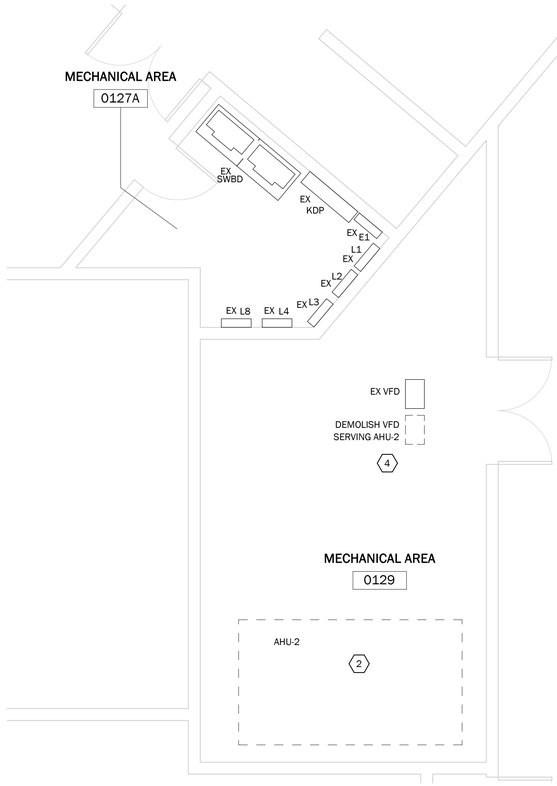
E0.1



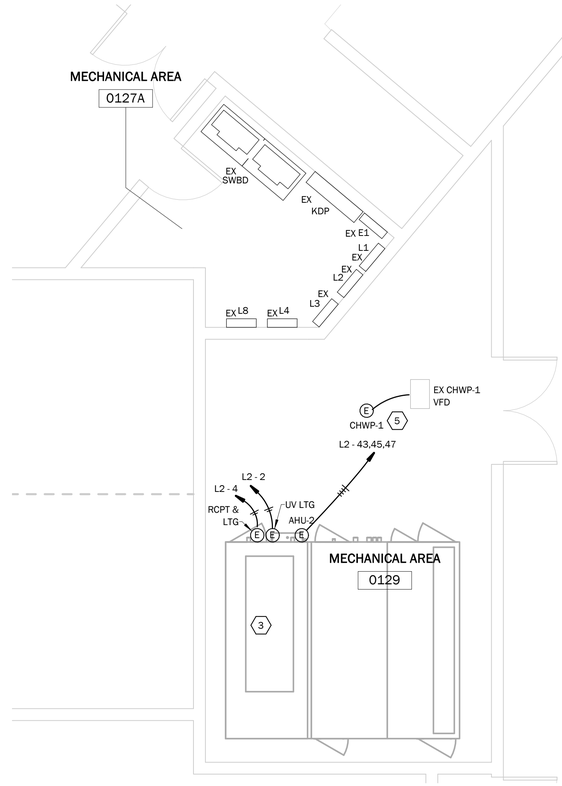
N PARTIAL ELECTRICAL FLOOR PLAN - AHU-1 DEMOLITION
SCALE: 1/4" = 1'-0"



N PARTIAL ELECTRICAL FLOOR PLAN - AHU-1 NEW WORK
SCALE: 1/4" = 1'-0"



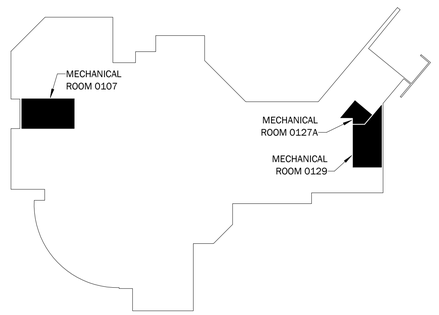
N PARTIAL ELECTRICAL FLOOR PLAN - AHU-2 DEMOLITION
SCALE: 1/4" = 1'-0"



N PARTIAL ELECTRICAL FLOOR PLAN - AHU-2 NEW WORK
SCALE: 1/4" = 1'-0"

KEY NOTES: (#)

1. CONTRACTOR SHALL DEMOLISH CKT, CONDUIT, EQUIPMENT, DEVICES, ETC. SERVING AHU-1. REMOVE EXISTING AHU RELAY AND DUCT MOUNTED SMOKE DETECTORS AND MAINTAIN FOR NEW WORK.
2. CONTRACTOR SHALL DEMOLISH CKT, CONDUIT, EQUIPMENT, DEVICES, ETC. SERVING AHU-2. REMOVE EXISTING AHU RELAY AND DUCT MOUNTED SMOKE DETECTORS AND MAINTAIN FOR NEW WORK.
3. CONTRACTOR SHALL REINSTALL AHU FIRE ALARM RELAYS FOR NEW DUCT-MOUNTED SMOKE DETECTOR. EXTEND AND REWIRE CKT AS REQUIRED.
4. CONTRACTOR SHALL DISCONNECT CKT, CONDUIT, EQUIPMENT, DEVICES, ETC. SERVING EXISTING 5HP CONTINOUS DUTY CHWP-1. MAINTAIN CKT FOR NEW WORK.
5. CONTRACTOR SHALL PROVIDE A NEW 5HP INVERTER DUTY RATED MOTOR FOR CHWP-1, RESUPPLIED FROM AND CONTROLLED BY EXISTING VFD VIA THE EXISTING CIRCUIT MAINTAINED DURING THE DEMOLITION PHASE.



N KEY PLAN
NOT TO SCALE

CAMPBELL SPELLICY
ENGINEERING
www.CampbellSpellicy.com
Phone: (352) 372-6967
Fax: (352)372-7232
Address: 1489 SW 74th Dr.
Gainesville, FL 32607

KEVIN M. SPELLICY
PE-0076968

UNIVERSITY OF FLORIDA GATOR CORNER DINING
AHU 1 & 2 REPLACEMENT
2021 STADIUM RD
GAINESVILLE, FL 32611

21028

100% CONSTRUCTION DOCUMENTS

ISSUE DATE: 08/23/2021

DESIGN: MAI
QC: KMS

REVISIONS

NO.	REFERENCE	DATE

ELECTRICAL FLOOR PLANS

E1.1