ADDENDUM #1
ISSUE DATE: June 17, 2021

RE: MEMORIAL UNION ADDITION AND REPAIRS
UNIVERSITY OF WISCONSIN - MADISON
UWSA Project No. A-20-018

BID OPENING: For MEP BIDDERS: 2:00 P.M., THURSDAY, JUNE 24, 2021
For GENERAL PRIME CONTRACTORS: 2:00 PM, THURSDAY, JULY 8, 2021

FROM: Hammel, Green and Abrahamson, Inc. Architects and Engineers
333 East Erie Street
Milwaukee, WI 53202

TO: Prospective Bidders

This addendum forms a part of the Contract Documents and modifies the original Contract Documents dated May 11, 2021 as noted below. Acknowledge receipt of this Addendum by inserting the number and issue date of this addendum in the blank space provided on the Bid Form. Failure to do so may subject the Bidder to disqualification.

This Addendum consists of forty-seven (47) pages (This text document of 2 pages, GPC and MEP Instruction to Bidders and Specification Sections 08 51 13, 09 67 23 and 23 09 24).

PREBID WALKTHROUGH (6/8/2021, 2:00 and 3:30 p.m.) QUESTIONS AND ANSWERS:

1. NONE in this Addendum.

CHANGES TO BIDDING REQUIREMENTS:

2. NONE in this Addendum

CHANGES TO CONDITIONS OF THE CONTRACT:

1. GPC Instructions to Bidders
2. MEP Instructions to Bidders
   a. Page 10, Line 34, omit “DDC SYSTEM” description.

CHANGES TO SPECIFICATIONS (DIVISIONS 2 THRU 28):

1. 08 51 13 ALUMINUM WINDOWS
   a. Page 2, Line 11, add accepted manufacturer “DeSCo Architectural Windows.”

2. 09 67 23 RESINOUS FLOORING
   a. Page 2, Line 20, add accepted manufacturer “Key Resin Company.”

3. 23 09 24 DIRECT DIGITAL CONTROL SYSTEM FOR HVAC
   a. Page 1, Line 3, omit “(INFORMATIONAL PURPOSES ONLY).”
   b. Page 1, Line 11, omit “The work associated with this section WILL NOT be bid as part of the Division 23 scope of work.” and add “The work associated with this section will be quoted to the mechanical contractors by the Johnson Controls Madison branch office by Jim Procknow
(608) 335-2996 and will be an extension of the existing JCI Extended Architecture BAS system.”

CHANGES/ADDITIONS TO DRAWINGS:

1. NONE in this Addendum.

END OF ADDENDUM

Hammel, Green and Abrahamson, Inc. Architects and Engineers
333 East Erie Street
Milwaukee, WI  53202

For the Board of Regents of the University of Wisconsin
On Behalf of the University of Wisconsin – Madison
1860 Van Hise Hall, 1220 Linden Drive
Madison, Wisconsin 53703
1. **Definitions**

   In this document, the following terms are defined as:

   (a) "Mechanical, electrical, or plumbing subcontractor" ("MEP Subcontractor") is a contractor that performs mechanical (Heating, Ventilating, and Air Conditioning), electrical, plumbing, or fire protection (fire suppression) work for the Project, and enters into a contract with the General Prime Contractor to perform their division of work.

   (b) "Qualified bidder" means a contractor that the department certifies under Wis. Stat. s. 16.855(9m)(b)1.

   (c) "Qualified responsible bidder" means a contractor who is a qualified bidder and who is a responsible bidder.

   (d) "Responsible bidder" means a contractor that the department certifies under Wis. Stat. s. 16.855(9m)(b)2.

   (e) "Single prime contracting" means bidding and contracting through a process in which only a general prime contractor has a contractual relationship with the owner and all mechanical, electrical, or plumbing subcontractors are identified by the department and are subcontractors to the General Prime Contractor.

   (f) "General Prime Contractor" ("GPC") is a contractor that enters into a contract with the owner to perform all work as required by the Contract Documents and enters into contracts with subcontractors including MEP Subcontractors identified by the Owner.

   (g) "Non-MEP Subcontractor" is a subcontractor to a General Prime Contractor in divisions of work other than mechanical, electrical, plumbing, and fire protection. This includes suppliers and installers to the General Prime Contractor.

   (h) "Subcontractor" is all subcontractors on a project. This includes MEP Subcontractors, subcontractors to the MEP Subcontractors, and Non-MEP Subcontractors.
(i) "Contractor" is all contractors working on a project regardless of contractual relationship. This includes the General Prime Contractor, MEP Subcontractors, Non-MEP Subcontractors, and all Subcontractors, regardless of tier of subcontract.

2. GENERAL

Time for bid opening shall be the prevailing central standard or daylight saving time in force at Madison, Wisconsin, on the date set forth in the Invitation to Bid.

All potential bidders must be certified by DOA prior to submitting bids on state construction projects over $50,000. All bids received from contractors who are not certified will be rejected. Contractor certification applications and instructions for completing the form may be obtained from the DOA Website DFD Contractor Certification page: http://www.doa.state.wi.us/category.asp?linkcatid=857&linkid=125&locid=4 or upon request from DFD--email dfdcertification@wisconsin.gov.

This project is being let using a single prime bidding and contracting process. The Owner will publicly bid the applicable mechanical, electrical, plumbing, and fire protection (MEP) divisions of work first. Within five (5) days of the MEP bid opening, the Owner will identify a lowest, qualified, responsible, certified bidder in each applicable MEP division of work. These successful MEP bids must be included in all general prime contractor bids received. No later than five (5) days after the Owner identifies the successful MEP bids, the Owner will publicly open general prime contractor bids. General prime contractor bids that do not include the successful MEP bids will be rejected. The Owner will enter into a single contract with the lowest, qualified, responsible, certified general prime contractor and this general prime contractor shall enter into subcontracts with the successful MEP bidders. If a project does not include any mechanical, electrical, plumbing, or fire protection divisions of work, the Owner will bid one bid package for all work to general prime contractors.

The Owner will issue an addendum if a successful MEP bid is withdrawn or rejected after the MEP Subcontractors have been identified but before the General Prime Contractor bid opening. This addendum will include a revised list of successful MEP bids that must be included in General Prime Contractor bids and will move the General Prime Contractor bid opening five (5) days later to allow bidders sufficient time to update their bids based on the revised MEP list.

Before submitting a bid, the Bidder shall examine all of the Bidding and Contract Documents listed in the Table of Contents of these specifications. The successful Bidder will be required to do all work which is shown on the drawings, mentioned in the specifications or reasonably implied as necessary to complete the contract for this project.

The Bidder shall visit and examine the site to become acquainted with the adjacent areas, means of approach to the site, conditions of actual job site, and facilities for delivering, storing, placing, and handling of materials and equipment. Failure to visit the site or failure to examine any and all Bidding and Contract Documents will in no way relieve the successful Bidder from the necessity of furnishing any materials or equipment, or performing any work, that may be required to complete the work in accordance with the Bidding and Contract Documents. Neglect of above requirements will not be accepted as reason for delay in the work or additional compensation.

All bidders shall have established and diligently maintained a satisfactory safety program, and if eligible for Experience Modification Rating (EMR), must have a rating of 1.20 or less as established by the Wisconsin Compensation Rating Bureau (WCRB) or the National Council on Compensation Insurance (NCCI).

3. DRAWINGS AND SPECIFICATIONS

The drawings and specifications that form a part of these Bidding Documents are listed in the Table of Contents of these specifications.

Complete sets of Contract Documents for all trades will be issued to all Bidders, irrespective of the category of work to be bid on, in order that all Bidders may be familiar with the work of other trades as they affect their bid.

4. INTERPRETATION

No verbal explanation or instructions will be given in regard to the meaning of the drawings or specifications during the bid period. Bidders shall bring inadequacies, omissions or conflicts to the Architect/Engineer's attention at least ten (10) days before the date set for bid opening. Prompt clarification will be supplied to all bidders of record by addendum.
Failure to so request clarification or interpretation of the drawings and specifications will not relieve the successful Bidder of responsibility. Signing of the contract will be considered as implicitly denoting that the Contractor has thorough understanding of the scope of work and comprehension of the contract documents.

Neither the Architect/Engineer nor the Owner will be responsible for verbal instructions.

5. MANDATORY PRE-BID DOA CERTIFICATION
All potential bidders must become certified as qualified and responsible bidders before they can bid on state projects over $50,000. The criteria for determining certification of qualified and responsible bidders are itemized in Wis. Stat. s. 16.855(9m). If the Owner determines that more experience is necessary for a particular project, the Owner may include additional requirements.

6. BID GUARANTEE
A bid bond prepared on the Bid Bond Form bound herein, payable to the Owner in the amount not less than 10% of the maximum bid shall accompany each bid as a guarantee. A bank certified check or a cashier’s check may accompany each bid as a guarantee pursuant to Wis. Stat. s. 779.14(1m)(c)2.b. Failure to enter into the contract with the owner (including failure to obtain certificate of insurance and separate 100% performance and 100% payment bonds) may result in forfeiture of the Bid Bond. The company issuing the Bonds must be licensed to do business in Wisconsin.

Any bid which is not accompanied by a bid guarantee will not be accepted and will not be read at the bid opening.

All checks tendered as bid guarantee, except those of the three lowest bidders, will be returned to their makers within three (3) days after bid opening. All such retained checks will be returned immediately upon execution of the contract between the General Prime Contractor and the Owner.

7. WITHDRAWAL OF BIDS
Prior to the time fixed for bid opening, bids may be withdrawn by written request from the Bidder, without prejudice to the right of the Bidder to file a new bid. Withdrawn bids will be returned unopened.

After the bid has been opened, negligence on the part of the Bidder in preparing their bid confers no right for withdrawal of the bid without penalty.

If a bid contains an error, omission, or mistake, the bidder may limit liability to the amount of their bid guarantee by giving the Owner written Notice, within seventy-two (72) hours of the bid opening, of their intent not to execute the contract with the owner. If no such notice is given, the Owner reserves the right to obtain the amount of the difference in bid price between the low bidder and the next low bidder.

8. CONTRACT FORM
These specifications include a copy of the contract the successful Bidder is required to enter into with the owner. Bidders shall read and understand the conditions contained in this contract. The successful Bidder will be offered a contract via email to the contact provided by the bidder on the Bid Form.

9. CONTRACT INTERESTS BY STATE PUBLIC OFFICIALS
In accordance with section 19.45(6) of the Wisconsin Statutes, no state public official, member of a state public official’s immediate family, nor any organization with which the state public official or a member of the official’s immediate family owns or controls at least 10% of the outstanding equity, voting rights, or outstanding indebtedness may enter into any contract or lease involving a payment or payments of more than $3,000 within a twelve (12) month period, in whole or in part derived from state funds unless the state public official has first made written disclosure of the nature and extent of such relationship or interest to the board and to the department acting for the state in regard to such contract or lease. Any contract or lease entered into in violation of this subsection may be voided by the owner in an action commenced within three (3) years of the date on which the ethics board, or the department or officer acting for the state in regard to the allocation of state funds from which such payment is derived, knew or should have known that a violation of this subsection had occurred. This subsection does not affect the application of s.946.13.
10. DISCLOSURE OF OWNERSHIP

The Bidder shall disclose on the date of submitting a bid for this project, the name of any construction business of which the Bidder has had a 25% or greater interest as a shareholder, officer, partner, or owner at any time during the preceding three (3) years, if said construction business has been found by the Department of Workforce Development to have failed to pay the prevailing wage rate or at least 1.5 times the hourly basic rate of pay for hours worked in excess of the prevailing hours of labor to any employee at any time within the preceding three (3) years.

The "Disclosure of Ownership" form may be obtained at no charge from the Department of Workforce Development, Equal Rights Division, P.O. Box 8928, Madison, Wisconsin 53708.

11. MINORITY BUSINESS ENTERPRISE AND DISABLED VETERAN-OWNED BUSINESS INVOLVEMENT

"Minority Business Enterprise" (MBE) means: a business certified by the Wisconsin Supplier Diversity Program under Wis. Stat. s. 16.287(2).

"Disabled Veteran-Owned Business" (DVB) means: a business certified by the Wisconsin Supplier Diversity Program under Wis. Stat. s. 16.283(3).

In awarding construction contracts, the University of Wisconsin System Administration shall attempt to ensure that 5 percent of the total amount expended in each fiscal year is awarded to contractors which are minority businesses, as defined under Wis. Stat. s. 16.75(3m)(a). The General Prime Contractor Bidder shall make every effort to award a minimum of 15% of the work to minority business enterprises (MBE) involvement for all projects within 60 mile radius of Milwaukee and 5% for projects located elsewhere.

In awarding construction contracts, the University of Wisconsin System Administration shall attempt to ensure that at least 1 percent of the total amount expended each fiscal year is awarded to contractors that are disabled veteran-owned businesses.

In order to assist the department in these endeavors we strongly encourage General Prime Contractors to use MBEs and DVBs.

General Prime Contractor Bidders shall submit a “Form A Affidavit of Compliance – Minority Business Enterprise and Disabled Veteran-Owned Business Provision” with their bid or within seven days of the general prime contract bid opening. This form should indicate the percentage of MBE/DVB participation commitment. Submission of a completed Affidavit of Compliance is an element of responsiveness. Failure to submit this completed form within the above time limits may be considered unresponsiveness and may result in contract award to the next apparent low bidder. All MEP Subcontractor Bidders shall also make every effort to encourage MBE and DVB involvement.

Every General Prime Contractor will be required to submit a report to the Owner, on a monthly basis and upon completion of the contract, which identifies the Minority Business Enterprises and Disabled Veteran-Owned Business to whom work was directly subcontracted and the value of said work. Subcontractors, material suppliers, etc. under contract to a subcontractor of a General Prime Contractor may not be used for reporting purposes under this paragraph without prior approval of the Wisconsin Supplier Diversity Program office. A MBE/DVB monthly report form will be sent to the Bidder after the Notice to Proceed is issued.

For assistance in identifying DOA certified MBE and DVB companies, please contact the Department of Administration Supplier Diversity Program at: DOABDMBD@wisconsin.gov, or by telephone at: (608)267-9550, or visit their website at: http://www.doa.wi.gov/Divisions/Enterprise-Operations/Supplier-Diversity-Program.

12. SUBSTANCE ABUSE PREVENTION

Mission/Purpose: The University of Wisconsin System Administration recognizes and supports drug-free workplace programs as an important element in the national strategy to reduce the devastating effects of drug and alcohol abuse in our society. The Owner requires contractors, subcontractors, suppliers and vendors to establish and enforce drug-free workplace policies and programs that conform to Sec 103.503 of the Wisconsin Statutes.

Statement: The possession, use of, distribution or purchase of illegal drugs, or use of alcohol at work by any employee on University of Wisconsin System Administration construction job sites, is strictly prohibited.
The terms of this Substance Abuse Program Statement shall cover all construction personnel who are working on University of Wisconsin System Administration job sites. This includes employees of all Contractors, Subcontractors, contractor suppliers, and their employees working at the job site.

General Prime Contractor's and Subcontractor's Written Program: Each General Prime Contractor and Subcontractor shall have in place a written Substance Abuse Program conforming to Sec 103.503(3) of the Wisconsin Statutes.

In addition, representatives of the Owner who believe that any General Prime Contractor's or Subcontractor's employee may be under the influence of alcohol or drugs shall, where deemed appropriate, contact the General Prime Contractor's or Subcontractor's appropriate management/supervision authority and request that appropriate action be taken. The General Prime Contractor's or Subcontractor's employer shall immediately remove an employee who is suspected of being under the influence of illegal drugs or alcohol shall be immediately removed from the job site.

Procedures for testing and handling of positive drug tests shall be in compliance and consistent with State and Federal laws.

Costs of Substance Abuse Programs and Testing: The cost associated with the development, implementation and enforcement of Substance Abuse Programs and any testing required shall be the responsibility of each individual General Prime Contractor and Subcontractor for their respective employees working on the job site. The Owner will not be responsible for any cost of substance abuse testing, rehabilitation or medical reviews related to substance abuse.

The General Prime Contractor and Subcontractors shall indemnify and hold the Owner harmless from any damages or other costs incurred that are related to the implementation or enforcement of any substance abuse policy or program.

13. METHOD OF AWARD - RESERVATION

General prime contractor bids that do not include the successful MEP bids identified by the Owner will be rejected.

The general prime contract will be awarded based on the following, as long as the cost does not exceed the amount of project funds available:

The lowest dollar amount is submitted by a qualified, responsible, certified bidder on a SINGLE BASE BID for all work comprising the project.

Should a qualified, responsible, certified minority business enterprise or disabled veteran-owned business submit a bid that is no more than 5% higher than the apparent low bid, the Contract may be awarded to the minority business enterprise or disabled veteran-owned business.

Firms wishing to be considered for the 5% bidding preference must be certified as a minority business enterprise or disabled veteran-owned business by the Wisconsin Supplier Diversity Program should indicate in the space provided on the Bid Form that preference is requested.

the Owner reserves the right to reject any and all bids, or to waive any informality in any bid, or to accept any bid which will serve the best interests of the Owner.

Informational Bids will not be considered in establishing low bidder.

14. SECURITY FOR SEPARATE 100% PERFORMANCE AND SEPARATE 100% PAYMENT

Bidder is required to furnish separate 100 % performance and 100 % payment bonds to the benefit of the Board of Regents of the University of Wisconsin as the sole obligee. These bonds shall be delivered to the Owner with the signed contract. The Surety Company shall be licensed to do business in Wisconsin. The Bond must be dated the same date or subsequent to the date of the Contract.

A certified copy of power of attorney shall be provided by the Surety Company showing that the agent who signs the Bond has the power of attorney to sign for the Surety Company. This power of attorney must be signed by the Secretary or Assistant Secretary of the company and not by an attorney-in-fact. The power of attorney must bear the same or later date as the bond.
If the Bidder is a partnership or a joint venture, a certified list providing the names of individuals constituting the partnership or joint venture must be furnished. The Contract itself may be signed by one partner of the partnership, or one partner of each firm comprising the joint venture, but the separate Performance and Payment Bonds must be signed by all of the partners.

If the Bidder is a corporation, a current certified copy of the resolution or other official act of the directors of the corporation must be submitted showing that the person who signs the contract is authorized to sign contracts for the corporation. The corporate seal must be affixed to the resolution, contract, and separate performance and payment bonds. If the Bidder's corporation has no seal, the above documents must include a statement or notation to the effect that the corporation has no seal.

15. TAXES
The Bidder shall include in the bid, all Sales, Consumer, Use and other similar taxes required by law.

In accordance with section 71.80(16)(a), Wis. Stats., SURETY BOND; NONRESIDENT CONTRACTOR. "All nonresident persons, whether incorporated or not, engaging in construction contracting in this state as contractor or subcontractor and not otherwise regularly engaged in business in this state, shall file a surety bond with the department (Wisconsin Department of Revenue MS 5-77 Attn: Non-Resident Surety Bonds, 2135 Rimrock Rd., Madison, WI 53713, telephone (608)266-2776) payable to the department of revenue, to guarantee the payment of income taxes, required unemployment compensation contributions, sales and use taxes and income taxes withheld from wages of employees, together with any penalties and interest thereon. The amount of the bond shall be 3% of the contract or subcontract price on all contracts of $50,000 or more..."

16. SUBMISSION OF BIDS
All bids shall be submitted on the standard Bid Forms and only bids that are made on the Bid Forms will be considered. The entire Bid Form including the Addendum Receipt/Signature page, the Bid Bond Form, (if used), and other supporting documents (if any), shall be filled out and submitted in the manner specified hereinafter. SPECIFICATIONS SHALL NOT ACCOMPANY BID.

No bids for any subdivision or any subclassification of this work, except as indicated, will be accepted. Any conditional bid, amendment to the Bid Form or appendant thereto, the inclusion of any correspondence, written or printed matter, unsolicited material or data, or details of any nature other than the information specifically called for, will disqualify the Bid. Telecommunication alterations to the bid will not be accepted.

Space is provided on the Bid Form for General Prime Contractor's single bid. Appropriate insertions are as follows: numerals indicating the cost of the work, $0 if there is no cost for the work, or the words 'No Bid' if the bidder is not intending to bid the work. Blank space(s) will be considered the same as 'No Bid'.

Bidders shall submit a Single Base Bid for all the work.

Spaces are also provided on the Bid Form for General Prime Contractor's to list the successful MEP Subcontractors bids included in the General Prime Contractor's single base bid.

General prime contractor bids that do not include the successful MEP bids identified by the Owner will be rejected.

Any addendum issued during the time of bidding shall become a part of the Contract Documents. Bidders shall acknowledge receipt of such addendum in the appropriate space provided on the Bid Form. Bid will be rejected if receipt of an addendum applicable to the award of contract has not been acknowledged on the Bid Form.

The Owner is not responsible for bids not clearly labeled as required. Bids shall be signed, sealed, and delivered to the place indicated in the Invitation to Bid before the time designated in the Invitation to Bid. All bids shall be identified with the Project Name, Project Number, Project Location, Category of Work being bid on, Bid Date, and the Name and Address of Bidder.
Bidder shall be responsible for the sealed bid being delivered to the place designated for the bid opening before the time specified. Bids received after the time indicated in the Invitation to Bid will be rejected and returned to Bidder unopened.

Bid will be considered invalid and will be rejected if it has not been signed by the Bidder.

Bids will be rejected if the bidder is not certified by DOA in the division(s) of work they bid on and/or if their bid amount exceeds their certification threshold in that division of work.

17. BASE BID
Base Bids shall be received as follows:
SINGLE BASE BID FOR ALL THE WORK.

Base Bid No. 1. All Work, as per specification Divisions 2 thru 33, applicable provisions of Division 1 and related drawings.

General prime contractor bids that do not include the successful MEP bids identified by the Owner will be rejected.

18. INFORMATIONAL BIDS
None.

19. UNIT PRICES
Unit prices requested on the Bid Form shall be given and, if included in the General Prime Contract, will be used for additions to or deductions from amount of work required under the Contract. Unit prices shall include all costs of materials, labor, insurance, taxes, overhead and profit.

The Owner reserves the right to reject any unit prices as given in the bid if they are considered excessive or unreasonable, or to accept any or all of the unit prices that may be considered fair and reasonable. If any unit price is rejected, the work governed by such unit price, if required, shall be treated as specified in General Conditions.

The Bidder shall refer to the Bid Form and the applicable technical section to determine the basis of unit measure and the detailed information related to each unit price item requested.

20. STATED ALLOWANCES
None.

21. SUBCONTRACTORS
GENERAL PRIME CONTRACTOR SUBCONTRACT WITH MEP SUBCONTRACTORS:
The successful General Prime Contractor shall offer a subcontract to the successful MEP Subcontractors identified by the Owner and included in the General Prime Contractor's bid. This subcontract between a General Prime Contractor and a MEP Subcontractor must include a scope of work clause identical to the scope of work clause included in the Bid Documents and the contract between the General Prime Contractor and the owner. A General Prime Contractor and an MEP Subcontractor may not enter any agreement in connection with bids submitted that would alter or affect the scope or price of the contracts entered into. This prohibition does not apply to the Owner change orders that result in changes to the plans or specifications, or to back charges allowed by the contract.

The General Prime Contractor must base the Project Schedule on the schedule that the MEP Subcontractors and General Prime Contractors bid on (in the specifications or bid instructions), unless otherwise agreed to by the MEP Subcontractor.

As the work progresses under any MEP subcontract for construction of a project, the General Prime Contractor shall, upon request of a subcontractor, pay to the subcontractor an amount equal to the proportionate value of the subcontractor's work properly completed, less retainage. The retainage shall be an amount equal to not more than 5 percent of the subcontractor's work completed until 50 percent of the subcontractor's work has been completed. At 50 percent completion, no additional amounts may be retained, and partial payments shall be made in full to the subcontractor unless the department certifies that the subcontractor's work is not proceeding satisfactorily. At 50 percent completion or any time thereafter when the progress of the subcontractor's work is not satisfactory, additional amounts may be retained but the total retainage may not be more than 10 percent of the value of the work completed. Upon
substantial completion of the subcontractor's work, any amount retained shall be paid to the subcontractor, less the value of any required corrective work or uncompleted work. All payments the General Prime Contractor makes under this paragraph shall be within 7 calendar days after the date on which the General Prime Contractor receives payment from the department.

The contract entered into between the General Prime Contractor and an MEP Subcontractor must contain all of the following clauses:

**Scope of Work.** The MEP Subcontractor scope of work is identical to the General Prime Contractor scope of work included in these bidding and contract documents. By submitting and signing a bid, all bidders have examined all of the Bidding Documents listed in the Table of Contents of the project specifications. The successful bidders will be required to do all work which is shown on the drawings, mentioned in the specifications, or reasonably implied as necessary to complete the division of work bid for this project.

**Prompt Payment.** (General prime contractor) shall pay (mechanical, electrical, or plumbing subcontractor) in accordance with section 16.855(19)(b), Wisconsin stats, for work that has been satisfactorily completed and properly invoiced by (mechanical, electrical, or plumbing subcontractor). A payment is timely if it is mailed, delivered, or transferred to (mechanical, electrical, or plumbing subcontractor) by the deadline under section 16.855(19)(b), Wisconsin stats.

If (mechanical, electrical, or plumbing subcontractor) is not paid by the deadline in this contract, (general prime contractor) shall pay interest on the balance due from the eighth day after the (general prime contractor) receives payment from the University of Wisconsin System Administration for the work for which payment is due and owing to (mechanical, electrical, or plumbing subcontractor), at the rate specified in section 71.82, Wisconsin stats., compounded monthly.

A (mechanical, electrical, or plumbing subcontractor) that receives payment as provided under this contract and that subcontracts with another entity shall pay those subcontractors, and be liable for interest on late payments to those subcontractors, in the same manner as the (general prime contractor) is required to pay the (mechanical, electrical, or plumbing subcontractor) under this contract.

**Insurance and Bonds.** (Mechanical, electrical, or plumbing subcontractor) shall not commence work under this contract until it has obtained all necessary insurance required of (mechanical, electrical, or plumbing subcontractor) in the contract between the (general prime contractor) and the University of Wisconsin System Administration. (mechanical, electrical, or plumbing subcontractor) shall provide a separate 100 percent performance bond and a separate 100 percent payment bond to the benefit of the (general prime contractor) as the sole named obligee. Original bonds shall be given to the (general prime contractor) and a copy shall be given to the University of Wisconsin System Administration no later than 10 days after execution of this contract.

**Indemnification.** To the fullest extent permitted by law, (mechanical, electrical, or plumbing subcontractor) shall defend, indemnify, and hold harmless (general prime contractor) and its officers, directors, agents, and any others whom (general prime contractor) is required to indemnify under its contract with the Owner, and the employees of any of them, from and against claims, damages, fines, penalties, losses, and expenses, including but not limited to attorney fees, arising in any way out of or resulting from the performance of the work under this contract, but only to the extent such claim, damage, fine, penalty, loss, or expense: (1) is attributable to bodily injury, sickness, disease, or death, or to injury to or destruction of property, including but not limited to loss of use resulting therefrom and is caused by the negligence, or acts or omissions, of (mechanical, electrical, or plumbing subcontractor), its subcontractors, any of their employees, and anyone directly or indirectly employed by them or anyone for whose acts they may be liable, or (2) as related to such claims, damages, fines, penalties, losses, and expense of or against (general prime contractor), results from or arises out of the negligence of the (general prime contractor) or other fault in providing general supervision or oversight of the work of (mechanical, electrical, or plumbing subcontractor) or (3) as related to claims, damages, fines, penalties, losses, and expense against the University of Wisconsin System Administration, arises out of the department's status as owner of the project or project site.

In addition (mechanical, electrical, or plumbing subcontractor) shall defend, indemnify, and hold harmless (general prime contractor) and its officers, directors, agents, and any others (general prime contractor) is required to indemnify under its contract with the department, and the employees of any of them, from any...
liability, including liability resulting from a violation of any applicable safe place act, that (general prime contractor) or the owner incurs to any employee of (mechanical, electrical, or plumbing subcontractor) or any third party where the liability arises from a derivative claim from said employee, when the liability arises out of the failure of the (general prime contractor) or the owner to properly supervise, inspect, or approve the work or work area of (mechanical, electrical, or plumbing subcontractor), but only to the extent that the liability arises out of the acts or omissions of (mechanical, electrical, or plumbing subcontractor), its employees, or anyone for whom (mechanical, electrical, or plumbing subcontractor) may be liable, or from (mechanical, electrical, or plumbing subcontractor’s) breach of its contractual responsibilities or arises out of (general prime contractor’s) negligence or other fault in providing general supervision or oversight of (mechanical, electrical, or plumbing subcontractor’s) work or arises out of the University of Wisconsin System Administration’s status as owner of the project or project site. In claims against (general prime contractor) or the owner by an employee of (mechanical, electrical, or plumbing subcontractor) or its subcontractors or anyone for whose acts (mechanical, electrical, or plumbing subcontractor) may be liable, the indemnification obligation of this paragraph is not limited by a limitation on amount or type of damage, compensation, or other benefits payable by or for the (mechanical, electrical, or plumbing subcontractor) subcontractors under workers compensation act.

Except as identified above, the obligations of (mechanical, electrical, or plumbing subcontractor) under this indemnification do not extend to the liability of (general prime contractor) and its agents or employees arising out of (1) preparation or approval of maps, drawings, opinions, reports, surveys, change orders, designs, or specifications; (2) the giving of or failure to give directions or instructions by the (general prime contractor) or the University of Wisconsin System Administration or their agents or employees provided the giving or failure to give is the cause of the injury or damage; or (3) the acts or omissions of other subcontractors.

Retainage. Retainage shall occur and be in amounts and on a schedule equal to that in the contract between (general prime contractor) and the University of Wisconsin System Administration.

MEP AND NON-MEP SUBCONTRACTORS:
Bidders shall submit a completed Request for Subcontractor Approval (Form DOA-4225) with their bid or within seven days of the general prime contractor bid opening. The Request for Subcontractor Form shall also include, to the extent practicable, a list of their suppliers furnishing materials for the project. Submission of a completed Request for Subcontractor Approval form is an element of responsiveness. Failure to submit this completed form within the above time limits will be considered unresponsiveness and may result in contract award to the next apparent low bidder. Refer to Article 11 of the General Conditions for further information.

22. COMMENCEMENT AND COMPLETION
The successful General Prime Contractor Bidder shall mobilize on a date to be specified in a written "Notice to Proceed" issued by the owner and to fully complete all the work per signed agreement of Substantial Completion as stated in the dates noted in the schedule below. Refer also to General Conditions for additional information in regards to time for completion.

The General Prime Contractor must base the Project Schedule on the schedule that the MEP Subcontractors and General Prime Contractors bid on (in the specifications or bid instructions), unless otherwise agreed to by the MEP Subcontractor. These milestones will be incorporated into the master project schedule after the Notice to Proceed is issued. The schedule must include, but is not limited to, the following milestone categories as they apply to the project:

SELECTIVE ABATEMENT BY OWNER
Owner to provide schedule.

MOBILIZATION FOR AREA B EAST
AUGUST, 2021

MOBILIZATION FOR AREA B WEST
OCTOBER, 2021

MOBILIZATION FOR AREA C
OCTOBER, 2021

MOBILIZATION FOR AREA A
OCTOBER, 2021
CRITICAL PATH SCOPE AREA A LEVEL 4 MOBILIZATION TO BEGIN NO EARLIER THAN OCTOBER 25, 2021 & CONSTRUCTION TO BE SUBSTANTIALLY COMPLETE NO LATER THAN MARCH 11, 2022

SUBSTANTIAL COMPLETION PHASE I (CRITICAL PATH MILESTONE)  MARCH 11, 2022
- INCLUDES AREA B EAST
- INCLUDES AREA B WEST
- INCLUDES AREA A LEVEL 4
- INCLUDES AREA C

SUBSTANTIAL COMPLETION PHASE II  MAY 20, 2022
- INCLUDE AREA A LEVEL 5

PARTIAL PROJECT CLOSE-OUT / PUNCH LIST  JUNE, 2022

PROJECT COMPLETE  JULY, 2022

23. WORK BY THE OWNER
The following work will be accomplished by the Owner or will be let under separate contracts and will not be included under the General Prime Contract, unless noted otherwise or for installation:

Owner Furnished = OF
Owner Installed = OI
Contractor Furnished = CF
Contractor Installed = CI

Furnishing, Fixtures and Equipment (FF&E):
- Furniture = OF/OI

Fire Extinguishers:
- All Fire Extinguisher (located in plan) OF/OI

Door Hardware:
- Locksets = CF/CI
- Cylinders to be handed over to UW Lock Shop for keying
- Install of Cylinders once Keying is complete = CI

Signage / Wayfinding:
- Code Required Signage = CF/CI
- Wayfinding / non-code required = not included

Security:
- Cabling = CF/CI
- Card Readers = CF/CI

DoIT:
- Wireless Access Points (WAPS) = OF/OI
- Cabling/Backboxes to the locations of the WAPS = CF/CI

Landscaping:
- Plant Media for plaza planters = OF/OI

ASBESTOS ABATEMENT:
The owner will contract with an asbestos abatement contractor, under separate contract, to remove asbestos containing Window Glazing Compound. Exterior Window Caulk and existing roof flashing contain asbestos and have been determined to be Category I, non-friable ACM. Removal of this material, as necessary for the project, is the responsibility
of the General Contractor. Refer to General Requirements, Article 5 “Hazardous Substances – Asbestos, Lead and Polychlorinated Biphenyls (PCB’s)”.

**DDC SYSTEM:**
Direct Digital Control System for HVAC is included in project as specified in Section 23 09 24 and is within the scope of the Contract. DDC System will not be accomplished by the Owner. *(ADD-1)*
MEP INSTRUCTIONS TO BIDDERS (Rev 05/2020)
UW-Madison Project No. 0008-2004 / UWSA Project No. A-20-018

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1. DEFINITIONS

In this document, the following terms are defined as:

(a) "Mechanical, electrical, or plumbing subcontractor" ("MEP Subcontractor") is a contractor that performs mechanical (Heating, Ventilating, and Air Conditioning, electrical, plumbing, or fire protection (fire suppression) work for the Project, and enters into a contract with the General Prime Contractor to perform their division of work.

(b) "Qualified bidder" means a contractor that the department certifies under Wis. Stat. s. 16.855(9m)(b)1.

(c) "Qualified responsible bidder" means a contractor who is a qualified bidder and who is a responsible bidder.

(d) "Responsible bidder" means a contractor that the department certifies under Wis. Stat. s. 16.855(9m)(b)2.

(e) "Single prime contracting" means bidding and contracting through a process in which only a general prime contractor has a contractual relationship with the owner and all mechanical, electrical, or audio visual subcontractors are identified by the department and are subcontractors to the General Prime Contractor.

(f) "General Prime Contractor" is a contractor that enters into a contract with the owner to perform all work as required by the Contract Documents and enters into contracts with subcontractors including MEP Subcontractors identified by the Owner.

(g) "Non-MEP Subcontractor" is a subcontractor to a General Prime Contractor in divisions of work other than mechanical, electrical, and audio visual. This includes suppliers and installers to the General Prime Contractor.

(h) "Subcontractor" is all subcontractors on a project. This includes MEP Subcontractors, subcontractors to the MEP Subcontractors, and Non-MEP Subcontractors.
(i) “Contractor” is all contractors working on a project regardless of contractual relationship. This includes the General Prime Contractor, MEP Subcontractors, Non-MEP Subcontractors, and all Subcontractors, regardless of tier of subcontract.

2. GENERAL

Time for bid opening shall be the prevailing central standard or daylight saving time in force at Madison, Wisconsin, on the date set forth in the Invitation to Bid.

All potential bidders must be certified by DOA prior to submitting bids on state construction projects over $50,000. All bids received from contractors who are not certified will be rejected. Contractor certification applications and instructions for completing the form may be obtained from the DOA Website DFD Contractor Certification page: http://www.doa.state.wi.us/category.asp?linkcatid=857&linkid=125&locid=4 or upon request from DFD—email dfdcertification@wisconsin.gov.

This project is being let using a single prime bidding and contracting process. the Owner will publicly bid the applicable mechanical, electrical, plumbing, and fire protection (MEP) divisions of work first. Within five (5) days of the MEP bid opening, the Owner will identify a lowest, qualified, responsible, certified bidder in each applicable MEP division of work. These successful MEP bids must be included in all general prime contractor bids received. No later than five (5) days after the Owner identifies the successful MEP bids, the Owner will publicly open general prime contractor bids. General prime contractor bids that do not include the successful MEP bids will be rejected. The owner will enter into a single contract with the lowest, qualified, responsible, certified general prime contractor and this general prime contractor shall enter into subcontracts with the successful MEP bidders.

The Owner will issue an addendum if a successful MEP bid is withdrawn or rejected after the MEP Subcontractors have been identified but before the General Prime Contractor bid opening. This addendum will include a revised list of successful MEP bids that must be included in General Prime Contractor bids and will move the General Prime Contractor bid opening five days later to allow bidders sufficient time to update their bids based on the revised MEP list.

Before submitting a bid, the Bidder shall examine all of the Bidding Documents listed in the Table of Contents of these specifications. The successful Bidder will be required to do all work which is shown on the drawings, mentioned in the specifications or reasonably implied as necessary to complete the division of work being bid for this project.

The Bidder shall visit and examine the site to become acquainted with the adjacent areas, means of approach to the site, conditions of actual job site, and facilities for delivering, storing, placing, and handling of materials and equipment.

Failure to visit the site or failure to examine any and all Bidding Documents will in no way relieve the successful Bidder from the necessity of furnishing any materials or equipment, or performing any work, that may be required to complete the work in accordance with the Bidding Documents. Neglect of above requirements will not be accepted as reason for delay in the work or additional compensation.

All bidders shall have established and diligently maintained a satisfactory safety program, and if eligible for Experience Modification Rating (EMR), must have a rating of 1.20 or less as established by the Wisconsin Compensation Rating Bureau (WCRB) or the National Council on Compensation Insurance (NCCI).

3. DRAWINGS AND SPECIFICATIONS

The drawings and specifications that form a part of these Bidding Documents are listed in the Table of Contents of these specifications.

Complete sets of Bidding Documents for all trades will be issued to all Bidders, irrespective of the category of work to be bid on, in order that all Bidders may be familiar with the work of other trades as they affect their bid.

4. INTERPRETATION

No verbal explanation or instructions will be given in regard to the meaning of the drawings or specifications during the bid period. Bidders shall bring inadequacies, omissions or conflicts to the Architect/Engineer's attention at least ten (10) days before the date set for bid opening. Prompt clarification will be supplied to all bidders of record by addendum.
Failure to so request clarification or interpretation of the drawings and specifications will not relieve the successful Bidder of responsibility. Signing of the subcontract with the General Prime Contractor will be considered as implicitly denoting that the MEP Subcontractor has thorough understanding of the scope of work and comprehension of the Bidding Documents.

Neither the Architect/Engineer nor the Owner will be responsible for verbal instructions.

5. MANDATORY PRE-BID DOA CERTIFICATION
All potential bidders must become certified as qualified and responsible bidders before they can bid on state projects over $50,000. The criteria for determining certification of qualified and responsible bidders are itemized in Wis. Stat. s. 16.855(9m). If the Owner determines that more experience is necessary for a particular project, the Owner may include additional requirements.

6. BID GUARANTEE
A bid bond prepared on the Bid Bond Form bound herein, payable to the Owner in the amount not less than 10% of the maximum bid shall accompany each bid as a guarantee. A bank certified check or a cashier’s check may accompany each bid as a guarantee pursuant to Wis. Stat. s. 779.14(1m)(c)2.b. and 779.14(1s). Failure to enter into the contract with the owner (including failure to obtain certificate of insurance and separate 100% performance and 100% payment bonds) with the General Prime Contractor may result in forfeiture of the Bid Bond. The company issuing the Bonds must be licensed to do business in Wisconsin.

Any bid which is not accompanied by a bid guarantee will not be accepted and will not be read at the bid opening.

All checks tendered as bid guarantee, except those of the three lowest bidders, will be returned to their makers within three (3) days after bid opening. All such retained checks will be returned immediately upon execution of the contract between the General Prime Contractor and the MEP Subcontractor.

7. WITHDRAWAL OF BIDS
Prior to the time fixed for bid opening, bids may be withdrawn by written request from the Bidder, without prejudice to the right of the Bidder to file a new bid. Withdrawn bids will be returned unopened.

After the bid has been opened, negligence on the part of the Bidder in preparing their bid confers no right for withdrawal of the bid without penalty.

If a bid contains an error, omission, or mistake, the bidder may limit liability to the amount of their bid guarantee by giving the Owner written Notice, within seventy-two (72) hours of the MEP bid opening, of their intent not to execute the contract with the General Prime Contractor. If no such notice is given, the Owner reserves the right to obtain the amount of the difference in bid price between the low bidder and the next low bidder.

8. MEP BIDDER IDENTIFICATION
Within five (5) days of the MEP bid opening, the Owner will identify a lowest, qualified, responsible, certified MEP Subcontractor in each applicable MEP division of work (as long as the cost does not exceed the amount of project funds available).

The lowest dollar amounts submitted by qualified, responsible, certified bidders on the SEPARATE BASE BIDS for various specified mechanical, electrical, plumbing, and fire protection divisions of the work; or

The lowest dollar amount submitted by qualified, responsible, certified bidders on the COMBINED BASE BIDS for any combination of the Separate Base Bids for various specified mechanical, electrical, plumbing, and fire protection divisions of the work.
The Owner reserves the right to reject any and all bids, or to waive any informality in any bid, or to accept any bid which will serve the best interest of the Owner.

9. MEP SUBCONTRACT WITH GENERAL PRIME CONTRACTOR
The General Prime Contractor will offer the successful MEP Bidder(s) a subcontract. A contract entered into between a General Prime Contractor and a MEP Subcontractor must include a scope of work clause identical to the scope of work clause included in the MEP Subcontractor bid documents. A General Prime Contractor and an MEP Subcontractor may not enter any agreement in connection with bids submitted that would alter or affect the scope or price of the contracts entered into. This prohibition does not apply to the Owner change orders that result in changes to the plans or specifications, or to back charges allowed by the contract.

The General Prime Contractor must base the Project Schedule on the schedule that the MEP Subcontractors and General Prime Contractors bid on (in the specifications or bid instructions), unless otherwise agreed to by the MEP Subcontractor.

As the work progresses under any MEP subcontract for construction of a project, the General Prime Contractor shall, upon request of a subcontractor, pay to the subcontractor an amount equal to the proportionate value of the subcontractor's work properly completed, less retainage. The retainage shall be an amount equal to not more than 5 percent of the subcontractor's work completed until 50 percent of the subcontractor's work has been completed. At 50 percent completion, no additional amounts may be retained, and partial payments shall be made in full to the subcontractor unless the department certifies that the subcontractor's work is not proceeding satisfactorily. At 50 percent completion or any time thereafter when the progress of the subcontractor's work is not satisfactory, additional amounts may be retained but the total retainage may not be more than 10 percent of the value of the work completed. Upon substantial completion of the subcontractor's work, any amount retained shall be paid to the subcontractor, less the value of any required corrective work or uncompleted work. All payments the General Prime Contractor makes under this paragraph shall be within 7 calendar days after the date on which the General Prime Contractor receives payment from the Owner.

The contract entered into between the General Prime Contractor and an MEP Subcontractor must contain all of the following clauses:

Scope of Work. The MEP Subcontractor scope of work is identical to the General Prime Contractor scope of work included in these bidding and contract documents. By submitting and signing a bid, all bidders have examined all of the Bidding Documents listed in the Table of Contents of the project specifications. The successful bidders will be required to do all work which is shown on the drawings, mentioned in the specifications, or reasonably implied as necessary to complete the division of work bid for this project.

Prompt Payment. (General prime contractor) shall pay (mechanical, electrical, or plumbing subcontractor) in accordance with section 16.855(19)(b), Wisconsin stats, for work that has been satisfactorily completed and properly invoiced by (mechanical, electrical, or plumbing subcontractor). A payment is timely if it is mailed, delivered, or transferred to (mechanical, electrical, or plumbing subcontractor) by the deadline under section 16.855(19)(b), Wisconsin stats. If (mechanical, electrical, or plumbing subcontractor) is not paid by the deadline in this contract, (general prime contractor) shall pay interest on the balance due from the eighth day after the (general prime contractor) receives payment from the Owner for the work for which payment is due and owing to (mechanical, electrical, or plumbing subcontractor), at the rate specified in section 71.82, Wisconsin stats., compounded monthly.

A (mechanical, electrical, or plumbing subcontractor) that receives payment as provided under this contract and thatsubcontracts with another entity shall pay those subcontractors, and be liable for interest on late payments to those subcontractors, in the same manner as the (general prime contractor) is required to pay the (mechanical, electrical, or plumbing subcontractor) under this contract.

Insurance and Bonds. (Mechanical, electrical, or plumbing subcontractor) shall not commence work under this contract until it has obtained all necessary insurance required of (mechanical, electrical, or plumbing subcontractor) in the contract between the (general prime contractor) and the Owner. (mechanical, electrical, or plumbing subcontractor) shall provide a separate 100 percent performance bond and a separate 100 percent
payment bond to the benefit of the (general prime contractor) as the sole named obligee. Original bonds shall be given to the (general prime contractor) and a copy shall be given to the Owner no later than 10 days after execution of this contract.

**Indemnification.** To the fullest extent permitted by law, (mechanical, electrical, or plumbing subcontractor) shall defend, indemnify, and hold harmless (general prime contractor) and its officers, directors, agents, and any others whom (general prime contractor) is required to indemnify under its contract with the department, and the employees of any of them, from and against claims, damages, fines, penalties, losses, and expenses, including but not limited to attorney fees, arising in any way out of or resulting from the performance of the work under this contract, but only to the extent such claim, damage, fine, penalty, loss, or expense: (1) is attributable to bodily injury, sickness, disease, or death, or to injury to or destruction of property, including but not limited to loss of use resulting therefrom and is caused by the negligence, or acts or omissions, of (mechanical, electrical, or plumbing subcontractor), its subcontractors, any of their employees, and anyone directly or indirectly employed by them or anyone for whose acts they may be liable, or (2) as related to such claims, damages, fines, penalties, losses, and expense of or against (general prime contractor), results from or arises out of the negligence of the (general prime contractor) or other fault in providing general supervision or oversight of the work of (mechanical, electrical, or plumbing subcontractor) or (3) as related to claims, damages, fines, penalties, losses, and expense against the Owner, arises out of the department's status as owner of the project or project site.

In addition (mechanical, electrical, or plumbing subcontractor) shall defend, indemnify, and hold harmless (general prime contractor) and its officers, directors, agents, and any others (general prime contractor) is required to indemnify under its contract with the department, and the employees of any of them, from any liability, including liability resulting from a violation of any applicable safe place act, that (general prime contractor) or the owner incurs to any employee of (mechanical, electrical, or plumbing subcontractor) or any third party where the liability arises from a derivative claim from said employee, when the liability arises out of the failure of the (general prime contractor) or the owner to properly supervise, inspect, or approve the work or work area of (mechanical, electrical, or plumbing subcontractor), but only to the extent that the liability arises out of the acts or omissions of (mechanical, electrical, or plumbing subcontractor), its employees, or anyone for whom (mechanical, electrical, or plumbing subcontractor) may be liable, or from (mechanical, electrical, or plumbing subcontractor's) breach of its contractual responsibilities or arises out of (general prime contractor's) negligence or other fault in providing general supervision or oversight of (mechanical, electrical, or plumbing subcontractor's) work or arises out of the Owner's status as owner of the project or project site. In claims against (general prime contractor) or the owner by an employee of (mechanical, electrical, or plumbing subcontractor) or its subcontractors or anyone for whose acts (mechanical, electrical, or plumbing subcontractor) may be liable, the indemnification obligation of this paragraph is not limited by a limitation on amount or type of damage, compensation, or other benefits payable by or for the (mechanical, electrical, or plumbing subcontractor) subcontractors under workers compensation act.

Except as identified above, the obligations of (mechanical, electrical, or plumbing subcontractor) under this indemnification do not extend to the liability of (general prime contractor) and its agents or employees arising out of (1) preparation or approval of maps, drawings, opinions, reports, surveys, change orders, designs, or specifications; (2) the giving of or failure to give directions or instructions by the (general prime contractor) or the University of Wisconsin System Administration or their agents or employees provided the giving or failure to give is the cause of the injury or damage; or (3) the acts or omissions of other subcontractors.

**Retainage.** Retainage shall occur and be in amounts and on a schedule equal to that in the contract between (general prime contractor) and the Owner.

10. **CONTRACT INTERESTS BY STATE PUBLIC OFFICIALS**

In accordance with section 19.45(6) of the Wisconsin Statutes, no state public official, member of a state public official's immediate family, nor any organization with which the state public official or a member of the official's immediate family owns or controls at least 10% of the outstanding equity, voting rights, or outstanding indebtedness may enter into any contract or lease involving a payment or payments of more than $3,000 within a twelve (12) month period, in whole or in part derived from state funds unless the state public official has first made written disclosure of the nature and extent of such relationship or interest to the board and to the department acting for the state in regard to such contract or lease. Any contract or lease entered into in violation of this subsection may be voided by the owner in an action commenced...
within three (3) years of the date on which the ethics board, or the department or officer acting for the state in regard to the allocation of state funds from which such payment is derived, knew or should have known that a violation of this subsection had occurred. This subsection does not affect the application of s.946.13.

11. DISCLOSURE OF OWNERSHIP
The Bidder shall disclose on the date of submitting a bid for this project, the name of any construction business of which the Bidder has had a 25% or greater interest as a shareholder, officer, partner, or owner at any time during the preceding three (3) years, if said construction business has been found by the Department of Workforce Development to have failed to pay the prevailing wage rate or at least 1.5 times the hourly basic rate of pay for hours worked in excess of the prevailing hours of labor to any employee at any time within the preceding three (3) years.

The “Disclosure of Ownership” form may be obtained at no charge from the Department of Workforce Development, Equal Rights Division, P.O. Box 8928, Madison, Wisconsin 53708.

12. MINORITY BUSINESS ENTERPRISE AND DISABLED VETERAN-OWNED BUSINESS INVOLVEMENT
"Minority Business Enterprise” (MBE) means: a business certified by the Wisconsin Supplier Diversity Program under Wis. Stat. s. 16.287(2).

“Disabled Veteran-Owned Business” (DVB) means: a business certified by the Wisconsin Supplier Diversity Program under Wis. Stat. s. 16.283(3).

General Prime Contractors are strongly encouraged to use MBEs and DVBs.

General Prime Contractor Bidders will be required to submit a “Form A Affidavit of Compliance – Minority Business Enterprise and Disabled Veteran-Owned Business Provision” with their bid or within seven days of the general prime contractor bid opening. This form will indicate the percentage of MBE/DVB participation commitment. Submission of a completed Affidavit of Compliance is an element of responsiveness. Failure to submit this completed form within the above time limits may be considered unresponsiveness and may result in contract award to the next apparent low bidder. All MEP Subcontractor Bidders shall also make every effort to encourage MBE and DVB involvement.

Every General Prime Contractor will be required to submit a report to the Owner, on a monthly basis and upon completion of the contract, which identifies the Minority Business Enterprises and Disabled Veteran-Owned Business to whom work was directly subcontracted and the value of said work. Subcontractors, material suppliers, etc. under contract to a subcontractor of a General Prime Contractor may not be used for reporting purposes under this paragraph without prior approval of the Wisconsin Supplier Diversity Program office. A MBE/DVB monthly report form will be sent to the General Prime Contractor after the Notice to Proceed is issued.

For assistance in identifying DOA certified MBE and DVB companies, please contact the Department of Administration Supplier Diversity Program at: DOABDMBD@wisconsin.gov, or by telephone at: (608)267-9550, or visit their website at: http://www.doa.wi.gov/Divisions/Enterprise-Operations/Supplier-Diversity-Program.

13. SUBSTANCE ABUSE PREVENTION
Mission/Purpose: The Board of Regents of the University of Wisconsin System recognizes and supports drug-free workplace programs as an important element in the national strategy to reduce the devastating effects of drug and alcohol abuse in our society. The the Owner requires contractors, subcontractors, suppliers and vendors to establish and enforce drug-free workplace policies and programs that conform to Sec 103.503 of the Wisconsin Statutes.

Statement: The possession, use of, distribution or purchase of illegal drugs, or use of alcohol at work by any employee on the Owner’s construction job sites, is strictly prohibited.

The terms of this Substance Abuse Program Statement shall cover all construction personnel who are working on the Owner’s job sites. This includes employees of all Contractors, Subcontractors, contractor suppliers, and their employees working at the job site.
General Prime Contractor's and Subcontractor's Written Program: Each General Prime Contractor and Subcontractor shall have in place a written Substance Abuse Program conforming to Sec 103.503(3) of the Wisconsin Statutes.

In addition, representatives of the Owner who believe that any General Prime Contractor's or Subcontractor's employee may be under the influence of alcohol or drugs shall, where deemed appropriate, contact the General Prime Contractor's or Subcontractor's appropriate management/supervision authority and request that appropriate action be taken. The General Prime Contractor's or Subcontractor's employer shall immediately remove an employee who is suspected of being under the influence of illegal drugs or alcohol shall be immediately removed from the job site.

Procedures for testing and handling of positive drug tests shall be in compliance and consistent with State and Federal laws.

Costs of Substance Abuse Programs and Testing: The cost associated with the development, implementation and enforcement of Substance Abuse Programs and any testing required shall be the responsibility of each individual General Prime Contractor and Subcontractor for their respective employees working on the job site. The Owner will not be responsible for any cost of substance abuse testing, rehabilitation or medical reviews related to substance abuse.

The General Prime Contractor and Subcontractors shall indemnify and hold the Owner harmless from any damages or other costs incurred that are related to the implementation or enforcement of any substance abuse policy or program.

14. SECURITY FOR SEPARATE 100% PERFORMANCE AND SEPARATE 100% PAYMENT
MEP Subcontractors will be required to deliver to the General Prime Contractor separate 100 % performance and 100 % payment bonds to the benefit of the General Prime Contractor as the sole obligee. Original bonds shall be given to the General Prime Contractor and a copy shall be given to the Owner no later than 10 days after the execution of the subcontract. Separate 100% performance and separate 100 % payment bond forms are included in Appendix 1 of these instructions.

15. TAXES
The Bidder shall include in the bid, all Sales, Consumer, Use and other similar taxes required by law.

In accordance with section 71.80(16)(a), Wis. Stats., SURETY BOND; NONRESIDENT CONTRACTOR. "All nonresident persons, whether incorporated or not, engaging in construction contracting in this state as contractor or subcontractor and not otherwise regularly engaged in business in this state, shall file a surety bond with the department (Wisconsin Department of Revenue MS 5-77 Attn: Non-Resident Surety Bonds, 2135 Rimrock Rd., Madison, WI 53713, telephone (608)266-2776.) payable to the department of revenue, to guarantee the payment of income taxes, required unemployment compensation contributions, sales and use taxes and income taxes withheld from wages of employees, together with any penalties and interest thereon. The amount of the bond shall be 3% of the contract or subcontract price on all contracts of $50,000 or more..."

16. SUBMISSION OF BIDS
All bids shall be submitted on the standard Bid Forms and only bids that are made on the Bid Forms will be considered. The entire Bid Form including the Addendum Receipt/Signature page, the Bid Bond Form (if used), and other supporting documents (if any) shall be filled out and submitted in the manner specified hereinafter. SPECIFICATIONS SHALL NOT ACCOMPANY BID.

No bids for any subdivision or any subclassification of this work, except as indicated, will be accepted. Any conditional bid, amendment to the Bid Form or appendant thereto, the inclusion of any correspondence, written or printed matter, unsolicited material or data, or details of any nature other than the information specifically called for, will disqualify the Bid. Telecommunication alterations to the bid will not be accepted.

Space(s) are provided on the Bid Form for each Division of Work. Appropriate insertions are as follows: numerals indicating the cost of the work, $0 if there is no cost for the work, or the words 'No Bid' if the bidder is not intending to bid the work. Blank space(s) will be considered the same as 'No Bid'.

Bidders may submit separate base bids for any divisions of work they are certified to bid on (Fire Suppression, Plumbing, Heating, Ventilating and Air Conditioning, and Electrical).
Bidders may submit combined base bids for any combination of base bid categories if they are certified in each division of work included in their combined base bid.

Any addendum issued during the time of bidding shall become a part of the Bidding Documents. Bidders shall acknowledge receipt of such addendum in the appropriate space provided on the Bid Form. Bid will be rejected if receipt of an addendum applicable to the award of contract has not been acknowledged on the Bid Form.

The Owner is not responsible for bids not clearly labeled as required. Bids shall be signed, sealed, and delivered to the place indicated in the Invitation to Bid before the time designated in the Invitation to Bid. All bids shall be identified with the Project Name, Project Number, Project Location, Category of Work being bid on, Bid Date, and the Name and Address of Bidder.

Bidder shall be responsible for the sealed bid being delivered to the place designated for bid opening before the time specified. Bids received after the time indicated in the Invitation to Bid will be rejected and returned to Bidder unopened.

Bid will be considered invalid and will be rejected if it has not been signed by the Bidder.

Bids will be rejected if the bidder is not certified by DOA in the division(s) of work they bid on and/or if their bid amount exceeds their certification threshold in that division of work.

17. BASE BIDS
Fire Protection (Fire Suppression), Plumbing, Mechanical (Heating, Ventilating and Air Conditioning), and Electrical Base Bids shall be received utilizing one or all methods of bidding as follows:

**SEPARATE BASE BIDS FOR THE VARIOUS DIVISIONS OF THE WORK.**

Base Bid No. 2 Fire Suppression Work as per specification Division 21, applicable provisions of Division 1 and related drawings.

Base Bid No. 3 Plumbing Work as per specification Division 22, applicable provisions of Division 1 and related drawings.

Base Bid No. 4 Heating, Ventilating and Air Conditioning Work as per specification Division 23, applicable provisions of Division 1 and related drawings.

Base Bid No. 5 Electrical Work as per specification Division 26, 27, 28 applicable provisions of Division 1 and related drawings.

**COMBINED BASE BIDS FOR ANY COMBINATION OF SEPARATE BASE BIDS FOR VARIOUS DIVISIONS OF THE WORK.**

Base Bid No.____for_______, Base Bid No.____for_______ and Base Bid No.____for_______as per specifications, applicable provisions of Division 1 and related drawings.

18. INFORMATIONAL BIDS
None.

19. UNIT PRICES
Unit prices requested on the Bid Form shall be given and, if included in the General Prime Contract, will be used for additions to or deductions from amount of work required under the Contract. Unit prices shall include all costs of materials, labor, insurance, taxes, overhead and profit.

The Owner reserves the right to reject any unit prices as given in the bid if they are considered excessive or unreasonable, or to accept any or all of the unit prices that may be considered fair and reasonable. If any unit price is rejected, the work governed by such unit price, if required, shall be treated as specified in General Conditions.
The Bidder shall refer to the Bid Form and the applicable technical section to determine the basis of unit measure and the detailed information related to each unit price item requested.

20. STATED ALLOWANCES
None.

21. COMMENCEMENT AND COMPLETION
The successful mechanical, electrical, plumbing, or fire protection Bidder must agree to commence the work on or before a date to be specified in a written "Notice to Proceed" issued by the owner and to fully complete all the work per signed agreement of Substantial Completion as stated in the dates noted in the schedule below. Refer also to General Conditions for additional information in regards to time for completion.

The General Prime Contractor must base the Project Schedule on the schedule that the MEP Subcontractors and General Prime Contractors bid on (in the specifications or bid instructions), unless otherwise agreed to by the MEP Subcontractor. These milestones will be incorporated into the master project schedule after the Notice to Proceed is issued. The schedule must include, but is not limited to, the following milestone categories as they apply to the project:

SELECTIVE ABATEMENT BY OWNER Owner to provide schedule

MOBILIZATION FOR AREA B EAST AUGUST, 2021

MOBILIZATION FOR AREA B WEST OCTOBER, 2021

MOBILIZATION FOR AREA C OCTOBER, 2021

MOBILIZATION FOR AREA A OCTOBER, 2021

CRITICAL PATH SCOPE AREA A LEVEL 4 MOBILIZATION TO BEGIN NO EARLIER THAN OCTOBER 25, 2021 & CONSTRUCTION TO BE SUBSTANTIALLY COMPLETE NO LATER THAN MARCH 11, 2022

SUBSTANTIALL COMPLETION PHASE I (CRITICAL PATH MILESTONE) MARCH 11, 2022
- INCLUDES AREA B EAST
- INCLUDES AREA B WEST
- INCLUDES AREA A LEVEL 4
- INCLUDES AREA C

SUBSTANTIAL COMPLETION PHASE II MAY 20, 2022
- INCLUDE AREA A LEVEL 5

PARTIAL PROJECT CLOSE-OUT / PUNCH LIST JUNE, 2022

PROJECT COMPLETE JULY, 2022

22. WORK BY THE OWNER
The following work will be accomplished by the Owner or will be let under separate contracts and will not be included under the General Prime Contract:

Owner Furnished = OF
Owner Installed = OI
Contractor Furnished = CF
Contractor Installed = CI
Furnishing, Fixtures and Equipment (FF&E):

Furniture = OF/OI

Fire Extinguishers:
All Fire Extinguisher (located in plan) OF/OI

Door Hardware:
Locksets = CF/CI
Cylinders to be handed over to UW Lock Shop for keying
Install of Cylinders once Keying is complete = CI

Signage / Wayfinding:
Code Required Signage = CF/CI
Wayfinding / non-code required = not included

Security:
Cabling = CF/CI
Card Readers = CF/CI

DoIT:
Wireless Access Points (WAPS) = OF/OI
Cabling/Backboxes to the locations of the WAPS = CF/CI

Landscaping:
Plant Media for plaza planters = OF/OI

ASBESTOS ABATEMENT:
The owner will contract with an asbestos abatement contractor, under separate contract, to remove asbestos containing Window Glazing Compound. Exterior Window Caulk and existing roof flashing contain asbestos and have been determined to be Category I, non-friable ACM. Removal of this material, as necessary for the project, is the responsibility of the General Contractor. Refer to General Requirements, Article 5 “Hazardous Substances – Asbestos, Lead and Polychlorinated Biphenyls (PCB’s)”.

DDC SYSTEM:
Direct Digital Control System for HVAC is included in project as specified in Section 23 09 24 and is within the scope of the Contract. DDC System will not be accomplished by the Owner. (ADD-1)

***
SECTION 08 51 13
ALUMINUM WINDOWS

PART 1 GENERAL

SUMMARY
Section includes aluminum windows for exterior locations.
Window types include the following:
Architectural Grade fixed single-plane windows with simulated true muntin design (AW-1).

ACTION SUBMITTALS
Product Data: For each type of product.
Include construction details, material descriptions, glazing and fabrication methods, dimensions of individual components and profiles, hardware, and finishes for aluminum windows.
Shop Drawings: For aluminum windows.
Include plans, elevations, sections, hardware, accessories, insect screens, operational clearances, and details of installation, including anchor, flashing, and sealant installation.
Samples: For each exposed product and for each color specified, 2 by 4 inches in size.
Samples for Initial Selection: For units with factory-applied finishes.
Include Samples of hardware and accessories involving color selection.
Samples for Verification: For aluminum windows and components required, showing full range of color variations for finishes, and prepared on Samples of size indicated below:
Exposed Finishes: 2 by 4 inches.
Exposed Hardware: Full-size units.
Product Schedule: For aluminum windows. Use same designations indicated on Drawings.

INFORMATIONAL SUBMITTALS
Qualification Data: For manufacturer and Installer.
Product Test Reports: For each type of aluminum window, for tests performed by a qualified testing agency.
Field quality-control reports.
Sample Warranties: For manufacturer's warranties.

QUALITY ASSURANCE
Manufacturer Qualifications: A manufacturer capable of fabricating aluminum windows that meet or exceed performance requirements indicated and of documenting this performance by test reports and calculations.
Installer Qualifications: An installer acceptable to aluminum window manufacturer for installation of units required for this Project.

WARRANTY
Special Warranty: Provide warranty in accordance with Window Guarantee provisions on form included at the end of this Section.
Failures include, but are not limited to, the following:
Failure to meet performance requirements.
Structural failures including excessive deflection, water leakage, condensation, and air infiltration.
Faulty operation of movable sash and hardware.
Deterioration of materials and finishes beyond normal weathering.

Warranty Period:
General Contractor and Installer: 5 years from date of Substantial Completion.
Manufacturer: 10 years from date of Substantial Completion.

PART 2 PRODUCTS

MANUFACTURERS

Fixed Windows
(AW-1) Basis-of-Design Product: Subject to compliance with requirements, provide Graham series 1200 Architectural Grade windows or comparable products by one of the following manufacturers:
DeSco Architectural Windows; i85 Series. (ADD-1)
EFCO Corporation; a Pella company.
Wausau Window and Wall Systems; EFCO Corporation; a Pella company.
Graham Architectural Products Corp.
Kawneer North America; an Alcoa company
Wausau Window and Wall Systems
YKK AP America Inc

Source Limitations: Obtain aluminum windows from single source from single manufacturer.

WINDOW PERFORMANCE REQUIREMENTS

Product Standard: Comply with AAMA/WDMA/CSA 101/1.S.2/A440 for definitions and minimum standards of performance, materials, components, accessories, and fabrication unless more stringent requirements are indicated.
Window Certification: AAMA certified with label attached to each window.
Performance Class and Grade: AAMA/WDMA/CSA 101/1.S.2/A440 as follows:
Minimum Performance Class: AW.
Minimum Performance Grade: 50.
Thermal Transmittance: NFRC 100 maximum whole-window U-factor of .35 Btu/sq, ft. x h x deg F
Solar Heat-Gain Coefficient (SHGC): NFRC 200 maximum whole-window SHGC of 0.40.
Condensation-Resistance Factor (CRF): Provide aluminum windows tested for thermal performance according to AAMA 1503, showing a CRF of .63.
Thermal Movements: Provide aluminum windows, including anchorage, that allow for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures by preventing buckling, opening of joints, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
Temperature Change: 120 deg F, ambient; 180 deg F material surfaces.

ALUMINUM WINDOWS

Types: Provide the following types in locations indicated on Drawings:
Fixed.
Thermally Improved Construction: Fabricate frames, sashes, and muntins with an integral, concealed, low-conductance thermal barrier located between exterior materials and window members exposed on interior side in a manner that eliminates direct metal-to-metal contact.
Window Frame Depth:
Fixed: 3-1/4”.
Insulating-Glass Units: ASTM E2190.
Glass: ASTM C1036, Type 1, Class 1, q3.

Kind: Fully tempered where indicated on Drawings or where required by code.

Filling: Fill space between glass lites with argon.

Low-E Coating: Sputtered on second surface.

Hardware, General: Provide manufacturer’s standard hardware fabricated from aluminum, stainless steel, carbon steel complying with AAMA 907, or other corrosion-resistant material compatible with adjacent materials; designed to smoothly operate, tightly close, and securely lock windows, and sized to accommodate sash weight and dimensions.

Exposed Hardware Color and Finish: As selected by Architect from manufacturer’s full range.

Weather Stripping: Provide full-perimeter weather stripping for each operable sash unless otherwise indicated.

Fasteners: Noncorrosive and compatible with window members, trim, hardware, anchors, and other components.

Exposed Fasteners: Do not use exposed fasteners to greatest extent possible. For application of hardware, use fasteners that match finish hardware being fastened.

ACCESSORIES

Dividers (Muntins): Provide extruded-aluminum divider grilles in designs indicated for each sash lite.

Muntin design shall be accomplished as follows:

Exterior grid shall be extruded rectangular tube muntins with integral reveal extruded into shape to replicate original muntin design.

Internal aluminum spacer grid shall be included with i.g. unit aligned with exterior and interior grids – misalignment of these grids shall be reason for rejection (tolerance = + or -.125”)

Interior muntins shall be flatstock applied to the #4 surface of the i.g. unit.

All muntin fabrication and application shall be done in listed manufacturer’s facility with manufacturer’s personnel to control quality and alignment.

Subsills: Thermally broken, extruded-aluminum subsills in configurations indicated on Drawings.

Interior Trim: Extruded-aluminum profiles in sizes and configurations indicated on Drawings.

Insert other accessories, such as nail fins, if required.

FABRICATION

Fabricate aluminum windows in sizes indicated. Include a complete system for assembling components and anchoring windows.

Glaze aluminum windows in the factory. Field or installer glazing of windows will not be permitted on this project.

Weather strip each operable sash to provide weathertight installation.

Weep Holes: Provide weep holes and internal passages to conduct infiltrating water to exterior.

Complete fabrication, assembly, finishing, hardware application, and other work in the factory to greatest extent possible. Disassemble components only as necessary for shipment and installation.

GENERAL FINISH REQUIREMENTS

Comply with NAAMM’s "Metal Finishes Manual" for recommendations for applying and designating finishes.

Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.
ALUMINUM FINISHES

Finish designations prefixed by AA comply with the system established by the Aluminum Association for designating aluminum finishes.

Class I, Clear Anodic Finish: AA-M12C22A41 (Mechanical Finish: nonspecular as fabricated; Chemical Finish: etched, medium matte; Anodic Coating: Architectural Class I, clear coating 0.018 mm or thicker) complying with AAMA 611.

PART 3 EXECUTION

EXAMINATION

Examine openings, substrates, structural support, anchorage, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

Verify rough opening dimensions, levelness of sill plate, and operational clearances.

Examine wall flashings, vapor retarders, water and weather barriers, and other built-in components to ensure weathertight window installation.

Proceed with installation only after unsatisfactory conditions have been corrected.

INSTALLATION

Comply with manufacturer's written instructions for installing windows, hardware, accessories, and other components. For installation procedures and requirements not addressed in manufacturer's written instructions, comply with installation requirements in ASTM E2112.

Install windows level, plumb, square, true to line, without distortion or impeding thermal movement, anchored securely in place to structural support, and in proper relation to wall flashing and other adjacent construction to produce weathertight construction.

Install windows and components to drain condensation, water penetrating joints, and moisture migrating within windows to the exterior.

Separate aluminum and other corrodible surfaces from sources of corrosion or electrolytic action at points of contact with other materials.

FIELD QUALITY CONTROL

Testing Agency: Contractor will engage a qualified testing agency to perform tests and inspections.

Testing and inspecting agency will interpret tests and state in each report whether tested work complies with or deviates from requirements.

Testing Services: Testing and inspecting of installed windows shall take place as follows:

Testing Methodology: Testing of windows for air infiltration and water resistance shall be performed according to AAMA 502.

Air-Infiltration Testing:
Test Pressure: That required to determine compliance with AAMA/WDMA/CSA 101/I.S.2/A440 performance class indicated.
Allowable Air-Leakage Rate: 1.5 times the applicable AAMA/WDMA/CSA 101/I.S.2/A440 rate for product type and performance class rounded down to one decimal place.

Water-Resistance Testing:
Test Pressure: Two-thirds times test pressure required to determine compliance with AAMA/WDMA/CSA 101/I.S.2/A440 performance grade indicated.
Allowable Water Infiltration: No water penetration.

Testing Extent: Three windows of each type as selected by Architect and a qualified independent testing and inspecting agency. Windows shall be tested after perimeter sealants have cured.

Test Reports: Prepared according to AAMA 502.
Remove and replace noncomplying windows and retest as specified above.

Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

Prepare test and inspection reports.

ADJUSTING, CLEANING, AND PROTECTION

Clean exposed surfaces immediately after installing windows. Avoid damaging protective coatings and finishes. Remove excess sealants, glazing materials, dirt, and other substances.

Keep protective films and coverings in place until final cleaning.

Remove and replace glass that has been broken, chipped, cracked, abraded, or damaged during construction period.

Protect window surfaces from contact with contaminating substances resulting from construction operations. If contaminating substances do contact window surfaces, remove contaminants immediately according to manufacturer's written instructions.

END OF SECTION
SECTION 09 67 23

RESINOUS FLOORING

PART 1 - GENERAL

SUMMARY

Section Includes:

- Resinous flooring system (RES-1).
- Preparation of concrete substrate to receive resinous flooring.

Related Sections:

- Section 03 30 00 - Cast-In-Place Concrete: for concrete substrates to receive resinous flooring. Coordinate requirements, including under-slab-on-grade vapor retarder, with products specified in this Section.
- Section 07 90 00 - Joint Protection: for sealants installed at joints in resinous flooring systems.
- Section 09 66 23 - Epoxy-Resin Terrazzo Flooring: for thin-set, resinous matrix terrazzo.

COORDINATION

Concrete Curing: Coordinate curing methods with manufacturer’s requirements for substrate compatibility.

ACTION SUBMITTALS

Product Data: For each type of product specified. Include manufacturer's technical data, installation instructions, and recommendations for each resinous flooring component required.

Samples for Initial Selection: Submit samples representing standard color range.

Samples: Provide samples for each resinous flooring system required, 6 inches square, applied by Installer for this Work to a rigid backing, in color, texture, and finish indicated. Where finishes involve normal color and texture variations, include sample sets showing the full range of variations expected.

INFORMATIONAL SUBMITTALS

Test Reports:

- Material test reports for each resinous flooring system.
- Adhesion Test Report

Installer Certificates: Signed by manufacturer certifying that installers comply with specified requirements.

Maintenance and Repair Data: Provide with maintenance manuals specified in Division 1.

QUALITY ASSURANCE

Installer Qualifications: Manufacturer's authorized representative who is trained and approved for installation of flooring systems required for this Project.

Engage an installer who is certified in writing by resinous flooring manufacturer as qualified to apply resinous flooring systems indicated.

Preinstallation Conference: Conduct conference at Project site.

Mockups: Apply mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.

Apply full-thickness mockups on 48-inch- square floor area selected by Architect.

Simulate finished lighting conditions for Architect's review of mockups.

Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

PROJECT CONDITIONS

Environmental Limitations: Comply with resinous flooring manufacturer's written instructions for substrate temperature, ambient temperature, moisture, ventilation, and other conditions affecting resinous flooring installation.
Lighting: Provide uniform and sufficient lighting in areas of installation.
Close spaces to traffic during resinous flooring application and for not less than 24 hours after application, unless manufacturer recommends a longer period.
Ventilate area in which flooring is being applied as required.

PART 2 - PRODUCTS

PERFORMANCE REQUIREMENTS
Source Limitations: Obtain primary elastomeric flooring materials including primers, resins, hardening agents, grouting coats, topcoats, finish and sealing coats from single manufacturer. Obtain secondary materials, including patching and fill material, joint sealant, and repair materials, of type and from manufacturer recommended in writing by Manufacturer of primary materials.
Flammability: Self-extinguishing according to ASTM D 635.

MANUFACTURERS
Products and Manufacturers: Subject to compliance with requirements, provide Basis of Design or equivalent flooring system as approved by Architect by one of the following manufacturers:
BASF Building Systems, BASF Construction Chemicals, Inc..
Dex-O-Tex, Crossfield Products Corporation.
DUDICK Inc..
General Polymers, a Sherwin-Williams Company.
International Coatings, Inc..
Key Resin Company (ADD-1)
Mesor Company, Inc..
NEOGARD; Division of JONES-BLAIR.
PLEXICOAT, a Sherwin-Williams Company.
PPG Industries, Inc..
Rust-Oleum Corporation.
Stonehard, Inc..
Tennant Company.
Tnemec Company, Inc..
Valspar Flooring.

EPOXY RESINOUS FLOORING
(RES-1) Resinous Flooring: Abrasion-, impact- and chemical-resistant, decorative-aggregate-filled, epoxy-resin-based, monolithic floor surfacing designed to produce a seamless floor and integral cove base.
System Description:
Primer: Type recommended by manufacturer for substrate and body coats indicated.
Body Coats:
Resin: Epoxy resin, 100 percent solid.
Application Method: Self-leveling slurry with broadcast aggregate.
Aggregates: Manufacturer's standard.
Topcoat: Sealing or finish coats.
Resin: Epoxy.
Type: Clear.
Finish: To match existing coating.
Base: Integral cove bases.
Height: To match existing.
System Characteristics:
Color and Pattern: To match existing Grey.
Wearing Surface: Lightly textured to match existing.
Overall System Thickness: 1/8 inch.
Products and Manufacturers:
System by Sherwin-Williams:
Primer Coat: ArmorSeal 33 Epoxy Primer/Sealer, B58-33 Series
Application: 7.0 - 8.0 dry mils.
Application: 10.0 - 30.0 dry mils per coat.
System by Tnemec:
Base Coats: Tnemec Series 237 Power-Tread,
Finish Coats: Tnemec Series 280 Tneme-Glaze,
Other resinous flooring systems subject to compliance with requirements and approval by Architect.

**SUBSTRATE PREPARATION MATERIALS**
Moisture Vapor Control: Provide Manufacturer’s moisture mitigation primer as recommended in writing by flooring system Manufacturer.
Patching and Fill Material: Resinous product of or approved by resinous flooring manufacturer and recommended by manufacturer for application indicated.
Joint Sealant: Provide sealant type recommended or produced by resinous flooring manufacturer for type of service and joint condition indicated, and compatible with resinous floor system.

**PART 3 - EXECUTION**

**EXAMINATION**
Ensure that subfloor is clean, dry, hard, sound, and free of oils or other substance which would affect proper bonding and curing.
Substrate shall be above 50 degrees F, dry and free of excessive water vapor transmission with a relative humidity below 85 percent.
Moisture Vapor Transmission: Perform Calcium Chloride test per ASTM F1869-04 to determine moisture vapor emission levels prior to application. If results exceed 3 pounds per 1000 square feet in 24 hours, apply manufacturer’s recommended vapor control product and retest until results are within 3 pound limit.
If test results exceed 15 pounds per 1000 square feet in 24 hours, consult resinous flooring manufacturer before applying vapor control products. Perform test after surface cleaning is performed. Notify Architect immediately of test results.
Verify that all floor penetrations are sealed.

**SUBSTRATE PREPARATION**
Concrete Substrates, General: Provide sound concrete surfaces free of laitance, glaze, efflorescence, curing compounds, form-release agents, dust, dirt, grease, oil, and other contaminants incompatible with resinous flooring.
Shot-blast surfaces with an apparatus that abrades the concrete surface, contains the dispensed shot within the apparatus, and re-circulates the shot by vacuum pickup.
Repair damaged and deteriorated concrete according to resinous flooring manufacturer’s written recommendations.
Prepare and clean substrates according to resinous flooring manufacturer’s written instructions for substrate indicated.
Strip all concrete cracks, construction joints with 10 inch wide elastomeric membrane with polypropylene fabric reinforcing.
Moisture Testing: Verify that concrete substrates are dry and moisture-vapor emissions are within acceptable levels according to manufacturer’s written instructions.
Perform anhydrous calcium chloride test, ASTM F 1869. Proceed with application of resinous flooring only after substrates have maximum moisture-vapor-emission rate of 3 lb of water/1000 sq. ft. of slab area in 24 hours.
Perform plastic sheet test, ASTM D 4263. Proceed with application only after testing indicates absence of moisture in substrates.
Perform relative humidity test using in situ probes, ASTM F 2170. Proceed with installation only after substrates have a maximum 75 percent relative humidity level measurement.
Alkalinity and Adhesion Testing: Verify that concrete substrates have pH within acceptable range.
Perform tests recommended by manufacturer. Proceed with application only after substrates pass testing.
Control Joint Treatment: Treat control joints and other nonmoving substrate cracks to prevent cracks from reflecting through resinous flooring according to manufacturer's written instructions.

Patching and Filling: Use patching and fill material to fill holes and depressions in substrates according to manufacturer's written instructions.

Keyways: Saw-cut key ways into concrete substrate in accordance with Manufacturer’s written recommendations.

**APPLICATION**

General: Apply components of flooring system according to manufacturer's written instructions to produce a uniform, monolithic wearing surface of thickness indicated. Coordinate application of components to provide optimum adhesion of resinous waterproof flooring system to substrate and optimum intercoat adhesion. Cure resinous components according to manufacturer's written instructions. Prevent contamination during application and curing processes. At substrate expansion and isolation joints, provide joint in resinous flooring to comply with resinous flooring manufacturer's written recommendations. Apply system with sufficient texture to slip resistance required by local code and provide surface texture to allow ease of cleaning.

Primer: Apply primer over prepared substrate at manufacturer's recommended spreading rate.

Reinforcement: Apply reinforcing membrane to substrate cracks.

Coatings: Apply coatings in thickness indicated. When cured, sand to remove trowel marks and roughness.

Self-Leveling Body Coats: Apply self-leveling slurry body coats in thickness indicated for flooring system. Troweled or Screeded Body Coats: Apply troweled or screeded body coats in thickness indicated for flooring system. Hand or power trowel and grout to fill voids. When body coats are cured, remove trowel marks and roughness using method recommended by manufacturer.

Grout Coat: Apply grout coat, of type recommended by resinous flooring manufacturer, to fill voids in surface of final body coat.

Topcoats: Apply topcoats in number indicated for flooring system and at spreading rates recommended in writing by manufacturer and to produce wearing surface indicated.

Aggregates: Broadcast aggregates at rate recommended by manufacturer and, after resin is cured, remove excess aggregates to provide surface texture indicated.

Integral Cove Base: Apply cove base mix to wall surfaces before applying flooring. Apply according to manufacturer's written instructions and details including those for taping, mixing, priming, troweling, sanding, and topcoating of cove base. Round internal and external corners.

Integral Cove Base Height: To match existing base.

**FIELD QUALITY CONTROL**

Material Sampling: Owner may at any time and any number of times during resinous flooring application require material samples for testing for compliance with requirements. General Contractor will engage and pay for an independent testing agency to take samples of materials being used. Material samples will be taken, identified, sealed, and certified in presence of Contractor. Testing agency will test samples for compliance with requirements, using applicable referenced testing procedures or, if not referenced, using testing procedures listed in manufacturer's product data. If test results show applied materials do not comply with specified requirements, pay for testing, remove noncomplying materials, prepare surfaces coated with unacceptable materials, and reapply flooring materials to comply with requirements.

Prepare test and inspection reports.
INSTALLED WORK

Protection: Protect resinous flooring from damage and wear during the remainder of construction period. Use protective methods and materials, including temporary covering, recommended in writing by resinous flooring manufacturer.

END OF SECTION
SECTION 23 09 24
DIRECT DIGITAL CONTROL SYSTEM FOR HVAC
(INFORMATIONAL PURPOSES ONLY) (ADD-1)
BASED ON DFD MASTER SPECIFICATION DATED 10/13/2017

PART 1 - GENERAL

SCOPE

The work associated with this section will be quoted to the mechanical contractors by the Johnson Controls Madison branch office by Jim Procknow (608) 335-2996 and will be an extension of the existing JCI Extended Architecture BAS system.

The work associated with this section WILL NOT be bid as part of the Division 23 scope of work. (ADD-1)

Work in this section includes Direct Digital Control (DDC) panels, main communication trunk, software programming, and other equipment and accessories necessary to constitute a completely coordinated extension of the existing campus or building Direct Digital Control (DDC) system. This system interfaced with pneumatic/electric controls (Section 23 09 14) utilizing Direct Digital Control signals to operate actuated control devices will meet, in every respect, all operational and quality standards specified herein, a fully coordinated modification and extension via DDC of the existing Central Campus Automation System.

PART 1 - GENERAL
Scope
Related Work
Reference
Reference Standards
Work Not Included
Quality Assurance
Submittals
Operation and Maintenance Data
Material Delivery and Storage

PART 2 - PRODUCTS
General
Local Control Panels
Direct Digital Controls (DDC)
Networking/Communications
BACnet Requirements
Supervisory Controllers
Application Specific Controllers - HVAC

PART 3 - EXECUTION
General
Installation
Construction Verification
Functional Performance Testing
Agency Training

RELATED WORK
Section 01 91 01 – Commissioning Process
Section 23 05 93 - Testing, Adjusting, and Balancing for HVAC - Coordination
Section 23 08 00 – Commissioning of HVAC

Section 23 09 14 - Electric Instrumentation and Control Devices for HVAC
Section 23 09 15 - Direct Digital Control Input/Output Point Summary Tables
Section 23 09 93 - Control Sequences
Division 23 - HVAC - Equipment provided to be controlled or monitored
Division 26 - Electrical - Equipment provided to be controlled or monitored

REFERENCE
Applicable provisions of Division 1 govern work under this section.

REFERENCE STANDARDS

WORK NOT INCLUDED
Section 23 09 14 work includes furnishing and installing all field devices, including electronic sensors for the DDC of this section, equipment, and all related field wiring, interlocking control wiring between equipment, pneumatic tubing, sensor mounting, etc., that is covered in that section.

Motorized control dampers and actuators, automatic control valves and their actuators are also covered in Section 23 09 14.

QUALITY ASSURANCE

MANUFACTURERS:
Johnson Controls Inc.

INSTALLER:
A firm specializing and experienced in DDC control system installation for no less than 3 years. All engineering and commissioning work shall be done by qualified personnel in the direct employ of this manufacturer, or of an Authorized Representative of that manufacturer that provides engineering and commissioning of the manufacturers control equipment. Where installing contractor is an authorized representative of the control equipment manufacturer, submit written confirmation of such authorization. Indicate in letter of authorization that the installing contractor has successfully completed all necessary training required for the engineering, installation, and commissioning of equipment and systems to be provided for the project, and that such authorization has been in effect for a period of not less than three years. The letter of authorization should also indicate that the installing contractor is authorized to install the manufacturer’s DDC equipment at the project location at the time the project is bid. Installation of the equipment shall be done by qualified mechanics and/or electricians in the direct employ or be directly subcontracted and under the supervision of the manufacturer or Authorized Representative.

RESPONSE TIME:
During warrantee period, four (4) hours or less, 24-hours/day, 7 days/week.

ELECTRICAL STANDARDS:
Provide electrical products, which have been tested, listed and labeled by Underwriters’ Laboratories (UL) and comply with NEMA standards.

DDC Standards: DDC manufacturer shall provide written proof with shop drawings that the equipment being provided is in compliance with FCC rules governing the control of interference caused by Digital Electronic Equipment to Radio Communications (Part 15, Subpart J, Class A).

SUBMITTALS
Include the following information:
Details of construction, layout, and location of each temperature control panel within the building, including instruments location in panel and labeling. Indicate which piece of mechanical equipment is associated with each controller and what area within the building is being served by that equipment. For terminal unit control, provide a room schedule that lists mechanical equipment tag, room number of space served, address of DDC controller, and any other pertinent information required for service.

PRODUCT DATA:
Submit manufacturer’s specifications for each control device furnished, including installation instructions and startup instructions. General catalog sheets showing a series of the same device is not acceptable unless the specific model is clearly marked. Annotated software program documentation shall be submitted for system sequences, along with descriptive narratives of the sequence of operation of the entire system involved. Submit wiring diagram for each electrical control device along with other details required to demonstrate that the system has been coordinated and will function as a system.

MAINTENANCE DATA:
Submit maintenance data and spare parts lists for each control device. Include this data in maintenance manual.

RECORD DRAWINGS:
Prior to request for final payment provide complete composite record drawings to incorporate the DDC and Pneumatic/Electric fieldwork. Accurate Section 23 09 14 record drawings to be supplied by the Section 23
09 14 contractor with the accuracy of these drawings being the responsibility of the 23 09 14 contractor. In the event that changes are required to the 23 09 14 supplied record drawings after they have been compiled by the 23 09 24 contractor, it shall be the 23 09 14 contractor’s responsibility to provide updated composite record drawings incorporating the 23 09 24 record drawings. All software addressing for device communication shall be noted for all devices provided under this section and the communication addressing required for devices provided by others that are integrated into the direct digital control system provided under this section. Point to point routing of communication trunks and power wiring between DDC controllers, DDC communication devices, control panels, and Ethernet switches shall be documented. For systems that have additions to existing communication networks, provide complete DDC network diagrams for the entire building with new work clearly delineated. Coordinate with the supplier of the equipment specified to be interfaced through digital communications for communication addressing. Provide circuit number of 120VAC panel power circuit(s) feeding each control panel on record drawings. Label circuit number(s) inside the panel served.

OPERATION AND MAINTENANCE DATA
All operations and maintenance data shall comply with the submission and content requirements specified under section GENERAL REQUIREMENTS.

MATERIAL DELIVERY AND STORAGE
Provide factory-shipping cartons for each piece of equipment and control device. This contractor is responsible for storage of equipment and materials inside and protected from the weather.

PART 2 - PRODUCTS

GENERAL
Provide DDC control products in sizes and of capacities as required, conforming to manufacturer's standard materials and components as published in their product information, designed and constructed as recommended by the manufacturer and as required for application indicate.

System shall be capable of operating with 120 VAC power supply, fully protected with a shutdown-restart circuit, and associated hardware and software.

All DDC controllers shall use screw terminals for termination of individual wires. Spade lugs are not acceptable.

LOCAL CONTROL PANELS
Use control panels with suitable mounting brackets for each supply fan system. Locate panel adjacent to system served.

Fabricate panels of 14 gauge furniture grade steel or 6063-T5 extruded aluminum alloy, totally enclosed on six sides, hinged door and keyed lock, with manufacturer's standard shop painted finish and color.

Provide UL listed cabinets for use with line voltage devices.

Control panels that have devices or terminations that are fed or switch 50V or higher shall enclose the devices, terminations, and wiring so that Personal Protective Equipment (PPE) is not required to service the under 50V devices and terminations within the control panel. As an alternative, a separate panel for only the 50V and higher devices may be provided and mounted adjacent to the under 50V control panel. For DDC controllers that are directly fed by 120VAC, provide an externally mounted 120VAC, 5A fast blow fuse to feed these controllers.

Plastic control enclosures will be approved provided all conduits are bonded and grounded.

Provide control panels for all DDC Controllers, ASC’s and associated function modules. All controls to be in control panels provided under this Section except for the following:

- Terminal unit controllers mounted within the terminal unit equipment enclosure as specified under Section 23 09 14.
- Above accessible lay-in tile ceilings where VAV box controllers designed to be directly mounted on air terminals.
- Above accessible lay-in tile ceilings where additional controllers are required for air terminal unit control. Where additional controllers are required, they shall not be mounted directly to

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the ductwork but be mounted on din rail or back panel in an accessible location as close as possible to the terminal unit(s) being controlled.

- Any devices other than DDC controllers, i.e. relays, pressure switches, etc. shall be installed in an enclosure.

All wiring for controllers shall be managed in a neat and workmanlike manner.

All cabling and electrical wiring terminated at controllers, devices and terminal strips are to be permanently tagged or labeled with permanent adhesive labels within one inch of terminal strip with a numbering system to correspond exactly with the "Record Drawings". Jumpers where the both ends of the wire are visible and terminations are within 6" of each other do not need to be labeled. Spare wires are to be labeled as “Spare” with unique number designations.

**DIRECT DIGITAL CONTROLS**

System to be capable of integrating multiple building functions, including equipment supervision and control, alarm management, energy management, and trend data collection.

DDC to consist of Supervisory Controllers, Programmable Controllers, stand-alone Application Specific Controllers (ASC's), Operators Terminals, Operator Workstations, DDC system servers, and other operator interface devices.

The vendor of the system provided under this Section shall provide all software and communication interface hardware necessary to program and upload/download programmable and application specific controllers from a laptop computer and make additional copies and future software revisions available for sale directly to the user Agency.

The system shall be modular in nature, and shall permit expansion of both capacity and functionality through the addition of sensors, actuators, ASC’s, and operator devices.

The failure of any single component or network connection shall not interrupt the execution of control strategies at other operational devices.

**NETWORKING/COMMUNICATIONS**

The design of the DDC shall be networked. The highest level networking shall use Ethernet and the sub-level networking shall use serial communications. Inherent in the system’s design shall be the ability to expand or modify the highest network either via a local area network (LAN), wide area network (WAN), or a combination of the two schemes.

The highest level DDC communications network shall be capable of direct connection to and communication with a high-speed LAN or WAN utilizing an Ethernet connection.

The supervisory controller shall directly oversee a local network such that communications may be executed directly to and between programmable controllers and ASC's. All operator devices, either network resident or connected via dial-up modems, shall have the ability to access all points and application reports on the network.

Provide serial communication ports on all ASC's for operator's terminal communications with the DDC Controller.

Access to system data shall not be restricted by the hardware configuration of the DDC system.

Global data sharing or global point broadcasting shall allow point data to be shared between programmable controllers and ASC's when it would be impractical to locate multiple sensors.

Network design shall include the following provisions:

- Data transfer rates for alarm reporting and quick point status from multiple programmable controllers and ASC’s. The minimum baud rate shall be 9600 baud.

- Support of any combination of programmable controllers and ASC's. A minimum of 32 programmable controllers and ASC’s shall be supported on a single local network. The buss shall be addressable for up to 32 ASC's.
- Detection of single or multiple failures of programmable controllers and ASC's or the network media.
- Error detection, correction, and re-transmission to guarantee data integrity.
- Use commonly available, multiple-sourced, networking components.
- Use of an industry standard communication transport, such as ARCNET, Ethernet, and IEEE RS-485 communications interface.

Provide a temporary Ethernet network for communications between supervisory controllers and operator workstation until the building IT network is available for use by the DDC system. The temporary Ethernet network and all other communications required for the DDC system shall be installed as required for specified operation of mechanical equipment so check out and commissioning of the equipment can occur in a timely manner.

**BACNET REQUIREMENTS**

BACnet of highest level network communications shall be capable of BACnet/IP over Ethernet and field level communications shall utilize BACnet MSTP

Supervisory controllers shall provide a Protocol Implementation Conformance Statement (PICS) and BACnet Interoperability Building Blocks (BIBB’S) as required by the American National Standards Institute/American Society of Heating, Refrigerating, and Air-Conditioning Engineers (ANSI/ASHRAE) Standard 135-2001, BACnet protocol.

In general, all highest level networked supervisory devices shall support the following

- Segmentation Capability
- Segmentation requests supported
- Segmentation responses supported
- Standard Object Types Supported

  - Analog input
  - Analog output
  - Analog value
  - Binary input
  - Binary output
  - Binary value
  - Calendar
  - Device
  - Event enrollment
  - Group
  - Multistate input
  - Multistate output
  - Multistate value
  - Notification class
  - Schedule

- Data Link Layer Option

  - BACnet Internet Protocol (IP) (Annex J)

- Networking Options

  - BACnet/IP Broadcast Management Device (BBDM)

- Character Sets supported

  - ANSI X3.4
  - ISO 10646 Universal Character Set-2
BACnet object name and description shall match the existing naming conventions used by the state Agency for their existing Building Automation System. Coordinate with Agency control personnel to establish the naming conventions prior to programming of any controllers provided under this specification section. All controllers shall have object names, descriptions, and engineering units that are writable at the controller level and shall be programmed so that the object names, descriptions, and engineering units match the desired naming standards as specified above. Ensure that the BACnet object attributes for object name, object description, engineering units and other required attributes will be transferred through to the Supervisory Controller when the auto-discovery function is executed.

Coordinate BACnet device instance numbering with the agency facility personnel for controllers provided under this Section that are being connected to an existing building automation system. This contractor shall be responsible for correcting any conflicts with existing devices that may occur or changing the device instance numbers to comply to follow the agency BACnet device instance numbering scheme.

The following table indicates the minimum VAV terminal unit objects, the associated naming, and the object values that are required to be writable that shall be provided for all VAV terminals. If the agency does not have a convention for VAV terminal object names and descriptions that it prefers, use the naming standards as listed below. Provide similar naming and descriptions that are approved by the agency for other types of terminal units and mechanical systems.

<table>
<thead>
<tr>
<th>Object Type</th>
<th>Object Name</th>
<th>Object Description</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>BV</td>
<td>DEVICE-S</td>
<td>DEVICE STATUS - SERVED BY AHU#</td>
<td>ONLINE/OFFLINE</td>
</tr>
<tr>
<td>MV</td>
<td>OCC-MODE</td>
<td>OCCUPIED MODE</td>
<td>OCC/UNOCC/STNDBY</td>
</tr>
<tr>
<td>BV</td>
<td>OCC-SCHED</td>
<td>OCCUPIED SCHEDULE Xam-Xpm</td>
<td>OCC/UNOCC</td>
</tr>
<tr>
<td>DI</td>
<td>OCC-S</td>
<td>OCCUPANCY SENSOR STATUS</td>
<td>OCC/UNOCC</td>
</tr>
<tr>
<td>AV</td>
<td>ZN-SP</td>
<td>ZONE TEMPERATURE SETPOINT</td>
<td>DEG F</td>
</tr>
<tr>
<td>AI</td>
<td>RM#-T</td>
<td>ROOM #### TEMPERATURE</td>
<td>DEG F</td>
</tr>
<tr>
<td>AI</td>
<td>DA-T</td>
<td>DISCHARGE AIR TEMPERATURE</td>
<td>DEG F</td>
</tr>
<tr>
<td>AO</td>
<td>HTG-VLV</td>
<td>HEATING VALVE</td>
<td>% OPEN</td>
</tr>
<tr>
<td>AO</td>
<td>SA-DPR</td>
<td>SUPPLY AIR DAMPER</td>
<td>% OPEN</td>
</tr>
<tr>
<td>AV</td>
<td>CFM-SP</td>
<td>ACTUAL FLOW SETPOINT</td>
<td>CFM</td>
</tr>
<tr>
<td>AI</td>
<td>CFM-FLOW</td>
<td>SUPPLY AIR FLOW</td>
<td>CFM</td>
</tr>
<tr>
<td>AV</td>
<td>HTG-SP</td>
<td>HEATING TEMPERATURE SETPOINT</td>
<td>DEG F</td>
</tr>
<tr>
<td>AV</td>
<td>CLG-SP</td>
<td>COOLING TEMPERATURE SETPOINT</td>
<td>DEG F</td>
</tr>
<tr>
<td>AV</td>
<td>OCC-C-CFM-MIN</td>
<td>OCCUPIED CLG CFM MIN SETPOINT</td>
<td>CFM</td>
</tr>
<tr>
<td>AV</td>
<td>OCC-C-CFM-MAX</td>
<td>OCCUPIED CLG CFM MAX SETPOINT</td>
<td>CFM</td>
</tr>
</tbody>
</table>

SUPERVISORY CONTROLLERS

Supervisory controllers shall be microprocessor-based, multi-tasking, multi-user and digital control processors.

Each supervisory controller shall have sufficient memory to support its own operating system and databases including:

- Control processes
- Energy management application
- Alarm management
- Trend data
• Maintenance support applications
• Operator I/O
• Dial-up communications
• Manual override monitoring

The system shall be modular in nature, and shall permit easy expansion through the addition of field controllers, sensors, and actuators.

Supervisory controllers shall provide at least two RS-232C, USB serial communication ports, or Ethernet ports for simultaneous operation of multiple operator I/O devices, such as laptop computers, personal computers, and video display terminals.

Supervisory controllers shall monitor the status of all overrides and include this information in the logs and summaries to inform the operator that automatic control has been inhibited.

Each supervisory controller shall continuously perform self-diagnostics, communications diagnostics, and diagnostics of all subsidiary equipment. Supervisory controllers shall provide both local and remote annunciation of any detected component failures, or repeated failure to establish communication. Indication of the diagnostic results shall be provided at each supervisory controller.

Isolation shall be provided at all network terminations, as well as all field point terminations, to suppress induced voltage transients consistent with IEEE Standard 587-1980. Isolation levels shall be sufficiently high to allow all signal wiring to be run in the same conduit as high voltage wiring acceptable by electrical code.

In the event of the loss of normal power, there shall be an orderly shutdown of the supervisory controller to prevent the loss of data base or operating system software. Non-volatile memory shall be incorporated for all critical controller configuration data, and battery backup shall be provided to support the real-time clock and all volatile memory for a minimum of 72 hours.

Upon restoration of normal power, the supervisory controller shall automatically resume full operation without manual intervention.

Should supervisory controller memory be lost for any reason, the supervisory controller shall have the capability of reloading the it’s programming via high speed local area network from the control system archive workstation or server, the local RS-232C port, or telephone line dial-in.

Programming tools for programmable and application specific controllers that utilize the Niagara Framework shall not be restricted to any specific brand of Jace. Tools and controllers shall be able to connect to any brand of Jace that are provided under this specification Section.

SYSTEM SOFTWARE FEATURES

All necessary software to form a complete operating system, as described in this specification, shall be provided as an integral part of the supervisory controller, and shall not be dependent upon higher level computer for execution.

Programming tools for programmable and application specific controllers that utilize the Niagara Framework shall not be restricted to any specific brand of Jace. Tools and controllers shall be able to connect to any brand of Jace that are provided under this specification Section. Vendor of the system provided under this Section shall provide all software and hardware necessary to program programmable and application specific controllers and make additional copies and future software revisions available for sale directly to the user Agency.

Control software shall include a provision for limiting the number of times that each piece of equipment may be cycled within any one-hour period.

The system shall provide protection against excessive demand situations during start-up periods by automatically introducing time delays between successive start commands to heavy electrical loads.

Supervisory controllers shall have the ability to perform any or all of the following energy management routines:

• Time of day scheduling
• Calendar based scheduling
- Holiday scheduling
- Optimal start
- Optimal stop
- Demand limiting
- Load rolling
- Heating/cooling interlock

All programs to be executed automatically without the need for operator intervention, and be flexible enough to allow user customization. Programs shall be applied to building equipment described in Section 23 09 93 of this specification.

Supervisory controllers shall be able to execute configured processes defined by the user to automatically perform calculations and control routines.

It shall be possible to use any of the following in a configured process:

- Any system-measured point data or status
- Any calculated data
- Any results from other processes
- Boolean logic operators (and, or)

Configured processes may be triggered based on any combination of the following:

- Time of day
- Calendar date
- Other processes
- Events (e.g., point alarms)

A single process shall be able to incorporate measured or calculated data from any and all other ASC’s.

A single process shall be able to issue commands to points in any and all other programmable controllers and ASC’s on the local network.

Alarm management shall be provided to monitor, buffer, and direct alarm reports to operator devices and memory files. Each supervisory controller shall perform distributed, independent alarm analysis and filtering to minimize network traffic and prevent alarms from being lost. At no time shall the ability of supervisory controllers to report alarms be affected by either operator activity at the local I/O device or communications with other ASC’s on the network.

All alarm or point change reports shall include the English language description of each point and the time and date of the occurrence.

The user shall be able to define the specific system reaction for each point. Alarms shall be prioritized to minimize nuisance reporting and to speed operator response to critical alarms. A minimum of three priority levels shall be provided. Users shall have the ability to manually inhibit alarm reporting for each point.

The user shall also be able to define conditions under which point changes need to be acknowledged by an operator and/or logged for analysis at a later date.

Alarms reports and messages shall be directed to an operator device.

In addition to the point's descriptor and the time and date, the user shall be able to print, display or store a 60-character alarm message to more fully describe the alarm condition or direct operator response.

Each supervisory controller shall be capable of storing a library of at least 100 messages. Each message may be assignable to any number of points in the panel.

A data collection utility shall be provided to automatically sample, store, and display system data.

Measured and calculated analog and binary data shall be assignable to user definable trends for the purpose of collecting operator specified performance data over extended periods of time. Sample intervals of 1 minute to 24 hours, in one minute or one hour intervals, shall be provided. Each supervisory controller shall have a dedicated buffer for trend data and shall be capable of storing 16 trend logs. Each trend log shall have up to
four points trended at 48 data samples each. Data shall be stored at the supervisory controller and up-loaded
to the DDC system server when archiving is desired.

Supervisory controllers shall automatically accumulate and store runtime hours for binary input and output
points specified in Section 23 09 14 of this specification.

Supervisory controllers shall automatically sample, calculate and store consumption totals on a daily, weekly,
or monthly basis, user defined, for user-selected analog and binary pulse input type points.

Totalization shall provide calculation and storage accumulations of up to 9,999,999 units (e.g., KWH, gallons
KBTU, tons, etc.).

The totalization routine shall have a sampling resolution of one minute.

The user shall have the ability to define a warning limit. Unique, user specified messages shall be generated
when the limit is reached.

The information available from pulse totalization shall include, but not be limited to, the following:

- Peak demand, with date and time stamp
- 24-hour demand log
- Accumulated KWH for day
- Sunday through Saturday KWH usage
- Demand KW annual history for past 12 periods
- KWH annual history for past periods

Supervisory controllers shall have the ability to count events, such as the number of times a pump or fan
system is cycled on and off.

The event totalization feature shall be able to store the records associated with a minimum of 9,999,999
events before reset.

APPLICATION SPECIFIC CONTROLLERS - HVAC APPLICATIONS

Each supervisory controller shall be able to extend its monitoring and control through the use of stand-alone
application specific controllers (ASC's).

Each ASC shall operate as a stand-alone controller capable of performing its specified control responsibilities
independently of other controllers in the network. Each ASC shall be a microprocessor based, multi-tasking,
real-time digital control processor.

Each ASC shall have sufficient memory to support its own operating system and databases including:

- Control Processes
- Energy Management Applications
- Operator I/O (Portable Service Terminal)

The operator interface to any ASC point or program shall be through the supervisory controller connection
to any ASC on the network.

ASC's shall directly support the temporary use of a portable service terminal that can be connected to the
ASC via zone temperature or directly at the controller. The capabilities of the portable service terminal shall
include, but not be limited to, the following information for the ASC:

- Display temperatures
- Display status
- Display setpoints
- Display control parameters
- Override binary output control
- Override analog output control
- Override analog setpoints
- Modification of gain and offset constants

All system setpoints, proportional bands, control algorithms, and any other programmable parameters shall
be stored such that a power failure of any duration does not necessitate reprogramming the ASC.
ASC’s shall support, but not be limited to, the following configurations of systems to address current requirements as described in Sections 23 09 14 and 23 09 93 portions of this specification, and for future expansion of air handling units:

- Variable Air Volume Terminals
- Reheat Terminals
- Exhaust Fans

For butterfly type Variable Air Volume (VAV) Terminals, provide differential pressure transducers and damper actuators for flow measurement and actuation of the VAV terminal damper. Pressure transducers for VAV box flow applications do not need to have adjustable pressure ranges or integral display. Provide filter on high side of flow pickups if flow measurement device requires airflow through the device.

Terminal unit space temperature sensors shall be furnished under this Section if they are specified to be provided with digital displays with setpoint adjustments and/or manual occupancy override and indication of occupancy status. Provide information to the AE on sensor colors offered by the manufacturer and obtain approval on what color should be provided on the project. Provide setpoint adjustment as specified in the DDC Input/Output Summary Table and sequence of operation.

Provide a method to view and print a summary of current K-factors for flow correction for each VAV terminal through the DDC system. The summary shall have a minimum of 50 K-factors per group of VAV terminals.

**OPERATOR INTERFACE REQUIREMENTS**

**COMMAND ENTRY/MENU SELECTION PROCESS:**
Operator interface software shall minimize operator training through the use of English language prompting and English language point identification.

**TEXT-BASED DISPLAYS:**
The operator interface shall provide consistent text-based displays of all system point and application data described in this specification. Point identification, engineering units, status indication, and application-naming conventions shall be the same at all operator devices.

**GRAPHIC-BASED DISPLAYS:**
The operator interface shall include graphic based displays of each system on DDC systems that currently employ graphic based displays. The point data associated with each system shall dynamically update at a minimum of every 30 seconds. Graphic displays shall have the ability to be linked to each other to provide a “drill down” capability from main graphic displays to more specific system based displays. Provide a building level graphic display that links to system graphics. For systems that have ASC controlled terminal unit controls, provide a building floor plan with dynamic temperatures shown on the graphic that can be drilled into for more specific terminal information. Points provided in the graphic shall have the override and adjust capability specified under operator commands.

**PASSWORD PROTECTION:**
Multiple-level password access protection shall be provided to allow the user/manager to limit control, display, and data base manipulation capabilities as he deems appropriate for each user, based upon an assigned password.

Passwords shall be exactly the same for all operator devices.

A minimum of three levels of access shall be supported:

- Level 1: Data access and display
- Level 2 = Level 1 + operator overrides and commands
- Level 3 = Level 2 + database generation and modification

A minimum of 4 passwords shall be supported at each supervisory controller.

Operators will be able to perform only those commands available for their respective passwords. Menu selections displayed at any operator device shall be limited to only those items defined for the access level of the password used to log-on.

Provide user definable, automatic log-off timers of from 1 to 60 minutes to prevent operators from inadvertently leaving devices on-line.
OPERATOR COMMANDS:
The operator interface shall allow the operator to perform commands including, but not limited to, the following:

- Start-up or shutdown selected equipment
- Adjust setpoints
- Override analog and binary outputs
- Add/modify/delete time programming
- Enable/disable process execution
- Lock/unlock alarm reporting for each point
- Enable/disable totalization for each point
- Enable/disable trending
- Enter temporary override schedules
- Define holiday schedules
- Change time/date
- Enter/modify analog alarm limits
- Enable/disable analog alarm limits
- Enable/disable demand limiting
- Enable/disable duty cycle

LOGS AND SUMMARIES:
Reports shall be generated manually, and directed to the displays. As a minimum, the system shall allow the user to easily obtain the following general listing of all points in the system, which shall include, but not be limited to:

- Points currently in alarm
- Off-line points
- Points currently in override status
- Points in weekly schedules
- Holiday programming

Summaries shall be provided for specific points, for a logical point group, for a user-selected group of groups, or for the entire facility without restriction due to the hardware configuration on the facility management system. Under no conditions shall the operator need to specify the address of hardware controller to obtain system information.

SYSTEM CONFIGURATION AND DEFINITION:
All temperature and equipment control strategies and energy management routines shall be definable by the operator. System definition and modification procedures shall not interfere with normal system operation and control.

The system shall be provided complete with all equipment, software, and documentation necessary to allow an operator to independently perform the following functions:

- Add/delete/modify application specific controllers
- Add/delete/modify points of any type, and all associated point parameters, and tuning constants
- Add/delete/modify alarm reporting definition for each point
- Add/delete/modify energy management applications
- Add/delete/modify time and calendar-based programming
- Add/delete/modify totalization for every point
- Add/delete/modify historical data trending for every point
- Add/delete/modify configured control processes
- Add/delete/modify dial-up telecommunication definition
- Add/delete/modify all operator passwords
- Add/delete/modify alarm messages

NETWORK WIDE STRATEGY DEVELOPMENT:
Inputs and outputs for any process shall not be restricted to a single programmable controller or ASC, but shall be able to include data from any and all other programmable controller or ASC's to allow the development of network-wide control strategies.

SYSTEM DEFINITION/CONTROL SEQUENCE:
All portions of system definition shall be self-documenting and capable of providing hardcopy printouts of all configuration and application data.

**DATA BASE SAVE/RESTORE/BACK-UP:**
Backup copies of all programmable controller, ASC and supervisory controller databases shall be stored in at least one personal computer or laptop. Users shall also have the ability to manually execute downloading of a programmable controller, ASC or supervisory controller database.

**OPERATOR WORK STATION & DDC SYSTEM SERVER**
Existing Computer (PC) Operator Workstation and DDC System Server software shall be used for command entry, information management, network alarm management, and database management and archiving functions. All functions specified under the Operator Interface section of this specification must be met.

All real-time control functions shall be resident in the stand-alone supervisory controllers to facilitate greater fault tolerance and reliability.

Provide software, including but not limited to functions such as:

- Grouping point data by systems or types
- Displaying trends in textual and graphical format
- Application software for programming all DDC controllers specified herein
- Graphics definition and development
- Managing archive data and programs

This contractor shall provide all labor and software upgrades required so that the manufacturer’s current software revision is provided at substantial completion. If the manufacturer will be upgrading within three months after substantial completion, the contractor must notify the agency that this will occur before substantial completion and provide a quote for upgrading to the current revision.

**PART 3 - EXECUTION**

**GENERAL**
All electronic work required as an integral part of the central campus automation system work is the responsibility of this section unless specifically indicated otherwise in this section, Section 23 09 14, or in Division 26.

This contractor shall provide all labor, materials, engineering, software permits, tools, check-out and certificates required to install a complete DDC expansion to the existing central campus automation system as herein specified. This system expansion shall be compatible with and interfaced to the existing computer driven automation center on campus, and shall operate through all the existing I/O devices, central processing unit (CPU), and digital communication trunks. This connection to the digital communications trunk shall be true bi-directional analog and digital communications with the existing central campus automation system.

Any and all points added with this project shall be properly interfaced into the existing central campus automation system format and grouped for display purposes into the system such that all points associated with a new or existing DDC system can appear together on the CRT display or printed log. Assignment of points to a group shall not be restricted by hardware configuration of the points of direct digital control. It shall be possible to assign a point to appear in more than one system. An English descriptor and an alpha/numeric identifier shall identify each system.

This central campus automation system expansion as herein specified shall be fully integrated and completely installed by this section. It shall include all required computer CPU software and hardware. Include the engineering, installation, supervision, calibration, software programming, and checkout necessary for a fully operational system.

**INSTALLATION**
All work and materials are to conform in every detail to the rules and requirements of the National Electrical Code and present manufacturing standards. All wiring and cable installation shall conform with the wiring installation as specified in the installation section of Section 23 09 14. All material shall be UL approved.

The addition of this specified system expansion shall in no way impair the future capabilities of any existing functions of the computer driven central campus automation system. A system expansion with lesser capabilities will not be accepted. Further, this contractor will not put in jeopardy the normal, uninterruptable
operation of the entire campus automation system the time it is interfaced through the completion of this project.

Install system and materials in accordance with manufacturer's instructions, rough-in drawings and details on drawings.

Line voltage wiring to power the DDC Controllers, not provided by the Division 26 contractor, to be by this contractor.

Control panels serving equipment fed by emergency power shall also be served by emergency power.

Provide uninterruptable power supplies where necessary to provide proper startup of equipment or to accomplish power restart control sequences specified.

Mount control panels adjacent to associated equipment on vibration-free walls or freestanding angle iron supports. One cabinet may accommodate more than one system in same equipment room. Provide printed plastic tags for instruments and controls inside cabinet and on engraved plastic nameplates cabinet face.

Provide as-built control drawings of all systems served by each local panel in a location adjacent to or inside of panel cover. Provide a protective cover or envelope for drawings.

Cable tray routing of the communication trunks is acceptable. 
Where a new system is required to be extended to an existing agency Building Automation Network (BAN) (typically connected via the agency Local Area Network (LAN) or Wide Area Network (WAN)), extension of the data-net between DDC Controllers and to the BAN to be by this contractor unless specified to be provided by the division 27 contractor. All wiring and cable installation shall conform to the wiring installation as specified in the installation section of Section 23 09 14 and division 27. If division 27 is not specified in this project specifications, the state master specification 27 00 00 located on the DFD Master Specification website should be used as reference.

http://www.doa.state.wi.us/DFD/mastspec_new.asp

Provide all necessary routers and or repeaters to accomplish connection to the LAN via the panel-mounted port provided.

Provide two data jacks in control panels housing supervisory controllers and allocate 6”x6” for each data jack in the panel. The first jack will be used for connecting the supervisory controller to the Building Automation Network (BAN). The second jack will be used as a spare for connecting to the BAN by service personnel.

For UW Madison projects, this contractor shall be responsible for data wiring and jack termination as specified under division 27 and the paragraph below unless specified to be provided by the division 27 contractor. Reference the following UW Madison website for additional wiring requirements: https://fpm-www3.fpm.wisc.edu/cpd/Default.aspx?tabid=154

In general, the supervisory controllers provided under this section on UW Madison projects should located adjacent to a temperature control panel they are serving and not in a telecommunication room. Building Automation Network (BAN) data jacks will be installed according to the campus standard except that a data jack is not needed and a patch cord can be used between the utilizing equipment and the network switch port under the following exceptions:

A. If the utilizing equipment is mounted on or within the vertical sides of the floor or wall rack.
B. If the utilizing equipment is mounted within the same telecommunications room and can be reached with a 40 foot or shorter patch cord that is routed with existing cabling in the racks, trays, J-hooks, etc….and is not stretched tight.

NOTE: If a patch cord is used in exceptions A or B above, the patch cord must be labeled on each end listing the termination point on the opposite end.

EXAMPLE:
Switch name and port #........................to..................equipment name
s-weeks-156-1-access, port 22.....................MS-SECVT0 north wall

Provide an input for a service shutdown toggle switch for each air handling unit system provided inside the 23 09 14 temperature control panel that will initiate a logical shutdown of the air handling unit system.
All cables to the DDC panels shall be extended by the pneumatic/electric controls contractor (Section 23 09 14) in the DDC panel with sufficient spare cable (minimum of 5') to allow termination by the DDC Contractor.

Provide a laptop or other tools and training to the 23 09 14 contractor on how to perform the communication trunk testing and end to end point checkout as specified in Section 23 09 14 for terminal units. Terminal unit room schedules are to be provided under Section 23 09 14 and supplied to this contractor. Provide engineered control drawings for installation of the terminal unit controllers and deliver these to the 23 09 14 contractor in time to meet the project schedule for the installation of these terminals.

Pneumatic/electric controls system contractor (Section 23 09 14) shall provide a field mechanic and system technician to inspect and validate all tubing and wiring associated with the DDC contractor (Section 23 09 24).

CONSTRUCTION VERIFICATION
Contractor is responsible for utilizing the construction verification checklists supplied under specification Section 23 08 00 in accordance with the procedures defined for construction verification in Section 01 91 01 or 01 91 02.

FUNCTIONAL PERFORMANCE TESTING
Contractor is responsible for utilizing the functional performance test forms supplied under specification Section 23 08 00 in accordance with the procedures defined for functional performance testing in Section 01 91 01 or 01 91 02.

AGENCY TRAINING
All training provided for agency shall comply with the format, general content requirements and submission guidelines specified under Section 01 91 01 or 01 91 02.

Contractor to provide factory authorized representative and/or field personnel knowledgeable with the operations, maintenance and troubleshooting of the system and/or components defined within this section for a minimum period of 4 hours.

Provide two follow-up visits for troubleshooting and instruction six months after substantial completion and the at the end of the warranty period. Length of each visit to be not less than [4] hours or the time necessary to provide required information and complete troubleshooting and inspection activity for all controls installed under this section. Coordinate the visit with the owner/Agency and provide an inspection report to the owner of any deficiencies found.

END OF SECTION