

Bay City Public Schools

PROJECT MANUAL



2024 Sinking Fund
Bid Pack 1
Central HS Fitness Center
Structural and HVAC

January 27, 2025

ARCHITECTS/ENGINEERS

WTA Architects
100 S Jefferson Ave Ste 601
Saginaw MI 48607
Telephone: 989-752-8107
Fax: 989-752-3125



WTA ARCHITECTS

CONSTRUCTION MANAGER

Wolgast Corporation
4835 Towne Centre Road, Suite 203
Saginaw, Michigan 48604
Telephone: (989) 790-9120
Fax: (989) 790-9063



Bidding Requirements, Contract Forms, and Conditions of the Contract

00005 – Index
00010 – Notice to Bidders
00100 – Instructions to Bidders
00300 – Instructions – Proposals/Bid Division Descriptions
00305 – Proposal Form
00306 – Familial Relationship Affidavit
00307 – Iran Business Relationship Affidavit
00309 – Bid Division Descriptions
00310 – Clarification Request Form
00410 – Bid Security
00500 – Notice to Proceed/Commencement of Work
00510 – Sample Owner/Contractor Agreement
00600 – Bonds
00650 – Certificates of Insurance/Sample Form
00670 – Schedule of Values
00680 – Subcontractor, Supplier, Material, Equipment
00690 – Employee Listing
00700 – General Conditions of the Contract for Construction – AIA A232
00900 – Addenda
00999 – Milestone Schedule

Division 1 – General Requirements

01010 – Summary of Work	01520 – Construction Aids
01030 – Project Work Hours	01530 – Safety
01040 – Project Administration	01540 – Security
01045 – Contractor Applications for Payment	01550 – Access and Deliveries
01050 – Sworn Statements/Waivers	01560 – Temporary Controls
01051 – Change Events	01570 – Traffic Regulation
01053 – Change Orders	01580 – Project Informational Signs
01055 – Field Engineering	01590 – Project Field Office
01060 – Prevailing Wage	01600 – Material and Equipment
01085 – Applicable Standards	01700 – Contract Closeout
01100 – Alternates	01710 – Cleaning
01200 – Project Meetings	01720 – Record Documents
01300 – Submittals	01730 – Operating and Maintenance Data
01350 – Schedules	01740 – Guaranties and Warranties
01400 – Quality Control	01800 – Hazardous Materials Affidavit of Non-Use
01410 – Testing Services	01805 – AHERA Notification
01510 – Temporary Utilities	01900 – Demolition and Removal

END OF SECTION 00005

Bay City Public Schools will receive sealed bid proposals for construction trade work from qualified contractors for the **Bay City Public Schools, 2024 Sinking Fund Bid Pack 1 - Central HS Fitness Center Structural and HVAC**. A pre-bid meeting and project walk-through will be conducted by the Construction Manager, Wolgast Corporation, and the Architect, **WTA Architects**, on **Thursday, January 30, 2025**, at **3:00 PM** (local time) at **Central HS East Entrance Door**.

Proposals may be mailed or delivered in person or uploaded to Building Connected and sent to **Attention, Superintendent**, c/o **Bay City Public Schools 601 Blend Street, Bay City MI 48706**. Proposals must be received prior to **2:00 PM** (local time) on **Tuesday, February 18, 2025**, at the **Bay City Public Schools Administration Building**. Proposals will be publicly/Virtually opened and read aloud at **2:01 PM** in the **Administration Office**. **Electronic Sealed bids must be submitted using Building Connected see below link.** <https://app.buildingconnected.com/login?retUrl=%2F> All bids will be evaluated after the bid opening. All bids received after **2:00 PM** of the bid date will be returned to the Bidder unopened. If you would like to listen in while the bids are being opened, please use this link <https://8x8.vc/wolgast/lisa.donahue>

The Project will utilize separate prime contractors. All contracts for construction will be direct contracts with the Owner. Overall administration of the Project will be the responsibility of the Construction Management Firm, Wolgast Corporation, 4835 Towne Centre, Suite 203, Saginaw, Michigan 48604, Phone: (989) 790-9120, Fax: (989) 790-9063. The Owner will award contracts on or about **Monday, March 10, 2025**, to separate prime contractors for separate bid divisions or combinations of bid divisions. A Bidder may submit a proposal on more than one Bid Division; however, a separate bid must be submitted for each Bid Division of a combined bid. All bids shall be submitted on the bid forms provided in the project specifications, completely filled in, and executed (copies of the bid forms are acceptable). Facsimile bids will not be accepted.

The Bidders shall read and review the Bidding Documents carefully and familiarize themselves thoroughly with all requirements.

Requests by Contractors for inclusion, as Bidders shall be addressed to Wolgast Corporation. One (1) set of Bidding Documents will be provided to each contractor. Plans may be obtained from Wolgast Corporation, attention **Lisa Donahue** ldonahue@wolgast.com . All questions regarding the bidding procedures, design, and drawing/specification intent are to be directed to the Construction Manager on a Clarification Request Form (Section 00310), attention **Dale Schwerin** dschwerin@wolgast.com .

A Bid Security by a qualified surety authorized to do business in the state where the Project is located in the amount of five percent (5%) of Base Bids shall accompany each proposal or proposal combination. The Bid Security may be in the form of a Bid Bond, Cashier's Check, or Money Order. Personal checks are NOT acceptable. Bids may not be withdrawn for a period of sixty (60) days after the bid date. Successful Bidders may be required to furnish Surety Bonds as stated in the Project Specifications (Section 00600).

The Owner reserves the right to reject any or all proposals, accept a bid other than the low bid, and to waive informalities, irregularities, and/or errors in the bid proposals, which they feel to be in their own best interest.

All bidders must provide familial disclosure in compliance with MCL 380.1267 and attach this information to the bid. The bid shall be accompanied by a sworn and notarized statement disclosing any familial relationship that exists between the Owner or the employee of the bidder and any member of the board, intermediate school board, or board of directors or the superintendent of the school district, intermediate superintendent of the intermediate school district, or chief executive officer of the public-school academy. The district shall not accept a bid that does not include this sworn and notarized disclosure statement.

END OF SECTION 00010

PART 1 – GENERAL

1.01 DEFINITIONS

- A. The Owner is: **Bay City Public Schools.**
- B. The Architect is: **WTA Architects.**
- C. The Construction Manager is: **Wolgast Corporation.**
- D. The Project Team consists of the Construction Manager, the Architect, and other design professionals providing services in connection with the project.
- E. The Project is: **Bay City Public Schools, 2024 Sinking Fund Bid Pack 1 - Central HS Fitness Center Structural and HVAC**
- F. Work is any portion of the Project.
- G. The Bidding Documents include (as applicable to the Project):
 - 1. The Notice to Bidders.
 - 2. The Instructions to Bidders.
 - 3. Bid Division Descriptions.
 - 4. Proposal Forms.
 - 5. Sample Contract Forms.
 - 6. The Specifications for the Project.
 - 7. The Drawings for the Project.
 - 8. All Addenda issued for the Project.
 - 9. The Preliminary Milestone Schedule.
- H. Addenda are written and/or graphic instruments issued by the Architect, which add to, delete from, clarify, or correct the Bidding Documents.
- I. Bids are sums stipulated in Proposals for which Bidders propose to perform the Work of Bid Divisions.
- J. Base Bids are sums stipulated in Proposals for which Bidders offer to perform the Work of Bid Divisions, and which Alternate Bids may be added to or deleted from.
- K. Alternate Bids are sums that may be added to or deleted from Base Bids for the performance of Alternate Work, as delineated in the Bidding Documents.
- L. Unit Prices are sums included in the Proposals as Bids per unit measure of materials and/or services, as required by the Bidding Documents.
- M. Proposals are complete, properly executed forms including Base Bids, Alternate Bids, Unit Prices, and other information requested by the Owner.
- N. Bidders are pre-qualified contractors who submit proposals to the Owner for Work as Prime Contractors on the Project.
- O. Bid Divisions are the divisions of Work into which the Project is divided for bidding. Bid Divisions shall not be confused with Technical Specification Divisions.
- P. Bid Division Descriptions (Section 00309) are written descriptions of the Work included in the Bid Divisions.

1.02 MULTIPLE PRIME CONTRACTS/BID DIVISIONS

- A. This is an Owner Represented Project. There is no General Contractor. All contracts awarded on the Project shall be prime contracts. The Owner will award contracts for each Bid Division and/or for groups of Bid Divisions. The Construction Manager will administrate the Project.
- B. Although each Bid Division involves an obvious and recognizable segment of “conventional” trade contracting, multiple contract project delivery requires that adjustments be made to permit the completion of each Bid Division as a separate segment of construction. Each bidder shall carefully review the total scope of their responsibilities with respect to the Work of their Bid Division(s) and shall provide for the total scope in their Proposal.
- C. Bid Division Descriptions (Section 00309) have been written to clearly delineate each Bid Division. The Owner is not responsible for a Bidder’s interpretation of the Bid Division Descriptions. Bidders are encouraged to request information by calling or emailing the Project Manager:

Dale Schwerin, Project Manager, Wolgast Corporation, (989) 790-9120, extension **704** or dschwerin@wolgast.com .

- D. For the purpose of clarity, the scope of work for each Bid Division may be divided into four categories: “GENERAL INCLUSIONS,” “DIVISION INCLUSIONS,” “PROJECT INCLUSIONS,” AND “EXCLUDED.”
1. Information provided under the heading “GENERAL INCLUSIONS” is the obvious and/or “conventional” work scope of each Bid Division.
 2. Information provided under “DIVISION INCLUSIONS” or “PROJECT INCLUSIONS” points out items which may be considered less obvious or “unconventional,” but which are included in the work scope of a particular Bid Division. (Information under these headings is not always necessary to delineate a Bid Division.)
 3. Information provided under “EXCLUDED” is for the purpose of indicating beginning and termination points, and/or to provide an understanding of fringe involvement included in Bid Divisions. (Information under this heading is not always necessary to delineate a Bid Division.)
- E. **Bidders shall construe nothing contained in the Bidding Documents, including the Bid Division Descriptions, as an assignment of work to any construction industry trade. Each Bidder is responsible for their own work assignments when making their proposal.**

1.03 INTERFACING BID DIVISIONS

- A. Each Bidder shall familiarize themselves with the work scope of all Bid Divisions that interface with their own. Each Bidder shall consider that the work of their Bid Division(s) may follow the work of another Division or other Divisions, and that other Contractors may perform work after the work of their Bid Division(s), and that other Contractors may work simultaneously with the work of their own Bid Division(s). Each Bidder shall include provisions for such interfaces and for cooperation with interfacing Contractors in their Proposal.

1.04 PRE-BID CONFERENCE

- A. **Central HS East Entrance Door**
1624 Columbus Avenue
Bay City, MI 48708
Thursday, January 30, 2025 at 3:00 PM

1.05 BIDDING DOCUMENTS

- A. Qualified Bidders have received sets of Bidding Documents. Requests from Bidders for additional sets of Bidding Documents will be honored under the conditions set forth in the Notice to Bidders (Section 00010).
- B. Following the award of construction contracts for the Project, all sets of Bidding Documents, plans, and specifications, except sets in possession of Contractors who have been awarded contracts, shall be returned to the Project Team.
- C. Bidders who return sets of Bidding Documents, plans, and specifications, in reasonably good condition shall have their plan deposit returned within ten (10) days of the Project Team's receipt of the documents.
- D. Bidders shall use complete sets of Bidding Documents in preparing Proposals. Bidders are responsible for ascertaining that the Bidding Documents upon which their Proposals are based are complete.
- E. Bidding Documents are provided to Bidders for uses pertaining to bidding only. No other use is permitted.
- F. Bidders shall promptly notify the Project Team of any ambiguities, inconsistencies, errors, and/or omissions they may discover in the Bidding Documents.
- G. Requests from Bidders for clarification or interpretation of the Bidding Documents must reach the Project Team five days before the bid date or by the date addressed in the pre-bid agenda. Any bidder clarifications which reach the Project Team after such dates have passed will not be considered.
- H. Changes and corrections to the Bidding Documents will be made by Addendum and distributed to Bidders.
- I. Each Bidder shall ascertain prior to submitting their Proposal that they have considered every Addendum issued prior to the Bid Date and shall acknowledge receipt of each Addendum in writing in their Proposal.

1.06 PRELIMINARY MILESTONE SCHEDULE

- A. The Preliminary Milestone Schedule is Section 00999 of this Project Manual.
- B. A Preliminary Milestone Schedule has been developed by the Construction Manager and supplied to the Bidders. Each Bidder is required to review the dates indicated in that Schedule, and either endorse or amend them within the context of the Bid Division(s) they are bidding. Space is provided on the Proposal Form for endorsement or amendment. The Milestone Schedule and the information it provides are not part of the Contract Documents.
- C. The milestone dates as endorsed and/or amended by successful bidders and accepted by the Owner will be used in the development of a Master Schedule to be used as a guide during the construction of the Project.
- D. Each Bidder is obligated to comment, in writing, on the Milestone Schedule if, in their opinion, the dates do not depict realistic time interval(s) for performance of the Work of their Bid Division(s)
- E. The effect of endorsements of and amendments to the Milestone Schedule will be considered when selecting Bidders for contract awards.

1.07 BID SECURITY

- A. Bid Security is required for this Project in the amount of five percent (5%). A surety company licensed, as such, to do business in the State of Michigan must issue a Bid Bond, and all other Bonds. For additional information and instructions regarding Bid Security, refer to Section 00410.

1.07.1 AFFIDAVITS ACCOMPANYING BID PROPOSALS

- A. All Bid Proposals shall include the Familial Affidavit form (see Section 00306 – Familial Affidavit) to be included as part of the Bid Proposal.
- B. All Bid Proposals shall include the State of Michigan required Iran Economic Sanctions Affidavit form (see Section – 00307 – Iran Economic Sanctions) to be included as part of the Bid Proposal.

1.08 SUBSTITUTIONS

- A. The materials, products, and equipment described in the Bidding Documents establish the quality standard, required function, dimensions, and appearance, which shall be met by all substitutions.
- B. Contractors may request items not included in the construction bid documents be considered for inclusion as acceptably specified items by submitting a written request to the Project Team addressed to the Construction Manager not later than ten (10) days prior to the bid date. The Construction Manager will forward these written requests to the Architect who will make the determination whether the requested item is an acceptable “equal”. These acceptable “equal” items will be identified as acceptable by their inclusion in a written Addendum.
- C. Each substitution request will include a complete description of the proposed substitute, drawings, cuts, performance and test data, the name of the material or equipment for which it is to be substituted, and any other information necessary for evaluation. A statement setting forth any changes in other materials, equipment, or work that incorporation of the substitute would require should also be included. The burden of proof of the merit of the proposed substitute is upon the Bidder. The Architect’s approval or disapproval of a proposed substitution shall be final.
- D. The bidder’s Base Bid contained in the Bid Proposal Form shall be the exact items contained in the construction bid documents (plans, specifications, or addenda). The Base Bid contained in the Bid Proposal Form shall not include any substitute items not allowed in the construction bid documents.
- E. Bidders that have other substitutions to be considered for inclusion in the Project must identify them as Voluntary Alternates in the portion of the Bid Proposal Form so designated. The identity of these items must include the all-product information and the dollar amount of increase or decrease associated with each individual substitute item.
- F. By making requests for any substitution, the Contractor represents:
 - 1. The Contractor has personally investigated the proposed substitution product and determined that it is equal to or superior to the product specified.
 - 2. The Contractor will provide the warranty for the substitution as the product specified.
 - 3. The cost data presented is complete and includes all related costs required for it to be incorporated into the Project including costs for additional Architectural and/or Construction Management services.
- G. The Architect will reply in writing to the Contractor, through the Construction Manager, stating whether the Owner or Architect, after due investigation, has reasonable objection to any substitution request. The decision of the Architect shall be final.

1.09 VOLUNTARY ALTERNATES/VALUE ENGINEERING SUGGESTIONS

- A. Base Bids and Alternate Bids shall be based upon the Bidding Documents, including approved substitutions, and on the Bidders’ evaluation of the Project Site. However, the Owner invites Voluntary Alternates or Value Engineering suggestions consistent with the intent of the Bidding Documents. Such Alternates and suggestions, if submitted, shall be incorporated into Proposals by describing Voluntary Alternate(s) on company letterhead and attached to the Bid Proposal Form.

1.10 BID OPENING AND CONTRACT AWARDS

- A. Bids will be opened publicly after the time and date established for receipt of Proposals. Bid Summaries will be made available to Bidders by request after the Bid Date, but not before Post Bid Interviews have been conducted.
- B. Contract awards will be based on Bidders' Proposals and ability to perform. The Owner intends to award contracts to Bidders who submit proper Proposals in accordance with the requirements of the Bidding Documents.
- C. Decisions regarding Bidders abilities affecting contract awards will be made by the Owner.
- D. The Owner reserves the right to waive any informality or irregularity in any Proposal.
- E. The Owner reserves the right to reject any Proposal.
- F. All awards will be made in the Owner's best interest.

1.11 POST-BID INTERVIEWS

- A. Bidders in contention for contract awards will be required to attend Post-Bid Interviews and submit post-bid submittals in rough draft for review.

1.12 POST-BID SUBMITTALS

- A. Bidders who have been notified of the Owner's intent to award a contract shall submit the following items to the Construction Manager:
 - 1. A Schedule of Values utilizing the level of detail requested by the Owner (reference Section 00670).
 - 2. A list of all subcontractors and suppliers to be used, and all items of material and equipment to be incorporated into the Project (reference Section 00680).
 - 3. The name(s) of the on-site supervisor(s) whom the Bidder proposes to employ to accomplish the Work (reference Section 00690).
 - 4. Sample copies of the construction contracts are included in Sections 00510.

1.13 OWNER'S RIGHT TO APPROVE SUPPLIERS, SUBCONTRACTORS, MATERIALS, EQUIPMENT, AND EMPLOYEES

- A. Bidders will be required to establish, to the satisfaction of the Owner, the reliability and responsibility of proposed employees, suppliers and subcontractors, and the suitability of proposed materials and equipment.
- B. Prior to the award of a contract, the Construction Manager will notify the Bidder if the Owner has reasonable and substantial objection to any person, organization, material, or equipment listed by the Bidder. If the Owner has a reasonable and substantial objection, the Bidder shall amend their Proposal by providing an acceptable substitute. The Owner may, at their discretion, accept such a substitute, or they may disqualify the Proposal.
- C. Suppliers, subcontractors, employees, materials, and equipment proposed by the Bidder and accepted by the Owner shall be used on the Work for which they are proposed and accepted and shall not be changed except with the written approval of the Owner.

1.14 BONDS

- A. Refer to Section 00600 for information and instructions regarding the bond requirements of this Project.

1.15 INSURANCE

1.16

- A. Refer to Sections 00650, and 00700 for information and instructions regarding insurance requirements for this Project.

PART 2 – FORMS FOR BIDDING

2.0 PROPOSAL FORMS

- A. Bidders are required to use the forms provided by the Owner for bidding purposes.
- B. Sample form(s) and instructions are in Section 00305 of this project manual.

PART 3 – PROCEDURES AND CONDITIONS FOR BIDDING

3.01 COMPLETION OF PROPOSAL FORMS

- A. Refer to Section 00300 for detailed information and instructions regarding completion of Proposal Forms.

3.02 SUBMISSION OF PROPOSALS

- A. Proposals shall be submitted to:

**Bay City Public Schools
Attention, Superintendent
601 Blend Street
Bay City MI 48706**

Electronic Sealed bids must be submitted using Building Connected see below link.

<https://app.buildingconnected.com/login?retUrl=%2F>

(Refer to Section 00010 – Notice to Bidders for additional information and instructions regarding the location for submittal of Proposals.)

If you want to listen in while the bids are being opened, please use this link <https://8x8.vc/wolgast/lisa.donahue>

- B. Proposals shall be submitted by **2:00 PM on Tuesday, February 18, 2025**.
(Refer to Section 00010 – Notice to Bidders for additional information and instructions regarding the date and time of submittal of Proposals.)
- C. **Bidders shall bear full responsibility for delivering Proposals to the required location by the time and date established.**

3.03 MODIFICATION OR WITHDRAWAL OF PROPOSALS

- A. A Proposal may not be modified, withdrawn, or cancelled by the Bidder within sixty (60) days following the time and date designated for the receipt of Proposals and the Bidder so agrees in submitting their Proposals.
- B. Prior to the time and date designated for receipt of Proposals, Proposals may be modified or withdrawn. Modifications and withdrawals shall be in writing or by telegram. If by telegram, written confirmation shall have been mailed and postmarked before the date and time set for receipt of Proposals. Telegraphic communications shall be worded so that the amounts of the original Proposals are not revealed.
- C. Withdrawn Proposals may be resubmitted up to the time and date designated for receipt of Proposals.

3.04 BIDDERS' REPRESENTATION AND ACKNOWLEDGEMENTS

A. In submitting their Proposal, each Bidder represents that:

1. They have read and understand the Bidding Documents.
2. Their Proposal is made in accordance with the Bidding Documents.
3. They have visited the Project Site and have familiarized themselves with the local conditions under which the Work they are bidding will be performed.
4. **They will accept the contract award, regardless of the identity of other Contractors on the Project.**
5. **During contract performance, they will not interrupt their Work nor impede the progress of other Contractors as a result of prejudice based on sex, race, color, creed, labor affiliation, or lack of labor affiliation of Contractors or employees of Contractors engaged on this Project.**

B. In submitting their Proposal each bidder acknowledges:

1. The right of the Owner to accept or reject any Proposal, to waive any informality or irregularity in any Proposal received, and to accept other than the low Bid.
2. The right of the Owner to accept any combination of Bid Divisions they desire.
3. The right of the Owner to award contracts in their own best interest.

3.05 OTHER INFORMATION

A. All Bidders shall comply with the requirements of the Bidding Documents, Addenda, and all applicable codes, laws, and regulations in preparing and submitting their Proposals.

B. Refer to Section 00300 – Instructions for Proposals and Bid Division Descriptions for additional information and instructions regarding Proposals.

END OF SECTION 00100

PART 1 – GENERAL**1.01 PROPOSAL FORMS**

- A. A separate set of Proposal Forms, Bid Division Descriptions, Drawings, Contract Conditions, Specifications, and Preliminary Milestone Schedule(s).
- B. Bidders shall use the copies of Proposal Forms included in the separate sets of Bidding Documents. Copies of the Proposal Forms are acceptable.

1.02 BID DIVISION DESCRIPTIONS

- A. Section 00309 contains the Bid Division Descriptions. Each Bid Division Description represents a separate, self-contained Scope of Work. Bid Divisions are the basic divisions of Work into which the Project has been divided for bidding and construction.

PART 2 – PROPOSAL FORMAT**2.01 BID PROPOSALS**

- A. Bidders are required to use the Proposal Forms provided by the Owner.
- B. A complete Proposal consists of:
 - 1. **Submit 2 complete copy of your proposal and bond, on the Proposal Form – Section 00305.**
 - 2. Alternate Pricing forms (if applicable to this Project).
- C. Each Proposal shall have a Bid Security in the amount of five percent (5%) attached to the proposal.
- D. All spaces provided on the Proposal Form(s) shall be filled in. If any space provided is not utilized by the Bidder, that space shall be filled in with the notation “N/A” (Not Applicable).
- E. The Proposal Form(s) shall be filled in by typewriter or printed manually in ink.
- F. Where indicated, all sums shall be expressed in words and figures.
In case of discrepancy, the words shall govern.
- G. **Bidders shall not make unsolicited notations or statements on the Proposal Form(s). Alteration of the Proposal Form(s) is not permitted.**
- H. All changes to and erasures of the Bidder’s entries shall be initialed by the signer of the Proposal.
- I. Each Proposal shall include the legal name of the Bidder and a statement regarding whether the Bidder is a sole proprietor, a partnership, a corporation, or other type of legal entity. Proposals submitted by corporations shall have the state of incorporation noted and shall have corporate seals affixed. Any Bid submitted by an agent shall have a current Power of Attorney attached, certifying the agent’s power to bind the Bidder.

2.02 ALTERNATES

- A. **All requested Alternates shall be bid with all lines completed or the Proposal will be considered incomplete.**

PROPOSAL FOR MULTIPLE BID DIVISIONS

- A. Each Bidder shall submit only one (1) Proposal for each Bid Division the Contractor is bidding. There is no limit to the number of Bid Divisions a Bidder may bid on.
- B. Each Bidder is required to include a separate Bid for each Bid Division in order to be considered for a contract award. Spaces are provided in the Proposal Form(s) to reference multiple Proposals.
- C. Multiple Bid Proposals shall contain separate Proposal Forms for each Bid Division being bid.
 - 1. Each Proposal Form shall be fully completed.
 - 2. The Bid for each Bid Division shall be independent of Bids for other Bid Divisions.
 - 3. Bidders shall use the "Combined Bid Deduct" section of the Proposal Form (Section 00305) to finalize multiple Bid Proposals.

PART 3 – COMPLETION OF PROPOSAL FORMS AND SEALED BID ENVELOPE**3.01 PROPOSAL FOR (SECTION 00305)**

- A. Each Bid Division shall be submitted in a separate envelope, with a separate Bid Bond.
- B. Fill in the legal name of the Bidder, the address, the telephone number, fax number, contact name and contact email.
- C. Fill in the name and number of the Bid Division covered by the Proposal.
- D. Fill in the numbers and dates of all Addenda issued, received, and considered a part of the Proposal. Proposals must include acknowledgement of all Addenda issued up to the Bid Date.
- E. On the Proposal Form(s), fill in the Lump Sum Base Bid for the Bid Division. Fill in the amount in both words and figures. DO NOT include costs for Performance Bonds or Labor/Materials Payment Bond in the Base Bid amount.
- F. Fill in the cost(s) for Performance Bond(s) and Labor and Material Payment Bond(s) in the amount(s) requested (reference Section 00600), in the space(s) provided. Fill in the amount(s) in both words and figures.
- G. In the "Combined Bid Deduct" portion of the Proposal Form(s), state the amount(s) to be deducted from the total of your Base Bid should you be awarded contracts for multiple Bid Divisions. State the numbers of the Bid Divisions included in each combination, and the amount to be deducted from the total of all Base Bids in each combination.
- H. If Alternate Bid(s) have been requested, fill in the Lump Sum Bid for each Alternate Bid in the space provided. DO NOT include costs for Performance Bonds or Labor and Material Payment Bonds.
- I. Fill in the anticipated date(s) of indicated Shop Drawings and/or Sample Submittal(s) in the space(s) provided.
- J. Fill in the anticipated number of weeks needed for fabrication of indicated items, beginning on the Bid Date.
- K. Fill in the anticipated number of on-site staff.
- L. Fill in the anticipated number of days to complete the Work.
- M. Fill in the anticipated number of weeks needed for delivery of indicated items, beginning on the Bid Date.
- N. Fill in the names of the manufacturers, suppliers, and/or subcontractors of indicated items.

- O. If you choose to submit Voluntary Alternates or Value Engineering Suggestions, please summarize your suggestions and state the amount to be deducted from the Base Bid.
- P. Review the "Bid Division Responsibilities" portion of the Proposal Form.
- Q. Review the "Schedule" portion of the Proposal Form.
- R. If the Proposal includes exceptions or substitutions to any part of the Bidding Documents or the Contract Documents, state the exceptions or substitutions in writing on the Proposal Form.
- S. Fill in the Bidder's legal name.
- T. Indicate the Bidder's status as a sole proprietor, partnership, corporation, or other type of entity.
- U. Sign the Proposal Form in the space provided.
- V. Type or print the signer's name and title in the spaces provided below the signature line.
- W. Date the Proposal Form in the space provided.
- X. Provide a phone number, fax number and email address on the space provided.

3.02 SEALED BID ENVELOPE

- A. Bids submitted must be sealed, preferably in a 9" x 12" manila envelope.
- B. Each Bid Division is to be submitted in a separate envelope.
- C. **Label the sealed bid as follows:**

TO:	Bay City Public Schools Attn: Attention: 601 Blend Street Bay City MI 48706
	<u>SEALED BID FOR:</u>
	Bay City Public Schools 2024 Sinking Fund Bid Pack 1 Central HS Fitness Center Structural and HVAC
	Bid Division No: _____

END OF SECTION 00300

**Project: Bay City Public Schools
2024 Sinking Fund Bid Pack 1
Central HS Fitness Center Structural and HVAC**

Submitted By: _____

(Bidder's Company Name)

Address: _____

City / State / Zip: _____

Phone: _____

Contact Name: _____

Email: _____

Bid Proposal Deadline: Prior to Tuesday, February 18, 2025 at 2:00 PM (local time) to:

**Bay City Public Schools
Attention: Superintendent,
601 Blend Street
Bay City MI 48706.**

Electronic Sealed bids must be submitted using Building Connected see below link.
<https://app.buildingconnected.com/login?retUrl=%2F>

Bid Division Name: _____

Bid Division Number: _____

ADDENDA

We (the Bidder) acknowledge receipt of the following Addenda:

- Addendum #__ Dated _____
- Addendum #__ Dated _____
- Addendum #__ Dated _____

BID BOND ATTACHED?

- Yes, 5% Bid Bond is Attached**
- Certified Check/Money Order for 5% of Base Bid is Attached**

BASE BID for Bay City Public Schools – 24 SF BP 1 Central HS Fitness Center (not including Labor Bond, Material Bond, and/or Performance Bond Costs):

_____ Dollars and 00/100ths

\$ _____

BOND COST for Bay City Public Schools – 24 SF BP 1 Central HS Fitness Center (Cost to provide Labor Bond, Material Bond, and/or Performance Bonds on Base Bid):

_____ Dollars and 00/100ths

\$ _____

COMBINED BID DEDUCT

If awarded a contract for the Work, combining the following Bid Division(s), the corresponding amount(s) may be deducted from the Base Bid(s) of each of the involved Bid Divisions.

Bid Divisions Combined

Deduct from each Bid Division:

ALTERNATES

SUBMITTALS

Anticipated Date of Shop Drawing Submittal at Post Bid Interview: _____

Anticipated Number of Days to Begin: _____

Anticipated Number of On-site Staff: _____

Anticipated Number of Days to Complete: _____

Anticipated Number of Days for Delivery of Needed Items: _____

Proposed Manufacturers, Suppliers, and/or Subcontractors:

<u>Item(s)</u>	<u>Manufacturer/Subcontractor/Supplier</u>
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

VOLUNTARY ALTERNATES / VALUE ENGINEERING SUGGESTIONS

We suggest the following alternate procedure(s) and/or material(s):

<u>Summary of Suggestions</u>	<u>Deduct from Base Bid</u>
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

BID DIVISION RESPONSIBILITY

We recognize that the Scope of Work within a Bid Division represents a construction segment that is not necessarily restricted to a single construction trade, and our Proposal includes work of all trades required to fully and successfully complete all of the Work required in the Bid Division(s) we have submitted Proposals for:

SCHEDULE

We have reviewed the Preliminary Milestone Schedule and hereby endorse it with regard to the Work of Bid Division(s) we have bid. ALL WORK MUST BE COMPLETED BY **Refer to Milestone Schedule.**

EXCEPTIONS AND/OR SUBSTITUTIONS

We have submitted our Proposal, as specified, complete and in accordance with the Bidding Documents, including Addenda and the Contract Documents, without exceptions or substitutions, unless otherwise noted in the "Voluntary Alternate / Value Engineering Suggestions" portion of this Proposal Form.

EXECUTION

Name of Bidder: _____

Bidder's Status:
__ Corporation; __ Partnership; __ Sole Proprietor; __ Other: (Please Specify: _____)

By/Signature: _____

Name: _____

Title: _____

Date: _____

Email: _____

Phone: _____ Fax: _____

END OF SECTION 00305

Familial Relationship Sworn Statement

_____ does hereby disclose that per MCL 380.1267:
Company Name

YES, there exists a familial relationship between the Owner of the project or any member of their Board, or Board of Directors, or the Superintendent of the School district, intermediate superintendent of the intermediate school district, or chief executive officer of the public-school academy and the Owner or an employee(s) of _____.
Company Name

Disclosure Between:

Name _____ AND Name _____

Title: _____ Title: _____

Relationship: _____ Relationship: _____

NO, there does not exist a familial relationship between the Owner of the project or any member of their Board, or Board of Directors, or the Superintendent of the School district, intermediate superintendent of the intermediate school district, or chief executive officer of the public school academy and the Owner or an employee(s) of _____.
Company Name

Name (printed): _____

Position: _____

Signature: _____

Date: _____

Notary Public(printed): _____

Signature: _____

County: _____

Date: _____ My Commission Expires: _____

Affix Notary Seal Here:



END OF SECTION 00306

Iran Business Relationship Affidavit

Effective April 1, 2013, all bids, proposals, and/or qualification statements received in the State of Michigan must comply with the "Iran Economic Sanctions Act". The following certification is to be signed and included at time of submittal.

CERTIFICATION

Pursuant to the Michigan Iran Economic Sanctions Act, 2012 P.A. 517, by submitting a bid, proposal or response, Respondent certifies, under civil penalty for false certification, that it is fully eligible to do so under law and that it is not an "Iran linked business," as that term is defined in the Act.

Signature

Title

Company

Date

END OF SECTION 00307

IRAN ECONOMIC SANCTIONS ACT
Act 517 of 2012

AN ACT to prohibit persons who have certain economic relationships with Iran from submitting bids on requests for proposals with this state, political subdivisions of this state, and other public entities; to require bidders for certain public contracts to submit certification of eligibility with the bid; to require reports; and to provide for sanctions for false certification.

History: 2012, Act 517, Eff. Apr. 1, 2013.

The People of the State of Michigan enact:

129.311 Short title.

Sec. 1. This act shall be known and may be cited as the "Iran economic sanctions act".

History: 2012, Act 517, Eff. Apr. 1, 2013.

129.312 Definitions.

Sec. 2. As used in this act:

(a) "Energy sector of Iran" means activities to develop petroleum or natural gas resources or nuclear power in Iran.

(b) "Investment" means 1 or more of the following:

(i) A commitment or contribution of funds or property.

(ii) A loan or other extension of credit.

(iii) The entry into or renewal of a contract for goods or services.

(c) "Investment activity" means 1 or more of the following:

(i) A person who has an investment of \$20,000,000.00 or more in the energy sector of Iran.

(ii) A financial institution that extends \$20,000,000.00 or more in credit to another person, for 45 days or more, if that person will use the credit for investment in the energy sector of Iran.

(d) "Iran" means any agency or instrumentality of Iran.

(e) "Iran linked business" means either of the following:

(i) A person engaging in investment activities in the energy sector of Iran, including a person that provides oil or liquefied natural gas tankers or products used to construct or maintain pipelines used to transport oil or liquefied natural gas for the energy sector of Iran.

(ii) A financial institution that extends credit to another person, if that person will use the credit to engage in investment activities in the energy sector of Iran.

(f) "Person" means any of the following:

(i) An individual, corporation, company, limited liability company, business association, partnership, society, trust, or any other nongovernmental entity, organization, or group.

(ii) Any governmental entity or instrumentality of a government, including a multilateral development institution, as defined in section 1701(c)(3) of the international financial institutional act, 22 USC 262r(c)(3).

(iii) Any successor, subunit, parent company, or subsidiary of, or company under common ownership or control with, any entity described in subparagraph (i) or (ii).

(g) "Public entity" means this state or an agency or authority of this state, school district, community college district, intermediate school district, city, village, township, county, public authority, or public airport authority.

History: 2012, Act 517, Eff. Apr. 1, 2013.

129.313 Ineligibility of Iran linked business to submit request for proposal bid; certification.

Sec. 3. (1) Beginning April 1, 2013, an Iran linked business is not eligible to submit a bid on a request for proposal with a public entity.

(2) Beginning April 1, 2013, a public entity shall require a person that submits a bid on a request for proposal with the public entity to certify that it is not an Iran linked business.

History: 2012, Act 517, Eff. Apr. 1, 2013.

129.314 Effect of false certification.

Sec. 4. If a public entity determines, using credible information available to the public, that a person has submitted a false certification under section 3(2), the public entity shall provide the person with written notice of its determination and of the intent not to enter into or renew a contract with the person. The notice shall include information on how to contest the determination and specify that the person may become eligible for a

future contract with the public entity if the person ceases the activities that cause it to be an Iran linked business. The person shall have 90 days following receipt of the notice to respond in writing and to demonstrate that the determination of false certification was made in error. If a person does not make that demonstration within 90 days after receipt of the notice, the public entity may terminate any existing contract and shall report the name of the person to the attorney general together with information supporting the determination.

History: 2012, Act 517, Eff. Apr. 1, 2013.

129.315 Civil action; penalty.

Sec. 5. The attorney general may bring a civil action against any person reported under section 4. If a civil action results in a finding that the person submitted a false certification, the person is responsible for a civil penalty of not more than \$250,000.00 or 2 times the amount of the contract or proposed contract for which the false certification was made, whichever is greater, the cost of the public entity's investigation, and reasonable attorney fees, in addition to the fine. A person who submitted a false certification shall be ineligible to bid on a request for proposal for 3 years from the date the public entity determines that the person has submitted the false certification.

History: 2012, Act 517, Eff. Apr. 1, 2013.

129.316 Conditional effect.

Sec. 6. The provisions of this act are effective only if Iran is a state sponsor of terror as defined under section 2 of the divestment from terror act, 2008 PA 234, MCL 129.292.

History: 2012, Act 517, Eff. Apr. 1, 2013.

END OF SECTION 00307

Bid Division: 060000 – General Trades

Bid to Include:

Total Responsibility for Specification Sections:

Section 024119 – Selective Demolition
Section 033000 – Cast-In-Place Concrete
Section 042000 – Unit Masonry
Section 055000 – Metal Fabrications
Section 061000 – Rough Carpentry
Section 079200 – Joint Sealants
Section 092216 – Non-Structural Metal Framing
Section 099123 – Interior Painting

Provide all labor, materials, tools, and equipment necessary to perform the work of the specified bid sections. The contractor must also furnish, deliver, unload, store, protect, erect and install all items required for the completion of the work of this bid division in compliance with all drawings and specifications for a complete operational system including but not limited to:

General Inclusions:

1. There is no general contractor associated with this project; any and all reference to a “general contractor” related to the work of this bid division shall be understood to mean the contractor of this bid division.
2. The contractor for this bid division work is required to include but is not limited to all items, services, tasks, materials, personnel, equipment, etc. identified in this bid division description regardless of the presence of language in other bid division descriptions that is the same or is similar to that found in this contractor’s bid division description.
3. Coordination of the work of this bid division with any and all work of other bid division contractors for the scheduling and integration of the work of this contractor.
4. All contractors are responsible for the entire set of plans and specifications, including tables, schedules, and notes.
5. Provide continuous housekeeping and clean-up, and proper legal off-site disposal of any debris generated by this Bid Division’s work.
6. The contractor is responsible for own dumpster(s) and all removal and disposal charges thereof. (Use of the Owner’s dumpsters is strictly prohibited.)
7. All Contractors are required to inspect the existing project components and are to include all work necessary to complete the work to deliver a fully operational system in compliance with all governing codes.
8. This Contractor shall be responsible for performing all work in full compliance with all health and safety standards including Asbestos Awareness and Notification, Lead Paint Abatement, and all MIOSHA Standards. This Contractor shall also be responsible for satisfying all safety violations and/or fines resulting from the actions or lack of action by this Contractor at the sole expense of this Contractor.
9. Any contractor who makes a mistake by installing their product on another Contractor’s obvious faulty work will assume responsibility for repair of said work.
10. This contractor shall repair and restore any damaged area to an original or better condition with no detectable evidence that the area has been repaired. Repairs must be done by personnel qualified in the execution of the work skilled and licensed in that trade. Whenever possible, repairs to work shall be done by the original installer of the work.
11. Submittal of all insurance, unit pricing, schedule of values, required product data and shop drawings within (2) two weeks of Owner’s Notice to commence work.
12. Must provide all submittals within 20 working days of contract award or sooner, unless specifically clarified with the construction manager prior to contract award.
13. Provide all layout and measurements required to perform the work of this Bid Division.
14. The Owner reserves the right to salvage any materials removed from the site during the duration of the project.
15. Coordinate delivery of materials with Construction Manager (48 hours) in advance of the delivery and provide proper personnel and equipment to perform the unloading.

Bid Division: 060000 – General Trades

16. Contractor shall submit to the field construction manager a complete written daily field report stating the work being done on site and the number of employees performing the work for each day the Contractor has representatives on site.
17. Contractor shall have a supervisor on site at all times when a crew is present on the job.
18. On Friday, or the last workday of each week, the Contractor must update the Master Copy of As-Builts, as it applies to the work of their Bid Division.
19. **Wolgast uses Software for their CM Software. Please note: We will upload all drawings, and drawing revisions as they are approved, to the Drawings tool. However, it is each contractor's responsibility to verify that they are working from the most up to date, approved, drawings.**

Division Inclusions:

1. Provide, receive, store, protect, inventory, and install all described bid items.
2. Provide proper legal off-site disposal off all construction debris generated by the described work.
3. Remove items indicated: clean, service and otherwise prepare them for reuse; store and protect against damage. Reinstall items in the same locations or in locations indicated.
4. Cover all countertops with double layered corrugated cardboard.
5. Clean and dust all casework upon completion.
6. Clean, prep and adjust all equipment immediately prior to Owner occupancy.
7. Patch all demolished areas and items affected by demolition to a condition ready to receive finishes and finish materials.
8. Furnish and install all joint sealants and fire stopping as indicated in specifications and drawings including but not limited to perimeter joints of doors and louvers at interior and exterior, perimeter joints between interior wall surfaces and frames of interior doors and all other joints indicated.
9. Provide all temporary enclosures as required, review demo drawings throughout the duration of construction.
10. Contractor shall furnish and install temporary insulated weather-tight closures of openings created as a result of the work in this scope in exterior surfaces to provide acceptable working conditions and protection for materials, to allow for temporary heating, and for building security. Provide doors with self-closing hardware and locks.
11. Provide all wood framing, plywood and nailers as shown and specified.

Project Inclusions:

1. Include an allowance of \$30,000 in your bid to be used at the direction of the Construction Manager.
2. Supply, install, and remove temporary access ramp into building to complete removals.
3. Include temporary access door per drawings A2.02, Keynote 5.
4. Include temporary barriers with air movers to control dust.
5. Include all removals called out on the drawings.
6. Include all saw cutting to complete your work.
7. Removed items called out for salvage and turn over to the Owner.
8. Remove and turn over existing batting cage to Owner.
9. Where carpet is being removed grind any material or glue left down to fresh concrete.
10. Include any required temporary shoring to complete your work.
11. Include all masonry work in this bid division.
12. Salvage brick as noted on the drawings.
13. Include all structural steel, metal decking, lintels, accessories and roof opening steel in this bid division.
14. Include all concrete work in this bid division.
15. Include suspended ceiling with drywall. Include painting of this ceiling.
16. Include all roofing new openings, repairs, infills, insulation, blocking, and flashing called out. The existing roof is a Duro-Last Roof system.

Bid Division: 060000 – General Trades

Excludes:

1. All demolition of conduits, ducts, pipes, fixtures, etc. (demolition required for all mechanical, plumbing, and electrical work) is to be performed by the specific mechanical, plumbing and electrical contractors.

Consideration for award:

The ability to begin as soon as areas of work become available. To have proper equipment and responsible personnel to complete the above list of work. To repair any adjacent materials damaged in the execution of the above-listed work. Close cooperation with the Construction Manager and other bid divisions to provide input to develop a working schedule. An approved schedule of values will be required before approval is granted for the first payment request. Expediting communication and follow-up as required.

END OF BID DIVISION 060000

Status	Spec	Item	Rev	Type	Title	Responsible contractor	Ball in court	Due Date	Responses
--------	------	------	-----	------	-------	------------------------	---------------	----------	-----------

Package: 060000-01-001 - General Trades

Draft	033000 Cast In Place Concrete	1	0	Product Data	Cast In Place Concrete - Product Data				Lisa Donahue (WOLGAST CORPORATION)
Draft	033000 Cast In Place Concrete	2	0	Mix Design	Cast In Place Concrete - Mix Design				Lisa Donahue (WOLGAST CORPORATION)
Draft	042000 Unit Masonry	3	0	Product Data	Unit Masonry - Product data				Lisa Donahue (WOLGAST CORPORATION)
Draft	042000 Unit Masonry	4	0	Shop Drawings	Unit Masonry - Shop Drawings				Lisa Donahue (WOLGAST CORPORATION)
Draft	042000 Unit Masonry	5	0	Samples	Unit Masonry - Samples				Lisa Donahue (WOLGAST CORPORATION)
Draft	042000 Unit Masonry	6	0	Mix Design	Unit Masonry - Mix Designs				Lisa Donahue (WOLGAST CORPORATION)

Status	Spec	Item	Rev	Type	Title	Responsible contractor	Ball in court	Due Date	Responses
							CORPORATIO N)		
Draft	053100 Steel Decking	7	0	Product Data	Steel Decking - Product Data		Lisa Donahue (WOLGAST CORPORATIO N)		
Draft	053100 Steel Decking	8	0	Shop Drawings	Steel Decking - Shop Drawings		Lisa Donahue (WOLGAST CORPORATIO N)		
Draft	055000 Metal Fabricatio ns	9	0	Product Data	Metal Fabrications - Product Data		Lisa Donahue (WOLGAST CORPORATIO N)		
Draft	055000 Metal Fabricatio ns	10	0	Shop Drawings	Metal Fabrications - Shop Drawings		Lisa Donahue (WOLGAST CORPORATIO N)		
Draft	061053 Misc. Rough Carpentry	11	0	Product Data	Misc. Rough Carpentry - Product data		Lisa Donahue (WOLGAST CORPORATIO N)		
Draft	079200 Joint Sealants	12	0	Product Data	Joint Sealant - Product Data		Lisa Donahue (WOLGAST		

Status	Spec	Item	Rev	Type	Title	Responsible contractor	Ball in court	Due Date	Responses
							CORPORATIO N)		
Draft	079200 Joint Sealants	13	0	Samples	Joint Sealant - Samples		Lisa Donahue (WOLGAST CORPORATIO N)		
Draft	092216 Non Structural Metal Framing	15	0	Product Data	Non Str Metal Framing - Product Data		Lisa Donahue (WOLGAST CORPORATIO N)		
Draft	092900 Gypsum Board	16	0	Product Data	Gypsum Board - Product Data		Lisa Donahue (WOLGAST CORPORATIO N)		
Draft	099123 Interior Painting	17	0	Product Data	Interior Paint - Product Data		Lisa Donahue (WOLGAST CORPORATIO N)		
Draft	099123 Interior Painting	18	0	Samples	Interior Paint - Samples		Lisa Donahue (WOLGAST CORPORATIO N)		

Package: **060000-02-001 - General Trades - Startup**

Status	Spec	Item	Rev	Type	Title	Responsible contractor	Ball in court	Due Date	Responses
Draft	060000 PA General Trades - Startup	43	0	Startup	Post Bid Interview/ Proposal Forms		Lisa Donahue (WOLGAST CORPORATIO N)		
Draft	060000 PA General Trades - Startup	44	0	Startup	Schedule of Values		Lisa Donahue (WOLGAST CORPORATIO N)		
Draft	060000 PA General Trades - Startup	45	0	Startup	Contracts Signed/ Returned		Lisa Donahue (WOLGAST CORPORATIO N)		
Draft	060000 PA General Trades - Startup	46	0	Startup	Payment/ Performance Bonds		Lisa Donahue (WOLGAST CORPORATIO N)		
Draft	060000 PA General Trades - Startup	47	0	Startup	Insurance/Letter of Compl		Lisa Donahue (WOLGAST CORPORATIO N)		
Draft	060000 PA General Trades - Startup	48	0	Startup	On Site Employee List		Lisa Donahue (WOLGAST CORPORATIO N)		

Status	Spec	Item	Rev	Type	Title	Responsible contractor	Ball in court	Due Date	Responses
Draft	060000 PA General Trades - Startup	49	0	Startup	Safety Policy		Lisa Donahue (WOLGAST CORPORATION)		
Draft	060000 PA General Trades - Startup	50	0	Startup	Safety Data Sheets (SDS)		Lisa Donahue (WOLGAST CORPORATION)		
Draft	060000 PA General Trades - Startup	51	0	Startup	Sub/Supplier Form		Lisa Donahue (WOLGAST CORPORATION)		
Draft	060000 PA General Trades - Startup	52	0	Startup	Hazardous/AHERA Notifications		Lisa Donahue (WOLGAST CORPORATION)		
Draft	060000 PA General Trades - Startup	53	0	Startup	Copy of all Permits		Lisa Donahue (WOLGAST CORPORATION)		

Package: 060000-03-001 - General Trades - Closeout

Draft	060000 PA/CO	54	0	Closeout	Contractor (2) Yr Guarantee		Lisa Donahue (WOLGAST CORPORATION)		
--------------	--------------	----	---	----------	-----------------------------	--	--	--	--

Status	Spec	Item	Rev	Type	Title	Responsible contractor	Ball in court	Due Date	Responses
	General Trades - Closeout						CORPORATIO N)		
Draft	060000 PA/CO General Trades - Closeout	55	0	Closeout	Consent of Surety		Lisa Donahue (WOLGAST CORPORATIO N)		
Draft	060000 PA/CO General Trades - Closeout	56	0	Closeout	Substantial Completion		Lisa Donahue (WOLGAST CORPORATIO N)		
Draft	060000 PA/CO General Trades - Closeout	57	0	Closeout	Completed Punch List		Lisa Donahue (WOLGAST CORPORATIO N)		
Draft	060000 PA/CO General Trades - Closeout	58	0	Closeout	As Built Drawings		Lisa Donahue (WOLGAST CORPORATIO N)		
Draft	060000 PA/CO General Trades - Closeout	59	0	Closeout	All CO Signed/ Returned		Lisa Donahue (WOLGAST CORPORATIO N)		
Draft	060000 PA/CO	60	0	Closeout	Insurance Up-To- Date		Lisa Donahue		

Status	Spec	Item	Rev	Type	Title	Responsible contractor	Ball in court	Due Date	Responses
	General Trades - Closeout						(WOLGAST CORPORATION)		
Draft	060000 PA/CO General Trades - Closeout	61	0	Closeout	Signed Hazardous Materials		Lisa Donahue (WOLGAST CORPORATION)		
Draft	060000 PA/CO General Trades - Closeout	62	0	Closeout	Asbestos Materials Affidavits		Lisa Donahue (WOLGAST CORPORATION)		
Draft	060000 PA/CO General Trades - Closeout	63	0	Closeout	Warranties for Equipment Installed		Lisa Donahue (WOLGAST CORPORATION)		
Draft	060000 PA/CO General Trades - Closeout	64	0	Closeout	O&M Manuals		Lisa Donahue (WOLGAST CORPORATION)		
Draft	060000 PA/CO General Trades - Closeout	65	0	Closeout	Final Inspections on permits		Lisa Donahue (WOLGAST CORPORATION)		
Draft	079200	14	0	Close Out	Joint Sealant - Warranties		Lisa Donahue		

Status	Spec	Item	Rev	Type	Title	Responsible contractor	Ball in court	Due Date	Responses
	Joint Sealants						(WOLGAST CORPORATION)		

Bid Division: 222300 – HVAC Systems

Total Responsibility for Specification Sections:

Section 230500 – HVAC Requirements
Section 230553 – HVAC Identification
Section 230593 – Testing, Adjusting and Balancing
Section 230713 – External Duct Insulation
Section 230714 – Internal Acoustical Duct Lining
Section 232500 – HVAC Systems Testing, Cleaning, Water Treatment and Startup
Section 233000 – Air Distribution
Section 23800 – Temperature Control System

Provide all labor, materials, tools, and equipment necessary to perform the work of the specified bid sections. The contractor must also furnish, deliver, unload, store, protect, erect and install all items required for the completion of the work of this bid division in compliance with all drawings and specifications for a complete operational system including but not limited to:

General Inclusions:

1. There is no general contractor associated with this project; any and all reference to a “general contractor” related to the work of this bid division shall be understood to mean the contractor of this bid division.
2. The contractor for this bid division work is required to include but is not limited to all items, services, tasks, materials, personnel, equipment, etc. identified in this bid division description regardless of the presence of language in other bid division descriptions that is the same or is similar to that found in this contractor’s bid division description.
3. Coordination of the work of this bid division with all work of other bid division contractors for the scheduling and integration of the work of this contractor.
4. All contractors are responsible for the entire set of plans and specifications, including tables, schedules, and notes.
5. Provide continuous housekeeping and clean-up, and proper legal off-site disposal of any debris generated by this Bid Division’s work.
6. The contractor is responsible for their own dumpster(s) and all removal and disposal charges thereof. (Use of the Owner’s dumpsters is strictly prohibited.)
7. All Contractors are required to inspect the existing project components and are to include all work necessary to complete the work to deliver a fully operational system in compliance with all governing codes.
8. This Contractor shall be responsible for performing all work in full compliance with all health and safety standards including Asbestos Awareness and Notification, Lead Paint Abatement, and all MIOSHA Standards. This Contractor shall also be responsible for satisfying all safety violations and/or fines resulting from the actions or lack of action by this Contractor at the sole expense of this Contractor.
9. Any contractor who makes a mistake by installing their product on another Contractor’s obvious faulty work will assume responsibility for repair of said work.
10. This contractor shall repair and restore any damaged area to an original or better condition with no detectable evidence that the area has been repaired. Repairs must be done by personnel qualified in the execution of the work skilled and licensed in that trade. Whenever possible, repairs to work shall be done by the original installer of the work.
11. Submittal of all insurance, unit pricing, schedule of values, required product data and shop drawings within (2) two weeks of Owner’s Notice to commence work.
12. Must provide all submittals within 20 working days of contract award or sooner, unless specifically clarified with the construction manager prior to contract award.
13. Provide all layout and measurements required to perform the work of this Bid Division.
14. The Owner reserves the right to salvage any materials removed from the site during the duration of the project.
15. Coordinate delivery of materials with Construction Manager (48 hours) in advance of the delivery and provide proper personnel and equipment to perform the unloading.

Wolgast Corporation – Construction Management

Bid Division: 222300 – HVAC Systems

16. Contractor shall submit to the field construction manager a complete written daily field report stating the work being done on site and the number of employees performing the work for each day the Contractor has representatives on site.
17. Contractor shall have a supervisor on site at all times when a crew is present on the job.
18. On Friday, or the last workday of each week, the Contractor must update the Master Copy of As-Builts, as it applies to the work of their Bid Division.
19. **Wolgast uses Software for their CM Software. Please note: We will upload all drawings, and drawing revisions as they are approved, to the Drawings tool. However, it is each contractor's responsibility to verify that they are working from the most up to date, approved, drawings.**

Division Inclusions:

1. Maintain fire rating in all walls penetrated.
2. Provide all required layouts and verify that no conflict occurs with other trades.
3. Provide all permits required.
4. Furnish test and balance reports.
5. The contractor shall coordinate phased delivery of all pre-purchased equipment with the supplier.
6. Contractor shall maintain existing HVAC systems in fully functional order in occupied areas of the building throughout the duration of the project.
7. Remove, clean and reinstall all existing grids, vents, registers and diffusers including those mounted in metal ceiling grid systems.

Project Inclusions:

1. Include an allowance of \$5,000 in your bid to be used at the direction of the Construction Manager.
2. Include all mechanical removals noted per the drawings.
3. Supply and install new HVAC as noted such as grilles and RTU.
4. Include all control work for new equipment.
5. Paint any new exterior gas piping.

Consideration for award:

The ability to begin as soon as areas of work become available. To have proper equipment and responsible personnel to complete the above list of work. To repair any adjacent materials damaged in the execution of the above-listed work. Close cooperation with the Construction Manager and other bid divisions to provide input to develop a working schedule. An approved schedule of values will be required before approval is granted for the first payment request. Expediting communication and follow-up as required.

Status	Spec	Item	Rev	Type	Title	Responsible contractor	Ball in court	Due Date	Responses
--------	------	------	-----	------	-------	------------------------	---------------	----------	-----------

Package: 222300-01-001 - HVAC Systems

Draft	230500 HVAC Requirements	20	0	Product Data	HVAC product data	Lisa Donahue (WOLGAST CORPORATION)			
Draft	230500 HVAC Requirements	21	0	Shop Drawings	HVAC shop drawings	Lisa Donahue (WOLGAST CORPORATION)			

Package: 222300-02-001 - HVAC Systems - Startup

Draft	222300 PA HVAC Systems - Startup	66	0	Startup	Post Bid Interview/ Proposal Forms	Lisa Donahue (WOLGAST CORPORATION)			
Draft	222300 PA HVAC Systems - Startup	67	0	Startup	Schedule of Values	Lisa Donahue (WOLGAST CORPORATION)			
Draft	222300 PA HVAC Systems - Startup	68	0	Startup	Contracts Signed/ Returned	Lisa Donahue (WOLGAST CORPORATION)			

Status	Spec	Item	Rev	Type	Title	Responsible contractor	Ball in court	Due Date	Responses
Draft	222300 PA HVAC Systems - Startup	69	0	Startup	Payment/ Performance Bonds		Lisa Donahue (WOLGAST CORPORATIO N)		
Draft	222300 PA HVAC Systems - Startup	70	0	Startup	Insurance/Letter of Compl		Lisa Donahue (WOLGAST CORPORATIO N)		
Draft	222300 PA HVAC Systems - Startup	71	0	Startup	On Site Employee List		Lisa Donahue (WOLGAST CORPORATIO N)		
Draft	222300 PA HVAC Systems - Startup	72	0	Startup	Safety Policy		Lisa Donahue (WOLGAST CORPORATIO N)		
Draft	222300 PA HVAC Systems - Startup	73	0	Startup	Safety Data Sheets (SDS)		Lisa Donahue (WOLGAST CORPORATIO N)		
Draft	222300 PA HVAC Systems - Startup	74	0	Startup	Sub/Supplier Form		Lisa Donahue (WOLGAST CORPORATIO N)		

Status	Spec	Item	Rev	Type	Title	Responsible contractor	Ball in court	Due Date	Responses
Draft	222300 PA HVAC Systems - Startup	75	0	Startup	Hazardous/AHERA Notifications		Lisa Donahue (WOLGAST CORPORATION)		
Draft	222300 PA HVAC Systems - Startup	76	0	Startup	Copy of all Permits		Lisa Donahue (WOLGAST CORPORATION)		

Package: 222300-03-001 - HVAC Systems - Closeout

Draft	222300 PA/CO HVAC Systems - Closeout	77	0	Closeout	Contractor (2) Yr Guarantee		Lisa Donahue (WOLGAST CORPORATION)		
Draft	222300 PA/CO HVAC Systems - Closeout	78	0	Closeout	Consent of Surety		Lisa Donahue (WOLGAST CORPORATION)		
Draft	222300 PA/CO HVAC Systems - Closeout	79	0	Closeout	Substantial Completion		Lisa Donahue (WOLGAST CORPORATION)		
Draft	222300 PA/CO	80	0	Closeout	Completed Punch List		Lisa Donahue (WOLGAST		

Status	Spec	Item	Rev	Type	Title	Responsible contractor	Ball in court	Due Date	Responses
	HVAC Systems - Closeout						CORPORATION)		
Draft	222300 PA/CO HVAC Systems - Closeout	81	0	Closeout	As Built Drawings		Lisa Donahue (WOLGAST CORPORATION)		
Draft	222300 PA/CO HVAC Systems - Closeout	82	0	Closeout	All CO Signed/ Returned		Lisa Donahue (WOLGAST CORPORATION)		
Draft	222300 PA/CO HVAC Systems - Closeout	83	0	Closeout	Insurance Up-To-Date		Lisa Donahue (WOLGAST CORPORATION)		
Draft	222300 PA/CO HVAC Systems - Closeout	84	0	Closeout	Signed Hazardous Materials		Lisa Donahue (WOLGAST CORPORATION)		
Draft	222300 PA/CO HVAC Systems - Closeout	85	0	Closeout	Asbestos Materials Affidavits		Lisa Donahue (WOLGAST CORPORATION)		

Status	Spec	Item	Rev	Type	Title	Responsible contractor	Ball in court	Due Date	Responses
Draft	222300 PA/CO HVAC Systems - Closeout	86	0	Closeout	Warranties for Equipment Installed		Lisa Donahue (WOLGAST CORPORATIO N)		
Draft	222300 PA/CO HVAC Systems - Closeout	87	0	Closeout	O&M Manuals		Lisa Donahue (WOLGAST CORPORATIO N)		
Draft	222300 PA/CO HVAC Systems - Closeout	88	0	Closeout	Final Inspections on permits		Lisa Donahue (WOLGAST CORPORATIO N)		
Draft	230500 HVAC Requirem ents	22	0	Close Out	HVAC test reports		Lisa Donahue (WOLGAST CORPORATIO N)		
Draft	230500 HVAC Requirem ents	23	0	Close Out	HVAC manuals		Lisa Donahue (WOLGAST CORPORATIO N)		
Draft	230593 Testing Adjusting and Balancing	19	0	Close Out	Test and Balance		Lisa Donahue (WOLGAST CORPORATIO N)		

Bid Division: 260000 – Electrical

Bid to Include:

Total Responsibility for Specification Sections:

Section 260000 – Basic Electrical Requirements
Section 260500 – Common Work Results for Electrical
Section 260505 – Selective Demolition for Electrical
Section 260519 – Low-Voltage Electrical Power Conductors and Cables
Section 260526 – Grounding and Bonding for Electrical Systems
Section 260529 – Handers and Supports for Electrical Systems
Section 260533.13 – Conduit for Electrical Systems
Section 260533.16 – Boxes for Electrical Systems
Section 260553 – Identification for Electrical Systems
Section 260583 – Wiring Connections
Section 260923 – Lighting Control Devices
Section 262726 – Wiring Devices
Section 262416 – Panel Boards
Section 262726 – Wiring Devices
Section 265100 – Interior Lighting
Section 284613 – Fire Alarm System

Provide all labor, materials, tools, and equipment necessary to perform the work of the specified bid sections. The contractor must also furnish, deliver, unload, store, protect, erect and install all items required for the completion of the work of this bid division in compliance with all drawings and specifications for a complete operational system including but not limited to:

General Inclusions:

1. There is no general contractor associated with this project; any and all reference to a “general contractor” related to the work of this bid division shall be understood to mean the contractor of this bid division.
2. The contractor for this bid division work is required to include but is not limited to all items, services, tasks, materials, personnel, equipment, etc. identified in this bid division description regardless of the presence of language in other bid division descriptions that is the same or is similar to that found in this contractor’s bid division description.
3. Coordination of the work of this bid division with any and all work of other bid division contractors for the scheduling and integration of the work of this contractor.
4. All contractors are responsible for the entire set of plans and specifications, including tables, schedules, and notes.
5. Provide continuous housekeeping and clean-up, and proper legal off-site disposal of any debris generated by this Bid Division’s work.
6. The contractor is responsible for their own dumpster(s) and all removal and disposal charges thereof. (Use of the Owner’s dumpsters is strictly prohibited.)
7. All Contractors are required to inspect the existing project components and are to include all work necessary to complete the work to deliver a fully operational system in compliance with all governing codes.
8. This Contractor shall be responsible for performing all work in full compliance with all health and safety standards including Asbestos Awareness and Notification, Lead Paint Abatement, and all MIOSHA Standards. This Contractor shall also be responsible for satisfying all safety violations and/or fines resulting from the actions or lack of action by this Contractor at the sole expense of this Contractor.
9. Any contractor who makes a mistake by installing their product on another Contractor’s obvious faulty work will assume responsibility for repair of said work.

Bid Division: 260000 – Electrical

10. This contractor shall repair and restore any damaged area to an original or better condition with no detectable evidence that the area has been repaired. Repairs must be done by personnel qualified in the execution of the work skilled and licensed in that trade. Whenever possible, repairs to the work shall be done by the original installer of the work.
11. Submittal of all insurance, unit pricing, schedule of values, required product data and shop drawings within (2) two weeks of Owner's Notice to commence work.
12. Must provide all submittals within 20 working days of contract award or sooner, unless specifically clarified with the construction manager prior to contract award.
13. Provide all layout and measurements required to perform the work of this Bid Division.
14. The Owner reserves the right to salvage any materials removed from the site during the duration of the project.
15. Coordinate delivery of materials with Construction Manager (48 hours) in advance of the delivery and provide proper personnel and equipment to perform the unloading.
16. Contractor shall submit to the field construction manager a complete written daily field report stating the work being done on site and the number of employees performing the work for each day the Contractor has representatives on site.
17. Contractor shall have a supervisor on site at all times when a crew is present on the job.
18. On Friday, or the last workday of each week, the Contractor must update the Master Copy of As-Builts, as it applies to the work of their Bid Division.
19. **Wolgast uses Software for their CM Software. Please note: We will upload all drawings, and drawing revisions as they are approved, to the Drawings tool. However, it is each contractor's responsibility to verify that they are working from the most up to date, approved, drawings.**

Division Inclusions:

1. Contractor shall maintain existing electrical systems in fully functional order in all areas of the building during the duration of the project.
2. The contractor is responsible for disconnecting, removing and legal and proper off-site disposal of all indicated existing light fixtures including ballasts and bulbs. Ballasts shall be assumed to contain PCB's. Provide Owner with appropriate documentation of disposal.
3. Provide all permits required.
4. Maintain fire rating at all walls penetrated.
5. Provide temporary lighting and power distribution. A minimum of 100 watts of temporary lighting per 250 SF of floor area.
6. Final hook-up of all equipment for other disciplines of work.

Project Inclusions:

1. Include an allowance of \$5,000 in your bid to be used at the direction of the Construction Manager.
2. Include all electrical removals called out on the drawings.
3. Include all electrical work noted on the drawings.
4. Provide smoke duct detectors per the drawings.
5. This Contractor is responsible for a complete operational fire alarm system.

Consideration for award:

The ability to begin as soon as areas of work become available. To have proper equipment and responsible personnel to complete the above list of work. To repair any adjacent materials damaged in the execution of the above-listed work. Close cooperation with the Construction Manager and other bid divisions to provide input to develop a working schedule. An approved schedule of values will be required before approval is granted for the first payment request. Expediting communication and follow-up as required.

END OF BID DIVISION 260000

Wolgast Corporation – Construction Management

Status	Spec	Item	Rev	Type	Title	Responsible contractor	Ball in court	Due Date	Responses
--------	------	------	-----	------	-------	------------------------	---------------	----------	-----------

Package: 260000-01-001 - Electrical

Draft	238000 Temperature Controls	24	0	Product Data	Temp Controls - product data	Lisa Donahue (WOLGAST CORPORATION)			
Draft	238000 Temperature Controls	25	0	Shop Drawings	Temp Controls - shop drawings	Lisa Donahue (WOLGAST CORPORATION)			
Draft	260000 Electrical Requirements	30	0	Product Data	Electrical - Product Data	Lisa Donahue (WOLGAST CORPORATION)			
Draft	260000 Electrical Requirements	31	0	Shop Drawings	Electrical - Shop Drawings	Lisa Donahue (WOLGAST CORPORATION)			
Draft	260923 Lighting Controls	33	0	Shop Drawings	Lighting Controls - shop drawings	Lisa Donahue (WOLGAST CORPORATION)			
Draft	262416 Panelboards	34	0	Shop Drawings	Panelboards - shop drawings	Lisa Donahue (WOLGAST CORPORATION)			

Status	Spec	Item	Rev	Type	Title	Responsible contractor	Ball in court	Due Date	Responses
							CORPORATIO N)		
Draft	265100 Interior Lighting	37	0	Shop Drawings	Interior Lighting - shop drawings		Lisa Donahue (WOLGAST CORPORATIO N)		
Draft	265100 Interior Lighting	38	0	Product Data	Interior Lighting - product data		Lisa Donahue (WOLGAST CORPORATIO N)		
Draft	284613 Fire Alarm System	39	0	Product Data	Fire Alarm - Product Data		Lisa Donahue (WOLGAST CORPORATIO N)		
Draft	284613 Fire Alarm System	40	0	Shop Drawings	Fire Alarm - Shop Drawings		Lisa Donahue (WOLGAST CORPORATIO N)		
Draft	284613 Fire Alarm System	42	0	Product Data	Fire Alarm - Product Data		Lisa Donahue (WOLGAST CORPORATIO N)		

Package: 260000-02-001 - Electrical - Startup

Status	Spec	Item	Rev	Type	Title	Responsible contractor	Ball in court	Due Date	Responses
Draft	260000 PA Electrical - Startup	89	0	Startup	Post Bid Interview/ Proposal Forms		Lisa Donahue (WOLGAST CORPORATION)		
Draft	260000 PA Electrical - Startup	90	0	Startup	Schedule of Values		Lisa Donahue (WOLGAST CORPORATION)		
Draft	260000 PA Electrical - Startup	91	0	Startup	Contracts Signed/ Returned		Lisa Donahue (WOLGAST CORPORATION)		
Draft	260000 PA Electrical - Startup	92	0	Startup	Payment/ Performance Bonds		Lisa Donahue (WOLGAST CORPORATION)		
Draft	260000 PA Electrical - Startup	93	0	Startup	Insurance/Letter of Compl		Lisa Donahue (WOLGAST CORPORATION)		
Draft	260000 PA Electrical - Startup	94	0	Startup	On Site Employee List		Lisa Donahue (WOLGAST CORPORATION)		

Status	Spec	Item	Rev	Type	Title	Responsible contractor	Ball in court	Due Date	Responses
Draft	260000 PA Electrical - Startup	95	0	Startup	Safety Policy		Lisa Donahue (WOLGAST CORPORATION)		
Draft	260000 PA Electrical - Startup	96	0	Startup	Safety Data Sheets (SDS)		Lisa Donahue (WOLGAST CORPORATION)		
Draft	260000 PA Electrical - Startup	97	0	Startup	Sub/Supplier Form		Lisa Donahue (WOLGAST CORPORATION)		
Draft	260000 PA Electrical - Startup	98	0	Startup	Hazardous/AHERA Notifications		Lisa Donahue (WOLGAST CORPORATION)		
Draft	260000 PA Electrical - Startup	99	0	Startup	Copy of all Permits		Lisa Donahue (WOLGAST CORPORATION)		

Package: 260000-03-001 - Electrical - Closeout

Draft	238000	26	0	Close Out	Temp Controls - testing		Lisa Donahue (WOLGAST CORPORATION)		
--------------	--------	----	---	-----------	-------------------------	--	--	--	--

Status	Spec	Item	Rev	Type	Title	Responsible contractor	Ball in court	Due Date	Responses
	Temperature Controls						CORPORATION)		
Draft	238000 Temperature Controls	27	0	Close Out	Temp Controls - manuals		Lisa Donahue (WOLGAST CORPORATION)		
Draft	238000 Temperature Controls	28	0	Close Out	Temp Controls - Warrantyes		Lisa Donahue (WOLGAST CORPORATION)		
Draft	238000 Temperature Controls	29	0	Close Out	Temp Controls - Owner Training		Lisa Donahue (WOLGAST CORPORATION)		
Draft	260000 Electrical Requirements	32	0	Close Out	Electrical - Manuals		Lisa Donahue (WOLGAST CORPORATION)		
Draft	260000 PA/CO Electrical - Closeout	100	0	Closeout	Contractor (2) Yr Guarantee		Lisa Donahue (WOLGAST CORPORATION)		
Draft	260000 PA/CO	101	0	Closeout	Consent of Surety		Lisa Donahue		

Status	Spec	Item	Rev	Type	Title	Responsible contractor	Ball in court	Due Date	Responses
	Electrical - Closeout						(WOLGAST CORPORATION)		
Draft	260000 PA/CO Electrical - Closeout	102	0	Closeout	Substantial Completion		Lisa Donahue (WOLGAST CORPORATION)		
Draft	260000 PA/CO Electrical - Closeout	103	0	Closeout	Completed Punch List		Lisa Donahue (WOLGAST CORPORATION)		
Draft	260000 PA/CO Electrical - Closeout	104	0	Closeout	As Built Drawings		Lisa Donahue (WOLGAST CORPORATION)		
Draft	260000 PA/CO Electrical - Closeout	105	0	Closeout	All CO Signed/ Returned		Lisa Donahue (WOLGAST CORPORATION)		
Draft	260000 PA/CO Electrical - Closeout	106	0	Closeout	Insurance Up-To-Date		Lisa Donahue (WOLGAST CORPORATION)		
Draft	260000 PA/CO	107	0	Closeout	Signed Hazardous Materials		Lisa Donahue		

Status	Spec	Item	Rev	Type	Title	Responsible contractor	Ball in court	Due Date	Responses
	Electrical - Closeout						(WOLGAST CORPORATION)		
Draft	260000 PA/CO Electrical - Closeout	108	0	Closeout	Asbestos Materials Affidavits		Lisa Donahue (WOLGAST CORPORATION)		
Draft	260000 PA/CO Electrical - Closeout	109	0	Closeout	Warranties for Equipment Installed		Lisa Donahue (WOLGAST CORPORATION)		
Draft	260000 PA/CO Electrical - Closeout	110	0	Closeout	O&M Manuals		Lisa Donahue (WOLGAST CORPORATION)		
Draft	260000 PA/CO Electrical - Closeout	111	0	Closeout	Final Inspections on permits		Lisa Donahue (WOLGAST CORPORATION)		
Draft	260000 PA/CO Electrical - Closeout	112	0	Closeout	Final Inspections on permits		Lisa Donahue (WOLGAST CORPORATION)		
Draft	262416	35	0	Close Out	Panelboards - install instructions		Lisa Donahue		

Status	Spec	Item	Rev	Type	Title	Responsible contractor	Ball in court	Due Date	Responses
	Panelboards						(WOLGAST CORPORATION)		
Draft	262416 Panelboards	36	0	Close Out	Panelboards - manuals		Lisa Donahue (WOLGAST CORPORATION)		
Draft	284613 Fire Alarm System	41	0	Close Out	Fire Alarm - Manuals		Lisa Donahue (WOLGAST CORPORATION)		

PART 1 – GENERAL

1.01 DEFINITION

- A. Clarification Request forms shall be used to document all questions regarding bidding documents and technical specifications. Please use **ONE** Clarification Form for each item.
- B. The Clarification Request form follows as page 2 of this Section.

1.02 PREPARATION OF CLARIFICATION REQUEST FORM

- A. The Contractor shall complete the following items on the Clarification Request form:
 - 1. Date
 - 2. Contractor Name
 - 3. Contractor contact person
 - 4. Contractor email, phone, and fax number
 - 5. Item(s) for clarification
- B. The Contractor shall forward the Clarification Request form, via fax or email, to the Construction Manager **no later than 5 days prior to bid due date**. Requests from bidders for clarification, or interpretation of the bidding documents must reach the Project Team five days before the bid date, or by the date addressed in the pre-bid agenda. Any bidder clarifications which reach the project team after such dates have passed will not be considered.

1.03 RESPONSIBILITIES FOR COMPLETION OF CLARIFICATION REQUEST FORMS

- A. The Construction Manager shall review and number Clarification Request forms as they are received.
- B. Clarification Requests regarding BIDDING INSTRUCTIONS OR PROCEDURES shall be answered by the Construction Manager.
- C. Clarification Requests regarding the DESIGN and/or TECHNICAL SPECIFICATIONS shall be answered by the Architect. The Construction Manager shall forward technical specification clarifications to the Architect, via fax or mail, as they are received.

1.04 RESPONSE TO CLARIFICATION REQUEST FORMS

- A. The Architect shall review each Clarification Request form received and return responses to the Construction Manager.
- B. As noted in Items 1.03.B and 1.03.C above, it is the responsibility of both the Construction Manager and the Architect to respond to Clarification Request forms.
- C. Responses shall be issued via the “Response” section of the Clarification Request form or Addenda.

CLARIFICATION REQUEST FORM

Date: _____

Wolgast Clarification Request
#: _____

To: Wolgast Corporation
[Dale Schwerin dschwerin@wolgast.com](mailto:dschwerin@wolgast.com) or [Lisa Donahue ldonahue@wolgast.com](mailto:ldonahue@wolgast.com)
4835 Towne Centre Road, Suite 203
Saginaw, MI 48604
Phone (989) 790-9120, Fax (989) 790-9063

From: _____
Contractor Name

Contact Name

Email Address

Phone # _____ Fax # _____

Bid Division # and Name: _____

CSI Code (If Applicable): _____

Drawing #: _____ Detail or Item #: _____

Reason for Request: More Detail Needed Engineering Clarification Alternate Proposal Other

Project: [Bay City Public Schools – 2024 Sinking Fund](#)

Site Location: [BP 1 Central HS Fitness Center Structural and HVAC](#)

ITEM(S) FOR CLARIFICATION OF BID: (Please use one form for each item)

Please review and respond to the following item(s) for clarification:

RESPONSE: ITEM TO BE INCLUDED IN ADDENDUM

Construction Manager: _____
Signature Date

Architect: _____
Signature Date

END OF SECTION 00310

PART 1 – GENERAL

1.01 BID SECURITY

- A. Each Proposal shall be accompanied by Bid Security pledging that the Bidder will enter into a contract with the Owner on the terms stated in the Proposal, and will, if required, furnish bonds as described in Section 00600. Should the Bidder refuse to enter into such contract or fail to furnish such Bonds, the amount of the Bid Security shall be forfeited to the Owner as liquidated damages, not as a penalty.
- B. Bid Security shall be in the amount of five percent (5%) of the Base Bid(s).
- C. Bid Security for each Proposal containing Bids for multiple Bid Divisions shall be in the amount of five percent (5%) of the total Base Bids for the highest-priced combination of Bid Divisions included in the Proposal.
- D. Bid Security may take the form of a **Bid Bond, a Cashier's Check, or a Money Order made payable to the Owner.** When submitting a Cashier's Check or Money Order a separate check or money order must accompany each Bid Division.
- E. Bid Security that is in the form of a Cashier's Check or Money Order will be returned to Bidders within a reasonable period after construction contracts have been executed, returned, and approved by the Owner.

END OF SECTION 00410

PART 1 – GENERAL**1.01 OWNER/CONTRACTOR AGREEMENT**

- A. The Agreement between the Owner and the Contractor will be written on the Owner's standard Owner/Contractor Agreement Form. A sample of this Form appears as Section 00510.
- B. The Owner/Contractor Agreement Form will be filled in by the Owner, as appropriate for each Contractor and will be sent to each Contractor.
- C. The executed Owner/Contractor Agreement, the General Conditions and the other Contract Documents will be the entire, integrated Contract between the Owner and each Contractor.
- D. Upon receipt of an Owner/Contractor Agreement, each successful Bidder shall review it for completeness and accuracy, execute it and return it to the Owner's Representative for delivery to the Owner.
- E. Each successful Bidder shall submit all required post-bid documents, including Labor and Material Payment Bond and Performance Bond (Section 00600) unless waived by the Owner, Certificates of Insurance (Section 00650), Schedule of Values (Section 00670), Subcontractor and Supplier Listing (Section 00680), and Employee Listing (Section 00690) as a prerequisite to execution of the Owner/Contractor Agreement
- F. The Owner will execute each Owner/Contractor Agreement after it has been properly executed by the Bidder and after all required post-bid documents have been submitted.

1.02 NOTICE TO PROCEED

- A. The Owner may elect to issue Notices to Proceed prior to the execution of Owner/Contractor Agreements.
- B. Upon receipt of Notice to Proceed, each Contractor shall commence work in accord with the conditions contained in the Notice to Proceed
- C. Regardless of the provisions of any Notice to Proceed or of this Section, no Contractor shall commence work until all required insurance is in force and Certificates of Insurance (Section 00650) have been submitted to the Owner's Representative for delivery to the Owner.
- D. Prior to commencement of work, Contractors shall submit evidence satisfactory to the Owner that required bonds will be furnished and shall deliver the Bonds by the date the Contractor executes the Owner/Contractor Agreement.
- E. The Owner may include Notice to Proceed in Purchase Orders.

1.03 COMMENCEMENT OF WORK

- A. Each Contractor shall commence work immediately upon receipt of Notice to Proceed under the conditions contained in the Notice to Proceed or upon execution of an Owner/Contractor Agreement, whichever is earlier.

END OF SECTION 00500

**SAMPLE
OWNER-CONTRACTOR
CONTRACT ON
FOLLOWING PAGE**

END OF SECTION 00510



Document A132™ - 2019

Standard Form of Agreement between Owner and Contractor, Construction Manager as Adviser Edition

AGREEMENT made as of the «Day» of «Month» in the year «Year»
(in words, indicate day, month and year)

BETWEEN the Owner:
(Name, legal status, address and other information)

«Owner Name»
«Owner Address»
«Owner CSZ»

Telephone:
Facsimile:

and the Contractor:
(Name, legal status, address and other information)

«Contractor»
«Address»
«CSZ»

Telephone:
Facsimile:

for the following Project:
(Name, legal status, address and other information)

«Project Description»
«Project Name»
«Project Address»
«Project CSZ»

«Bid Division» - «Description»

The Construction Manager is:
(Name, legal status, address and other information)

Wolgast Corporation
4835 Towne Centre Road, Suite 203
Saginaw, MI 48604
Telephone: (989) 790-9120
Facsimile: (989) 790-9120

The Architect is:
(Name, legal status, address and other information)

«Architect Name»
«Architect Address»
«Architect CSZ»

Telephone:
Facsimile:

The Owner and Contractor agree as set forth below.

This document has important legal consequences. Consultation with an attorney is encouraged with respect to its completion or modification.

This document is intended to be used in conjunction with AIA Documents A232™-2019, General Conditions of the Contract for Construction. Construction Manager as Adviser Edition: B132™-2019, Standard Form of Agreement Between Owner and Architect, Construction Manager as Adviser Edition; and C132™-2019, Standard Form of Agreement Between Owner and Construction Manager as Adviser.

AIA Document A232™-2019 is adopted in this document by reference. Do not use with other general conditions unless this document is modified.

TABLE OF ARTICLES

1	THE CONTRACT DOCUMENTS
2	THE WORK OF THIS CONTRACT
3	DATE OF COMMENCEMENT AND DATES OF SUBSTANTIAL COMPLETION
4	CONTRACT SUM
5	PAYMENTS
6	DISPUTE RESOLUTION
7	TERMINATION OR SUSPENSION
8	MISCELLANEOUS PROVISIONS
9	ENUMERATION OF CONTRACT DOCUMENTS

ARTICLE 1 THE CONTRACT DOCUMENTS

The Contract Documents consist of this Agreement, Conditions of the Contract (General, Supplementary, and other Conditions), Drawings, Specifications, Addenda issued prior to the execution of this Agreement, other documents listed in this Agreement, and Modifications issued after execution of this Agreement, all of which form the Contract, and are as fully a part of the Contract as if attached to this Agreement or repeated herein. The Contract represents the entire and integrated agreement between the parties hereto and supersedes prior negotiations, representations, or agreements, either written or oral. An enumeration of the Contract Documents, other than Modifications, appears in Article 9.

ARTICLE 2 THE WORK OF THIS CONTRACT

The Contractor shall fully execute the Work described in the Contract Documents, except as specifically indicated in the Contract Documents to be the responsibility of others, or as follows:

§ 2.1 Provide all work described by but not limited to Bidding Requirements, Contract Forms and Conditions of the Contract, Additional Conditions of the Contract, General Conditions of the Contract for Construction, Division 1 General Requirements and:

BID DIVISION: _____ «Bid Division» - «Description»

Provide all labor, materials, tools and equipment necessary to perform the work of the specified bid sections. The Contractor must also furnish, deliver, unload, store, protect erect and install all items required for the satisfactory completion of the work of this bid division (as indicated on drawings and associated specifications.) Including but not limited to:

«Written Description» _____

INCLUDING SECTIONS: «Including Sections1» _____

Limited Responsibility: «Limited Responsibility» _____

§ 2.2 Pre-Bid Meeting Agenda and Meeting Minutes dated: _____ «Pre Bid Date»

§ 2.3 Post-Bid Interview dated: _____ «Post Bid Interview Date»

§ 2.4 Pre-Construction Meeting Agenda and Meeting Minutes dated: _____ «Pre Con Date»

§ 2.5 Performance Bond and Labor and Material Payment Bond required: _____ «Bond Required»

§ 2.6 Project Start Date: _____ «Project Start Date»

§ 2.7 Completion Date: _____ «Completion Date»

- § 2.8 All submittals and shop drawings required by the specifications must be submitted by: «Submittals Due By»
- § 2.9 Provide all clean-up and legal off-site disposal of all debris generated by any work performed by this Contract including general housekeeping of employee generated trash and garbage (i.e. drink cups, food wrappers, bag, etc.).
- § 2.10 The Bid Division Description(s) identify the scope of work, areas of responsibility and specific work to be included in the Contract Amount. If any conflict is found between the architect/engineer specifications and the Bid Division Descriptions regarding the scope of work to be performed, the Bid Division Description(s) shall govern. Further, if a conflict occurs between the Bidding Requirements, the General Requirements, the Specifications, the Bid Division Description(s), the Drawings, or the Addenda(s), the most stringent requirement shall apply.
- § 2.11 Other Special provisions: Article 8.6
- § 2.12 Compliance with EPA AHERA for Asbestos: The Contractor must adhere to all EPA AHERA and Michigan State Asbestos Regulations for Asbestos and other hazardous materials.
- § 2.13 Compliance with Lead-Containing Materials: ALL Contractors, Subcontractors and Sub-Subcontractors shall adhere to the Environmental Protection Agency (EPA) lead-based paint regulation titled the “Renovation, Repair and Paint (RRP) Rule”. Included under this law are “Child Occupied Facilities” (COFs). COFs encompass locations of pre-1978 constructed buildings where children under age six (6) regularly visit, such as kindergarten rooms, 1st grade classrooms, applicable restrooms, pre-school and day care centers. Therefore portions of each pre-1978 constructed school building falls under the RRP Rule. Any contractor working on this project who disturbs painted surfaces in COF spaces shall ensure that they adhere to all aspects of the RRP Rule. This included but is not limited to meeting the requirements for being a Certified Firm, having a Certified Lead Renovator involved and following applicable lead safe work practices. Furthermore, all Contractors shall be responsible to comply with all applicable Federal and Michigan State lead regulations including, but not limited to, 29CFR Part 1926.62 of the OSHA Lead Construction Standards, (Part 603 of the Michigan State Standards). All costs associated with regulatory compliance shall be borne by the Contractor.
- § 2.14 This Contractor is responsible for all safety issues for all work that he has effected until his project is complete.

ARTICLE 3 DATE OF COMMENCEMENT AND DATES OF SUBSTANTIAL COMPLETION

§ 3.1 The date of commencement of the Work shall be:

- The date of this Agreement.
- A date set forth in a notice to proceed issued by the Owner.
- Established as follows:
(Insert a date or a means to determine the date of commencement of the Work.)

If a date of commencement of Work is not selected, then the date of commencement shall be the date of this Agreement.

§ 3.2 The Contract Time shall be measured from the date of commencement of the Work.

§ 3.3 Substantial Completion of the Project or Portions Thereof

§ 3.3.1 Subject to adjustments of the Contract Time as provided in the Contract Documents, the date of Substantial Completion of the Work of all of the Contractors for the Project will be : See Milestone Schedule for details
(Insert the date of Substantial Completion of the Work of all Contractors for the Project.)

«Substantial Completion Date»

§ 3.3.2 The Contractor agrees that time is of the essence and to start work when directed by the Construction Manager and to furnish sufficient materials and a sufficient number of properly skilled works, so as not to delay the work of any other Contractor or completion of the project.

ARTICLE 4 CONTRACT SUM

§ 4.1 The Owner shall pay the Contractor the Contract Sum in current funds for the Contractor’s performance of the Contract. The Contract Sum shall be one of the following:

(Check the appropriate box.)

- Stipulated Sum, in accordance with Section 4.2 below:
- Cost of the work plus the Contractor’s Fee without a Guaranteed Maximum Price, in accordance with Section 4.3 below:
- Cost of the Work plus the Contractor’s Fee with a Guaranteed Maximum Price, in accordance with Section 4.4 below

(Based on the selection above, complete Section 4.2, 4.3 or 4.4 below.)

§ 4.2 Stipulated Sum

§ 4.2.1 The Stipulated Sum shall be «Contract Amount» Dollars (\$«Contract Amount »), subject to additions and deductions as provided in the Contract Documents.

Contract amount includes: Base Bid \$«Base Bid», PLM Bond Amount \$«Bond Amount», Alternates \$«Alternate» totaling \$«Contract Amount ».

§ 4.2.2 Alternates

§ 4.2.2.1 Alternates, if any, included the Contract Sum:

Item	Price
<u>«Alternate Description»</u>	

§ 4.2.2.2 Subject to the conditions noted below, the following alternates may be accepted by the Owner following execution of this Agreement. Upon acceptance, the Owner shall issue a Modification to this Agreement. (Insert below each alternate and the conditions that must be met for the Owner to accept the alternate.)

Item	Price	Conditions for Acceptance
------	-------	---------------------------

§ 4.2.3 Allowances, if any, included in the Contract Sum: (Identify each allowance.)

Item	Price
------	-------

§ 4.2.4 Unit Prices, if any:

(Identify the item and state the unit price, and quantity limitations, if any, to which the unit price will be applicable.)

Item	Units and Limitations	Price per Unit (\$0.00)
------	-----------------------	-------------------------

ARTICLE 5 PAYMENTS

§ 5.1 Progress Payments

§ 5.1.1 The Construction Manager will provide a Contractor Invoice Form to the Contractor for submitting the Contractor’s request for payment each month. All reference to “Application for Payment” or “Progress Payment Request” shall mean “Contractor Invoice Form”. Based upon Applications for Payment submitted to the Construction Manager by the Contractor and upon certification of the Application for Payment by the Construction Manager and Architect, the Owner shall make progress payments on account of the Contract Sum to the Contractor, as provided below and elsewhere in the Contract Documents.

§ 5.1.2 The period covered by each Application for Payment shall be one calendar month ending on the last day of the month, or as follows:

See Contractor Invoice Form Due Date on Attachment “A”

§ 5.1.3 Provided an Application for Payment is received by the Construction Manager not later than the “Contractor Invoice Form Due Date” found on Attachment “A”, the Owner shall make payment of the amount certified in the Application for Payment to the Contractor for all undisputed amounts not later than forty-five (45) days after the “Owner Approves Invoice” date found on Attachment “A”. If an Application for Payment is received by the Construction Manager after the application date fixed above, payment for all undisputed amounts shall be made by the Owner after the Construction Manager receives the Application for Payment and at the payment date for the Applications for Payment of the following month.

(Federal, state or local laws may require payment within a certain period of time.)

§ 5.1.4 Progress Payments Where the Contract Sum is Based on a Stipulated Sum

§ 5.1.4.1 Each Contractor Invoicing Form and CM prepared Progress Payment Request Form shall be based on the most recent schedule of values submitted by the Contractor in accordance with the Contract Documents. The schedule of values shall allocate the entire Contract Sum among the various portions of the Work. The schedule of values shall be prepared in such form, and supported by such data to substantiate its accuracy, as the Construction Manager and Architect may require. This approved schedule of values, unless objected to by the Construction Manager, shall be used as a basis for reviewing the Contractor’s Invoicing Form and CM prepared Progress Payment Form.

§ 5.1.4.2 The Contractor Invoicing Form shall show the percentage of completion of each portion of the Work as of the end of the period covered by the Application for Payment.

§ 5.1.4.3 In accordance with AIA Document A232™-2019, General Conditions of the Contract for Construction, Construction Manager as Adviser Edition, and subject to other provisions of the Contract Documents, the amount of each progress payment shall be computed as follows:

§ 5.1.4.3.1 The amount of each progress payment shall first include:

- .1 Take that portion of the Contract Sum properly allocable to completed Work as determined by multiplying the percentage completion of each portion of the Work by the share of the total Contract Sum allocated to that portion of the Work in the schedule of values, less retainage of ten percent (10%). Pending final determination of cost to the Owner of changes in the Work, amounts not in dispute may be included as provided in Section 7.3.9 of the General Conditions; and
- .2 Add that portion of the Contract Sum properly allocable to materials and equipment delivered and suitably stored at the site for subsequent incorporation in the completed construction, or, if approved in advance by the Owner, suitably stored off the site at a location agreed upon in writing, less retainage of ten percent (10%); and
- .3 That portion of Construction Change Directives that the Architect determines, in the Architect’s professional judgment, to be reasonably justified; and
- .4 Add, upon Substantial Completion of the Work, a sum sufficient to increase the total payments to ninety percent (90%) of the Contract Sum, less such amounts as the Construction Manager and Owner recommends and the Architect determines for incomplete Work and unsettled claims; and
- .5 Add, if final completion of the Work is thereafter materially delayed through no fault of the Contractor, any additional amounts payable in accordance with Section 9.10.3 of the General Conditions.

§ 5.1.4.3.2 The amount of each progress payment shall then be reduced by:

- .1 The aggregate of any amounts previously paid by the Owner.
- .2 The amount, if any, for Work that remains uncorrected and for which the Construction Manager or Architect has previously withheld or nullified a Certificate for Payment as provided in Article 9 of AIA Document A232-2019.
- .3 Any amount for which the Contractor does not intend to pay a Subcontractor or material supplier, unless the Work has been performed by others the Contractor intends to pay.
- .4 For Work performed or defects discovered since the last payment application, any amount for which the Architect may withhold payment, or nullify a Certificate of Payment in whole or in part, as provided in Article 9 of AIA Document A232-2019; and

.5 Retainage withheld pursuant to Section 5.1.7.

§ 5.1.4.4 The Contractor shall submit to the Construction Manager an itemized progress payment request by the date required in Section 01045 of the Project Manual. The progress payment request is referred to as the Contractor Invoice Form. After the schedule of values is submitted to and approved by the Construction Manager, the Construction Manager will prepare a Contractor Invoice Form master template in accordance with the approved schedule of values and provide it to the Contractor for use to prepare all progress payment requests. The Contractor shall submit a signed and notarized original Contractor Invoice Form for each monthly progress payment request. It shall be accompanied by such supporting data and documents the Owner, Construction Manager and Architect may require substantiating the Contractor's right to payment.

1. Contractor Invoice Form as defined as: See Section 1045 (Contractors Application for Payment)
2. Cost Control Manual as defined as: See Section 1045 (Contractors Application for Payment)
3. Progress Payment Request as defined as: See Section 1045 (Contractors Application for Payment)

§ 5.1.7 Retainage

§ 5.1.7.1 For each progress payment made prior to when the Work of this Contract is substantially complete, the Owner may withhold the following amount, as retainage, from the payment otherwise due:

(Insert a percentage or amount to be withheld as retainage from each Application for Payment. The amount of retainage may be limited by governing law.)

Ten percent (10%) retainage

§ 5.1.7.2 Reduction or limitation of retainage, if any, shall be as follows:

(If the retainage established in Section 5.1.7.1 is to be modified prior to when the entire Work of this Contract is substantially complete, including modifications for completion of portions of the Work as provided in Section 3.4.2, insert provisions for such modifications.)

Ten percent (10%) retainage shall be held back until the project is complete.

§ 5.2 Final Payment

§ 5.2.1 Final Payment Where the Contract Sum is Based on a Stipulated Sum

§ 5.2.1.1 Final payment, constituting the entire unpaid balance of the Contract Sum, shall be made by the Owner to the Contractor when

- .1 the Contractor has fully performed the Contract except for the Contractor's responsibility to correct Work as provided in Article 12 of AIA Document A232-2019, and to satisfy other requirements, if any, which extend beyond final payment; and
- .2 a final Certificate for Payment or Project Certificate for Payment has been issued by the Architect.

§ 5.2.1.2 The Owner's final payment to the Contractor shall be made no later than 30 days after the issuance of the final Certificate for Payment or Project Certificate for Payment, or as follows:

§ 5.2.2 The following must be submitted to the Construction Manager before the acceptance and submission of final payment in addition to requirements of other sections:

- .1 All required closeout documents including warranties, guarantees, operation and maintenance documents, and training;
- .2 As-Builts Drawings;
- .3 Itemized lists of all surplus and extra materials required per specifications at which time the Construction Manager will schedule the delivery of such materials to the owner by the Contractor;
- .4 Consent of Surety for Final Payment;
- .5 Submit Releases and Final Unconditional Waivers of Lien from all suppliers and subcontractors;
- .6 Submit certification stating that no materials containing asbestos were incorporated into the Work;
- .7 Submit certification that all punch list items have been completed.

§ 5.3 Payments due and unpaid under the Contract shall bear interest from the date payment is due at the rate stated below, or in the absence thereof, at the legal rate prevailing from time to time at the place where the Project is located.

(Insert rate of interest agreed upon, if any.)

Five Percent (5%) per annum % See MCL 438.31

ARTICLE 6 DISPUTE RESOLUTION

§ 6.1 Initial Decision Maker

The Architect will serve as Initial Decision Maker pursuant to Section 15 of AIA Document A232-2019, unless the parties appoint below another individual, not a party to this Agreement, to serve as Initial Decision Maker.

(If the parties mutually agree, insert the name, address and other contact information of the Initial Decision Maker, if other than the Architect.)

N/A

§ 6.2 Binding Dispute Resolution

For any Claim subject to, but not resolved by, mediation pursuant to Section 15 of AIA Document A232-2019, the method of binding dispute resolution shall be as follows:

(Check the appropriate box.)

- Arbitration pursuant to Section 15 of AIA Document A232-2019
- Litigation in a court of competent jurisdiction
- Other: *(Specify)*

If the Owner and Contractor do not select a method of binding dispute resolution, or do not subsequently agree in writing to a binding dispute resolution method other than litigation, Claims will be resolved by litigation in a court of competent jurisdiction.

§ 6.2.1 In an effort to resolve any conflicts that arise during the construction of the Project or following the completion of the project, the Owner and the Contractor agree that all disputes between them arising out of or relating to this Agreement shall be submitted to non-binding mediation, unless the parties mutually agree otherwise. All parties shall endeavor to settle disputes by mediation in accordance with the Construction Industry Mediation Rules of the American Arbitration Association currently in effect. Demand for mediation shall be filed in writing with the other party of this Agreement and with the American Arbitration Association. A demand for mediation shall be made within a reasonable time after the claim, dispute, or other matter in writing to the other party. In the event non-binding mediation fails to resolve any or all of the disputes or claims, the parties may pursue relief through any other legal and/or equitable means.

§ 6.2.2 The Owner reserves the right in its discretion to require consolidation or joinder of any mediation relating to this Agreement with another mediation involving an independent contractor or consultant engaged by the Owner in connection with the Project. Agreement in the event the Owner believes such consolidation or joinder is necessary in order to resolve a dispute or avoid duplication of time, expense, or effort.

§ 6.2.3 In the event the Owner is involved in a dispute which is not subject to mediation involving a person or entity not a party to this Agreement, the mediation provision of this Article shall be deemed to be void and nonexistent in the event the Owner, in its discretion, determines the Contractor should become a part to that dispute by joinder or otherwise.

§ 6.2.4 The Owner reserves the right to require any mediation to be held near the Owner's principal place of business.

ARTICLE 7 TERMINATION OR SUSPENSION

§ 7.1 Where the Contract Sum is a Stipulated Sum

AIA Document A132™ - 2019. Copyright © 1975, 1980, 1992, 2019 and 2019 by The American Institute of Architects. All rights reserved. This AIA® Document is protected by U.S. Copyright Law and International Treaties. Unauthorized reproduction or distribution of this AIA® Document, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under the law. To report copyright violations, e-mail The American Institute of Architects' legal counsel, copyright@aia.org.

§ 7.1.1 The Contract may be terminated by the Owner or the Contractor as provided in Article 14 of AIA Document A232-2019.

§ 7.1.2 The Work may be suspended by the Owner as provided in Article 14 of AIA Document A232-2019.

ARTICLE 8 MISCELLANEOUS PROVISIONS

§ 8.1 Where reference is made in this Agreement to a provision of AIA Document A232-2019 or another Contract Document, the reference refers to that provision as amended or supplemented therein, or as amended or supplemented by other provisions of the Contract Documents.

§ 8.2 The Owner's representative:
(Name, address, email address, and other information)

«Owner Name»
«Owner Address»
«Owner CSZ»

§ 8.3 The Contractor's representative:
(Name, address, email address, and other information)

«Contractor»
«Address»
«CSZ»

§ 8.4 Neither the Owner's nor the Contractor's representative shall be changed without ten days written notice to the other party.

§ 8.5 Insurance and Bonds

§ 8.5.1 The Owner and the Contractor shall purchase and maintain insurance as set forth in AIA Document A132™-2019, Standard Form of Agreement Between Owner and Contractor, Construction Manager as Adviser Edition, and elsewhere in the Contract Documents.

Type of Insurance	Limit of Liability (\$0.00) Per Specifications
-------------------	---

§ 8.5.2 The Contractor shall provide bonds as set forth in Article 11 of AIA Document A132™-2019, and elsewhere in the Contract.

§ 8.6 Other provisions:

§ 8.6.1 Project Team is comprised of the Owner, Construction Manager, Owner's Representative and Architect.

§ 8.6.2 The Bid Division Description(s) outline the work items that the Contractor is responsible to provide for the Project regardless of any customary practices or agreements of that trade.

§ 8.6.3 If a Project Team member has reasonable objection to the actions of or the manner by which work is performed by a person directly employed by the Contractor or by any subcontractor of the Contractor, the Contractor shall propose another to whom the Project Team has no reasonable objection. Any cost associated with the removal and replacement of such a person shall be at the expense of the Contractor.

§ 8.6.4 All Change Orders and Change Directives will be initiated by a Change Event. (Reference Sections 01051, and 01053 of the Project Manual). The Change Event will be the instrument by which the Contractor will submit a detailed and itemized cost proposal for a proposed change for review by the Construction Manager, Owner's Representative and Architect, and the approval by the Owner, before the contract change is issued.

§ 8.6.5 A Change Event shall not alter the Contractor’s obligation to comply with the process of filing claims in accordance with other provisions of this agreement.

§ 8.6.6 All Contractors must conform to the provisions of the Michigan Right-To-Know Law, 1986 PA 80.

§ 8.6.7 All Contractors must have available on site a copy of all Safety Data Sheets and in addition provide a copy to the Construction Manager. The Construction Manager will return the copy of the Contractor’s Safety Data Sheets at the completion of the project.

§ 8.6.8 The Contractor shall include similar dispute resolution provisions in all agreements with subcontractors, sub-consultants, suppliers, or fabricators so retained, thereby providing for a consistent method of dispute resolution among the parties to those agreements.

§ 8.6.9 In the event of any inconsistency between this agreement and the General Conditions of the Contract for Construction (the “General Conditions”), the terms of this agreement shall govern.

§ 8.6.10 Claims by the Owner arising under this Agreement shall be subject to the limitations provisions defined in Michigan law, except that in no event shall a claim by the Owner be deemed untimely if filed within six (6) years of the final project completion. This provision is acknowledged to apply notwithstanding any other and shorter time frames contractually applicable to claims of the Contractor.

§ 8.6.11 The provisions of the General Conditions related to any waiver of subrogation are hereby deleted from the document and shall be deemed to have no effect. Further, any provision interpreted as the Owner waiving consequential or other indirect damages shall be ineffective and void.

§ 8.6.12 The modifications made to AIA Document A232-2019 Edition by the Owner are hereby incorporated into this Agreement.

§ 8.6.13 All specified insurance certificates and/or insurance policies must be received by the Construction Manager prior to the Contractor commencing work. The Contractor agrees to furnish a performance bond, and labor and materials payment bond for the full amount of this contract, including change orders.

ARTICLE 9 ENUMERATIONS OF CONTRACT DOCUMENTS

§ 9.1 This Agreement is comprised of the following documents:

- .1 AIA Document A132™-2019, Standard Form of Agreement Between Owner and Contractor, Construction Manager as Adviser Edition
- .2
- .3 AIA Document A232™-2019, General Conditions of the Contract for Construction, Construction Manager as Adviser Edition
- .4
- .5 The Drawings are as follows, and are dated [«Drawings Dates»](#) unless a different date is show below: See Attachment “C”

Number	Title	Date
--------	-------	------

- .6 The Specifications are those contained in the Project Manual dated [«Manual Dated»](#) unless a different date is shown below: See Attachment “B”

Section	Title	Date	Pages
---------	-------	------	-------

- .7 The Addenda, if any:

Number	Date	Pages
«Addendum 1 »	«Adm Date»	

«Addendum 2» «Adm 2 Date»
«Addendum 3» «Adm 3 Date»

Portions of Addenda relating to bidding or proposal requirements are not part of the Contract Documents unless the bidding or proposal requirements are also enumerated in this Article 9.

.8 Other Exhibits:

Supplementary and other Conditions of the Contract: Those contained in the Project Manual dated «Manual Dated» unless a different date is shown below: See Attachment “B”

Document	Title	Date	Pages
----------	-------	------	-------

.9 Other documents, if any listed below:

(List here any additional documents that are intended to form part of the Contract Documents. AIA Document A232-2019 provides that the advertisement or invitation to bid, Instructions to Bidders, sample forms, the Contractor’s bid or proposal, portions of Addenda relating to bidding or proposal requirements, and other information furnished by the Owner in anticipation of receiving bids or proposals, are not part of the Contract Documents unless enumerated in this Agreement. Any such documents should be listed here only if intended to be part of the Contract Documents.)

Pre Bid Meeting and Agenda, Post Bid Interview Form, and Pre Construction Meeting and Agenda

This Agreement is entered into the day and year first written above.

OWNER
«Owner Name»

CONTRACTOR
«Contractor»

(Signature)

(Signature)

«Owner and Title»
(Printed name and title)

(Printed name and title)

(Date)

(Date)

PART 1 – GENERAL

1.01 BID BONDS

- A. Bid Security must be in the form of a Bid Bond or a certified check made payable to the Owner.
- B. When a Bid Bond is submitted, the Owner shall be listed as obligee.
- C. When a Bid Bond is submitted, the attorney-in-fact that executes the bond on behalf of the Surety shall attach to the Bond a certified, current copy of their Power of Attorney.
- D. **THE BID BOND AND ALL OTHER BONDS MUST BE ISSUED BY A SURETY COMPANY LICENSED AS SUCH TO DO BUSINESS IN THE STATE OF MICHIGAN.**

1.02 LABOR & MATERIAL PAYMENT BONDS AND PERFORMANCE BONDS

- A. The Owner reserves the right to require any successful Bidder to furnish both a Labor and Material Payment Bond, and a Performance Bond, each in the amount of one hundred percent (100%) of their contract amount.
- B. **THE LABOR & MATERIAL PAYMENT BOND AND THE PERFORMANCE BOND MUST BE ISSUED BY A SURETY COMPANY LICENSED AS SUCH TO DO BUSINESS IN THE STATE OF MICHIGAN.**
- C. When required, Labor and Material Payment Bonds and Performance Bonds must be separate. The combined form will not be accepted. Labor & Material Payment Bonds and Performance Bonds must be submitted on AIA Document A312, 2010 edition, without modifications.
- D. When submitted, Labor and Material Payment Bonds and Performance Bonds shall include:
 - 1. Full name and address of Contractor Surety and Owner.
 - 2. The proper Contract Date.
 - 3. The exact amount of the Contract.
 - 4. A description of the contract work / project.
 - 5. The Owner's name and address.
 - 6. An incorporation by reference of the contract terms.
 - 7. Language obligating the Surety, jointly and severally, with the Contract to the Owner
 - 8. The condition for discharge to the Surety.
 - 9. Signature.
 - 10. Corporate Seal, if applicable.
 - 11. Notarization.
 - 12. Power of Attorney.

1.03 SUPPLY BONDS

- A. The Owner reserves the right to require any direct supplier to furnish a Supply Bond in the amount of one hundred percent (100%) of their contract amount.
- B. Supply Bonds shall include all information required above (reference 1.02C above) for Labor and Material Payment Bonds and Performance Bonds.
- C. **ALL SUPPLY BONDS SHALL BE LEGAL AND ENFORCEABLE IN THE STATE OF MICHIGAN.**

1.04 BOND COSTS IN BIDS

- A. Do not include costs for Labor and Material Payment Bond(s), Performance Bond(s), or Supply Bond(s) in Base bid. State the cost of such Bond(s) separately, in the space(s) provided on the Proposal Form (Section 00300).

1.05 SUBMISSION OF BONDS

- A. Bonds shall be submitted to the Construction Manager for delivery to the Owner within fifteen (15) days following the date of issue of the Contract.
- B. Bonds must be submitted prior to contract execution and accepted by the Owner before work may begin on-site.
- C. If the work is commenced prior to contract execution in response to a Notice to Proceed (reference Section 00500), the Contractor shall, prior to commencement of the work, submit evidence satisfactory to the Owner that required bonds will be furnished, and shall deliver the Bonds by the date the Bidder executes the Owner/Contractor Agreement (reference Section 00510).

END OF SECTION 00600

PART 1 – GENERAL

1.01 INSURANCE CERTIFICATES

- A. Each Contractor shall provide, prior to the beginning of Work, a certificate of insurance for delivery to the Owner indicating that all required insurance coverage is in force.
- B. Use standard Insurance Certificate Form. The Accord Form 25 (2016/03) are preferable forms. These forms should be obtained from your Insurance agent.
- C. Issue all certificates to: **Bay City Public Schools**
601 Blend Street
Bay City MI 48706
- D. Certificates must show as ‘additional insured’ the Owner, **Bay City Public Schools**, the Architect, **WTA Architects**, and the Construction Manager, **WOLGAST CORPORATION**.
- E. A “Letter of Compliance” must be completed and submitted along with the certificate of insurance. The “Letter of Compliance” form is Page 3 of this section.
- F. **Insurance certificates must be completed as follows: (please refer to corresponding numerals on the sample certificate (following instructions) and also reference the “Section 00700 - General Conditions of the Contract for Construction.”**
1. This blank is to be dated the date the certificate of insurance is issued.
 2. This blank is to provide the complete name and address of the insurance agency issuing the certificate.
 3. This blank is to provide the full name and address of the “prime contractor.”
 4. These blanks are to provide the name (or names) of the insurance company (ies) providing coverage for the specific coverage issued on the certificate.
 5. General Liability
 - a. General Liability – All blanks must be checked in this section and policies must be on an “occurrence” basis.
 - b. Policy Number – A policy number must be listed here.
 - c. Policy “effective” and “expiration” dates must be listed in these two blanks.
 - d. This section must be filled in with dollar amounts (listed in thousands). Please refer to the example on the following page.
 6. Automobile liability
 - a. These blanks must be filled in with either:
Option 1: Any Auto, Hired, and Non-Owned automobiles OR
Option 2: All Owned Autos (Priv. Pass.), All Owned Autos (Other than Priv. Pass.), Hired Autos, and Non-Owned Autos.
 - b. Policy Number – A policy number must be listed here.
 - c. Policy Effective and Expiration dates must be listed in these two blanks.
 - d. This Section must be filled in with dollar amounts (in thousands).
 7. Excess Liability (Provide \$2 million Excess Liability Umbrella policy):
 - a. This blank must be checked with the “Umbrella Form.”
 - b. Policy Number – A policy number must be listed here.
 - c. Policy Effective and Expiration dates must be listed in these blanks.
 - d. If this section is required (see Item 7 above), both of these blanks must be filled in with a minimum of \$2,000,000 and \$2,000,000.

8. Worker's Compensation
 - a. Nothing needs to be checked here.
 - b. Policy Number – A policy number must be listed here.
 - c. Policy Effective and Expiration dates must be listed in these blanks.
 - d. These blanks must be filled in with minimum limits as follows:
 - \$500,000 (each accident)
 - \$500,000 (disease policy limits)
 - \$500,000 (disease each employee)
9. This section need not be completed unless some unique coverage is required for a certain type of job.
10. This section should contain the listing of the additional insured as in 1.01D. The names of the Owner, Architect, and Construction Manager must be listed here.
11. The Owner should be listed here, as this is the actual Certificate Holder. List the Owner as follows:

Bay City Public Schools

12. This blank must show the number thirty (30), indicating that the Owner and all additional insured parties will receive at least thirty (30) days' notice of cancellation of any of the policies listed on the certificate.
13. The certificate must be signed by a licensed insurance agent or representative of the insurance company in order to be valid.

NOTE: Sample Certificate of Liability and Letter of Compliance follows.

Letter of Compliance

Owner: _____

Contractor: _____

Project: _____

This letter is to acknowledge that I/We am/are the Insurance Agent(s) for the above-named Contractor and furthermore, that we have reviewed the insurance coverage required under this Contract with the Owner:

Bay City Public Schools

We hereby certify that said Contractor is in compliance with all insurance coverage required under this Contract with the Owner referenced above.

We hereby certify that said Contractor is in compliance with all insurance requirements, whether or not so evidenced on the attached certificate of insurance.

Signed: _____

Agency: _____

Address: _____

Agent: _____

Witness: _____

Date: _____

Notary: _____

My Commission Expires: _____

For: _____

Contractor: _____

Address: _____

Bid Division: _____



CERTIFICATE OF LIABILITY INSURANCE

DATE (MM/DD/YYYY)
(1)

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

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

PRODUCER (2)	CONTACT NAME:	
	PHONE (A/C, No, Ext):	FAX (A/C, No):
	E-MAIL ADDRESS:	
	INSURER(S) AFFORDING COVERAGE	
INSURED (3)	INSURER A:	(4)
	INSURER B:	
	INSURER C:	
	INSURER D:	
	INSURER E:	
	INSURER F:	

COVERAGES CERTIFICATE NUMBER: REVISION NUMBER:

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

INSR LTR	TYPE OF INSURANCE	ADDL(SUBR) INSD WVD	POLICY NUMBER	POLICY EFF (MM/DD/YYYY)	POLICY EXP (MM/DD/YYYY)	LIMITS
	<input checked="" type="checkbox"/> COMMERCIAL GENERAL LIABILITY (5A) <input type="checkbox"/> CLAIMS-MADE <input type="checkbox"/> OCCUR GEN'L AGGREGATE LIMIT APPLIES PER: <input type="checkbox"/> POLICY <input type="checkbox"/> PRO-JECT <input type="checkbox"/> LOC OTHER:		(5B)	(5C)		EACH OCCURRENCE (5D) \$ 1,000,000.00 DAMAGE TO RENTED PREMISES (Ea occurrence) \$ 100,000.00 MED EXP (Any one person) \$ 5,000.00 PERSONAL & ADV INJURY \$ 1,000,000.00 GENERAL AGGREGATE \$ 1,000,000.00 PRODUCTS - COMP/OP AGG \$ 1,000,000.00
	<input checked="" type="checkbox"/> AUTOMOBILE LIABILITY (6A) <input checked="" type="checkbox"/> ANY AUTO OWNED AUTOS ONLY <input checked="" type="checkbox"/> HIRER AUTOS ONLY <input type="checkbox"/> SCHEDULED AUTOS NON-OWNED AUTOS ONLY		(6B)	(6C)		COMBINED SINGLE LIMIT (Ea accident) (6D) \$ 1,000,000.00 BODILY INJURY (Per person) \$ BODILY INJURY (Per accident) \$ PROPERTY DAMAGE (Per accident) \$
	<input checked="" type="checkbox"/> UMBRELLA LIAB <input type="checkbox"/> EXCESS LIAB <input type="checkbox"/> OCCUR (7A) <input type="checkbox"/> CLAIMS-MADE DED RETENTION \$		(7B)	(7C)		EACH OCCURRENCE (7D) \$ 2,000,000.00 AGGREGATE \$ 2,000,000.00
	WORKERS COMPENSATION AND EMPLOYERS' LIABILITY (8A) ANY PROPRIETOR/PARTNER/EXECUTIVE OFFICER/MEMBER EXCLUDED? (Mandatory in NH) If yes, describe under DESCRIPTION OF OPERATIONS below	Y/N <input type="checkbox"/> N/A	(8B)	(8C)		PER STATUTE OTH-ER (8D) E.L. EACH ACCIDENT \$ 500,000.00 E.L. DISEASE - EA EMPLOYEE \$ 500,000.00 E.L. DISEASE - POLICY LIMIT \$ 500,000.00
(9)						

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

(10) LIST THE OWNER, ARCHITECT AND CONSTRUCTION MANAGER AS ADDITIONAL INSURED

CERTIFICATE HOLDER	CANCELLATION
(11) INSERT THE OWNER'S NAME HERE NOTE: PLEASE HAVE YOUR INSURANCE COMPANY MAIL THIS DOCUMENT TO THE CONSTRUCTION MANAGER	(12) SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, NOTICE WILL BE DELIVERED IN ACCORDANCE WITH THE POLICY PROVISIONS. AUTHORIZED REPRESENTATIVE
	(13)

© 1988-2015 ACORD CORPORATION. All rights reserved.

ACORD 25 (2016/03)

The ACORD name and logo are registered marks of ACORD

POLICY NUMBER:

COMMERCIAL GENERAL LIABILITY

THIS ENDORSEMENT CHANGES THE POLICY. PLEASE READ IT CAREFULLY.

**ADDITIONAL INSURED - OWNERS, LESSEES OR
CONTRACTORS - SCHEDULED PERSON OR ORGANIZATION**

This endorsement modifies insurance provided under the following:

COMMERCIAL GENERAL LIABILITY COVERAGE PART

SCHEDULE

Name Of Additional Insured Person(s) Or Organization(s)	Location(s) Of Covered Operations
Information required to complete this Schedule, if not shown above, will be shown in the Declarations.	

A. Section II - Who Is An Insured is amended to include as an additional insured the person(s) or organization(s) shown in the Schedule, but only with respect to liability for "bodily injury", "property damage" or "personal and advertising injury" caused, in whole or in part, by:

1. Your acts or omissions; or
2. The acts or omissions of those acting on your behalf;

in the performance of your ongoing operations for the additional insured(s) at the location(s) designated above.

However:

1. The insurance afforded to such additional insured only applies to the extent permitted by law; and
2. If coverage provided to the additional insured is required by a contract or agreement, the insurance afforded to such additional insured will not be broader than that which you are required by the contract or agreement to provide for such additional insured.

B. With respect to the insurance afforded to these additional insureds, the following additional exclusions apply:

This insurance does not apply to "bodily injury" or "property damage" occurring after:

1. All work, including materials, parts or equipment furnished in connection with such work, on the project (other than service, maintenance or repairs) to be performed by or on behalf of the additional insured(s) at the location of the covered operations has been completed; or
2. That portion of "your work" out of which the injury or damage arises has been put to its intended use by any person or organization other than another contractor or subcontractor engaged in performing operations for a principal as a part of the same project.

C. With respect to the insurance afforded to these additional insureds, the following is added to **Section III - Limits Of Insurance**:

If coverage provided to the additional insured is required by a contract or agreement, the most we will pay on behalf of the additional insured is the amount of insurance:

1. Required by the contract or agreement; or
2. Available under the applicable Limits of Insurance shown in the Declarations;

whichever is less.

This endorsement shall not increase the applicable Limits of Insurance shown in the Declarations.

THIS ENDORSEMENT CHANGES THE POLICY. PLEASE READ IT CAREFULLY.

ADDITIONAL INSURED - OWNERS, LESSEES OR CONTRACTORS - AUTOMATIC STATUS WHEN REQUIRED IN CONSTRUCTION AGREEMENT WITH YOU

This endorsement modifies insurance provided under the following:

COMMERCIAL GENERAL LIABILITY COVERAGE PART

A. Section II - Who Is An Insured is amended to include as an additional insured any person or organization for whom you are performing operations when you and such person or organization have agreed in writing in a contract or agreement that such person or organization be added as an additional insured on your policy. Such person or organization is an additional insured only with respect to liability for "bodily injury", "property damage" or "personal and advertising injury" caused, in whole or in part, by:

1. Your acts or omissions; or
2. The acts or omissions of those acting on your behalf;

in the performance of your ongoing operations for the additional insured.

However, the insurance afforded to such additional insured:

1. Only applies to the extent permitted by law; and
2. Will not be broader than that which you are required by the contract or agreement to provide for such additional insured.

A person's or organization's status as an additional insured under this endorsement ends when your operations for that additional insured are completed.

B. With respect to the insurance afforded to these additional insureds, the following additional exclusions apply:

This insurance does not apply to:

1. "Bodily injury", "property damage" or "personal and advertising injury" arising out of the rendering of, or the failure to render, any professional architectural, engineering or surveying services, including:

- a. The preparing, approving, or failing to prepare or approve, maps, shop drawings, opinions, reports, surveys, field orders, change orders or drawings and specifications; or
- b. Supervisory, inspection, architectural or engineering activities.

This exclusion applies even if the claims against any insured allege negligence or other wrongdoing in the supervision, hiring, employment, training or monitoring of others by that insured, if the "occurrence" which caused the "bodily injury" or "property damage", or the offense which caused the "personal and advertising injury", involved the rendering of or the failure to render any professional architectural, engineering or surveying services.

2. "Bodily injury" or "property damage" occurring after:

- a. All work, including materials, parts or equipment furnished in connection with such work, on the project (other than service, maintenance or repairs) to be performed by or on behalf of the additional insured(s) at the location of the covered operations has been completed; or
- b. That portion of "your work" out of which the injury or damage arises has been put to its intended use by any person or organization other than another contractor or subcontractor engaged in performing operations for a principal as part of the same project.

C. With respect to the insurance afforded to these additional insureds, the following is added to **Section III - Limits Of Insurance**:

The most we will pay on behalf of the additional insured is the amount of insurance:

1. Required by the contract or agreement you have entered into with the additional insured; or
2. Available under the applicable Limits of Insurance shown in the Declarations;

whichever is less.

This endorsement shall not increase the applicable Limits of Insurance shown in the Declarations.

THIS ENDORSEMENT CHANGES THE POLICY. PLEASE READ IT CAREFULLY.

**ADDITIONAL INSURED - OWNERS, LESSEES OR
CONTRACTORS - COMPLETED OPERATIONS**

This endorsement modifies insurance provided under the following:

COMMERCIAL GENERAL LIABILITY COVERAGE PART
PRODUCTS/COMPLETED OPERATIONS LIABILITY COVERAGE PART

SCHEDULE

Name Of Additional Insured Person(s) Or Organization(s)	Location(s) And Description Of Covered Operations
Information required to complete this Schedule, if not shown above, will be shown in the Declarations.	

A. Section II - Who Is An Insured is amended to include as an additional insured the person(s) or organization(s) shown in the Schedule, but only with respect to liability for "bodily injury" or "property damage" caused, in whole or in part, by "your work" at the location designated and described in the schedule of this endorsement performed for that additional insured and included in the "products-completed operations hazard".

However:

1. The insurance afforded to such additional insured only applies to the extent permitted by law; and
2. If coverage provided to the additional insured is required by a contract or agreement, the insurance afforded to such additional insured will not be broader than that which you are required by the

contract or agreement to provide for such additional insured.

B. With respect to the insurance afforded to these additional insureds, the following is added to Section III - Limits Of Insurance:

If coverage provided to the additional insured is required by a contract or agreement, the most we will pay on behalf of the additional insured is the amount of insurance:

1. Required by the contract or agreement; or
2. Available under the applicable Limits of Insurance shown in the Declarations;

whichever is less.

This endorsement shall not increase the applicable Limits of Insurance shown in the Declarations.

PART 1 – GENERAL

1.01 DESCRIPTION

- A. Within fifteen (15) days following the date of the issue of the Notice to Proceed (Section 00500), each Contractor shall submit to the Construction Manager for delivery to the Owner, a Schedule of Values showing accurate costs for the elements of their Work.
- B. The Schedule of Values shall be typed or printed on the Contractor's letterhead, identify the project and work division, and must be dated and signed.
- C. The Schedule of Values shall divide the Work into a sufficient number of individual cost elements to serve as an accurate basis for Contractor's Application for Payment.
- D. Each work element shall be listed identifying labor and material as separate line items. Each work element shall include its prorated share of profit, overhead, and retainage.

1.02 SPECIAL ITEMS

- A. As a part of the schedule of values the Contractor shall designate specific line items and associated values identified as:
 - 1. Performance Bond and Labor & Material Payment Bond (when required by Owner).
Value: Actual Cost of Bonds
 - 2. Daily housekeeping and clean-up inclusive of any special cleaning and preparation required by the specification for delivering the building for the Owners occupancy.
Value: Two percent (2%) of the total Contract Amount
 - 3. Retainage / Punch List
Value: Ten percent (10%) of the total Contract Amount
- B. A request for payment of any special item amount contained in the Contractor's approved Schedule of Values or a portion thereof may be submitted for payment once the work for that item has been completed to the satisfaction of the Owner, Architect and Construction Manager
- C. Upon the completion of the Contractor's work exclusive of any punch list work, a Contractor may submit a separate Application for Payment requesting the Retention / Punch List line item be reduced to (5%). **This** request must be submitted to the Construction Manager along with a Partial Consent of Surety. Once received, the Construction Manager will forward it to the Owner for approval and notify the contractor when fully executed. The Owner shall reserve the right to accept or reject all requests for Retention / Punch List reduction.
- D. The Schedule of Values shall be submitted and approved prior to Contract execution and receipt of any payment.
- E. **Absolutely NO CHANGES may be made to an approved Schedule of Values.**
- F. Increases or decreases in the Contract Amount shall be through change orders.
- G. Each Change Order shall be listed as a new line item on the Contractor Invoicing Form.

END OF SECTION 00670

PART 1 – GENERAL**1.01 DESCRIPTION**

- A. Within fifteen (15) days following the date of the issue of the Contract, each Contractor shall submit to the Construction Manager for delivery to the Owner, a list of all subcontractors that they intend to utilize in their performance of the Work, and all suppliers who will be providing materials and/or equipment to be incorporated into the Work.
- B. All SUBCONTRACTORS' names, addresses, telephone numbers, and types of Work shall be included on the list.
- C. All SUPPLIERS' names, addresses, telephone number, and items provided shall be included on the list.
- D. All items of material and equipment included in the Work shall be listed. Each item shall be listed with its manufacturer, supplier, and installing subcontractor, if applicable.
- E. Subcontractor / Supplier / Material / Equipment listings shall be submitted prior to contract execution.
- F. Prior to awarding a contract, the Construction Manager will notify the contractor if the Owner has a reasonable and substantial objection to any person, organization, material and/or equipment listed by the Contractor. If the Owner has a reasonable and substantial objection, the Contractor shall amend their Proposal by providing an acceptable substitute. The Owner may, at their discretion, accept such a substitute or they may disqualify the Proposal.
- G. **Suppliers, Subcontractors, Material, and Equipment proposed by the Contractor and accepted by the Owner shall be used in the Work for which they are proposed and accepted and shall not be changed except with prior written approval by the Construction Manager and Owner.**

END OF SECTION 00680

PART 1 – GENERAL

1.01 DESCRIPTION

- A. Within fifteen (15) days following the date of issue of a Contract, each Contractor shall submit to the Construction Manager, for delivery to the Owner, a list of all supervisory employees whom the Contractor proposes to employ to accomplish the Work.
- B. This list shall include supervisory employees' names, titles, and duties.
- C. Employee listings shall be submitted prior to contract execution.

1.02 OWNER'S APPROVAL

- A. Contractors are required to establish, to the satisfaction of the Owner, the reliability and responsibility of proposed employees.
- B. Prior to the award of a contract, the Construction Manager will notify the Contractor if the Owner has a reasonable and substantial objection to any person listed by the Contractor. If the Owner has a reasonable and substantial objection, the Contractor may amend their Proposal by providing an acceptable substitute. The Owner may, at their discretion, accept such a substitute or they may disqualify the Proposal.
- C. Employees proposed by the Contractor and accepted by the Owner shall be employed on the Work for which they are proposed and accepted and shall not be changed except with written approval of the Owner.

END OF SECTION 00690

PROJECT GENERAL CONDITIONS OF THE CONTRACT FOR CONSTRUCTION ON FOLLOWING PAGE(S)

Will be issued with addendum 1

END OF SECTION 00700

PART 1 – GENERAL

1.01 DESCRIPTION

- A. Addenda are written or graphic instruments issued prior to execution of construction contracts which add to, delete from, clarify, or correct the Bidding Documents and/or the Contract Documents.
- B. Addenda may be included in the Bidding Documents and may be included in the Contract Documents.
- C. Addenda may be issued by either the Architect or the Construction Manager as deemed necessary to facilitate the building and construction of the Project.

1.01 BIDDERS' AND CONTRACTORS' RESPONSIBILITIES

- A. Each Bidder shall be responsible for taking the provisions of all Addenda issued prior to the Bid Date into account during the presentation of his Proposal.
- B. Each Bidder shall be responsible for obtaining all Addenda, and for ascertaining that all Addenda issued prior to the Bid Date have been considered in preparing his Proposal.
- C. Each Contractor shall perform his work in accordance with all Addendums issued.

END OF SECTION 00900

**MILESTONE
SCHEDULE
ON
FOLLOWING
PAGE(S)**

END OF SECTION 00999

PART 1 – GENERAL

1.01 PROJECT DESCRIPTION

A. Bay City Public Schools – 2024 Sinking Fund Bid Pack 1 - Central HS Fitness Center Structural and HVAC

1.02 CONTRACTORS USE OF PREMISES

A. Contractors shall limit their use of the Project site for Work and for storage, to allow for:

1. Work by other Contractors.

B. Contractors shall coordinate their use of the Project site under the direction of the Construction Manager.

C. Contractors shall assume full responsibility for the protection and safekeeping of materials and equipment stored on the site. No security will be employed.

D. Each Contractor shall move any stored material or equipment under their control if it interferes with the operations of the Owner or other Contractors, as directed by the Construction Manager.

E. Contractors shall obtain and pay for additional storage or work areas needed for operations not allowed on the site.

1.03 OWNER OCCUPANCY

A. The owner intends to occupy the Project by [Refer to Milestone Schedule](#). All contractors must comply with this requirement.

1.04 OWNER FURNISHED PRODUCTS

A. Products furnished and paid for by the Owner are described in the Specifications and in the Bid Division List (Section 00309).

B. Owner's Responsibilities Regarding Owner-Furnished Products:

1. Arrange for and deliver necessary shop drawings, product data and samples to the installing contractor,

2. Arrange and pay for product delivery to the site, in concert with the Short-Term Construction Activities Plan,

3. Arrange for the suppliers to submit bills of materials to Contractors,

4. Inspect deliveries jointly with Contractors,

5. Submit claims for transportation damage,

6. Arrange for replacement of damaged, defective, or missing items,

7. Arrange for manufacturer's warranties, bonds, service, and inspections, as required.

- C. Contractor's Responsibilities Regarding Owner-Furnished Products:
1. Designate needed delivery dates for each product in the Short-Term Construction Activities Plan,
 2. Review shop drawings, product data and samples,
 3. Review and return Owner-Furnished shop drawings, data, and samples with notification of any discrepancies or problems anticipated in use of the product, within 2 weeks,
 4. Promptly inspect products jointly with the Owner, and record shortages, damaged items, and defective items,
 5. Handle products at the site, including uncrating and storage,
 6. Protect products from exposure to elements, and other forms of damage,
 7. Assemble, install, connect, adjust, and finish products as stipulated in the Specification,
 8. Repair or replace items damaged by Contractor,
 9. Dispose of all crating, wrapping, and trash related to the material.

END OF SECTION 01010

PART 1 – GENERAL

1.01 NORMAL WORK HOURS

A. 7 a.m. to 5 p.m., Monday through Friday.

1.02 EXCEPTIONS

- A. Necessary variations of normal work hours shall only occur with the express approval of the Construction Manager on the Owner's behalf.
- B. As a condition to the contract, the Contractor agrees that no premium-time, over-time or other special rate shall be charged for the scheduled completion of the project for any reason or cause.
- C. It will be the responsibility of each Contractor to provide an adequate work force to assure the timely completion of all Work.
- D. The Contractor will work whatever hours required (overtime, weekends, holidays) to complete their work and allow for the completion of all other work to achieve final completion in the time frames required by the Owner.

END OF SECTION 01030

PART 1 – GENERAL

1.01 CONSTRUCTION MANAGEMENT

- A. This is a Construction Management project. There is no General Contractor. All Contractors on this Project are Prime Contractors. The Owner will award contracts for all Bid Divisions involved in the Project. The Project will be controlled and administered by a Construction Manager.

1.02 WORK ASSIGNMENTS

- A. Nothing contained on the Contract Documents, and especially in the work scope of any Bid Division, shall be construed as a Work assignment to any construction trade industry. Each Contractor is responsible for their own decisions on Work assignments and shall make them in accord with the prevailing practice in the areas of the Project, and in such a way that neither their progress nor the progress of others will be adversely affected.
- B. Disputes that may arise over improper assignments or over assignments claimed by more than one Contractor shall be settled immediately by the Contractors and shall in no case result in a slowdown or stoppage of Work of any Contractor.

1.03 RETAINAGE ON OWNER PURCHASED ITEMS

- A. The Owner may retain an amount of Five Thousand (\$5,000.00) or ten percent (10%); whichever is the larger amount, on material and/or equipment purchased from suppliers for inclusion in the Work, until such time as it is satisfactorily installed. The purpose of this provision is to ensure proper conformance to the Contract Documents.

1.04 PERFORMANCE OF WORK

- A. All Contractors shall provide weekly input to aid in the preparation of the Look Ahead Schedule by which the Project will be built. Consequently, it is the responsibility and obligation of each Contractor to utilize their manpower and resources according to the commitments made under the Look Ahead Schedule.

1.05 PROMPTNESS OF EXECUTION

- A. It is the intention of the Owner to complete the Project in the fastest practical time frame. Whereas varying conditions inherent in the construction process will affect the progress of the Work, it is the intent of each construction contract that the Contractor maintain the progress pace set forth in the CAP schedule.

1.06 PROGRESS PAYMENTS

- A. It is the intention of the Owner to recognize timely performance prescribed in the CAP. Contractors who maintain specified progress will be eligible for 100% Progress Payments.
- B. Contractors who fail to maintain specified progress may be subject to retainage up to 100% of Progress Payments, at such times as those Contractors are judged by the Construction Manager, and/or the Project Architect, to be behind schedule.

1.07 PAYMENT FOR STORED MATERIALS

- A. As a means of eliminating cost escalation on available items of material and equipment, and in the interest of obtaining competitive Bids, the Owner will provide payment for contract items purchased early and stored on site, and in specific pre-approved instances, off the Project site as well. To qualify for such payment, the material or equipment must be safely stored, protected, and insured against loss or damage, inspected and dedicated to this Project only. Any extra cost of off-site storage is to be included as part of the Bid Proposal.

- B. Materials stored on the site shall be in the area designated by the Construction Manager. Materials or equipment lost through theft, or mishandling, shall be replaced by the Contractor, without cost to the Owner. The Contractor receiving materials shall provide and maintain protection of stored materials at no additional cost to the Owner. The contractor shall retain responsibility for any loss, damage, or replacement costs of any and all stored materials.
- C. Requests for payment for materials delivered and stored at the site must have acceptable itemized bills attached and available at the time of delivery.

1.08 SCHEDULE OF VALUES

- A. The Schedule of Values (Section 00670) shall include the following mandatory items for any Contractor who provides on-site labor as a part of their Contract:

- 1. Labor for each portion of the work to be performed.
- 2. Materials for each portion of the work to be performed.
- 3. Performance Bond and Labor & Material Payment Bond (when required by Owner).
Value: Actual Cost of Bonds
- 4. Daily housekeeping and clean-up inclusive of any special cleaning and preparation required by the specifications for delivering the building for the Owners occupancy.
Value: Two percent (2%) of the total Contract Amount
- 5. Retainage / Punch List
Value: Ten percent (10%) of the total Contract Amount

- B. Monthly allocations shall be made to each item as appropriate and as directed by the Construction Manager.
- C. The value of the Housekeeping/Final Clean-Up item shall be two percent (2%) of the Contract value, or as described by the Construction Manager.

1.09 MATERIAL AND EQUIPMENT EXPEDITING

- A. The Construction Manager will initiate and coordinate an expediting program on the Owner's behalf in cooperation with each Contractor, incorporating all critical items of material and/or equipment provided under the various Bid Division contracts.
- B. Each Contractor shall provide the Construction Manager with a completed Material and Equipment Purchase/Delivery list and as a part of the Bid Division Descriptions. The Contractor's purchase order issue date, supplier name and phone number and the delivery date for each material and equipment item required for the project must be provided.
- C. Each Contractor shall further cooperate by keeping the Construction Manager informed of all changes in the commitments previously indicated in the Material and Equipment Purchase/Delivery list and when deemed necessary by the Construction Manager, provide source contacts for direct expediting by the Construction Manager.
- D. The Contractor must require all suppliers to notify the Contractor's office a minimum of twenty-four (24) hours prior to the delivery of any materials or equipment so the Contractor is present to receive and unload the delivery.
- E. If a Contractor is not present on the job site to receive and unload the Contractor's material or equipment the Construction Manager may have the owner authorize others to perform the work. All costs associated with such actions will be deducted from the payments due the Contractor.

1.10 PROTECTION OF THE WORK OF OTHERS

- A. Contractors shall consider protection of finished Work of prime importance. Care shall be taken by Contractors not to damage completed Work of other Contractors, and to provide adequate protection to their own completed Work. Contractors who damage the work of others or existing finishes shall be back charged all costs associated with repairing or replacing the damaged work.
- B. When moving laborers and/or materials across floors, grades, roofs, other vulnerable surfaces, or through occupied areas, the Contractor shall provide adequate surface protection to prevent damage to surfaces.

1.11 MANDATORY ATTENDANCE AT MEETINGS

- A. Each Contractor shall provide a representative of the Contractor authorized and empowered to enact decisions regarding schedule compliance, manpower commitments and cost changes at all Project and Progress Meetings.

1.12 PRE-ON-SITE ACTIVITY MEETING

- A. Each Contractor is required to meet on the site with the Field Construction Manager prior to beginning their Work. The purpose of this meeting is to review the intent of the Contract Documents as they pertain to the Contractor's Work, and to integrate the Contractor's schedule into the Short-Term Construction Activities Plan for the Project.

1.13 RETURN ACTIVITIES

- A. Each Contractor is required to report to the Field Construction Manager prior to resuming Work on the Project after an absence from the site of one or more working days. The purpose of reporting is to make the Field Construction Manager aware of the Contractor's re-involvement with the Project, and to provide an update regarding any conditions that could affect the continuing Work of the Contractor.

1.14 CUTTING AND PATCHING

- A. Each Contractor shall make arrangements with the Construction Manager for fitting their Work into the Project and shall coordinate all fitting with other Contractors. Whenever any contractor has been given sufficient information as to required openings prior to beginning their Work, they shall pay the cost for cutting and/or restoring if they fail to provide proper required openings.
- B. Each Contractor shall be responsible for any cutting, fitting, and patching that may be required to complete their Work if they have failed to properly notify the Construction Manager and preceding Contractors of any openings required. Contractors shall not endanger the Work of any other Contractor by cutting, excavating, or otherwise altering any Work, and shall not cut or alter the Work of any other contractor except with the consent of the Construction Manager. Any costs caused by defective or ill-timed Work shall be borne by the party responsible for such Work.
- C. Cutting or restoring performed by any Contractor, for work that is rejected by the Architect shall be corrected under the direction of the Construction Manager, as instructed by the Architect. The Contractor responsible for the defective restoration shall incur the cost of such Work.
- D. Openings over six inches in diameter must be formed by the concrete contractor(s).
- E. Cutting and patching of concrete floors and decks shall be performed in a neat and workman like manner, using a coring machine. After coring, each Contractor shall pack and grout openings around sleeves or other Work penetrating floors and decks.

- F. No Contractor shall do any cutting that may impair the strength of any building or its components. No holes, except for small screws or bolts, may be drilled in beams or other structural members for the purpose of supporting or attaching Mechanical Work, without prior approval from the Architect.
- G. Each Contractor shall be responsible for the cutting and patching of holes and openings through existing walls, partitions, floors, ceilings, and roofs necessary for the installation of their work. If the location for a hole or opening is through an existing joist, beam, or column, the Contractor shall notify the Construction Manager who, after consultation with the Architect, will instruct the Contractor how to proceed.
- H. Each Contractor shall be responsible for the closing and patching of holes and openings through existing walls, partitions, floors, ceilings, and roofs created by demolition work they are shown to complete unless noted otherwise.
- I. Temporary removal and replacement of all ceilings not scheduled to be replaced shall be the responsibility of the Contractor requiring access.
- J. The Contractor responsible for patching shall provide both the rough (substrate) and finish surfaces. They shall employ only qualified tradesmen to assure that all work is done in a neat and workmanlike manner. All patching shall match adjacent surfaces.

1.15 BLOCKING, BACKING AND GROUNDS

- A. Each Contractor shall be responsible for providing the blocking, backing and grounds necessary for the installation of their work unless specifically noted on the drawings in which case said blocking, backing, and grounds shall be provided by the Bid Division supplying shown backing material.

1.16 ACCESS PANELS

- A. Each Contractor shall be responsible for furnishing the necessary access panels for items of work installed under their contract.
- B. Installation of all access panels shall be the responsibility of the contractor erecting the wall or ceiling system.
- C. If not specified, these access panels shall be approved by the Architect prior to installation.

END OF SECTION 01040

PART 1 – GENERAL

1.01 DESCRIPTION

- A. All Applications for Payment must be submitted on a “Contractor Invoice Form.”
- B. Contractor Invoice Form(s) will be sent to contractors each month by the Construction Manager. The Contractor Invoice Form must be returned to the Construction Manager by the due date (located in the upper left-hand corner of the form) in order to be included in the current month Cost Control Manual to be submitted to the Owner. The due date can also be found on “Attachment A” of the Owner-Contractor contract.
- C. Any completed Contractors Invoice Form received by the Construction Manager **later** than the contract established due date **will not** be accepted and **will need to be re-billed the following month.**

1.02 SWORN STATEMENTS AND WAIVERS

- A. All Applications for Payment must be accompanied by a Sworn Statement and applicable waivers.
- B. For complete instructions on preparing Sworn Statements and Waivers, please reference Section 01050 – Sworn Statements and Lien Waivers.
- C. Final Sworn Statement and Full Unconditional Lien Waivers must be provided prior to the release of the final payment or exchanged for final payment by presenting them in person.

1.03 SCHEDULE OF VALUES

- A. All billings are processed based on approved Schedules of Values. Absolutely NO CHANGES may be made to approved Schedule of Values.

1.04 CHANGE ORDERS

- A. Increases or decreases in the Contract Amount shall be through change orders.
- B. Each Change Order shall be listed as a new line item on the Contractor Invoice Form. This is the only way a change order will be processed for payment.

1.05 APPROVAL OR REJECTION OF APPLICATION FOR PAYMENT

- A. Approved Applications for Payment will be included in the current month Cost Control Manual submitted to the Owner for their approval and payment. Following approval, the Owner will process payments and forward them to the Construction Manager for accompaniment of appropriate waiver(s), and payment will be sent on to Contractor.
- B. Contractors with Applications for Payment that were adjusted or rejected will be contacted by Wolgast for an explanation.
- C. No payment will be issued through the Owner for any progress payment when the substantiating sworn statement and lien waiver(s) from the previous payment have not been received by the Construction Manager.

END OF SECTION 01045

PART 1 – GENERAL

1.01 DESCRIPTION

- A. Sworn Statement shall be included with each Application for Payment.
- B. A sample Sworn Statement follows as Pages 2 and 3 of this Section.
- C. Page 1 of the Sworn Statement shall contain all necessary Project information, including
 - 1. Date of Sworn Statement.
 - 2. County in which the deponent is at the time of the completion of the Sworn Statement.
 - 3. Deponent name.
 - 4. Contractor name on whose behalf the deponent is making statement.
 - 5. County in which the Project is situated.
 - 6. Project name and site location.
 - 7. Deponent signature and typewritten name.
 - 8. Notary name, signature, and commission expiration date.
- D. Page 2 of the Sworn Statement shall contain all necessary Project information, including:
 - 1. Project name and site location.
 - 2. Subcontractor/Supplier listings as submitted for approval at the beginning of the Project.
 - 3. Description of work to be completed by each subcontractor/supplier.
 - 4. Total contract amount for each subcontractor/supplier.
 - 5. Listings of amounts paid, amounts owing, retentions held, and balances to complete.

1.02 WAIVERS

- A. All Applications for Payment must be accompanied by a Sworn Statement and applicable waivers.
- B. Sample “partial” and “full” waivers follow as Pages 4 and 5 of this Section.

1.03 APPLICATION AND CERTIFICATE FOR PAYMENT

- A. No payment will be issued through the Owner for any progress payment when the substantiating sworn statement and lien waiver(s) from the previous payment have not been received by the Construction Manager.
- B. For additional information and instructions on the Application and Certificate for Payment, please reference Section 01045.

Sample Sworn Statement

STATE OF MICHIGAN
COUNTY OF _____

_____ Being duly sworn, deposes and says that
_____ Is the Contractor for an improvement to the following described real property situated in
_____ COUNTY, MICHIGAN, known as _____. That the following is a statement of each subcontractor and
supplier and laborer, for which laborer the payment of wages for fringe benefits and withholdings is due but unpaid, with whom the contractor has
subcontracted for performance under the contract with the owner or lessee thereof, and that the amounts due to the persons as of the date hereof
are correctly and fully set forth opposite their names, as follows on Page 2.

That the contractor has not procured materials from, or subcontracted with, any other person other than those set forth and owes no money for the
improvement other than the sums set forth.

Deponent further says that he or she makes the foregoing statement as the contractor for the purpose of representing to the owner or lessee of the
above described premises and his or her agents that the above described property is free from claims of construction liens, or the possibility of
construction liens, except as specifically set forth and except for claims of Construction Lien Act, Act No. 497 of the Public Acts of 1980, as amended,
being Section 570.1109 of the Michigan Compiled Laws.

Deponent Signature

Deponent Name – Typewritten

Subscribed and sworn before me this _____ day of _____, 19 _____.

Notary Public Signature

Notary Public Name – Typewritten

My commission expires: _____

Warning to the owner; an owner or lessee of the above described property may not rely on this sworn statement to avoid the claim of a
subcontractor, supplier, or laborer who has provided a notice of furnishing or a laborer who may provide a notice of furnishing pursuant to Section
109 of the Construction Lien Act to the designee or the owner of lessee if the designee is not named or has died.

Warning to the deponent; a person, who with intent to defraud, gives a false sworn statement is subject to criminal penalties as provided in Section
110 of the Construction Lien Act, Act No. 497 of the Public Acts of 1980, as amended, being Section 50.1110 of the Michigan Compiled Laws.

**PARTIAL UNCONDITIONAL WAIVER OF LIEN
Subcontractor/Supplier**

Check No. _____

Amount: \$ _____

Invoice#: _____

I/we have a contract with **Bay City Public Schools – 2024 Sinking Fund Bid Pack 1 - Central HS Fitness Center Structural and HVAC** to provide

_____ For the improvement of the property described as **Bay City Public Schools**, and hereby waive my/our construction lien to the amount of \$ _____ for labor/materials provided through _____.

This waiver, together with all previous waivers, if any, (circle one) DOES / DOES NOT cover all amounts due to me/us for contract improvement through the date shown above.

(Name of Lien Claimant)

By: _____ Signed on: _____
(Signature of lien claimant or authorized officer or agent of lien claimant) (Date)

Address: _____

Telephone: _____

**FULL UNCONDITIONAL WAIVER OF LIEN
Subcontractor/Supplier**

Check No. _____

Amount: \$ _____

Invoice#: _____

My/our contract with **Bay City Public Schools – 2024 Sinking Fund Bid Pack 1 - Central HS Fitness Center Structural and HVAC** to provide

_____ For the improvement of the property described as **Bay City Public Schools**, having been fully paid and satisfied, all my/our construction lien rights against such property and hereby waived and released.

(Name of Lien Claimant)

By: _____ Signed on: _____
(Signature of lien claimant or authorized officer or agent of lien claimant) (Date)

Address: _____

Telephone: _____

END OF SECTION 01050

PART 1 – GENERAL

1.01 DESCRIPTION

- A. The Change Event Form will be used to document any request for a change in the scope of the Work throughout the construction process, and establish owner and architect approval prior to preparing a change order or having work performed.
- B. The Change Event Form will only be used when it IS NOT NECESSARY for work to be performed immediately.

1.02 PROCESSING OF CHANGE EVENT FORMS

- A. The Owner, Architect, Engineer, Construction Manager or Contractor may initiate a request for change during the Project in the form of a bulletin/proposal request, construction change directive, request for information, or value engineering proposal. Requests for changes shall be submitted to the Construction Manager for preparation and distribution of the Change Event Form.
 - B. The Change Event will be accompanied by a copy of all related sketches, drawings, specifications, instructions, etc.
 - C. The Construction Manager will forward the Change Event to the Contractor for the purposes of obtaining an itemized quote (including labor, material, equipment, units, rates, and subtotals) for the changes requested.
 - D. The Contractor will complete and return the Change Event Form within five (5) days, or less, to the Construction Manager.
 - E. The Construction Manager will review all Change Events and itemized detail for accuracy and validity within 48 hours of receiving said information.
 - F. If the Construction Manager approves the costs or deductions submitted by the Contractor in the Change Event, the Construction Manager will:
 - 1. Forward one (1) copy of the Change Event with itemized detail to the Architect for review and endorsement, stipulating the date by the endorsed Change Event is to be returned.
 - 2. Discuss the Change Event and costs or deductions with the Architect to secure their endorsement.
 - 3. Forward one (1) copy of the Change Event with itemized detail to the Owner for approval and signature.
 - G. After receiving the endorsed Change Event(s) timely from the Architect and Owner, the Construction Manager will prepare a Change Order for Contractor signature. The Contractor will sign the Change Order, acknowledging notice to proceed with change, and return a copy back to the Construction Manager.
 - H. Only Change Events with the Architect's and Owner's signature of approval and acceptance will be processed into Change Orders.
- 1.03 PRICING GUIDELINES FOR CHANGE EVENTS**
- A. Pricing Guidelines for Change Events that will be considered for Change Orders shall be fully detailed and itemized showing each of the following:
 - 1. Labor: All field labor indicating worker name, date, and hours worked and hourly rate; hourly rate shall be based on straight time only and shall include the labor classification.

2. Fringes: All established payroll taxes, assessments and fringe benefits on the labor in 7.3.2.1; this may include, but is not limited to, FICA, Federal and State unemployment, Health and Welfare and Workers Compensation; each of the fringes is to be a separate line item.
3. Material: All material purchased by the Contractor and incorporated into the changed Work, showing quantities, unit costs and costs of each item as appropriate; material costs will only be allowed at the Contractor's actual cost including any and all discounts, rebates or related credits. Only one third (33 percent) of the cost of reusable materials for each use, such as formwork lumber, shoring or temporary enclosures will be allowed.
4. Equipment: Rental Equipment – charges for certain non-owned, heavy or specialized equipment up to 100 percent of the documented rental costs; no rental charges will be allowed for hand tools, minor equipment, simple scaffolds, etc.; downtime due to Contractor caused delays, repairs, maintenance, late fees and weather will not be allowed. Owned Equipment – charges for certain owned, heavy or specialized equipment up to 100 percent of the cost listed by the Associated Equipment Dealers Blue Book; no charges will be allowed for hand tools, minor equipment, simple scaffolds, etc.; only the actual time the equipment is necessary to be in use to perform the work will be allowed; downtime due to Contractor caused delays, repairs, maintenance and weather will not be allowed.
5. A total amount of ten (10) percent of the total of all labor, materials and equipment performed by the Contractor's own forces shall be allowed for the Contractor's combined overhead and profit.
6. A total amount of ten (10) percent of the total of all extra work performed by the Contractor's Subcontractor(s) shall be allowed for the Contractor's combined overhead and profit.
7. For work deleted, that would have been completed by the Contractor or the Contractor's Subcontractor(s) an amount equaling the cost of the Work plus an amount equaling five (5) percent of the work shall be credited to the owner.

1.04 TIME LIMIT

- A. Contractor must return the Change Event and respective price quotations within five (5) working days, unless noted otherwise on the Construction Management issued Change Event.
- B. Failure to return the completed Change Event within the predefined time period will indicate the contractor shall have no charge for the associated work within their bid division per the Change Event at no additional cost to the Owner, Construction Manager and Architect.

END OF SECTION 01051

PART 1 – GENERAL

1.01 DESCRIPTION

- A. The Change Order Document is the legal instrument used to modify the Contract Documents.
- B. Change Orders will be prepared, as necessary, following the acceptance of the Change Event amount by the Owner (Section 01051).
- C. A sample Change Order follows as page 2 of this Section.

1.02 PROCESSING OF CHANGE ORDERS

- A. All changes and potential changes to the Project shall be documented by using the Change Event Form (Section 01051).
- B. Complete and approved Change Events will be converted into Change Orders as necessary.
- C. One (1) original Change Order shall be prepared by the Construction Manager and forwarded to the Contractor for signature. Signatory parties shall include: the Contractor only on Change Order.

1.02 PRICING GUIDELINES

- A. Pricing Guidelines for Change Events that will be considered for Change Orders shall be fully detailed and itemized showing each of the following:
 - 1. Labor: All field labor indicating worker name, date, and hours worked and hourly rate; hourly rate shall be based on straight time only and shall include the labor classification.
 - 2. Fringes: All established payroll taxes, assessments, and fringe benefits on the labor in 7.3.2.1; this may include, but is not limited to, FICA, Federal and State unemployment, Health and Welfare and Workers Compensation; each of the fringes is to be a separate line item.
 - 3. Material: All material purchased by the Contractor and incorporated into the changed Work, showing quantities, unit costs and costs of each item as appropriate; material costs will only be allowed at the Contractor's actual cost including any and all discounts, rebates or related credits. Only one third (33 percent) of the cost of reusable materials for each use, such as formwork lumber, shoring or temporary enclosures will be allowed.
 - 4. Equipment: Rental Equipment – charges for certain non-owned, heavy, or specialized equipment up to 100 percent of the documented rental costs; no rental charges will be allowed for hand tools, minor equipment, simple scaffolds, etc.; downtime due to Contractor caused delays, repairs, maintenance, late fees and weather will not be allowed. Owned Equipment – charges for certain owned, heavy or specialized equipment up to 100 percent of the cost listed by the Associated Equipment Dealers Blue Book; no charges will be allowed for hand tools, minor equipment, simple scaffolds, etc.; only the actual time the equipment is necessary to be in use to perform the work will be allowed; downtime due to Contractor caused delays, repairs, maintenance and weather will not be allowed.
 - 5. A total amount of ten (10) percent of the total of all labor, materials and equipment performed by the Contractor's own forces shall be allowed for the Contractor's combined overhead and profit.

6. A total amount of ten (10) percent of the total of all extra work performed by the Contractor's Subcontractor(s) shall be allowed for the Contractor's combined overhead and profit.
7. For work deleted, that would have been completed by the Contractor or the Contractor's Subcontractor(s) an amount equaling the cost of the Work plus an amount equaling five (5) percent of the work shall be credited to the owner.

CHANGE ORDER

PROJECT: PROJECT NO:
 CHANGE ORDER NO.:
 CHANGE ORDER DATE:
 CONTRACT DATE:
 CONTRACT NO.:

CONTRACTOR: ARCHITECT: OWNER:

It is hereby agreed to make the following changes to the Contract:

- 1. QR#
- 2. N/A
- 3. N/A
- 4. N/A
- 5. N/A

This work described by this Change Order becomes a part of and is to be performed by the same terms as the existing Contract. This Change Order must be signed by the Owner, Architect, and Contractor to be valid.

The Original Contract Sum..... \$
 Net change by previously authorized Change Orders..... \$
 The Contract Sum prior to this Change order..... \$
 The Contract Sum will be increased / decreased by this Change Order.....
 The new Contract Sum including this Change Order is..... \$

Contractor _____ *Architect* _____ *Owner* _____

By: _____ By: _____ By: _____

Date: _____ Date: _____ Date: _____

DISTRIBUTION - FULLY EXECUTED CHANGE ORDERS ARE COPIED AND DISTRIBUTED AS FOLLOWS:
 White (original) – Owner; Blue – Construction Manager; Green – Contractor; Yellow – Architect

END OF SECTION 01053

PART 1 – GENERAL

1.01 LAYOUT AND MEASUREMENTS

- A. The responsibility for accurate layout and measurement of the Work of each Contractor is their own. In addition, each Contractor shall verify the dimensional accuracy of the Work upon which their own Work relies before they begin their Work. They shall report all inaccuracies to the Construction Manager and shall not proceed until all corrections are made. If a Contractor proceeds with their Work on dimensionally inaccurate Work of another Contractor, they shall be liable for the cost of corrections to their own Work when the error is corrected and shall cooperate in the correction as directed by the Construction Manager.
- B. The Owner, through the Construction Manager, will provide a bench mark and baseline for all Contractors' reference.
- C. If the Construction Manager performs layout work or must arrange for others to perform layout work that is the responsibility of the Contractor, those costs will be charged to the Contractor. The costs will be submitted to the Owner and the Owner will deduct those costs from the Contractor's contract payment.

END OF SECTION 01055

PART 1 – GENERAL

1.01 PREVAILING WAGE

- A. This project shall be subject to the prevailing wage laws of the State of Michigan.
- B. The Owner has requested the prevailing wage rates applicable for this project and project location. The applicable prevailing wage rates provided by the Owner are enclosed on the following pages.
- C. The Owner and Construction Manager expressly rely upon the contractor to satisfy the pay requirements of the prevailing wage laws of the State of Michigan.
- D. Each proposal shall include the Prevailing Wage for Bay County as of the latest published issue by the State of Michigan.

Will be issued with addendum 1

END OF SECTION 01060

PART 1 – GENERAL

1.01 DESCRIPTION

A. Work included:

1. Throughout the Contract Documents, reference is made to codes and standards which establish qualities and type of workmanship and materials, and which establish methods for testing and reporting on the pertinent characteristics.
2. Where materials or workmanship are required by these Contract Documents to meet or exceed the specifically named code or standard, it is the Contractor's responsibility to provide materials and workmanship that meet or exceed the specifically names code or standard.
3. It is also the Contractor's responsibility, when so required by the Contract Documents or by written request from the Owner, to deliver to the Owner all required proof that the materials or workmanship, or both, meet or exceed the requirements of the specifically named code or standard. Such proof shall be in the form requested in writing by the Owner, and generally will be required to be copies of a certified report of tests conducted by a testing agency approved for that purpose by the Owner.

B. Related Work Described Elsewhere:

1. Specific naming of codes or standards occurs on the Drawings and other Sections of these specifications.

1.02 QUALITY ASSURANCE

A. Familiarity with Pertinent Codes and Standards.

1. In procuring all items used in this Work, it is the Contractor's responsibility to verify the detailed requirements of the specifically named codes and standards and to verify that the items procured for use in this Work meet or exceed the specified requirements.

B. Rejection of Non-Complying Items.

1. The Owner reserves the right to reject items incorporated into the Work which fail to meet the specified minimum requirements.
2. The Owner further reserves the right and without prejudice to other recourse the Owner may take, to accept non-complying items subject to an adjustment in the Contract Amount as approved by the Owner.

C. Applicable standards listed in these Specifications include, but are not necessarily limited to, standards promulgated by the following agencies and organizations:

1. AASHTO – American Association of State Highway and Transportation Officials, 341 National Press Building, Washington, D.C. 20004.

ACI – American Concrete Institute, Box 19150, Redford Station, Detroit, Michigan 48219

AISC – American Institute of Steel Construction, Inc., 1221 Avenue of the Americans, New York, New York, 10020.

ANSI – American National Standards Institute (successor to USASI and ASAO), 1430 Broadway, New York, New York 10018.

ASTM – American Society for Testing Materials, 1916 Race Street, Philadelphia, Pennsylvania 19103.

AWS – American Welding Society, Inc., 2501 N.W. 7th Street, Miami, Florida 33125.

AWWA – American Water Works Association, Inc., 6666 West Quincy Avenue, Denver, Colorado 80235.

BOCA – Building Officials Code Administrators International, Inc. 17926 South Halsted Street, Homewood, Illinois 60460.

CRSI – Concrete Reinforcing Steel Institute, 228 North LaSalle Street, Chicago, Illinois 60610.

CS – Commercial Standard of NBS, U.S. Department of Commerce, Government Printing Office, Washington, D.C. 20402.

FGMA – Flat Glass Marketing Association, 3310 Harrison, Topeka, Kansas 66611.

State of Michigan Fire Marshall Bulletin 412.0.

NAAMM – The National Association of Architectural Metal Manufacturers, 1033 South Boulevard, Oak Park, Illinois 60302.

NEC – National Electric Code (see NFPA).

NEMA – National Electrical Manufacturer’s Association, 155 East 44th Street, New York, New York 10017.

NFPA – National Fire Protection Association, 470 Atlantic Avenue, Boston, Massachusetts 02210.

SDI – Steel Deck Institute, 135 Addison Avenue, Elmhurst, Illinois 60125.

SSPC – Steel Structures Painting Council, 4400 Fifty Avenue, Pittsburgh, Pennsylvania 15213.

TCA – Tile Council of America, Inc., P.O. Box 326, Princeton, New Jersey 08540.

UL – Underwriters’ Laboratories, Inc., 207 East Ohio Street, Chicago, Illinois 60611.

Fed. Specs, and Fed. Standards: Specifications Sales (3FRI), Building 197, Washington Navy Yard, General Service Administration, Washington, D.C. 20407.

UBC – Uniform Building Code, International Conference of Building Officials, 5360 South Workman Mill Road, Whittier, California 90601.

END OF SECTION 01085

PART 1 – GENERAL

1.01 ALTERNATES

- A. This section identifies each alternate by number and describes the basic changes to be incorporated into the work, only when that alternate is made a part of the Work by specific provisions in the Owner-Contractor Agreement.
- B. Related Requirements in other parts of the Project Manual:
 - 1. Method of quotation of the cost of each alternate, and the basis of the Owner’s acceptance of alternates: Bidding Documents
 - 2. Incorporation of alternates into the Work: Owner-Contractor Agreement.
- C. Related Requirements Specified in Other Sections:
 - 1. Part 1.01: Description of Work
 - 2. Sections of the Specifications as listed under the respective Alternates.
- D. Referenced sections of specifications stipulate pertinent requirements for products and methods to achieve the work stipulated under each Alternate.
- E. Coordinate pertinent related work and modify surrounding work as required to properly integrate the work under each Alternate and to provide the complete construction required by the Contract Documents.
- F. The Owner reserves the right to accept the proposed amount for any alternate at any time during the active construction of the project. If the Owner elects to accept an alternate after the Owner-Contractor contract has been issued, the work shall be added to the contract by change order.

1.02 DESCRIPTION OF ALTERNATES

[See proposal form](#)

END OF SECTION 01100

PART 1 – GENERAL

1.01 PRE-CONSTRUCTION MEETINGS

- A. Prior to the initiation of on-site activity, a meeting will be held with all Bid Division Contractors for the purpose of planning, scheduling, and coordinating an orderly initiation of on-site construction activity. Attendance at this meeting is required of all Contractors. The Construction Manager will advise all Contractors of the time and location of this meeting.
- B. A representative of the contractor authorized to enact decisions regarding schedule, manpower commitments and costs must attend the pre-construction meeting.

1.02 PRE-CONSTRUCTION CONFERENCES

- A. Each Contractor is required to meet on the site with the Construction Manager prior to beginning their Work. The purpose of this meeting is to review the intent of the Contract Documents as they pertain to the Contractor's Work, and to integrate the initiation of that Work with the Work already in progress on the site.

1.03 PROGRESS AND PROJECT MEETINGS

- A. Contractors active on-site shall be required to attend Progress and Project Meetings when called by the Construction Manager. These meetings are for the purpose of planning and assessing construction progress and for discussing problems of mutual concern.
- B. It is mandatory that any contractor actively engaged in work on site shall be required to have a representative of the contractor authorized and empowered to enact decisions regarding schedule, manpower commitments and costs and their superintendent attend these meetings, or the Owner may withhold the Contractor's payment.
- C. All decisions, instructions, and interpretations given by the Owner or their designated representatives at these meetings shall be conclusive and shall be binding on the Contractors.
- D. The proceedings of such meetings will be recorded and posted. Copies will be forwarded to Contractors.

END OF SECTION 01200

PART 1 – GENERAL

1.01

- A. Contractor shall be solely responsible to submit all shop drawings, product data, and samples, or other items required by the Construction Documents hereinafter referred to as submittals to the Construction Manager for processing and forwarding to the Architect for their review.
- B. Submittals shall be delivered to the Construction Manager's office in accordance with the procedures and dates required by the Construction Documents and/or this section, Section 01300, of the project manual (specifications) whichever is more stringent in its requirement. All submittals shall be provided to the Construction Manager within 30 calendar days of receipt of the signed contract or Notice to Proceed unless specified otherwise in the Construction Documents.

1.02 SUBMITTALS - SHOP DRAWINGS, PRODUCT DATA AND SAMPLES

- A. The Contractor shall submit to the Construction Manager individual submittals either via Procore or email. All files must include the specification number, item number and name as indicated in the submittal log.
- B. Contractor shall provide electronic copies of submittals. The submittals shall be in PDF format only. COLOR SAMPLES MUST BE SUBMITTED AS PHYSICAL SAMPLES.
- C. In submitting shop drawings, product data and samples, each Contractor represents that they have checked and coordinated the information contained within such submittals with the requirements of the Work and of the Contract Documents. All submittals must be stamped or signed by the contractor responsible for submitting, to attest to their review.

ALL SUBMITTALS MUST BE ACCOMPANIED BY THE WOLGAST CORPORATION SHOP DRAWING / SUBMITTAL FORM (see Page 2 of this section).

- D. Any submittal not accompanied by the Wolgast Corporation Shop Drawing / Submittal Form will be returned to the contractor for resubmittal.
- E. The Submittal Log provided as part of the Bid Division Descriptions shall be a guideline only and is not to be a representation of every or all submittals required for the completion of the Project. The Contractor shall be required to provide all items and perform all work in complete compliance with the Contract Documents.
- F. The Contractor shall not be relieved of the responsibility for any deviation in the work required by the Contract Documents, or any errors and omissions contained in shop drawings, product data; samples, or other submittal data reviewed and returned to the Contractor by the Architect. Any work performed prior to the Architect's review shall be subject to removal and replacement at the Contractor's expense.
- G. No portion of the Work requiring submission of shop drawings, product data or samples shall commence until the submission has been reviewed by the Architect. If any work is performed prior to the Architect's review of the required submittal(s), the work shall be subject to removal and replacement at the Contractor's expense if that work does not comply with the requirements of the contract documents.

1.03 START-UP DOCUMENTS (CONTRACT-AWARD SUBMITTALS)

- A. (Refer to Sections 00100, 00600, 00650, 00670, 00680, 00690.)

1.04 CONTRACT CLOSEOUT DOCUMENTS (CLOSE-OUT SUBMITTALS)

- A. (Refer to Sections 01700, 01720, 01730, and 01740.)

END OF SECTION 01300

TRANSMITTAL FORM FOR WOLGAST CORPORATION SHOP DRAWINGS / SUBMITTAL FORM

CONTRACTOR:	PROJECT TITLE AND LOCATION	
_____ _____ _____ _____	_____ _____ _____ _____	WOLGAST PROJECT NO. _____ DATE RECEIVED: _____ From Contractor _____ To Architect _____ From Architect _____ To Contractor. _____

Pkg. NO.	Pkg. Name	Item No.	CSI Code No.	CSI Code Name	Item Ref. No.	Item Description	Item Type	No. of each	Subcontractors/MFR

The undersigned certifies that the above submitted items have been reviewed in detail and are correct and in strict conformance with the contract documents except as otherwise noted. NOTE: Approval of items submitted does not relieve contractor from complying with all requirements of the contract documents.

CONTRACTOR'S COMMENTS:	_____ CONTRACTOR'S NAME _____ SIGNATURE
------------------------	--

PART 1 – GENERAL

1.01 CONSTRUCTION SCHEDULES

- A. A Milestone Schedule is provided as part of the bidding documents to indicate dates by which certain critical tasks and/or portions of the project must be completed. The Milestone schedule also indicates the date by which the Project must be 100% complete, receipt of final inspections, occupancy allowed by all governing authorities, and owner move-in.
- B. Based on the Milestone Schedule each Contractor shall submit to the Construction Manager, at or prior to the Pre-Construction Meeting, two (2) copies of the proposed progress schedule for their Work identifying the critical tasks that they must complete to achieve the Milestone Schedule completion dates.
- C. The Construction Manager will utilize the scheduling input from the Contractors for incorporation into the Project Construction Schedule. The Project Construction Schedule will be compiled and distributed to all contractors.
- D. By signing the Owner-Contractor Agreement the Contractor agrees to cooperate with all of the other multiple contractors and to coordinate all construction activities to allow the work of that contractor and all other contractors to meet the completion date(s) established in the Milestone Schedule. The Contractor also agrees that the Project Construction Schedule shall be followed to achieve or improve upon the completion dates for the various tasks in order to attain the final completion of the project by the scheduled completion date.
- E. The Construction Manager will, at times, issue a weekly Look-Ahead Schedule as part of the weekly Contractor Coordination Meetings. The Look-Ahead Schedule will support the Project Construction Schedule and provide specific scheduling information for the Contractor to assure the scheduled completion dates are achieved. The Contractor agrees to comply with the required work identified in the Look-Ahead Schedules.

END OF SECTION 01350

PART 1 – GENERAL

1.01 QUALITY CONTROL BY PROJECT ARCHITECT AND CONSTRUCTION MANAGER

- A. Each Contractor shall comply with the quality control provisions of the Contract Documents.
- B. The quality and completeness of the Work shall be maintained on a day-to-day basis. Inaccurate, faulty, incomplete, and defective Work shall be corrected by the Contractor without continuous prodding by the Construction Manager. Failure to cooperate in this continuous punch list effort may reduce Progress Payments.

1.02 CONTRACTOR QUALITY CONTROL

- A. Each Contractor shall be responsible to provide a quality workmanship consistent with the requirements of the Contract Documents. All Work will be of good quality and free from faults and defects. Every care shall be exercised to ensure that the quality specified is the quality provided.
- A. If at any time a Contractor is of the opinion that the quality of their Work is, or will be, jeopardized as a result of rescheduling or coordination of the Project, or for any other reason known to them, they shall stop work immediately and shall inform the Construction Manager of their action and the reasons thereof. The Contractor shall immediately provide a written explanation to the Field Construction Manager and Project Manager for the record, and shall mail a copy to the Architect. Upon investigation by the Construction Manager, a decision will be made on the note of jeopardy, in order to resolve the problem.
- C. Any Contractor who compounds a mistake by installing their product on another Contractor's obviously faulty work will assume responsibility for repair of said work.

END OF SECTION 01400

PART 1 – GENERAL

1.01 DESCRIPTION

- A. The Owner may employ and pay for the services of an independent testing laboratory to perform specified testing as identified in the Bid Division Descriptions.
- B. Contractors shall cooperate with the Laboratory to facilitate the execution of this service.
- C. Employment of the Laboratory shall in no way relieve the Contractor's obligation to maintain the quality of their work.

1.02 CONTRACTOR'S RESPONSIBILITIES

- A. Contractors shall cooperate with Laboratory personnel, and shall provide access to Work, and to manufacturers' operations.
- B. Contractors shall provide the Laboratory samples of proposed materials, which require testing.
- C. Contractors shall provide to the Laboratory the preliminary design mix proposed to be used for concrete and other materials, which require control, by the Laboratory.
- D. Contractors shall furnish all test results and coordinate testing with the Construction Manager.
- E. Contractors shall furnish incidental labor and facilities necessary:
 - 1. To provide access to Work to be tested.
 - 2. To obtain and handle samples at the Project site or at the source of the project to be tested.
 - 3. To facilitate inspections and tests.
- F. Contractors shall notify the Laboratory sufficiently in advance of operations to allow for Laboratory assignment of personnel and scheduling of tests.
- G. Contractors shall make arrangements with the Laboratory and pay for additional samples and tests required for the Contractor's convenience.
- H. Contractors shall comply with the Project Team's instructions regarding testing.

END OF SECTION 01410

PART 1 - GENERAL

1.01 DESCRIPTION

- A. The Owner will allow each Contractor to use power and water, where available, for use in construction. All usage will be arranged for by the Construction Manager.

1.02 REQUIREMENTS OF REGULATORY AGENCIES

- A. Comply with the National Electric Code.
- B. Comply with federal, state and local codes and regulations and with utility company requirements.

1.03 MATERIALS, GENERAL

- A. Cords, connectors, etc. may be new or used, but must be adequate in capacity for the required usage, must not create unsafe conditions, and must not violate requirements of applicable codes and standards.

1.04 TEMPORARY ELECTRICITY AND LIGHTING

- A. The Electrical Contractor shall furnish, install and maintain a complete and adequate temporary electrical service and distribution system for use by the Construction Manager and all Contractors during the construction period.
- B. The Electrical Contractor shall obtain, provide, and pay for all temporary electrical power service installation from the local power company or the existing building if the capacity is available.
- C. The cost of electrical power consumption shall be paid for by the Owner.
- D. Prior to the start of construction, the Electrical Contractor shall provide temporary power at each construction area and at the office of the Construction Manager. Each temporary service will be sufficient in size to provide continuous power for: twelve (12) ground fault protected, 20 amp, duplex receptables; two (2) 220v, 3 phase 40 amp receptable; 20 amp, 120v grounded temporary lighting circuits to provide for a minimum of one (1) lamp holder for each 200 square feet or a minimum of one (1) per room. Each lamp holder will be provided with one (1) 150 watt lamp and guard with no more than twelve (12) lamps per circuit. The Electrical Contractor shall be responsible for replacing all lamps as required.
- E. All wire and cable shall be sized to hold voltage drop at all outlets to a maximum of 5% total from transformer.
- F. Portions of the permanent electrical system may, at the option of the Electrical Contractor, be used for temporary power and lighting. The Electrical Contractor shall replace all burned out lamps, damaged wiring devices, and plates prior to acceptance of building by Owner. When any part of the permanent electrical system is used for temporary power or lighting, the Electrical Contractor will maintain the system until the final acceptance by the Owner and begin all warranties and guarantees upon the date of substantial completion.
- G. Overtime work requiring standby electricians shall be at the expense of the Contractor requiring the same.
- H. Installation of temporary electrical power and lighting shall be as scheduled by the Construction Manager.
- I. All temporary electrical installations shall be in compliance with the latest National Electrical Code (N.E.C.), MIOSHA or OSHA, whichever is more stringent. Compliance with N.E.C Section 210-8(b) shall be the responsibility of the Electrical Contractor. Assured grounding systems as defined in Exception Number 2 of N.E.C. Section 210-8(b) shall not be used in place of ground fault protection 9.

The Electrical Contractor shall completely remove the temporary electrical service and distribution system when directed to do so by the Construction Manager. The contractors responsible for the installation of all ceilings and partitions shall patch their work as necessary after removal of the temporary electrical system at no additional cost to the Construction Manager or Owner.

- J. The Owner shall pay for all electrical energy consumed during the construction period except for energy consumed to provide power or lighting in excess to those listed in this Article.
- K. Any electrical requirements for power or lighting beyond those listed in this Section (including energy charges) shall be the responsibility of the Contractor requiring them.

1.05 TELEPHONE SERVICE

- A. A telephone, if located at the Construction Manager's Field Office, may be provided for all Contractors' use in making local or long-distance calls.

1.06 WATER

- A. A temporary water distribution center will be provided in a nearby convenient location. The Contractor shall supply all hoses, etc. beyond that point.

1.07 SANITARY FACILITIES

- A. The Construction Manager will arrange for temporary sanitary facilities. Contractors shall not use permanent facilities at the site.

1.08 TEMPORARY HEAT

- A. When identified and required by the H.V.A.C. Contractor's Bid Division Description, the H.V.A.C. contractor shall install a heating system (permanent or temporary) in readiness for furnishing temporary heat in the new structure.
- B. When the H.V.A.C. Contractor is required to provide a temporary heating system, the H.V.A.C. Contractor shall operate and maintain the temporary heating system. The temporary heating system shall maintain a minimum temperature at all times of 40 degrees during rough-ins and 60 degrees during finishing operations. The H.V.A.C. contractor shall be responsible for the costs of all temporary electrical work relating to the temporary heating system if the permanent system is not used.
- C. In the event that temporary gas fired or open flame heating devices are used, they shall be of the heat exchanger type properly vented to the outdoors, and shall comply with local and state laws, codes, and ordinances.
- D. Portions of the new heating system may, at the option of the H.V.A.C. contractor, be used for temporary heat providing that all parts of the system are cleaned and restored to prime condition prior to acceptance. The H.V.A.C. contractor shall remove any filters used during the temporary heating period and replace with new filters. In addition, the H.V.A.C. subcontractor shall pay the cost of extending warranty and guarantee periods on any permanent equipment used prior to Substantial Completion. The H.V.A.C. contractor shall completely remove the temporary heating system when directed to do so by the Construction Manager.
- E. When identified and required by the H.V.A.C. Contractor's Bid Division Description, all or portions of the new (permanent) H.V.A.C. system shall be used for temporary heat. When the new/permanent system is used for temporary heat, the H.V.A.C. Contractor shall:

1. Maintain the system throughout its use.
2. At the end of the system's use as a temporary system, the H.V.A.C. Contractor shall replace all filters with new filters.
3. Cover openings in permanent return air ductwork with filter media. Maintain and replace filter media as required so air flow is not restricted.
4. Clean and restore all parts of the system to prime condition immediately prior to final acceptance by the Owner.
5. Provide the full warranty and guarantee of the entire system with the warranty/ guarantee period beginning at the time of final acceptance by the Owner.

F. All fuel costs for Temporary Heat shall be paid fo by the Owner.

1.09 EXECUTION

A. Each Contractor shall maintain and operate systems to assure continuous service, and avoid disruption of service.

1.10 REMOVAL

- A. Each Contractor shall promptly remove their own temporary materials and equipment when their use is no longer required.
- B. Each Contractor shall clean and repair damage they have caused by temporary installations or use of temporary facilities.
- C. Each Contractor shall restore existing facilities they have used for temporary services to their specified or original condition.

END OF SECTION 01510

PART 1 – GENERAL

1.01 DESCRIPTION

- A. Each Contractor shall furnish, install, and maintain construction aids required for the performance of their own Work, and shall move or remove them when they are no longer needed for the Work.
- B. Certain construction aids will be provided for and maintained by the Owner as indicated in later paragraphs in this Section.

PART 2 – PRODUCTS

2.01 MATERIALS, GENERAL

- A. Materials may be new or used, shall be suitable for their intended purposes, and shall not violate the requirements of applicable codes and standards.

2.02 CONSTRUCTION AIDS

- A. Each Contractor shall provide all required construction aids and equipment to facilitate the execution of the Work, including scaffolds, staging, ladders, and other such facilities and equipment.
- B. Contractors shall maintain all facilities and equipment in a first-class condition.

2.03 TEMPORARY ENCLOSURES

- A. The Construction Manager will arrange for temporary enclosures except those required by section 01900 – 2.01 to separate work areas from the areas of existing buildings occupied by the Owner to prevent penetration of dust or moisture into occupied areas, to prevent damage to existing equipment, and to protect the Owner’s employees, customers, and operations from construction work.

PART 3 – EXECUTION

3.01 PREPARATION

- A. Consult with the Owner, Construction Manager, and other Consultants and review the site conditions and other factors, which could affect construction procedures and construction aids, including adjacent properties and public facilities which may be affected by execution of the project.

3.02 GENERAL

- A. Comply with applicable requirements of the Specifications.
- B. Relocate construction aids as required by the progress of construction, by storage requirements, and to accommodate requirements of the Owner and other Contractors employed at the site.

3.03 REMOVAL

- A. Completely remove temporary materials, equipment, and services:
 - 1. When construction needs can be met by use of permanent construction.
 - 2. At the completion of the Project.
- B. Clean and repair damage to the permanent facilities caused by installation or by use of temporary facilities.
- C. Restore existing facilities used for temporary purposes to specified or original condition.

END OF SECTION 01520

PART 1 – GENERAL

1.01 DESCRIPTION

- A. Safety is the responsibility of each individual Contractor. Each Contractor shall comply with all local safety ordinances and MIOSHA regulations and requirements while performing the Work.
- B. Each Contractor is required to submit Safety Data Sheets (SDS) to the Construction Manager via Procore or email, to be used for reference only, prior to transporting the material/chemical on site. In addition, it is the responsibility of each Contractor to maintain an accessible SDS file for their employees, subcontractors, sub-subcontractors, and suppliers that are on site.
- C. Each Contractor shall submit evidence of an Employer Safety Program that complies with current MIOSHA regulations and requirements prior to beginning any contract Work.
- D. Each Contractor and their Subcontractor(s), Sub-subcontractor(s), and Suppliers shall take all necessary precautions to ensure the safety of the public and/or workers on the job, and to prevent accidents or injury to any persons, on, about, or adjacent to the premises where the Work is being performed. The Contractor and their Subcontractor(s), Sub-subcontractor(s), and Supplier(s) shall comply with Federal or State OSHA regulations and all other laws, codes, ordinances, and regulations relative to safety and the prevention of accidents.
- E. The Contractor shall designate a responsible representative at the jobsite as Safety Representative who shall be responsible for the promotion of safety and prevention of accidents, and shall enforce all applicable laws, ordinances, codes, rules, regulations, and standards pertaining to safety and prevention of accidents.

END OF SECTION 01530

PART 1 – GENERAL

1.01 SECURITY

- A. Each Contractor shall bear full responsibility for protecting equipment, materials, and tools from damage, loss and vandalism.

END OF SECTION 01540

PART 1 – GENERAL

1.01 PROJECT ACCESS

- A. All employees of the Contractor(s), employees of the subcontractor(s) of the Contractor, any and all other persons having any related activity to the Contractor including suppliers & sales representatives, Inspectors, Architect/Engineer Representatives and all other Visitors must report to the Construction Manager Field Supervisor in the CM Site Office before being permitted into the project.
- B. Each worker must register at the site office prior to entering the work area each day that worker is engaged in the required tasks for the construction of the project. The worker shall register by signing their name and issued ID number, identifying the company they represent. The supervising foreman for each Contractor shall be responsible for registering all employees or tier subcontractor employees of that Contractor each day and providing that registration to the CM Field Supervisor.
- C. If Owner requested, all workers will be issued a photo identification badge and corresponding number by the Construction Manager allowing them access to the project. The ID badge shall be always worn. Any person failing to wear the photo ID badge will be required to leave the project immediately.
- D. Only workers performing required tasks for the construction of the project will be permitted access to the project site. Workers not actively engaged in performing required tasks will not be permitted on the project.
- E. Suppliers, sales representatives, and any other person having legitimate business with the Contractor or a subcontractor of any tier to the Contractor must remain at the Site Office until the on-site supervisor for that Contractor or tier subcontractor meets with that person at the CM Site Office.
- F. Any visitor to the project must register at the CM Site Office, request permission from the CM Site Supervisor for access to the project, have their own personal protection equipment as required by the CM Site Supervisor, and be issued a "Visitor" identification badge allowing access to the project.
- G. The CM Site Supervisor may deny any person access to the project for any reason the supervisor may see fit.
- H. The Contractor agrees to adhere to this Project Access policy regardless of all other agreements.

1.02 ACCESS ROADS

- A. Contractors' access to the Project site and arrangements for periodic, temporary access for specific construction shall be made through the Construction Manager with the Owner's approval.

1.03 DELIVERY

- A. Contractors receiving deliveries to site shall request a 24-hour notice to delivery from suppliers. Contractors receiving deliveries shall ensure that their personnel are at the site to receive deliveries, and properly store them.
- B. Bidders of Divisions for supply only should give 48 hours' notice to the Field Construction Manager so proper arrangements can be made for unloading.
- C. Any Contractors or Bid Division suppliers not giving notice shall reimburse Contractors at the site or be back charged accordingly for unloading and storage of said materials.
- D. Since site space is limited, delivery of materials shall not be made to the jobsite before progress of the job schedule calls for it, unless approved by the Construction Manager.

1.04 PARKING

- A. Contractor parking will be in an area designated by the Construction Manager on site.

1.05 SITE PLAN

- A. Refer to the Contractors use of premises (Section 01010) for further information on the use of the site.

END OF SECTION 01550

PART 1 – GENERAL

1.01 CONTROLS

- A. Control of elements such as noise, dust, water, pests, rodents, debris, pollution, and erosion are the responsibility of the Contractor(s). The Architect and Construction Manager will identify the Contractor(s) responsible for these controls in the event such controls have not been implemented. The Contractor(s) agrees to abide by the assignment of responsibility by the Architect and Construction Manager regarding such controls when required. The Contractor(s) shall be responsible for performing the control measures in strict conformance to all governing codes and restrictions.

END OF SECTION 01560

PART 1 – GENERAL

1.01 TRAFFIC REGULATIONS

- A. Contractors shall abide by all governmental and Owner-established traffic regulations.
- B. Contractors shall use the route designated by the Owner/Construction Manager and shall comply with the requirements of Section 01550 – Access and Deliveries.

END OF SECTION 01570

PART 1 – GENERAL

1.01 DESCRIPTION

- A. No signs shall be displayed by any Contractor.

END OF SECTION 01580

PART 1 – GENERAL

1.01 DESCRIPTION

- A. The Project Field Office will be located on-site adjacent to the location of the temporary power.
- B. The Project Field Office will be used by the Owner, Construction Manager, and Architect.
- C. Project meetings and progress meetings will be held in the Project Field Office, or at another location selected by the Construction Manager when deemed necessary.

1.02 TRAILERS, ETC.

- A. Trailers to be used as Contractors' site office and storage will be permitted. Approval must be obtained from the Field Construction Manager prior to moving on-site and will be located as directed by the Construction Manager. All trailers must meet federal, state, and local electrical and fire codes.

END OF SECTION 01590

PART 1 – GENERAL

1.01 NEW MATERIAL AND EQUIPMENT

- A. Material and equipment incorporated into the Work shall:
1. Conform to applicable specification and standards,
 2. Comply with sizes, makes, types, and qualities specified or as specifically approved in writing by the Architect or Owner.
- B. Manufactured and Fabricated Products:
1. Design, fabricate and assemble in accord with the best engineering and shop practices.
 2. Manufacture like parts of duplicate units to standard sizes and gauges, to be interchangeable.
 3. Two or more items of the same kind shall be identical, by the same manufacturer.
 4. Products shall be suitable for service conditions.
 5. Equipment capacities, sizes, and dimensions shown or specified shall be adhered to, unless variations are specifically approved in writing by the Project Architect.
- C. Do not use material or equipment for any purpose other than that for which it is designed or is specified.

1.02 MANUFACTURERS INSTRUCTIONS

- A. When the Contract Documents require that installation comply with manufacturers' printed instructions, obtain and distribute copies of such instructions to parties involved in the installation, including two (2) copies to the Project Architect.
- B. Maintain one set of complete instructions at the site during installation, until project completion.
- C. Handle, install, connect, clean, condition and adjust products in strict accord with such instructions and in conformity with specified requirements.
1. Should job conditions or specified requirements conflict with manufacturers' instructions, consult with the Project Team for further instructions.
- D. Perform Work in accord with manufacturers' instructions. Do not omit any preparatory step or installation procedure unless specifically modified or exempted by the Contract Documents.

1.03 TRANSPORTATION AND HANDLING

- A. Arrange deliveries of products in accordance with the Short-Term Construction Activities Plan. Coordinate to avoid conflict with Work and conditions at the site.
1. Deliver products in undamaged condition, in manufacturers' original containers or packaging, and with identifying labels intact and legible.
 2. Immediately upon delivery, inspect shipments to assure compliance with the requirements of the Contract Documents and approved submittals, and to ensure that products are properly protected and undamaged.
- B. Provide equipment and personnel to handle products by methods which will prevent soiling or damage to products or packaging.

1.04 STORAGE AND PROTECTION

- A. Store products in accord with manufacturers' instructions, with seals and labels intact and legible.
 - 1. Store products subject to damage by the elements in weather tight enclosures.
 - 2. Maintain temperature and humidity within the ranges required by Manufacturers' instructions.
- B. Arrange storage in a manner to provide easy access for inspection. Make periodic inspections of stored products to assure that the products are maintained under specific conditions and are free from damage or deterioration.
- C. Protection after Installation:
 - 1. Provide substantial coverings as necessary to protect installed products from damage, traffic, and subsequent construction operations. Remove the coverings when they are no longer needed.

1.05 SUBSTITUTIONS AND PRODUCT OPTIONS

- A. Products List:
 - 1. Before commencing Work, submit to the Construction Manager a complete list of major products proposed to be used, with manufacturers and suppliers' names, product names, model numbers, and where applicable, names of installing subcontractors. (Refer to Section 00680.)
- B. Contractor's Options:
 - 1. For products specified only by reference standard, select any product meeting that standard.
 - 2. For products specified by naming several products or manufacturers, select any one of the products or manufacturers named, which complies with the specifications.
 - 3. For products specified by naming one or more products or manufacturer and "or equal," Contractors must submit requests for substitutions for any product or manufacturer not specifically names.
 - 4. For products specified by naming only one product and manufacturer, there is no option.
- C. Substitutions:
 - 1. The Project Team will consider written requests from Contractors for substitution of products.
 - 2. Submit a separate request for each product, supported with complete data, with drawings and samples, as appropriate, including:
 - a. Comparison of the qualities of the proposed substitution with that specified,
 - b. Changes required in other elements of the Work because of the substitution,
 - c. Effect on the construction schedule,
 - d. Cost data comparing the proposed substitution with the product specified,
 - e. Any required license fees or royalties,
 - f. Availability of maintenance service, and source of replacement materials.
 - 3. Architect will be the judge of the acceptability of all proposed substitutions.
 - 4. Any request for a substitution constitutes a representation that the Contractor:
 - a. Has investigated the proposed product and determined that it is equal to or superior in all respects to that specified,
 - b. Will provide the same warranties or bonds for the substitution as for the product specified,
 - c. Will coordinate the installation of accepted substitutions into the Work, and make such other Changes as may be required to make the Work complete in all respects,
 - d. Waivers all claims for additional costs which may subsequently become apparent.
 - 5. The Construction Manager will review requests for substitutions and the Architect's determination of acceptability with reasonable promptness and will notify Contractors in writing of his decisions regarding requested substitutions.

END OF SECTION 01600

PART 1 – GENERAL

1.01 DESCRIPTION

- A. Each Contractor shall comply with requirements stated in the General Conditions and in the Specifications for procedures in closing out the Work.

1.02 SUBSTANTIAL COMPLETION AND FINAL INSPECTION PROCEDURE

- A. When a Contractor's work is 98% complete, and in compliance with Section 10 "Completion" of the Contract, the Contractor will be provided with a Certificate of Substantial Completion, after proper certification by the Construction Manager and Architect. A list of Work in need of correction and a list of incomplete Work will be forwarded to the Contractor. Both the Construction Manager and the Architect will have input to each list.
- B. Each Contractor will be allowed two weeks to complete the items on both lists beginning from the date stipulated on the Certification of Substantial Completion. The Contractor shall begin completion and correction activities within seven (7) days of receipt of the lists and complete all activities within the two-week period specified. Contractors failing to perform in accord with these time parameters will be subject to the provisions of the Additional Conditions, and the Owner will have the right to carry out the corrective Work and/or complete the Work. The cost of correction or completion will be deducted from the Contractor's contract amount.
- C. By the act of submitting the Certificate of Substantial Completion for execution by the Construction Manager and the Architect, the Contractor represents that they have:
1. Reviewed the Contract Documents.
 2. Inspected their Work for compliance with the Contract Documents.
 3. Completed their Work in accord with the Contract Documents and all pertinent submittals.
- D. They further represent that:
1. Equipment and systems have been tested in the presence of the Owner's representative and are operational.
 2. Their Work is completed and ready for final inspection.

1.03 CONTRACTOR'S CLOSEOUT DOCUMENTS

- A. Upon Substantial Completion, the Contractor shall submit the following:
1. Evidence of compliance with requirements of governing authorities, including Certificates of Inspection.
 2. Operating and Maintenance Data, Product Data and Instructions to the Owner's personnel.
 3. Warranties and Bonds
 4. Spare Parts and Maintenance Materials
 5. Evidence of Payment and Release of Liens
 6. Certification of Substantial Completion.
 7. As Built Drawings
 8. Contractor Hazardous Materials Compliance Affidavit
 9. Asbestos Free Affidavit
 10. Letter from Contractor's Insurance carrier that a Certificate of Insurance shall be sent to the Construction Manager at renewal time for a two (2) year period after substantial completion.
- B. One (1) hard copy set along with one (1) electronic set of closeout documents shall be submitted to the Construction Manager upon Substantial Completion.

- C. All Close Out documents must be turned in within two weeks of substantial completion. Final payment to the contractor will not be released until all closeout documents have been received and approved and/or punch list items have been completed and signed off.

1.04 FINAL APPLICATION FOR PAYMENT

- A. Each Contractor shall submit the final Application for Payment in accord with the procedures and requirements stated in the General Conditions of the Contract for Construction.
- B. Refer to Sections 01720, 01730, and 01740 for further information regarding submittals.

END OF SECTION 01700

PART 1 – GENERAL

1.01 DESCRIPTION

- A. Each Contractor shall execute cleaning during the progress of the Work, and at completion of the Work, as required by the Additional Conditions and the Specifications.

1.02 DISPOSAL REQUIREMENTS

- A. Conduct cleaning and disposal operation to comply with codes, ordinances, regulations, and anti-pollution law.

PART 2 – PRODUCTS AND EQUIPMENT

2.01 MATERIALS

- A. Use only those cleaning materials which will not create hazards to health or property, and which will not damage surfaces.
- B. Use only those cleaning materials and methods recommended by the manufacturer of the surface material to be cleaned.
- C. Use cleaning materials only on surfaces recommended by the cleaning material manufacturer.
- D. Each Contractor shall provide his/her own cleaning equipment.
- E. Each Contractor shall cooperate with the Owner and the Construction Manager regarding clean up.

PART 3 – EXECUTION

3.01 HOUSEKEEPING AND CLEAN-UP

- A. Each Contractor shall execute daily housekeeping to keep their Work, the site, and adjacent properties free from accumulations of waste materials, rubbish, and windblown debris resulting from construction operations.
- B. Each Contractor is financially responsible for his/her clean-up operations. Clean up must be timely as well as thorough in order to meet safety regulations and permit other Contractors to perform without hindrance from dirt and debris. The Construction Manager will coordinate Project housekeeping and take appropriate steps to maintain clean, safe working conditions. **Contractors failing to meet housekeeping requirements will be charged for services arranged by the Construction Manager.**

3.02 DUST CONTROL

- A. Clean interior spaces prior to the start of finish painting and continue cleaning on an as-needed basis until painting is finished.
- B. Schedule operations so that dust and other contaminants resulting from the cleaning process will not fall on wet or newly coated surfaces.
- C. Clean up must be performed after each task is done.
- D. Each Contractor is responsible for developing a plan for dust control and debris removal for each task prior to starting.

3.03 FINAL CLEANING

- A. Each Contractor shall employ qualified people for cleaning.
- B. Installing Contractors shall remove grease, mastic adhesives, dust, dirt, stains, finger-paints, labels, and other foreign materials from exposed interior and exterior surfaces, for acceptance by the Construction Manager, prior to leaving the site.
- C. Prior to final completion or Owner occupancy, each Contractor shall conduct an inspection of exposed interior and exterior surfaces and all work areas, to verify that the entire Project is clean.

END OF SECTION 01710

PART 1 – GENERAL

1.01 DESCRIPTION

- A. The Construction Manager will make available a set of Record Documents of the following:
1. Drawings.
 2. Specifications.
 3. Addenda.
 4. Change Orders and other Modifications to the Contracts.
 5. Written Instructions.
 6. Approved Shop Drawings, Product Data and Samples.
 7. Field Test Records.
 8. Construction Photographs.

1.02 RECORD DRAWINGS

- A. As a condition of final payment, each Contractor shall mark any and all installation information that differs in location, size, dimension or type from that shown on the Construction Documents on a single set of Construction Documents. Location of items of work such as electrical conduits, junction boxes, fire alarm cable, data cable, etc., that are not specifically shown on the Construction Documents shall be included in the Record Drawings. Locations of all work installed under concrete slabs shall be noted with accurate dimensions and the depth below finish floor indicated.

1.03 SUBMITTAL

- A. At Contract Closeout, each Contractor shall deliver one (1) hard set along with (1) electronic set of Record Documents, as indicated in 01700.1.03B to the Construction Manager, for delivery to the Owner.
- B. Each Contractor shall accompany their Record Document submittal with a transmittal letter in duplicate, containing:
1. Date.
 2. Project and Phase Designation.
 3. Contractor's name and address.
 4. Bid Division name and number.
 5. Title and number of each Record Document.
 6. Signature of Contractor of his authorized representative.
- D. The receipt of such Record Documents by the Construction Manager or the Owner shall not be a waiver of any deviations from the Contract Documents.

END OF SECTION 01720

PART 1 – GENERAL

1.01 DESCRIPTION

- A. Each Contractor shall compile product, data, and related information appropriate to the Owner’s maintenance and operation of products furnished under their contract.
- B. Each Contractor shall instruct the Owner’s personnel in the maintenance of products and in the operation of equipment and systems.

1.02 MAINTENANCE AND OPERATING MANUALS

- A. Prior to Substantial Completion, each Contractor shall submit to the Construction Manager one (1) hard set along with one (1) electronic set of all comprehensive maintenance and operating materials, presenting complete directions and recommendations for the proper care and maintenance of all visible surfaces, as well as maintenance and operating instructions for all equipment items which the Contractor has provided or installed.
- B. Operating instructions shall include all necessary printed directions for correct operation, adjustment, servicing, and maintenance of movable parts. Also included shall be suitable parts lists and diagrams showing parts location and assembly.

1.03 INSTRUCTION OF OWNER’S PERSONNEL

- A. Prior to final inspection or acceptance, each Contractor shall fully instruct the Owner’s designated operating and maintenance personnel in the operation, adjustment, and maintenance of all products, equipment, and systems.
- B. Manufacturer’s operating and maintenance manuals shall constitute the basis of instruction. Each Contractor shall review the contents of such manuals with the Owner’s personnel in full detail to explain all aspects of operation and maintenance.

END OF SECTION 01730

PART 1 – GENERAL

1.01 DESCRIPTION

- A. The Contractor shall provide a written Guarantee for all labor, material, equipment, and workmanship for a minimum period of two (2) years from the date of Substantial Completion of the project (or longer period if stipulated in the specifications) covering the work of their entire Bid Division(s).
- B. The Contractor shall also provide a written Warranty covering all work of their entire Bid Division(s) for a minimum period of two (2) years from the date of final project completion (or longer period if stipulated in the specifications).
- C. The Contractor shall further provide all suppliers, manufacturer, subcontractor and other written guaranties and warranties covering the work of the entire Bid Division(s) as required by the project specifications.

1.02 REQUIREMENTS

- A. The Contractor shall provide one (1) hard copy along with one (1) electronic copy of all written Guaranties and Warranties.
- B. The Contractor shall review all guaranties and warranties to assure of their compliance with all conditions of the contract.
- C. The Contractor shall assemble all guaranties and warranties, fully executed by each respective contractor, supplier, manufacturer and subcontractor and submit to the construction manager within two weeks of the date of Substantial Completion of the project.
- D. If the Owner elects to permit equipment and component parts of equipment into service during the progress of construction and has issues such permission in writing, all such guaranties and warranties must be submitted to the construction manager within two weeks after inspection and acceptance.
- E. For items of work where acceptance is delayed materially beyond the Date of Substantial Completion, the Contractor shall provide revised guaranties and warranties listing the acceptance date as the start of the guaranty or warranty period.

END OF SECTION 01740

PART 1 – GENERAL**1.01 DESCRIPTION**

- A. It shall be the Contractor's responsibility to ensure that the Owner is notified of any hazardous materials brought to the site.
- B. In compliance with Michigan State Law there is to be no smoking anywhere on the project site or owner's property or use of any tobacco product at any time.
- C. The Contractor agrees to disallow any known carcinogens to be brought onto the jobsite at any time.
- D. The Contractor will not permit any employee to be in possession of any firearm or ammunition when on school property either on the worker's person or in the worker's vehicle. It is illegal to possess firearms or ammunition on your person or in a vehicle on school property at any time.

1.02 REQUIREMENTS

- A. The Contractor shall provide:
 - 1. One (1) hard copy of each Safety Data Sheet (SDS) for each of the hazardous materials used on the site.
 - 2. Certification that the Contractor (and their subcontractors) has instructed the persons using the hazardous materials in their proper use.
 - 3. For removal of any unused hazardous materials in their proper use.
 - 4. Certification that no asbestos containing materials are being used or brought onto the site by signing and notarizing the asbestos free certificate, which follows as page 3 of this Section.
- B. The Contractor shall utilize employee(s) that have been trained and certified for Hazardous Material Awareness specifically for asbestos and lead awareness.
- C. The Contractor has the responsibility to make themselves, their employees, and their subcontractors aware of any hazardous materials in the area of their specified work.
- D. The above requirements must be fulfilled, in writing, at or prior to a pre-construction meeting by filling out the Contractor Hazardous Materials Compliance Form, which is page 2 of this section.
- E. Standard safety practices and regulations as supplied by all governmental agencies will be in effect.
- F. A list of districts SDS sheets is available on request.
- G. The Contractor shall submit a completed Contractor Hazardous Materials Compliance Affidavit and Asbestos-Free Affidavit certifying that no hazardous material has been incorporated into the Project as part of the documentation for Contract Close-Out.

2.01 COMPLIANCE

- A. Compliance with EPA AHERA for Asbestos.
 - 1. The Contractor must adhere to all EPA AHERA and Michigan State Asbestos Regulations for asbestos and other hazardous materials.

B. Compliance with Lead-Containing Materials.

1. All Contractors, Subcontractors and Sub-subcontractors shall adhere to the Environmental Protection Agency (EPA) lead-based paint regulation titled the "Renovation, Repair and Painting (RRP) Rule". Included under this law are "Child Occupied Facilities" (COFs). COFs encompass locations of a pre-1978 constructed buildings where children under age of six (6) regularly visit, such as kindergarten rooms, 1st grade classrooms, applicable restrooms, preschools and day care centers. Therefore portions of each pre-1978 constructed school building falls under the RRP Rule.
2. Any contractor working on this project who disturbs painted surfaces in COF spaces shall ensure that they adhere to all aspects of the RRP Rule. This includes but is not limited to meeting the requirements for being a Certified Firm, having a Certified Lead Renovator involved and following applicable lead safe work practices.
3. Furthermore, all Contractors shall be responsible to comply with all applicable Federal and Michigan State lead regulations including, but not limited to, 29 CFR Part 1926.62 of the OSHA Lead Construction Standard, (Part 603 of the Michigan State Standards). All costs associated with regulatory compliance shall be borne by the Contractor.

CONTRACTOR HAZARDOUS MATERIALS COMPLIANCE AFFIDAVIT

PROJECT NAME: _____

TITLE: _____

Contractor: _____

Address: _____

Contractor's Representative: _____

Phone: _____ Fax: _____

Job Location: _____

This document certifies that the Contractor and any subsequent Contractors have complied with the terms set forth in the requirements for **Bay City Public Schools** as they pertain to hazardous materials.

The SDS's are attached for all hazardous materials which will be brought to **Bay City Public Schools**.

There are _____ SDS's attached.

The Contractor's employees (including subcontractors) have received appropriate instructions pertaining to the use and handling of hazardous materials.

The Contractor has been informed of hazardous materials in the area of the specified work.

Signature of Contractor's Representative

Date: _____

Received by: _____

Date: _____

ASBESTOS FREE AFFIDAVIT

Contractor: _____

Company Name: _____

Street: _____ City: _____ State: _____ Zip: _____

Project: _____

Bid Division: _____

Name of Building(s) in which work was performed:

Certificate Statement:

I _____, representing and having authority for
_____, hereby certify that any and all products/materials
that will be or have been installed/introduced in the above mentioned buildings, are asbestos free or less
that one percent (1%) asbestos by weight.

Name (printed): _____ Position: _____

Signature: _____

Date: _____

Notary Public: _____

My Commission Expires: _____

END OF SECTION 01800

PART 1 – GENERAL

1.01 NOTICE

- A. This notice is to formally advise you, per AHERA Requirements, that all buildings may have asbestos containing materials present. All areas testing positive for asbestos are documented in booklets located in the **Bay City Public Schools**.

1.02 DESCRIPTION

- A. All thermal insulation such as pipe wrap, especially joints, should be assumed to contain asbestos. Contractors are cautioned not to attempt removal of these materials without first notifying the Owner.

AHERA Notification and Contractor Compliance Affidavit

Project Name: Bay City Public Schools 2024 Sinking Fund Bid Pack 1 Central HS Fitness Center Structural and HVAC
Project #: A24911-1A
Owner: Bay City Public Schools
Address: 601 Blend Street, Bay City, MI 48706

This notice is to formally advise you, per AHERA Requirements, that all buildings may have existing asbestos containing materials. All areas testing positive for asbestos have been documented in the owner’s asbestos inspection report available for inspection at the owner’s main office. All areas currently testing positive for asbestos are documented in the attached Three-Year Re-Inspection Asbestos plan report that has been provided by: Bay City Public Schools.

All thermal insulation such as pipe wrap, especially joints, should be assumed to contain asbestos. Contractors are cautioned not to attempt removal of these materials without first notifying the Owner.

I / We _____ doing business as _____ acknowledge receipt of the Three Year Re-Inspection Asbestos plan for the above mentioned project(s) as provided by Bay City Public Schools and certify that all employees of this contractor shall have been trained in the MIOSHA Two-Hour Asbestos Awareness program. It is this Contractor’s responsibility to inform any subcontractors or suppliers of this information and assume all responsibility for such notification.

Company

State of _____ County of _____

Name

Subscribed and sworn to before me this _____

day of _____

Title

Notary Public: _____

Address

My Commission Expires: _____

City, State, Zip

Seal

END OF SECTION 01805



October 18, 2022

Mr. Patrick Tobin
Director of Athletics, Facilities and Maintenance
4721 S. Three Mile Road
Bay City, MI 48706

RE: Project # CI0924/CHS104

Dear Mr. Tobin:

Enclosed please find the results of the bulk sample(s) collected by Nova Environmental, Inc., from Central High School, on October 14, 2022. The samples were analyzed utilizing Polarized Light Microscopy (PLM), according to the EPA 600/R-93/116 Method.

If you have any questions or if I can be of further assistance, please feel free to contact me at (734) 930-0995.

Sincerely,

NOVA ENVIRONMENTAL, INC.

A handwritten signature in cursive script that reads "Felicia Fields".

Felicia Fields
Senior Environmental Consultant

FF/ab

Enclosures



BULK SAMPLING INFORMATION

This form provides information regarding the collection of bulk samples, in accordance with 40 CFR, part 763.85(b)(vii)(B).

1. **Date(s) of Bulk Sampling (Project # CI0924/CHS104):**

October 14, 2022

2. **Name of Accredited Inspector(s) who collected Bulk Sample(s):**

Mason Amin

3. **Signature of Accredited Inspector(s) who collected Bulk Sample(s):**

A handwritten signature in black ink that reads "Mason Amin".

4. **State of Accreditation of Inspector(s) who collected Bulk Sample(s):**

Michigan

5. **Accreditation Number of Accredited Inspector(s) who collected Bulk Sample(s):**

A55095

Note: Description of the manner used to determine sample locations:

All Samples are collected in accordance with 40 CFR, Part 763.86 and the EPA's Asbestos in Buildings: Simplified Sampling Scheme for Friable Surfacing Materials.

State of Michigan
Department of Labor and Economic Opportunity
Michigan Occupational Safety & Health Administration - Asbestos Program



Asbestos Inspector

Mason K. Amin
c/o Nova Environmental, Inc.
5300 Plymouth Rd.
Ann Arbor, MI 48105



Accreditation Number
A55095

Expiration Date
11/22/2023

DOB: 04/05/1994

This individual has satisfactorily met or exceeded the requirements of Michigan Public Act 440 of 1988, as amended, to be accredited as an Asbestos Inspector.

Accreditation card is not valid if altered.

160527



LABORATORY INFORMATION

1. **Name of Laboratory:**

EMSL

2. **Address of Laboratory:**

15111 Northville Rd., Plymouth, MI 48170

3. **Name of Analyst:**

Madeline Ryan

4. **Signature of Analyst:**

See Attached Laboratory Results Sheet

5. **Date(s) of Analysis:**

October 14-17, 2022

6. **National Voluntary Laboratory Accreditation Program (NVLAP) Number:**

101048-4

7. **Applicable Requirements Statement:**

Samples are analyzed for asbestos by laboratories accredited under the National Voluntary Laboratory Accreditation Program (NVLAP), in accordance with 40 CFR, Part 763.87(a). This program is provided under the auspices of the United States Department of Commerce National Institute of Standards and Technology. Question #6 provides the NVLAP Accreditation Number for the laboratory, which performed the asbestos bulk analysis on the samples collected.



BULK SAMPLE RESULTS

CLIENT: Bay City Public Schools

BUILDING: Central High School

PROJECT #: CI0924/CHS104

TYPE OF ANALYSIS: PLM

<u>SAMPLE I.D.</u>	<u>MATERIAL DESCRIPTION</u>	<u>CLASS</u>	<u>LOCATION OF SAMPLE</u>	<u>SAMPLE CONDITION</u>	<u>ASBESTOS DETECTED</u>	<u>%/TYPE</u>	<u>NON-ASBESTOS MATERIAL</u>
CI0924/CHS104-001	Gluepod – Black	Misc.	Locker Room	Non-Friable	Yes	18% Chrysotile	Refer to Analytical Report
CI0924/CHS104-002A	Wrap for Mud Elbow	TSI	Shower Area	Friable	None Detected	---	Refer to Analytical Report
CI0924/CHS104-002B	Mud Elbow	TSI	Shower Area	Friable	Yes	2% Amosite 85% Chrysotile	Refer to Analytical Report
CI0924/CHS104-003A	Wrap for Aircell	TSI	Shower Area	Friable	None Detected	---	Refer to Analytical Report
CI0924/CHS104-003B	Mud for Aircell	TSI	Shower Area	Friable	Yes	91 % Chrysotile	Refer to Analytical Report
CI0924/CHS104-003C	Aircell	TSI	Shower Area	Friable	None Detected	---	Refer to Analytical Report
CI0924/CHS104-004A-B	Aircell	TSI	Shower Area	Friable	None Detected	---	Refer to Analytical Report
CI0924/CHS104-005A	Wrap for Aircell	TSI	Shower Area	Friable	None Detected	---	Refer to Analytical Report
CI0924/CHS104-005B	Mud for Aircell	TSI	Shower Area	Friable	Yes	90% Chrysotile	Refer to Analytical Report
CI0924/CHS104-005C	Aircell	TSI	Shower Area	Friable	None Detected	---	Refer to Analytical Report

11 samples total – Refer to Analytical Report



EMSL Analytical, Inc.

15111 Northville Rd Plymouth, MI 48170

Tel/Fax: (734) 668-6810 / (734) 668-8532

<http://www.EMSL.com> / annarborlab@emsl.com

EMSL Order: 082202348

Customer ID: NOVA53

Customer PO:

Project ID:

Attention: Meghan McCarthy
Nova Environmental, Inc
5300 Plymouth Rd
Ann Arbor, MI 48105

Phone: (734) 548-5237

Fax: (734) 930-2969

Received Date: 10/14/2022 12:10 PM

Analysis Date: 10/14/2022 - 10/17/2022

Collected Date:

Project: CI0924/HS104/Bay City/Central High School

Test Report: Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 Method using Polarized Light Microscopy

Sample	Description	Appearance	Non-Asbestos		Asbestos
			% Fibrous	% Non-Fibrous	% Type
CI0924/HS104-001 <small>082202348-0001</small>		Black Non-Fibrous Homogeneous		82% Non-fibrous (Other)	18% Chrysotile
CI0924/HS104-002A <small>082202348-0002</small>	Wrap	White Fibrous Homogeneous	90% Cellulose	10% Non-fibrous (Other)	None Detected
CI0924/HS104-002B <small>082202348-0002A</small>	Mud	White Fibrous Homogeneous		13% Non-fibrous (Other)	2% Amosite 85% Chrysotile
CI0924/HS104-003A <small>082202348-0003</small>	Wrap	White Fibrous Homogeneous	90% Cellulose	10% Non-fibrous (Other)	None Detected
CI0924/HS104-003B <small>082202348-0003A</small>	Mud	Gray Fibrous Homogeneous		9% Non-fibrous (Other)	91% Chrysotile
CI0924/HS104-003C <small>082202348-0003B</small>	Insulation	White Fibrous Homogeneous	90% Cellulose	10% Non-fibrous (Other)	None Detected
CI0924/HS104-004A <small>082202348-0004</small>	Wrap	White Fibrous Homogeneous	90% Cellulose	10% Non-fibrous (Other)	None Detected
CI0924/HS104-004B <small>082202348-0004A</small>	Insulation	Brown Fibrous Homogeneous	90% Cellulose 2% Hair	8% Non-fibrous (Other)	None Detected
CI0924/HS104-005A <small>082202348-0005</small>	Wrap	White Fibrous Homogeneous	95% Cellulose	5% Non-fibrous (Other)	None Detected
CI0924/HS104-005B <small>082202348-0005A</small>	Mud	Gray Fibrous Homogeneous	2% Cellulose	8% Non-fibrous (Other)	90% Chrysotile
CI0924/HS104-005C <small>082202348-0005B</small>	Insulation	Brown Fibrous Homogeneous	88% Cellulose	12% Non-fibrous (Other)	None Detected

Initial report from: 10/17/2022 09:29:04



EMSL Analytical, Inc.

15111 Northville Rd Plymouth, MI 48170

Tel/Fax: (734) 668-6810 / (734) 668-8532

<http://www.EMSL.com> / annarborlab@emsl.com

EMSL Order: 082202348

Customer ID: NOVA53

Customer PO:

Project ID:

Analyst(s)

Madeline Ryan (11)

Eric Budai, Laboratory Manager
or Other Approved Signatory

EMSL maintains liability limited to cost of analysis. Interpretation and use of test results are the responsibility of the client. This report relates only to the samples reported above, and may not be reproduced, except in full, without written approval by EMSL. EMSL bears no responsibility for sample collection activities or analytical method limitations. The report reflects the samples as received. Results are generated from the field sampling data (sampling volumes and areas, locations, etc.) provided by the client on the Chain of Custody. Samples are within quality control criteria and met method specifications unless otherwise noted. The above analyses were performed in general compliance with Appendix E to Subpart E of 40 CFR (previously EPA 600/M4-82-020 "Interim Method") but augmented with procedures outlined in the 1993 ("final") version of the method. This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST or any agency of the federal government. Non-friable organically bound materials present a problem matrix and therefore EMSL recommends gravimetric reduction prior to analysis. Unless requested by the client, building materials manufactured with multiple layers (i.e. linoleum, wallboard, etc.) are reported as a single sample. Estimation of uncertainty is available on request.

Samples analyzed by EMSL Analytical, Inc. Plymouth, MI NVLAP Lab Code 101048-4

Initial report from: 10/17/2022 09:29:04



September 29, 2022

Mr. Patrick Tobin
Director of Athletics, Facilities and Maintenance
4721 S. Three Mile Road
Bay City, MI 48706

RE: Project # CI0924/CHS103

Dear Mr. Tobin:

Enclosed please find the results of the bulk sample(s) collected by Nova Environmental, Inc., from Central High School, on September 21, 2022. The samples were analyzed utilizing Polarized Light Microscopy (PLM), according to the EPA 600/R-93/116 Method.

If you have any questions or if I can be of further assistance, please feel free to contact me at (734) 930-0995.

Sincerely,

NOVA ENVIRONMENTAL, INC.

A handwritten signature in cursive script that reads "Felicia Fields".

Felicia Fields
Senior Environmental Consultant

FF/ab

Enclosures



BULK SAMPLING INFORMATION

This form provides information regarding the collection of bulk samples, in accordance with 40 CFR, part 763.85(b)(vii)(B).

1. **Date(s) of Bulk Sampling (Project # CI0924/CHS103):**

September 21, 2022

2. **Name of Accredited Inspector(s) who collected Bulk Sample(s):**

Felicia Fields

3. **Signature of Accredited Inspector(s) who collected Bulk Sample(s):**

Felicia Fields

4. **State of Accreditation of Inspector(s) who collected Bulk Sample(s):**

Michigan

5. **Accreditation Number of Accredited Inspector(s) who collected Bulk Sample(s):**

A53464

Note: Description of the manner used to determine sample locations:

All Samples are collected in accordance with 40 CFR, Part 763.86 and the EPA's Asbestos in Buildings: Simplified Sampling Scheme for Friable Surfacing Materials.

State of Michigan
Department of Labor and Economic Opportunity
Michigan Occupational Safety & Health Administration - Asbestos Program


Asbestos Inspector

Felicia F. Fields
c/o Nova Environmental, Inc.
5300 Plymouth Road
Ann Arbor, MI 48105

Accreditation Number **AS3464** **Expiration Date** **10/11/2022** **DOB:** 03/20/1993

This individual has satisfactorily met or exceeded the requirements of Michigan Public Act 440 of 1988, as amended, to be accredited as an Asbestos Inspector.

Accreditation card is not valid if altered. **154117**





LABORATORY INFORMATION

1. **Name of Laboratory:**

EMSL

2. **Address of Laboratory:**

15111 Northville Rd., Plymouth, MI 48170

3. **Name of Analyst:**

Madeline Ryan

4. **Signature of Analyst:**

See Attached Laboratory Results Sheet

5. **Date(s) of Analysis:**

September 21, 2022

6. **National Voluntary Laboratory Accreditation Program (NVLAP) Number:**

101048-4

7. **Applicable Requirements Statement:**

Samples are analyzed for asbestos by laboratories accredited under the National Voluntary Laboratory Accreditation Program (NVLAP), in accordance with 40 CFR, Part 763.87(a). This program is provided under the auspices of the United States Department of Commerce National Institute of Standards and Technology. Question #6 provides the NVLAP Accreditation Number for the laboratory, which performed the asbestos bulk analysis on the samples collected.



BULK SAMPLE RESULTS

CLIENT: Bay City Public Schools

BUILDING: Central High School

PROJECT #: CI0924/CHS103

TYPE OF ANALYSIS: PLM

<u>SAMPLE I.D.</u>	<u>MATERIAL DESCRIPTION</u>	<u>CLASS</u>	<u>LOCATION OF SAMPLE</u>	<u>SAMPLE CONDITION</u>	<u>ASBESTOS DETECTED</u>	<u>%/TYPE</u>	<u>NON-ASBESTOS MATERIAL</u>
CI0924/CHS103-001A	Smooth Plaster Ceiling - Finishcoat	Misc.	Auditorium, Southeast Corner	Non-Friable	None Detected	---	Refer to Analytical Report
CI0924/CHS103-001B	Smooth Plaster Ceiling - Browncoat	Misc.	Auditorium, Southeast Corner	Non-Friable	None Detected	---	Refer to Analytical Report
CI0924/CHS103-002A	Smooth Plaster Ceiling - Finishcoat	Misc.	Balcony, North Corner	Non-Friable	None Detected	---	Refer to Analytical Report
CI0924/CHS103-002B	Smooth Plaster Ceiling - Browncoat	Misc.	Balcony, North Corner	Non-Friable	Layer Not Present	---	Refer to Analytical Report
CI0924/CHS103-003A	Smooth Plaster Wall - Finishcoat	Misc.	Balcony, North Corner	Non-Friable	None Detected	---	Refer to Analytical Report
CI0924/CHS103-003B	Smooth Plaster Wall - Browncoat	Misc.	Balcony, North Corner	Non-Friable	Layer Not Present	---	Refer to Analytical Report
CI0924/CHS103-004	Accent Piece Plaster - Browncoat	Misc.	Balcony, North Corner	Non-Friable	None Detected	---	Refer to Analytical Report
CI0924/CHS103-005	Caret Glue - Yellow	Misc.	Balcony, Northeast Wall	Non-Friable	None Detected	---	Refer to Analytical Report

6 samples total – Refer to Analytical Report



EMSL Analytical, Inc.

15111 Northville Rd Plymouth, MI 48170

Tel/Fax: (734) 668-6810 / (734) 668-8532

<http://www.EMSL.com> / annarborlab@emsl.com

EMSL Order: 082202129

Customer ID: NOVA53

Customer PO:

Project ID:

Attention: Felicia Fields
Nova Environmental, Inc
5300 Plymouth Rd
Ann Arbor, MI 48105

Phone: (734) 930-0995

Fax: (734) 930-2969

Received Date: 09/21/2022 2:35 PM

Analysis Date: 09/21/2022

Collected Date:

Project: CI0924/CHS103/Bay City Public Schools/Central H.S.

Test Report: Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 Method using Polarized Light Microscopy

Sample	Description	Appearance	Non-Asbestos		Asbestos
			% Fibrous	% Non-Fibrous	% Type
CI0924/CHS103-001A <i>082202129-0001</i>	Finish Coat	White Non-Fibrous Homogeneous		2% Quartz 98% Non-fibrous (Other)	None Detected
CI0924/CHS103-001B <i>082202129-0002</i>	Base Coat	Gray Non-Fibrous Homogeneous	<1% Hair	8% Quartz 92% Non-fibrous (Other)	None Detected
CI0924/CHS103-002A <i>082202129-0003</i>	Finish Coat	White Non-Fibrous Homogeneous		2% Quartz 98% Non-fibrous (Other)	None Detected
CI0924/CHS103-002B <i>082202129-0004</i> <i>No BC present</i>	Base Coat				Layer Not Present
CI0924/CHS103-003A <i>082202129-0005</i>	Finish Coat	White Non-Fibrous Homogeneous		3% Quartz 97% Non-fibrous (Other)	None Detected
CI0924/CHS103-003B <i>082202129-0006</i> <i>BC not present</i>	Base Coat				Layer Not Present
CI0924/CHS103-004 <i>082202129-0007</i>		Gray Non-Fibrous Homogeneous		8% Quartz 92% Non-fibrous (Other)	None Detected
CI0924/CHS103-005 <i>082202129-0008</i>		Tan Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected

Analyst(s)

Madeline Ryan (6)

Eric Budai, Laboratory Manager
or Other Approved Signatory

EMSL maintains liability limited to cost of analysis. Interpretation and use of test results are the responsibility of the client. This report relates only to the samples reported above, and may not be reproduced, except in full, without written approval by EMSL. EMSL bears no responsibility for sample collection activities or analytical method limitations. The report reflects the samples as received. Results are generated from the field sampling data (sampling volumes and areas, locations, etc.) provided by the client on the Chain of Custody. Samples are within quality control criteria and met method specifications unless otherwise noted. The above analyses were performed in general compliance with Appendix E to Subpart E of 40 CFR (previously EPA 600/M4-82-020 "Interim Method") but augmented with procedures outlined in the 1993 ("final") version of the method. This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST or any agency of the federal government. Non-friable organically bound materials present a problem matrix and therefore EMSL recommends gravimetric reduction prior to analysis. Unless requested by the client, building materials manufactured with multiple layers (i.e. linoleum, wallboard, etc.) are reported as a single sample. Estimation of uncertainty is available on request.

Samples analyzed by EMSL Analytical, Inc. Plymouth, MI NVLAP Lab Code 101048-4

Initial report from: 09/22/2022 13:15:07



August 18, 2022

Mr. Patrick Tobin
Director of Athletics, Facilities and Maintenance
4721 S. Three Mile Road
Bay City, MI 48706

RE: Project # CI0924/CHS102

Dear Mr. Tobin:

Enclosed please find the results of the bulk sample(s) collected by Nova Environmental, Inc., from Central High School, on August 17, 2022. The samples were analyzed utilizing Polarized Light Microscopy (PLM), according to the EPA 600/R-93/116 Method.

If you have any questions or if I can be of further assistance, please feel free to contact me at (734) 930-0995.

Sincerely,

NOVA ENVIRONMENTAL, INC.

A handwritten signature in blue ink that reads "Meghan L. McCarthy".

Meghan L. McCarthy
Senior Environmental Consultant

MLM/ab

Enclosures



BULK SAMPLING INFORMATION

This form provides information regarding the collection of bulk samples, in accordance with 40 CFR, part 763.85(b)(vii)(B).

1. **Date(s) of Bulk Sampling (Project # CI0924/CHS102):**

August 17, 2022

2. **Name of Accredited Inspector(s) who collected Bulk Sample(s):**

Felicia Fields

3. **Signature of Accredited Inspector(s) who collected Bulk Sample(s):**

Felicia Fields

4. **State of Accreditation of Inspector(s) who collected Bulk Sample(s):**

Michigan

5. **Accreditation Number of Accredited Inspector(s) who collected Bulk Sample(s):**

A53464

Note: Description of the manner used to determine sample locations:

All Samples are collected in accordance with 40 CFR, Part 763.86 and the EPA's Asbestos in Buildings: Simplified Sampling Scheme for Friable Surfacing Materials.

State of Michigan
Department of Labor and Economic Opportunity
Michigan Occupational Safety & Health Administration - Asbestos Program


Asbestos Inspector

Felicia F. Fields
c/o Nova Environmental, Inc.
5300 Plymouth Road
Ann Arbor, MI 48105

Accreditation Number **AS3464** **Expiration Date** **10/11/2022** **DOB:** 03/20/1993

This individual has satisfactorily met or exceeded the requirements of Michigan Public Act 440 of 1988, as amended, to be accredited as an Asbestos Inspector.

Accreditation card is not valid if altered. **154117**





LABORATORY INFORMATION

1. **Name of Laboratory:**

EMSL

2. **Address of Laboratory:**

15111 Northville Rd., Plymouth, MI 48170

3. **Name of Analyst:**

Ashton Bullock / Eric Budai

4. **Signature of Analyst:**

See Attached Laboratory Results Sheet

5. **Date(s) of Analysis:**

August 17-18, 2022

6. **National Voluntary Laboratory Accreditation Program (NVLAP) Number:**

101048-4

7. **Applicable Requirements Statement:**

Samples are analyzed for asbestos by laboratories accredited under the National Voluntary Laboratory Accreditation Program (NVLAP), in accordance with 40 CFR, Part 763.87(a). This program is provided under the auspices of the United States Department of Commerce National Institute of Standards and Technology. Question #6 provides the NVLAP Accreditation Number for the laboratory, which performed the asbestos bulk analysis on the samples collected.



BULK SAMPLE RESULTS

CLIENT: Bay City Public Schools

BUILDING: Central High School

PROJECT #: CI0924/CHS102

TYPE OF ANALYSIS: PLM

<u>SAMPLE I.D.</u>	<u>MATERIAL DESCRIPTION</u>	<u>CLASS</u>	<u>LOCATION OF SAMPLE</u>	<u>SAMPLE CONDITION</u>	<u>ASBESTOS DETECTED</u>	<u>%/TYPE</u>	<u>NON-ASBESTOS MATERIAL</u>
CI0924/CHS102-001	HVAC Fabric – Black	Misc.	Concession Storage, North Wall, Center	Non-Friable	None Detected	---	Refer to Analytical Report
CI0924/CHS102-002	Carpet Glue – Yellow	Misc.	Men’s Locker Room, Coaches Office, Southeast Corner	Non-Friable	None Detected	---	Refer to Analytical Report
CI0924/CHS102-003	Door Window Glaze – Gray	Misc.	Men’s Locker Room, Teachers Office, Northeast Door	Non-Friable	Yes	< 1% Chrysotile	Refer to Analytical Report
CI0924/CHS102-004	Door Caulk Remnants - Tan	Misc.	Men’s Locker Room, Teachers Office, Southeast Door	Non-Friable	Yes	5% Chrysotile	Refer to Analytical Report
CI0924/CHS102-005A	4” Covebase – Black	Misc.	Men’s Locker Room, Coaches Office, Southwest Corner	Non-Friable	None Detected	---	Refer to Analytical Report
CI0924/CHS102-005B	Mastic for 4” Covebase – Black	Misc.	Men’s Locker Room, Coaches Office, Southwest Corner	Non-Friable	None Detected	---	Refer to Analytical Report
CI0924/CHS102-006	Whiteboard Gluepod - Tan	Misc.	Men’s Locker Room, West Wall	Non-Friable	None Detected	---	Refer to Analytical Report
CI0924/CHS102-007	Urinal Mortar	Misc.	Men’s Restroom Area	Non-Friable	None Detected	---	Refer to Analytical Report
CI0924/CHS102-008A	Ceramic Wall Tile	Misc.	Men’s Locker Room, Shower Entrance	Non-Friable	None Detected	---	Refer to Analytical Report
CI0924/CHS102-008B	Ceramic Wall Tile Mortar	Misc.	Men’s Locker Room, Shower Entrance	Non-Friable	None Detected	---	Refer to Analytical Report
CI0924/CHS102-009	Door Caulk – Gray	Misc.	Men’s Locker Room, Drying Area	Non-Friable	Yes	6% Chrysotile	Refer to Analytical Report
CI0924/CHS102-010	Fiberglass Pipe Insulation	TSI	Concession Storage, West Wall, Center	Friable	None Detected	---	Refer to Analytical Report
CI0924/CHS102-011A-B	Duct Sealant – Gray	Misc.	Concession Storage, West Wall, Center	Non-Friable	None Detected	---	Refer to Analytical Report
CI0924/CHS102-012	Rough Plaster – Finishcoat	Surf.	Men’s Locker Room, Center	Non-Friable	None Detected	---	Refer to Analytical Report
CI0924/CHS102-013A	Orange Peel Plaster - Finishcoat	Surf.	Men’s Locker Room, Restroom, Northwest Corner	Non-Friable	None Detected	---	Refer to Analytical Report
CI0924/CHS102-013B	Orange Peel Plaster - Browncoat	Surf.	Men’s Locker Room, Restroom, Northwest Corner	Non-Friable	None Detected	---	Refer to Analytical Report



BULK SAMPLE RESULTS

CLIENT: Bay City Public Schools

BUILDING: Central High School

PROJECT #: CI0924/CHS102

TYPE OF ANALYSIS: PLM

<u>SAMPLE I.D.</u>	<u>MATERIAL DESCRIPTION</u>	<u>CLASS</u>	<u>LOCATION OF SAMPLE</u>	<u>SAMPLE CONDITION</u>	<u>ASBESTOS DETECTED</u>	<u>%/TYPE</u>	<u>NON-ASBESTOS MATERIAL</u>
CI0924/CHS102-014A	Rough Plaster – Finishcoat	Misc.	Men’s Locker Room, Drying Area, Southwest Corner	Non-Friable	None Detected	---	Refer to Analytical Report
CI0924/CHS102-014B	Rough Plaster – Browncoat	Misc.	Men’s Locker Room, Drying Area, Southwest Corner	Non-Friable	None Detected	---	Refer to Analytical Report
CI0924/CHS102-015A	Rough Plaster Finishcoat	Misc.	Concession Storage, West End	Non-Friable	None Detected	---	Refer to Analytical Report
CI0924/CHS102-015B	Rough Plaster - Browncoat	Misc.	Concession Storage, West End	Non-Friable	None Detected	---	Refer to Analytical Report

21 samples total – Refer to Analytical Report



EMSL Analytical, Inc.

15111 Northville Rd Plymouth, MI 48170

Tel/Fax: (734) 668-6810 / (734) 668-8532

<http://www.EMSL.com> / annarborlab@emsl.com

EMSL Order: 082201911

Customer ID: NOVA53

Customer PO:

Project ID:

Attention: Felicia Fields
Nova Environmental, Inc
5300 Plymouth Rd
Ann Arbor, MI 48105

Phone: (734) 930-0995

Fax: (734) 930-2969

Received Date: 08/17/2022 12:40 AM

Analysis Date: 08/17/2022 - 08/18/2022

Collected Date:

Project: CI0924/CHS102/ Bay City/ Central H.S.

Test Report: Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 Method using Polarized Light Microscopy

Sample	Description	Appearance	Non-Asbestos		Asbestos
			% Fibrous	% Non-Fibrous	% Type
CI0924/CHS102-001 <small>082201911-0001</small>		Tan/Black Fibrous Heterogeneous	85% Synthetic	15% Non-fibrous (Other)	None Detected
CI0924/CHS102-002 <small>082201911-0002</small>		Tan Non-Fibrous Homogeneous	4% Cellulose	96% Non-fibrous (Other)	None Detected
CI0924/CHS102-003 <small>082201911-0003</small> <i>Insufficient material to point count.</i>	Glaze Only	Gray/Tan Non-Fibrous Homogeneous		100% Non-fibrous (Other)	<1% Chrysotile
CI0924/CHS102-004 <small>082201911-0004</small>		Gray Non-Fibrous Homogeneous		95% Non-fibrous (Other)	5% Chrysotile
CI0924/CHS102-005A <small>082201911-0005</small>	CB	Black Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
CI0924/CHS102-005B <small>082201911-0006</small>	M	Tan Non-Fibrous Homogeneous	<1% Synthetic	100% Non-fibrous (Other)	None Detected
CI0924/CHS102-006 <small>082201911-0007</small>		Tan Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
CI0924/CHS102-007 <small>082201911-0008</small>		Gray Non-Fibrous Homogeneous	2% Cellulose	4% Quartz 94% Non-fibrous (Other)	None Detected
CI0924/CHS102-008A <small>082201911-0009</small>	Ceramic	Tan Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
CI0924/CHS102-008B <small>082201911-0010</small>	Mortar	Gray Non-Fibrous Homogeneous	<1% Cellulose	5% Quartz 95% Non-fibrous (Other)	None Detected
CI0924/CHS102-009 <small>082201911-0011</small>	Caulk Only	Gray Non-Fibrous Homogeneous		94% Non-fibrous (Other)	6% Chrysotile
CI0924/CHS102-010 <small>082201911-0012</small>		Gray Non-Fibrous Homogeneous	<1% Cellulose <1% Synthetic	100% Non-fibrous (Other)	None Detected
CI0924/CHS102-011A <small>082201911-0013</small>	Wrap	Silver/Beige Fibrous Heterogeneous	55% Cellulose 12% Glass	33% Non-fibrous (Other)	None Detected
CI0924/CHS102-011B <small>082201911-0013A</small>	Insulation	Yellow Fibrous Homogeneous	<1% Cellulose 97% Glass	3% Non-fibrous (Other)	None Detected
CI0924/CHS102-012 <small>082201911-0014</small>		White Non-Fibrous Homogeneous		3% Quartz 97% Non-fibrous (Other)	None Detected
CI0924/CHS102-013A <small>082201911-0015</small>	FC	White Non-Fibrous Homogeneous		3% Quartz 97% Non-fibrous (Other)	None Detected

Initial report from: 08/18/2022 11:02:07



EMSL Analytical, Inc.

15111 Northville Rd Plymouth, MI 48170

Tel/Fax: (734) 668-6810 / (734) 668-8532

<http://www.EMSL.com> / annarborlab@emsl.com

EMSL Order: 082201911
Customer ID: NOVA53
Customer PO:
Project ID:

Test Report: Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 Method using Polarized Light Microscopy

Sample	Description	Appearance	Non-Asbestos		Asbestos
			% Fibrous	% Non-Fibrous	% Type
CI0924/CHS102-013B <small>082201911-0016</small>	BC	Gray Non-Fibrous Homogeneous		7% Quartz 93% Non-fibrous (Other)	None Detected
CI0924/CHS102-014A <small>082201911-0017</small>	FC	White Non-Fibrous Homogeneous		3% Quartz 97% Non-fibrous (Other)	None Detected
CI0924/CHS102-014B <small>082201911-0018</small>	BC	Gray Non-Fibrous Homogeneous		8% Quartz 92% Non-fibrous (Other)	None Detected
CI0924/CHS102-015A <small>082201911-0019</small>	FC	White Non-Fibrous Homogeneous		12% Quartz 88% Non-fibrous (Other)	None Detected
CI0924/CHS102-015B <small>082201911-0020</small>	BC	Gray Non-Fibrous Homogeneous	2% Cellulose	10% Quartz 88% Non-fibrous (Other)	None Detected

Analyst(s)

Ashton Bullock (19)

Eric Budai (2)

Eric Budai, Laboratory Manager
or Other Approved Signatory

EMSL maintains liability limited to cost of analysis. Interpretation and use of test results are the responsibility of the client. This report relates only to the samples reported above, and may not be reproduced, except in full, without written approval by EMSL. EMSL bears no responsibility for sample collection activities or analytical method limitations. The report reflects the samples as received. Results are generated from the field sampling data (sampling volumes and areas, locations, etc.) provided by the client on the Chain of Custody. Samples are within quality control criteria and met method specifications unless otherwise noted. The above analyses were performed in general compliance with Appendix E to Subpart E of 40 CFR (previously EPA 600/M4-82-020 "Interim Method") but augmented with procedures outlined in the 1993 ("final") version of the method. This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST or any agency of the federal government. Non-friable organically bound materials present a problem matrix and therefore EMSL recommends gravimetric reduction prior to analysis. Unless requested by the client, building materials manufactured with multiple layers (i.e. linoleum, wallboard, etc.) are reported as a single sample. Estimation of uncertainty is available on request.

Samples analyzed by EMSL Analytical, Inc. Plymouth, MI NVLAP Lab Code 101048-4

Initial report from: 08/18/2022 11:02:07



September 28, 2021

Mr. Patrick Tobin
Director of Athletics, Facilities and Maintenance
4721 S. Three Mile Road
Bay City, MI 48706

RE: Project # CI0924/CHS101

Dear Mr. Tobin:

Enclosed please find the results of the bulk sample(s) collected by Nova Environmental, Inc., from Central High School, on September 23, 2021. The samples were analyzed utilizing Polarized Light Microscopy (PLM), according to the EPA 600/R-93/116 Method.

If you have any questions or if I can be of further assistance, please feel free to contact me at (734) 930-0995.

Sincerely,

NOVA ENVIRONMENTAL, INC.

A handwritten signature in blue ink that reads "Lisa Whitton".

Lisa Whitton
Vice President

LW/ab

Enclosures



BULK SAMPLING INFORMATION

This form provides information regarding the collection of bulk samples, in accordance with 40 CFR, part 763.85(b)(vii)(B).

1. **Date(s) of Bulk Sampling (Project # CI0924/CHS101):**

September 23, 2021

2. **Name of Accredited Inspector(s) who collected Bulk Sample(s):**

Lisa Whitton

3. **Signature of Accredited Inspector(s) who collected Bulk Sample(s):**

A handwritten signature in blue ink that reads "Lisa Whitton". The signature is written in a cursive style and is placed over a light blue rectangular background.

4. **State of Accreditation of Inspector(s) who collected Bulk Sample(s):**

Michigan

5. **Accreditation Number of Accredited Inspector(s) who collected Bulk Sample(s):**

A30431

Note: Description of the manner used to determine sample locations:

All Samples are collected in accordance with 40 CFR, Part 763.86 and the EPA's Asbestos in Buildings: Simplified Sampling Scheme for Friable Surfacing Materials.

State of Michigan
 Department of Labor and Economic Opportunity
 Michigan Occupational Safety & Health Administration - Asbestos Program

Asbestos Inspector





Lisa L. Whitton
 c/o Nova Environmental, Inc.
 5300 Plymouth Road
 Ann Arbor, MI 48105

Accreditation Number **Expiration Date**
 A30431 10/11/2022

DOB: 11/18/1981

This individual has satisfactorily met or exceeded the requirements of Michigan Public Act 440 of 1988, as amended, to be accredited as an Asbestos Inspector.

Accreditation card is not valid if altered. 154434

State of Michigan
 Department of Labor and Economic Opportunity
 Michigan Occupational Safety & Health Administration - Asbestos Program

Asbestos Management Planner





Lisa L. Whitton
 c/o Nova Environmental, Inc.
 5300 Plymouth Road
 Ann Arbor, MI 48105

Accreditation Number **Expiration Date**
 A30431 10/11/2022

DOB: 11/18/1981

This individual has satisfactorily met or exceeded the requirements of Section 206 of the Toxic Substances Control Act to be accredited in the above discipline.

Accreditation card is not valid if altered. 154435

State of Michigan
 Department of Labor and Economic Opportunity
 Michigan Occupational Safety & Health Administration - Asbestos Program

Asbestos Project Designer





Lisa L. Whitton
 c/o Nova Environmental, Inc.
 5300 Plymouth Road
 Ann Arbor, MI 48105

Accreditation Number **Expiration Date**
 A30431 10/11/2022

DOB: 11/18/1981

This individual has satisfactorily met or exceeded the requirements of Section 206 of the Toxic Substances Control Act to be accredited in the above discipline.

Accreditation card is not valid if altered. 154433



LABORATORY INFORMATION

1. **Name of Laboratory:**

EMSL

2. **Address of Laboratory:**

15111 Northville Rd., Plymouth, MI 48170

3. **Name of Analyst:**

Ashton Bullock

4. **Signature of Analyst:**

See Attached Laboratory Results Sheet

5. **Date(s) of Analysis:**

September 27, 2021

6. **National Voluntary Laboratory Accreditation Program (NVLAP) Number:**

101048-4

7. **Applicable Requirements Statement:**

Samples are analyzed for asbestos by laboratories accredited under the National Voluntary Laboratory Accreditation Program (NVLAP), in accordance with 40 CFR, Part 763.87(a). This program is provided under the auspices of the United States Department of Commerce National Institute of Standards and Technology. Question #6 provides the NVLAP Accreditation Number for the laboratory, which performed the asbestos bulk analysis on the samples collected.



BULK SAMPLE RESULTS

CLIENT: Bay City Public Schools

BUILDING: Central High School

PROJECT #: CI0924/CHS101

TYPE OF ANALYSIS: PLM

<u>SAMPLE I.D.</u>	<u>MATERIAL DESCRIPTION</u>	<u>CLASS</u>	<u>LOCATION OF SAMPLE</u>	<u>SAMPLE CONDITION</u>	<u>ASBESTOS DETECTED</u>	<u>%/TYPE</u>	<u>NON-ASBESTOS MATERIAL</u>
CI0924/CHS101-001	Rock Underlayment for Wood Flooring	Misc.	Room 144	Non-Friable	None Detected	---	Refer to Analytical Report



EMSL Analytical, Inc.

15111 Northville Rd Plymouth, MI 48170

Tel/Fax: (734) 668-6810 / (734) 668-8532

<http://www.EMSL.com> / annarborlab@emsl.com

EMSL Order: 082102457

Customer ID: NOVA53

Customer PO:

Project ID:

Attention: Lisa Whitton
Nova Environmental, Inc
5300 Plymouth Rd
Ann Arbor, MI 48105

Phone: (734) 260-5525

Fax: (734) 930-2969

Received Date: 09/27/2021 8:00 AM

Analysis Date: 09/27/2021

Collected Date:

Project: CI0924/CHS101/ Bay City Schools / Central High School

Test Report: Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 Method using Polarized Light Microscopy

Sample	Description	Appearance	Non-Asbestos		Asbestos
			% Fibrous	% Non-Fibrous	% Type
CI0924/CHS101-001		Black Fibrous	10% Fibrous (Other)	2% Quartz 88% Non-fibrous (Other)	None Detected
082102457-0001		Heterogeneous			

Analyst(s)

Ashton Bullock (1)

Ryan Shannon, Laboratory Manager
or Other Approved Signatory

EMSL maintains liability limited to cost of analysis. Interpretation and use of test results are the responsibility of the client. This report relates only to the samples reported above, and may not be reproduced, except in full, without written approval by EMSL. EMSL bears no responsibility for sample collection activities or analytical method limitations. The report reflects the samples as received. Results are generated from the field sampling data (sampling volumes and areas, locations, etc.) provided by the client on the Chain of Custody. Samples are within quality control criteria and met method specifications unless otherwise noted. The above analyses were performed in general compliance with Appendix E to Subpart E of 40 CFR (previously EPA 600/M4-82-020 "Interim Method") but augmented with procedures outlined in the 1993 ("final") version of the method. This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST or any agency of the federal government. Non-friable organically bound materials present a problem matrix and therefore EMSL recommends gravimetric reduction prior to analysis. Unless requested by the client, building materials manufactured with multiple layers (i.e. linoleum, wallboard, etc.) are reported as a single sample. Estimation of uncertainty is available on request.

Samples analyzed by EMSL Analytical, Inc. Plymouth, MI NVLAP Lab Code 101048-4

Initial report from: 09/27/2021 14:52:15

NOVA
ENVIRONMENTAL, INC.
5300 PLYMOUTH ROAD
ANN ARBOR, MICHIGAN 48105
734-930-0995

December 1, 2021

Mr. Patrick Tobin
Director of Athletics, Facilities and Maintenance
Bay City Public Schools
1624 Columbus Avenue
Bay City, MI 48708

Dear Mr. Tobin:

The following is the 2021 Three-Year Reinspections for Central High School. This Reinspection was conducted in accordance with 40 CFR, Part 763.85(b), of the Asbestos Hazard Emergency Response Act (AHERA).

If you have any questions regarding the Reinspection Report or if I can be of further assistance, please contact me at (734) 930-0995.

Sincerely,

NOVA ENVIRONMENTAL, INC.



Lisa Whitton
Vice President

LW/ab

Enclosures

Nova Environmental, Inc.
Reinspection Form

Client: Bay City Public Schools

Date of Reinspection: October 13, 2021

Name of Building: Central High School

Address: 1624 Columbus Ave., Bay City, MI 48708

This Building has known or assumed: Friable Non-Friable

Homogeneous Area(s) of known or assumed ACBM identified in the Management Plan and/or last Reinspection/Surveillance

2021 Reinspection findings for ACBM – Central High School – October 13, 2021					Management Planner Recommendations			
HA #	HA Description	F/NF	Previous Assessment	New Assessment	Locations	Assessment Justification	Response	Schedule
	Pipe/Pipe Fitting Insulation	F	ACBM with potential for Damage	ACBM with potential for Damage	Above inaccessible ceilings & behind walls	Material is inaccessible	If found **O & M	Ongoing
	Fire Curtain & Stage Spot Light wire insulation	F	ACBM with potential for Damage	ACBM with potential for Damage	Stage	Material is intact	**O & M	Ongoing
	Phone & Electrical Wiring	NF	*Non-Friable	N/A	Throughout	Material was removed	N/A	N/A

*No assessment necessary for Non-friable materials

**Maintain under an Operation and Maintenance Program

NOVA ENVIRONMENTAL, INC.

Accredited Inspector/Management Planner Information
Inspection and Assessment

This form provides the information for Inspectors/Management Planners, which is required to perform Reinspections, in accordance with 40 CFR, Part 763.85(b),(vii),(A) and (C).

1. **Date(s) of Reinspection:** October 13, 2021
2. **Name of Accredited Inspector(s) performing Reinspection and Assessments:**
Felicia Fields
3. **Signature(s) of Accredited Inspector(s) performing Reinspection and Assessments:**


4. **Name of Accredited Management Planner(s) who performed the Reinspection and Assessments:**
Lisa Whitton
5. **Signature of Accredited Management Planner(s) who performed the Reinspection and Assessments:**

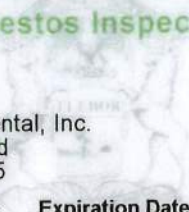
-
6. **State of Accreditation:** Michigan/Michigan
7. **Accreditation Number:** A53464/A30431
8. **Training Institute:** Nova Environmental, Inc.
9. **Certificate Expiration:** August 27, 2022/ August 27, 2022
10. **Building Name and Address:**
Central High School
1624 Columbus Ave.
Bay City, MI 48708


Note: Copy(s) of current Michigan Department of Licensing & Regulatory Affairs Accreditation Cards attached for each Accredited Inspector performing Reinspection and Assessments.

State of Michigan
Department of Labor and Economic Opportunity
Michigan Occupational Safety & Health Administration - Asbestos Program

Asbestos Inspector

 **Felicia F. Fields**
c/o Nova Environmental, Inc.
5300 Plymouth Road
Ann Arbor, MI 48105





Accreditation Number **A53464** **Expiration Date** **10/11/2022** **DOB:** 03/20/1993

This individual has satisfactorily met or exceeded the requirements of Michigan Public Act 440 of 1988, as amended, to be accredited as an Asbestos Inspector.

Accreditation card is not valid if altered. **154117**

State of Michigan
 Department of Labor and Economic Opportunity
 Michigan Occupational Safety & Health Administration - Asbestos Program

Asbestos Inspector

Lisa L. Whitton
 c/o Nova Environmental, Inc.
 5300 Plymouth Road
 Ann Arbor, MI 48105

Accreditation Number **Expiration Date**
 A30431 10/11/2022

DOB: 11/18/1981

This individual has satisfactorily met or exceeded the requirements of Michigan Public Act 440 of 1988, as amended, to be accredited as an Asbestos Inspector.

Accreditation card is not valid if altered. 154434

State of Michigan
 Department of Labor and Economic Opportunity
 Michigan Occupational Safety & Health Administration - Asbestos Program

Asbestos Management Planner

Lisa L. Whitton
 c/o Nova Environmental, Inc.
 5300 Plymouth Road
 Ann Arbor, MI 48105

Accreditation Number **Expiration Date**
 A30431 10/11/2022

DOB: 11/18/1981

This individual has satisfactorily met or exceeded the requirements of Section 206 of the Toxic Substances Control Act to be accredited in the above discipline.

Accreditation card is not valid if altered. 154435

State of Michigan
 Department of Labor and Economic Opportunity
 Michigan Occupational Safety & Health Administration - Asbestos Program

Asbestos Project Designer

Lisa L. Whitton
 c/o Nova Environmental, Inc.
 5300 Plymouth Road
 Ann Arbor, MI 48105

Accreditation Number **Expiration Date**
 A30431 10/11/2022

DOB: 11/18/1981

This individual has satisfactorily met or exceeded the requirements of Section 206 of the Toxic Substances Control Act to be accredited in the above discipline.

Accreditation card is not valid if altered. 154433

NOVA ENVIRONMENTAL, INC.

Designated Person Information Sheet

1. **Name of Designated Person:**

Mr. Patrick Tobin

2. **Professional Title of Designated Person:**

Director of Athletics, Facilities, and Maintenance

3. **Address of Designated Person:**

1624 Columbus Avenue
Bay City, MI 48708

4. **Telephone Number of Designated Person:**

(989) 686-8371

The intent of this statement is to certify that the Three-Year Reinspection with the AHERA regulation, has been conducted by Accredited persons. This statement also certifies that I have reviewed the new Accredited Management Planner's Response Action Recommendations and Response Action Schedules, and approve them for implementation.

5. **Signature of Designated Person:**

6. **Date of Signature:**

PART 1 – GENERAL

1.01 CODES

- A. All work shall comply with the applicable requirements of the local building code and accident and fire prevention regulations.

1.02 SCOPE

- A. The Work covered by this section of Specifications includes, but is not limited to, the following:
1. Demolish and remove existing materials as shown on the plan and noted in the Description of Work.
 2. Cover holes and other hazardous openings with approved materials and barriers.
 3. Remove all demolition materials and debris from the construction site and dispose of in a legal manner.
 4. Protect adequately the construction site, adjoining property, and utility services as work proceeds through all stages.

1.03 QUALITY ASSURANCE

- A. The contractor's staff responsible for demolition shall be experienced in this type of work. Equipment is to be of suitable type, in good working condition, and operated by skilled mechanics.

PART 2 – PRODUCTS

2.01 TEMPORARY ENCLOSURES

- A. Provide temporary enclosures to prevent dust from entering other parts of the facility during demolition. Furnish, install, and remove when directed, temporary weathertight enclosures in all exterior openings created during demolition by the contractor.

PART 3 – EXECUTION

3.01 GENERAL INSTRUCTIONS

- A. All work shall be done in a safe and cautious manner in order to avoid accidents and property damage.
- B. Protect the work scheduled to remain, and if damaged, repair to match existing work.
- C. All salvaged material unless otherwise noted on plans or in the Description of Work shall become the property of the Contractor and shall be evaluated in the Contractor's bid price. Promptly remove salvaged material from the construction site as the work proceeds.
- D. Carefully dismantle and store on site all material scheduled to remain the Property of the Owner. Protect until removed by the Owner or until end of Contract.
- E. Protect from damage and clean materials scheduled to be reused.
- F. Protect parts of the existing Work scheduled to remain. Cut away carefully the parts to be demolished to reduce the number of necessary repairs.
- G. Support existing structure as needed during cutting of new openings or replacement of structural members.
- H. Prevent accumulation of debris and overloading of any part of the structure.
- I. Prevent access of unauthorized persons to partly demolished areas.
- J. Remove all demolition materials, debris, and rubbish from the site as soon as practicable. Do not permit any accumulation on the site. Transport all demolition materials without spillage on the streets.

END OF SECTION 001900

Division Section Title

SERIES 0 - BIDDING REQUIREMENTS AND CONTRACT FORMS

N/A

DIVISION 1 - GENERAL REQUIREMENTS

013300 SUBMITTAL PROCEDURES
 CAD DOCUMENT DISCLAIMER FORM

DIVISION 2 - EXISTING CONDITIONS

024119 SELECTIVE DEMOLITION

DIVISION 3 - CONCRETE

033000 CAST-IN-PLACE CONCRETE

DIVISION 4 - MASONRY

042000 UNIT MASONRY

DIVISION 5 - METALS

055000 METAL FABRICATIONS

DIVISION 6 - WOOD AND PLASTICS

061000 ROUGH CARPENTRY

DIVISION 7 - THERMAL AND MOISTURE PROTECTION

079200 JOINT SEALANTS

DIVISION 8 - DOORS AND WINDOWS

N/A

DIVISION 9 - FINISHES

092216 NON-STRUCTURAL METAL FRAMING
099123 INTERIOR PAINTING

DIVISION 10 - SPECIALTIES

N/A

DIVISION 11 - EQUIPMENT

N/

DIVISION 12 - FURNISHINGS

N/A

DIVISION 21 - FIRE SUPPRESSION

N/A

DIVISION 22 - PLUMBING

N/A

DIVISION 23 - HVAC

230500	HVAC REQUIREMENTS
230553	HVAC IDENTIFICATION
230593	TESTING, ADJUSTING AND BALANCING
230713	EXTERNAL DUCT INSULATION
230714	INTERNAL ACOUSTICAL DUCT LINING
232500	HVAC SYSTEMS TESTING, CLEANING, WATER TREATMENT AND STARTUP
233000	AIR DISTRIBUTION
238000	TEMPERATURE CONTROL SYSTEM

DIVISION 26- ELECTRICAL

260100	BASIC ELECTRICAL REQUIREMENTS
260500	COMMON WORK RESULTS FOR ELECTRICAL
260505	SELECTIVE DEMOLITION FOR ELECTRICAL
260519	LOW VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES
260526	GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS
260529	HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS
260533.13	CONDUIT FOR ELECTRICAL SYSTEMS
260533.16	BOXES FOR ELECTRICAL SYSTEMS
260553	IDENTIFICATION FOR ELECTRICAL SYSTEMS
260583	WIRING CONNECTIONS
260923	LIGHTING CONTROL DEVICES
262416	PANELBOARDS
262726	WIRING DEVICES
265100	INTERIOR LIGHTING

DIVISION 28 - ELECTRONIC SAFETY AND SECURITY

283100	FIRE ALARM SYSTEM
--------	-------------------

DIVISION 32 - EXTERIOR IMPROVEMENTS

N/A

END OF TABLE OF CONTENTS

SECTION 01330 - SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

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

1.2 SUBMITTAL ADMINISTRATIVE REQUIREMENTS

- A. Coordination: Coordinate preparation and processing of submittals with performance of construction activities.
- B. Processing Time: Allow time for submittal review, including time for resubmittals, as follows. Time for review shall commence on Architect's receipt of submittal. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing, including resubmittals.
 - 1. Allow 15 days for initial review of each submittal. Allow additional time if coordination with subsequent submittals is required. Architect will advise Contractor when a submittal being processed must be delayed for coordination.
- C. Distribution: Furnish copies of final submittals to subcontractors and others as necessary.
- D. Use for Construction: Retain complete copies of submittals on Project site. Use only final action submittals that are marked with approval notation from Architect's action stamp.

PART 2 - PRODUCTS

2.1 SUBMITTAL PROCEDURES

- A. General Submittal Procedure Requirements:
 - 1. Post electronic submittals as PDF electronic files directly to Architect's FTP site specifically established for Project, or as PDF files sent by e-mail.
 - 2. Paper action Submittals: Submit three paper copies of each submittal unless otherwise indicated. Architect will return two copies.
 - 3. Certificates and Certifications Submittals: Provide a statement that includes signature of entity responsible for preparing certification. Certificates and certifications shall be signed by an officer or other individual authorized to sign documents on behalf of that entity.
- B. Product Data: Collect information into a single submittal for each element of construction and type of product or equipment.
 - 1. For equipment, include the following in addition to the above, as applicable:
 - a. Wiring diagrams showing factory-installed wiring.
 - b. Printed performance curves.
 - c. Operational range diagrams.
 - d. Clearances required to other construction, if not indicated on accompanying Shop Drawings.
- C. Shop Drawings: Prepare Project-specific information, drawn accurately to scale. Do not base Shop Drawings on reproductions of the Contract Documents or standard printed data.
 - 1. Preparation: Fully illustrate requirements in the Contract Documents.

- D. Samples: Submit Samples for review of kind, color, pattern, and texture for a check of these characteristics with other elements and for a comparison of these characteristics between submittal and actual component as delivered and installed.
- E. Test and Inspection Reports and Schedule of Tests and Inspections Submittals: Comply with requirements specified in Section 01400 "Quality Requirements."
- F. Closeout Submittals and Maintenance Material Submittals: Comply with requirements specified in Section 01770 "Closeout Procedures."
- G. Maintenance Data: Comply with requirements specified in Section 017823 "Operation and Maintenance Data."

2.2 DELEGATED-DESIGN SERVICES

- A. Performance and Design Criteria: Where professional design services or certifications by a design professional are specifically required of Contractor by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated.
 - 1. If criteria indicated are not sufficient to perform services or certification required, submit a written request for additional information to Architect.
- B. Delegated-Design Services Certification: In addition to Shop Drawings, Product Data, and other required submittals, submit three paper copies of certificate, signed and sealed by the responsible design professional, for each product and system specifically assigned to Contractor to be designed or certified by a design professional.
 - 1. Indicate that products and systems comply with performance and design criteria in the Contract Documents. Include list of codes, loads, and other factors used in performing these services.

PART 3 - EXECUTION

3.1 CONTRACTOR'S REVIEW

- A. Action and Informational Submittals: Review each submittal and check for coordination with other Work of the Contract and for compliance with the Contract Documents. Note corrections and field dimensions. Mark with approval stamp before submitting to Architect.
- B. Approval Stamp: Stamp each submittal with a uniform, approval stamp. Include Project name and location, submittal number, Specification Section title and number, name of reviewer, date of Contractor's approval, and statement certifying that submittal has been reviewed, checked, and approved for compliance with the Contract Documents.

3.2 ARCHITECT'S ACTION

- A. Action Submittals: Architect will review each submittal, make marks to indicate corrections or revisions required, and return it. Architect will stamp each submittal with an action stamp and will mark stamp appropriately to indicate action.
- B. Incomplete submittals are unacceptable, will be considered nonresponsive, and will be returned for resubmittal without review.

END OF SECTION 01330

WTA Architects

100 South Jefferson Avenue, Suite 601
Saginaw, Michigan 48607



E-mail: design@wtaarch.com
Telephone: (989) 752-8107
Fax: (989) 752-3125

LETTER OF AUTHORIZATION FOR TRANSFER OF CAD DOCUMENTS

Not for Modification or Reuse

Project: Bay City Central Fitness Structural / HVAC WTA Project No. 2018040.19

Documents to be Transferred: _____

Purpose of Documentation: _____

Per your request, we will transmit the CAD Documents listed above in the form of disks or e-mailed files upon receipt of an original signed copy of this letter with conditions of agreement as stated below.

1. In accepting the described CAD electronic data, the undersigned agrees that these documents are instruments of service, not products, and as such these documents shall remain the property of **WTA Architects (WTA)**.
2. By acceptance it is understood and agreed that the data and medium being supplied is to be used only for the project referenced and for the purpose stated above.
3. The Undersigned agrees, to the fullest extent permitted by law, to indemnify and hold WTA and its Consultants harmless from any claim, liability or cost (including, but not limited to, attorney fees and defense costs) arising or allegedly arising out of the authorized or unauthorized use, reuse or modification of the electronic files by any trade contractor, person or entity that acquires or obtains the electronic files from or through the Undersigned.
4. It is understood and agreed that the documents being transferred are prepared from the original construction document CAD files. WTA makes no claims with regard to accuracy or completeness of the drawings, or the suitability of the drawings to be used for the proposed purpose or any other purpose.
5. The recipient understands that the transferred files may not reflect current field conditions and the status of any addenda, bulletins, field orders, or other modifications that may have occurred since the initial date of issue.
6. As a record of information to be transmitted, we will prepare a duplicate back-up for our files, which may be electronic or hard copy.
7. Compensation for providing this material will be **\$150.00 FOR FIRST SHEET AND \$50.00 FOR EACH ADDITIONAL SHEETS**. Payment must be provided along with a signed copy of this form before disks will be created and/or released. Please remit to **WTA Architects**.

Agreed to By:

(Signature)

(Date)

(Title)

(Company)

Accepted By:

(Signature)

(Date)

WTA Architects

SECTION 024119 - SELECTIVE STRUCTURE DEMOLITION

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Demolition and removal of selected portions of building or structure.
 - 2. Demolition and removal of selected site elements.
 - 3. Salvage of existing items to be reused or recycled.
 - 4. Identification of Utilities

1.2 DEFINITIONS

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

1.3 PREINSTALLATION MEETINGS

- A. Predemolition Conference: Conduct conference at Project site.

1.4 CLOSEOUT SUBMITTALS

- A. Landfill Records: Where hazardous material is being disposed of, Indicate receipt and acceptance of hazardous wastes by a landfill facility licensed to accept hazardous wastes.

1.5 FIELD CONDITIONS

- A. Owner will occupy portions of building immediately adjacent to selective demolition area. Conduct selective demolition so Owner's operations will not be disrupted.
- B. Provide 1-hour rated separation between work area and occupied areas of the building, or maintain existing barriers.
- C. Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.
- D. Notify Architect of discrepancies between existing conditions and Drawings before proceeding with selective demolition.
- E. Hazardous Materials: A report on the presence of hazardous materials is on file for review and use. Examine report to become aware of locations where hazardous materials are present.
 - 1. Hazardous material remediation will be performed under a separate contract. Contractor to coordinate with abatement contractor..
 - 2. If suspected hazardous materials are encountered, do not disturb; immediately notify Architect and Owner.

- F. Storage or sale of removed items or materials on-site is not permitted.
- G. Utility Service:
 - 1. Notify affected utility companies before starting work and comply with their requirements.
 - 2. Mark location and termination of utilities.
 - 3. Maintain existing utilities indicated to remain in service and protect them against damage during selective demolition operations.
 - 4. Maintain fire-protection facilities in service during selective demolition operations.

1.6 WARRANTY

- A. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during selective demolition, by methods and with materials so as not to void existing warranties.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Regulatory Requirements: Comply with governing EPA notification regulations before beginning selective demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.
- B. Standards: Comply with ANSI/ASSE A10.6 and NFPA 241.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify that utilities have been disconnected and capped before starting selective demolition operations.
- B. Survey existing conditions and correlate with requirements indicated to determine extent of selective demolition required.
- C. When unanticipated mechanical, electrical, or structural elements that conflict with intended function or design are encountered, investigate and measure the nature and extent of conflict. Promptly submit a written report to Architect.

3.2 UTILITY SERVICES AND MECHANICAL/ELECTRICAL SYSTEMS

- A. Existing Services/Systems to Remain: Maintain services/systems indicated to remain and protect them against damage.
- B. Existing Services/Systems to Be Removed, Relocated, or Abandoned: Locate, identify, disconnect, and seal or cap off indicated utility services and mechanical/electrical systems serving areas to be selectively demolished.
 - 1. Owner will arrange to shut off indicated services/systems when requested by Contractor.
 - 2. Arrange to shut off indicated utilities with utility companies.
 - 3. If services/systems are required to be removed, relocated, or abandoned, provide temporary services/systems that bypass area of selective demolition and that maintain continuity of services/systems to other parts of building.

4. Disconnect, demolish, and remove fire-suppression systems, plumbing, and HVAC systems, equipment, and components indicated to be removed.
 - a. Piping to Be Removed: Remove portion of piping indicated to be removed and cap or plug remaining piping with same or compatible piping material.
 - b. Piping to Be Abandoned in Place: Drain piping and cap or plug piping with same or compatible piping material.
 - c. Equipment to Be Removed: Disconnect and cap services and remove equipment.
 - d. Equipment to Be Removed and Reinstalled: Disconnect and cap services and remove, clean, and store equipment; when appropriate, reinstall, reconnect, and make equipment operational.
 - e. Equipment to Be Removed and Salvaged: Disconnect and cap services and remove equipment and deliver to Owner.
 - f. Ducts to Be Removed: Remove portion of ducts indicated to be removed and plug remaining ducts with same or compatible ductwork material.
 - g. Ducts to Be Abandoned in Place: Cap or plug ducts with same or compatible ductwork material.
- C. Refrigerant: Remove refrigerant from mechanical equipment to be selectively demolished according to 40 CFR 82 and regulations of authorities having jurisdiction.

3.3 PREPARATION

- A. Site Access and Temporary Controls: Conduct selective demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.
 1. Comply with requirements for access and protection specified in Section 015000 "Temporary Facilities and Controls."
- B. Temporary Facilities: Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.
- C. Temporary Partitions: Erect and maintain temporary partitions to prevent spread of dust, odors, and noise to permit continued Owner occupancy. Provide fire-rated partitions where required by the Authority Having Jurisdiction.
- D. Temporary Shoring: Provide and maintain shoring, bracing, and structural supports as required to preserve stability and prevent movement, settlement, or collapse of construction and finishes to remain, and to prevent unexpected or uncontrolled movement or collapse of construction being demolished.
- E. Temporary signage: Provide appropriate temporary signage including signage for exit or building egress.

3.4 SELECTIVE DEMOLITION, GENERAL

- A. Conduct demolition to minimize interference with adjacent and occupied building areas.
- B. Cease operations immediately if structure appears to be in danger and notify Architect/Engineer. Do not resume operations until directed.
- C. Demolish and remove existing construction only to the extent required by new construction and as indicated. Use methods required to complete the Work within limitations of governing regulations and as follows:
 1. Neatly cut openings and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage construction to remain or adjoining construction. Use hand tools or small power tools designed for sawing or grinding,

- not hammering and chopping, to minimize disturbance of adjacent surfaces. Temporarily cover openings to remain.
2. Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.
 3. Do not use cutting torches until work area is cleared of flammable materials. At concealed spaces, such as duct and pipe interiors, verify condition and contents of hidden space before starting flame-cutting operations. Maintain portable fire-suppression devices during flame-cutting operations.
 4. Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
 5. All materials and services slated for removal are to be fully removed, cleaned up and firestopped as required in sections 017700 Closeout Procedures, Final Cleaning, and 078416 Firestopping.
- D. Removed and Salvaged Items:
1. Clean salvaged items.
 2. Pack or crate items after cleaning. Identify contents of containers.
 3. Store items in a secure area until delivery to Owner.
- E. Existing Items to Remain: Protect construction indicated to remain against damage and soiling during selective demolition. When permitted by Architect, items may be removed to a suitable, protected storage location during selective demolition **and cleaned** and reinstalled in their original locations after selective demolition operations are complete.
1. Protect the following materials and equipment remaining:
 - a. Structural systems and supports.
 - b. Mechanical systems intended to remain.
 - c. Electrical and communications equipment.
 - d. Remaining structural, material, or equipment systems revealed by the demolition process.
- F. Promptly repair damages caused to adjacent facilities not scheduled for demolition, removal, or reconstruction at no additional cost to Owner. Lawn areas where vehicle traffic has occurred shall be finish graded including topsoil and seeding.

3.5 DISPOSAL OF DEMOLISHED MATERIALS

- A. General: Except for items or materials indicated to be recycled, reused, salvaged, reinstalled, or otherwise indicated to remain Owner's property, remove demolished materials from Project site and legally dispose of them in an EPA-approved landfill.
1. Do not allow demolished materials to accumulate on-site.
 2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
 3. Remove debris from elevated portions of building by chute, hoist, or other device that will convey debris to grade level in a controlled descent.
- B. Burning: Do not burn demolished materials.
- C. Burying: Do not bury demolished materials onsite.
- D. Disposal: Transport demolished materials off Owner's property and legally dispose of them.

3.6 CLEANING

- A. Clean adjacent structures and improvements of dust, dirt, and debris caused by selective demolition operations. Return adjacent areas to condition existing before selective demolition operations began.

END OF SECTION 024119

SECTION 033000 - CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes cast-in-place concrete.
- B. Related Sections:
 - 1. Section 024119 "Selective Demolition"
 - 2. Mechanical and Electrical Sections for new utilities requiring slab removal and replacement.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Design Mixtures: For each concrete mixture.

1.3 INFORMATIONAL SUBMITTALS

- A. Material test reports.
- B. Floor surface flatness and levelness measurements.

1.4 QUALITY ASSURANCE

- A. Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C 94/C 94M requirements for production facilities and equipment.
 - 1. Manufacturer certified according to NRMCA's "Certification of Ready Mixed Concrete Production Facilities."
- B. ACI Publications: Comply with the following unless modified by requirements in the Contract Documents:
 - 1. ACI Building Code (318); Manual of Standard Practice for Detailing (315) for the mixing, fabrication and placement of concrete, reinforcing steel, and accessories.
 - 2. ACI 117, "Specifications for Tolerances for Concrete Construction and Materials."
- C. Preinstallation Conference: Conduct conference at Project site.

PART 2 - PRODUCTS

2.1 FORM-FACING MATERIALS

- A. Smooth-Formed Finished Concrete: Form-facing panels that will provide continuous, true, and smooth concrete surfaces. Furnish in largest practicable sizes to minimize number of joints.

2.2 STEEL REINFORCEMENT

- A. Reinforcing Bars: ASTM A 615 Grade 60 deformed.
- B. Welded Wire Fabric: ASTM A-1064
 - 1. Concrete Slabs on Grade: 6x6 - W1.4xW1.4 WWF unless noted otherwise. Locate in upper 1/3 of slab.

2.3 CONCRETE MATERIALS

- A. Cementitious Material: Use the following cementitious materials, of the same type, brand, and source, throughout Project:
 - 1. Portland Cement: ASTM C 150, Type I.
- B. Normal-Weight Aggregates: ASTM C 33, graded.
 - 1. Maximum Coarse-Aggregate Size: 1 inches (25.3 mm) nominal.
 - 2. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.
- C. Water: ASTM C 94/C 94M and potable.

2.4 VAPOR RETARDERS

- A. Sheet Vapor Retarder: ASTM E 1745, Class B. Include manufacturer's recommended adhesive or pressure-sensitive tape.
- B. Sheet Vapor Retarder: Polyethylene sheet, ASTM D 4397, not less than 10 mils (0.25 mm) thick.

2.5 RELATED MATERIALS

- A. Expansion- and Isolation-Joint-Filler Strips: ASTM D 1751, asphalt-saturated cellulosic fiber or ASTM D 1752, cork or self-expanding cork.

2.6 CONCRETE MIXTURES

- A. Prepare design mixtures for each type and strength of concrete, proportioned on the basis of laboratory trial mixture or field test data, or both, according to ACI 301.
- B. Cementitious Materials: Use fly ash, pozzolan, ground granulated blast-furnace slag, and silica fume as needed to reduce the total amount of portland cement, which would otherwise be used, by not less than 40 percent.
- C. Proportion normal-weight concrete mixture as follows:
 - 1. Minimum Compressive Strength at 28 days
 - a. Concrete Slabs on Grade and slabs on form deck $f'c = 3500$ psi
 - 2. Maximum Water-Cementitious Materials Ratio:
 - a. $f'c = 3500$ psi 0.62 non-air entrained
- D. Slump Limits:
 - 1. Slabs and walls: 4"

2.7 FABRICATING REINFORCEMENT

- A. Fabricate steel reinforcement according to CRSI's "Manual of Standard Practice."

2.8 CONCRETE MIXING

- A. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete according to ASTM C 94/C 94M and ASTM C 1116/C 1116M, and furnish batch ticket information.
 - 1. When air temperature is between 85 and 90 deg F (30 and 32 deg C), reduce mixing and delivery time from 1-1/2 hours to 75 minutes; when air temperature is above 90 deg F (32 deg C), reduce mixing and delivery time to 60 minutes.

PART 3 - EXECUTION

3.1 FORMWORK

- A. Form all concrete.
- B. Design, erect, shore, brace, and maintain formwork, according to ACI 301, to support vertical, lateral, static, and dynamic loads, and construction loads that might be applied, until structure can support such loads.
- C. Construct formwork so concrete members and structures are of size, shape, alignment, elevation, and position indicated, within tolerance limits of ACI 117.
- D. Do not chamfer exterior corners and edges of permanently exposed concrete.

3.2 EMBEDDED ITEMS

- A. Place and secure anchorage devices and other embedded items required for adjoining work that is attached to or supported by cast-in-place concrete. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.

3.3 VAPOR RETARDERS

- A. Sheet Vapor Retarders: Place, protect, and repair sheet vapor retarder according to ASTM E 1643 and manufacturer's written instructions.
 - 1. Lap joints 6 inches (150 mm) and seal with manufacturer's recommended tape.

3.4 STEEL REINFORCEMENT

- A. General: Comply with CRSI's "Manual of Standard Practice" for placing reinforcement.
 - 1. Do not cut or puncture vapor retarder. Repair damage and reseal vapor retarder before placing concrete.
 - 2. Lap Reinforcing: 42 bar diameters for bars up to #5, 60 bar diameters for bars larger than #5.

3.5 CONCRETE PLACEMENT

- A. Before placing concrete, verify that installation of formwork, reinforcement, and embedded items is complete and that required inspections have been performed.
- B. Deposit concrete continuously in one layer or in horizontal layers of such thickness that no new concrete will be placed on concrete that has hardened enough to cause seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as indicated. Deposit concrete to avoid segregation.
 - 1. Consolidate placed concrete with mechanical vibrating equipment according to ACI 301.

3.6 FINISHING FORMED SURFACES

- A. Smooth-Formed Finish: As-cast concrete texture imparted by form-facing material, arranged in an orderly and symmetrical manner with a minimum of seams. Repair and patch tie holes and defects. Remove fins and other projections that exceed specified limits on formed-surface irregularities.
 - 1. Finish similar to adjacent existing concrete surfaces, to be covered with a coating or covering material applied directly to concrete.
- B. Related Unformed Surfaces: At tops of walls, horizontal offsets, and similar unformed surfaces adjacent to formed surfaces, strike off smooth and finish with a texture matching

adjacent formed surfaces. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces unless otherwise indicated.

3.7 FINISHING FLOORS AND SLABS

- A. General: Comply with ACI 302.1R recommendations for screeding, re-straightening, and finishing operations for concrete surfaces. Do not wet concrete surfaces.
- B. Trowel and Fine-Broom Finish: Apply a first trowel finish to surfaces where ceramic or quarry tile is to be installed by either thickset or thin-set method. While concrete is still plastic, slightly scarify surface with a fine broom.
 - 1. Comply with flatness and levelness tolerances for trowel-finished floor surfaces.
 - 2. Coordinate with Tile installer for specific requirements.

3.8 CONCRETE PROTECTING AND CURING

- A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Comply with ACI 306.1 for cold-weather protection and ACI 301 for hot-weather protection during curing.
- B. Evaporation Retarder: Apply evaporation retarder to unformed concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb/sq. ft. x h (1 kg/sq. m x h) before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete, but before float finishing.

3.9 CONCRETE SURFACE REPAIRS

- A. Defective Concrete: Repair and patch defective areas when approved by Architect. Remove and replace concrete that cannot be repaired and patched to Architect's approval.

3.10 FIELD QUALITY CONTROL

- A. Testing and Inspecting: Owner will engage a qualified testing and inspecting agency to perform field tests and inspections and prepare test reports.

END OF SECTION 033000

SECTION 042000 - UNIT MASONRY

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
1. Concrete masonry units.
 2. Clay face brick.
 3. Mortar and grout.
 4. Steel reinforcing bars.
 5. Masonry-joint reinforcement.
 6. Ties and anchors.
 7. Embedded flashing.
 8. Miscellaneous masonry accessories.
 9. Masonry waste disposal.

1.2 DEFINITIONS

- A. CMU(s): Concrete masonry unit(s).
- B. Reinforced Masonry: Masonry containing reinforcing steel in grouted cells.

1.3 SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: For reinforcing steel. Detail bending, lap lengths, and placement of unit masonry reinforcing bars. Comply with ACI 315.
- C. Samples for Verification: For each type and color of exposed masonry unit.
- D. Mix Designs: For each type of mortar and grout. Include description of type and proportions of ingredients.
1. Include test reports for mortar mixes required to comply with property specification. Test according to ASTM C 109/C 109M for compressive strength, ASTM C 1506 for water retention, and ASTM C 91/C 91M for air content.
 2. Include test reports, according to ASTM C 1019, for grout mixes required to comply with compressive strength requirement.

1.4 QUALITY ASSURANCE

- A. Field Verification: Unit masonry assemblies are to be installed in or adjacent to existing construction. Contractor to field verify existing conditions, coursing, and adjacent construction. Notify Architect of conditions that would affect the work.
- B. Sample Panels: Build sample panels to verify selections made under Sample submittals and to demonstrate aesthetic effects.

1.5 FIELD CONDITIONS

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

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

PART 2 - PRODUCTS

2.1 UNIT MASONRY, GENERAL

- A. Masonry Standard: Comply with ACI 530.1 specifications.
- B. Defective Units: Referenced masonry unit standards may allow a certain percentage of units to contain chips, cracks, or other defects exceeding limits stated. Do not use units where such defects are exposed in the completed Work.
- C. Fire-Resistance Ratings: Comply with requirements for fire-resistance-rated assembly designs indicated.
 - 1. Where fire-resistance-rated construction is indicated, units shall be listed and labeled by a qualified testing agency acceptable to authorities having jurisdiction.

2.2 CONCRETE MASONRY UNITS

- A. Shapes: Provide shapes indicated and as follows, with exposed surfaces matching exposed faces of adjacent units unless otherwise indicated.
 - 1. Provide special shapes for lintels, corners, jambs, sashes, movement joints, headers, bonding, and other special conditions.
- B. CMUs: ASTM C 90.
 - 1. Grade N, two core type for reinforced masonry. Design based on $f'm = 1500$ psi.
 - 2. Density Classification: Normal weight.

2.3 BRICK

- A. General: Provide shapes indicated and as follows, with exposed surfaces matching finish and color of exposed faces of adjacent units:
 - 1. Re-use salvaged and cleaned existing brick for toothing in new opening. If sufficient quantities of existing brick cannot be reclaimed in good condition use New Face Brick indicated in 2.3 B below.
 - 2. For applications that would otherwise expose unfinished brick surfaces, provide units without cores or frogs and with exposed surfaces finished.
 - 3. Provide square-edged units for outside corners.
- B. Existing Face Brick: Existing face brick to salvaged from demolition, cleaned, and re-used if possible. It is believed that sufficient quantity can be obtained for the repair work indicated.
- C. New Face Brick: Where sufficient existing brick in suitable condition can not be obtained, use Facing brick complying with ASTM C 216.
 - 1. Manufacturer and Product:
 - a. Match existing adjacent brick.
 - 2. Grade: SW (exterior) SW or MW (interior)
 - 3. Type: FBX or FBS.
 - 4. Unit Compressive Strength: Provide units with minimum average net-area compressive strength of 3350 psi (23.10 MPa).
 - 5. Initial Rate of Absorption: Less than 20 g/30 sq. in. (20 g/194 sq. cm) per minute when tested according to ASTM C 67.

6. Efflorescence: Provide brick that has been tested according to ASTM C 67 and is rated "not effloresced."

2.4 MORTAR AND GROUT MATERIALS

- A. Portland Cement: ASTM C 150/C 150M, Type I or II, except Type III may be used for cold-weather construction. Provide natural color or white cement as required to produce mortar color indicated.
- B. Hydrated Lime: ASTM C 207, Type S.
- C. Portland Cement-Lime Mix: Packaged blend of Portland cement and hydrated lime containing no other ingredients.
- D. Masonry Cement: ASTM C 91/C 91M.
- E. Aggregate for Mortar: ASTM C 144.
 1. For joints less than 1/4-inch (6 mm) thick, use aggregate graded with 100 percent passing the No. 16 (1.18-mm) sieve.
 2. White-Mortar Aggregates: Natural white sand or crushed white stone.
- F. Ready-Mixed Mortar: Cementitious materials, water, and aggregate complying with requirements specified in the Article; combined with set-controlling admixtures to produce a ready-mixed mortar complying with ASTM C1142.
- G. Aggregate for Grout: ASTM C 404.
- H. Cold-Weather Admixture: Nonchloride, noncorrosive, accelerating admixture complying with ASTM C 494/C 494M, Type C, and recommended by manufacturer for use in masonry mortar of composition indicated.
- I. Water: Potable.

2.5 REINFORCEMENT

- A. Uncoated-Steel Reinforcing Bars: Reinforcing bars shall be ASTM A-615, Grade 60, lap minimum 40 bar diameters for #5 bars and smaller, lap minimum 52 bar diameters for bars larger than #5 unless noted otherwise.
- B. Masonry-Joint Reinforcement for Single-Wythe Masonry: Ladder or truss type with single pair of side rods. ASTM A-82, 9 ga, hot dipped galvanized per ASTM A-153 (1.5 oz per sf.), ladder type, equal to Dur-A-Wal.
- C. Masonry-Joint Reinforcement for Multiwythe Masonry:
 1. Ladder type with one side rod at each face shell of hollow masonry units more than 4 inches (100 mm) wide, plus one side rod at each wythe of masonry 4 inches (100 mm) wide or less.
 2. Adjustable (two-piece) type, either ladder or truss design, with one side rod at each face shell of backing wythe and with separate adjustable ties with pintle-and-eye connections having a maximum horizontal play of 1/16 inch (1.5 mm) and maximum vertical adjustment of 1-1/4 inches (32 mm). Size ties to extend at least halfway through facing wythe but with at least 5/8-inch (16-mm) cover on outside face. Ties have hooks or clips to engage a continuous horizontal wire in the facing wythe.

2.6 TIES AND ANCHORS

- A. General: Ties and anchors shall extend at least 1-1/2 inches (38 mm) into veneer but with at least a 5/8-inch (16-mm) cover on outside face.

- B. Materials: Provide ties and anchors specified in this article that are made from materials that comply with the following unless otherwise indicated:
 - 1. Hot-Dip Galvanized, Carbon-Steel Wire: ASTM A 82/A 82M, with ASTM A 153/A 153M, Class B-2 coating.
 - 2. Steel Sheet, Galvanized after Fabrication: ASTM A 1008/A 1008M, Commercial Steel, with ASTM A 153/A 153M, Class B coating.
 - 3. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.
- C. Individual Wire Ties: Rectangular units with closed ends and not less than 4 inches (100 mm) wide.
 - 1. Wire: Fabricate from 3/16-inch- (4.76-mm-) diameter, hot-dip galvanized-steel wire.
- D. Adjustable Anchors for Connecting to Structural Steel Framing: Provide anchors that allow vertical or horizontal adjustment but resist tension and compression forces perpendicular to plane of wall.
 - 1. Anchor Section for Welding to Steel Frame: Crimped 1/4-inch- (6.35-mm-) diameter, hot-dip galvanized-steel wire.
 - 2. Tie Section: Triangular-shaped wire tie made from 0.187-inch- (4.76-mm-) diameter, hot-dip galvanized-steel wire.
- E. Rigid Anchors: Fabricate from steel bars 1-1/2 inches (38 mm) wide by 1/4 inch (6.35 mm) thick by 24 inches (610 mm) long, with ends turned up 2 inches (51 mm) or with cross pins unless otherwise indicated.
 - 1. Corrosion Protection: Hot-dip galvanized to comply with ASTM A 153/A 153M Epoxy coating 0.020 inch (0.51 mm) thick.
- F. Adjustable Masonry-Veneer Anchors:
 - 1. General: Provide anchors that allow vertical adjustment but resist a 100-lbf (445-N) load in both tension and compression perpendicular to plane of wall without deforming or developing play in excess of 1/16 inch (1.5 mm).
 - 2. Fabricate sheet metal anchor sections and other sheet metal parts from 0.075-inch- (1.90-mm-) thick steel sheet, galvanized after fabrication.
 - 3. Fabricate wire ties from 0.187-inch- (4.76-mm-) diameter, hot-dip galvanized-steel wire unless otherwise indicated.
 - 4. Screw-Attached, Masonry-Veneer Anchors: Wire tie and a rib-stiffened, sheet metal anchor section.
 - 5. Screw-Attached, Masonry-Veneer Anchors: Wire tie and a gasketed sheet metal anchor section, with pronged legs of length to match thickness of insulation or sheathing and raised rib-stiffened strap to provide a slot for inserting wire tie.

2.7 EMBEDDED FLASHING MATERIALS

- A. Metal Flashing: Provide metal flashing complying with SMACNA's "Architectural Sheet Metal Manual" and as follows:
 - 1. Fabricate metal flashing from type 304 stainless steel: 7" x 1" upturned leg with 45 degree hemmed drip. Extend drip 3/4 inch out from wall.
 - 2. Fabricate metal sealant stops from stainless steel. Extend full width of flashing into wall and out to exterior face of wall. At exterior face of wall, bend metal back on itself for 3/4 inch (19 mm) and down into joint 1/4 inch (6 mm) to form a stop for retaining sealant backer rod.
 - 3. Fabricate metal expansion-joint strips from stainless steel to shapes indicated.
- B. Flexible Flashing: Use one of the following over stainless steel flashing unless otherwise indicated:

1. Copper-Laminated Flashing: 5-oz./sq. ft. (1.5-kg/sq. m) copper sheet bonded between two layers of glass-fiber cloth. Use only where flashing is fully concealed in masonry.
 - a. Products: Subject to compliance with requirements, provide one of the following:
 - 1) Advanced Building Products Inc.; Copper Fabric Flashing.
 - 2) Dayton Superior Corporation, Dur-O-Wal Division; Copper Fabric Thru-Wall Flashing.
 - 3) Hohmann & Barnard, Inc.; H & B C -Fab Flashing.
 - 4) York Manufacturing, Inc.; Multi-Flash 500.
2. Rubberized-Asphalt Flashing: Composite flashing product consisting of a pliable, adhesive rubberized-asphalt compound, bonded to a high-density, cross-laminated polyethylene film to produce an overall thickness of not less than 0.030 inch (0.76 mm). Use only where flashing is fully concealed in masonry.
 - a. Products: Subject to compliance with requirements, provide one of the following:
 - 1) Advanced Building Products Inc.; Peel-N-Seal.
 - 2) Carlisle Coatings & Waterproofing; CCW-705-TWF Thru-Wall Flashing.
 - 3) Dayton Superior Corporation, Dur-O-Wal Division; Dur-O-Barrier Thru-Wall Flashing.
 - 4) Grace Construction Products, W.R. Grace & Co. - Conn.; Perm-A-Barrier Wall Flashing.
 - 5) Heckmann Building Products Inc.; No. 82 Rubberized-Asphalt Thru-Wall Flashing.
 - 6) Hohmann & Barnard.; Textroflash.
 - 7) W.R. Meadows, Inc.; Air-Shield Thru-Wall Flashing.
 - 8) Williams Products, Inc.; Everlastsic MF-40.
- C. Adhesives, Primers, and Seam Tapes for Flashings: Flashing manufacturer's standard products or products recommended by flashing manufacturer for bonding flashing sheets to each other and to substrates.

2.8 MISCELLANEOUS MASONRY ACCESSORIES

- A. Compressible Filler: Premolded filler strips complying with ASTM D 1056, Grade 2A1; compressible up to 35 percent; of width and thickness indicated; formulated from neoprene or urethane.
- B. Preformed Control-Joint Gaskets: Made from styrene-butadiene-rubber compound, complying with ASTM D 2000, Designation M2AA-805 and designed to fit standard sash block and to maintain lateral stability in masonry wall; size and configuration as indicated.
- C. Bond-Breaker Strips: Asphalt-saturated felt complying with ASTM D 226/D 226M, Type I (No. 15 asphalt felt).
- D. Cavity Drainage Material: Free-draining mesh, made from polymer strands that will not degrade within the wall cavity.
 1. Configuration: Provide the following:
 - a. Strips, full depth of cavity and 10 inches (250 mm) high, with dovetail shaped notches 7 inches (175 mm) deep that prevent clogging with mortar droppings.

2.9 MASONRY CLEANERS

- A. Proprietary Acidic Cleaner: Manufacturer's standard-strength cleaner designed for removing mortar/grout stains, efflorescence, and other new construction stains from new masonry

without discoloring or damaging masonry surfaces. Use product expressly approved for intended use by cleaner manufacturer and manufacturer of masonry units being cleaned.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Diedrich Technologies, Inc.
 - b. EaCo Chem, Inc.
 - c. ProSoCo, Inc.

2.10 MORTAR AND GROUT MIXES

- A. General: Do not use admixtures, including pigments, air-entraining agents, accelerators, retarders, water-repellent agents, antifreeze compounds, or other admixtures unless otherwise indicated.
 1. Do not use calcium chloride in mortar or grout.
 2. Use portland cement-lime or masonry cement mortar unless otherwise indicated.
 3. For exterior masonry, use portland cement-lime or masonry cement mortar.
 4. For reinforced masonry, use portland cement-lime or masonry cement mortar.
 5. Add cold-weather admixture (if used) at same rate for all mortar that will be exposed to view, regardless of weather conditions, to ensure that mortar color is consistent.
- B. Preblended, Dry Mortar Mix: Furnish dry mortar ingredients in form of a preblended mix. Measure quantities by weight to ensure accurate proportions, and thoroughly blend ingredients before delivering to Project site.
- C. Mortar for Unit Masonry: Comply with ASTM C 270, Proportion Specification. Provide the following types of mortar for applications stated unless another type is indicated.
 1. For masonry below grade or in contact with earth, use Type M.
 2. For reinforced masonry, use Type S.
 3. For above-grade, load-bearing, use Type M or S.
 4. For above grade non-load-bearing partitions, Type N.
 5. For all exterior brick veneer use Type N.
- D. Grout for Unit Masonry: Comply with ASTM C 476.
 1. Proportion grout in accordance with ASTM C 476, paragraph 4.2.2 for specified 28-day compressive strength not less than 2000 psi, tested per ASTM C1019.
 2. Provide grout with a slump of 8 to 11 inches (200 to 280 mm) as measured according to ASTM C 143.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Use full-size units without cutting if possible. If cutting is required to provide a continuous pattern or to fit adjoining construction, cut units with motor-driven saws; provide clean, sharp, unchipped edges. Allow units to dry before laying unless wetting of units is specified. Install cut units with cut surfaces and, where possible, cut edges concealed.
- B. Select and arrange units for exposed unit masonry to produce a uniform blend of colors and textures. Mix units from several pallets or cubes as they are placed.
- C. Provide lintels at all openings larger than 8" wide, see schedule.

3.2 TOLERANCES

- A. Dimensions and Locations of Elements:

1. For dimensions in cross section or elevation, do not vary by more than plus 1/2 inch (12 mm) or minus 1/4 inch (6 mm).
2. For location of elements in plan, do not vary from that indicated by more than plus or minus 1/2 inch (12 mm).
3. For location of elements in elevation, do not vary from that indicated by more than plus or minus 1/4 inch (6 mm) in a story height or 1/2 inch (12 mm) total.

B. Lines and Levels:

1. For bed joints and top surfaces of bearing walls, do not vary from level by more than 1/4 inch in 10 feet (6 mm in 3 m), or 1/2-inch (12-mm) maximum.
2. For conspicuous horizontal lines, such as lintels, sills, parapets, and reveals, do not vary from level by more than 1/8 inch in 10 feet (3 mm in 3 m), 1/4 inch in 20 feet (6 mm in 6 m), or 1/2-inch (12-mm) maximum.
3. For vertical lines and surfaces, do not vary from plumb by more than 1/4 inch in 10 feet (6 mm in 3 m), 3/8 inch in 20 feet (9 mm in 6 m), or 1/2-inch (12-mm) maximum.
4. For conspicuous vertical lines, such as external corners, door jambs, reveals, and expansion and control joints, do not vary from plumb by more than 1/8 inch in 10 feet (3 mm in 3 m), 1/4 inch in 20 feet (6 mm in 6 m), or 1/2-inch (12-mm) maximum.
5. For lines and surfaces, do not vary from straight by more than 1/4 inch in 10 feet (6 mm in 3 m), 3/8 inch in 20 feet (9 mm in 6 m), or 1/2-inch (12-mm) maximum.

C. Joints:

1. For bed joints, do not vary from thickness indicated by more than plus or minus 1/8 inch (3 mm), with a maximum thickness limited to 1/2 inch (12 mm).
2. For head and collar joints, do not vary from thickness indicated by more than plus 3/8 inch (9 mm) or minus 1/4 inch (6 mm).
3. For exposed head joints, do not vary from thickness indicated by more than plus or minus 1/8 inch (3 mm).

3.3 LAYING MASONRY WALLS

- A. Lay out walls in advance for accurate spacing of surface bond patterns with uniform joint thicknesses and for accurate location of openings, movement-type joints, returns, and offsets. Avoid using less-than-half-size units, particularly at corners, jambs, and, where possible, at other locations.
- B. Bond Pattern for Exposed Masonry: Unless otherwise indicated, lay exposed masonry in running bond; do not use units with less-than-nominal 4-inch (100-mm) horizontal face dimensions at corners or jambs.
- C. Built-in Work: As construction progresses, build in items specified in this and other Sections. Fill in solidly with masonry around built-in items.
- D. CMU Control joints shall be "Michigan" type unless noted otherwise. Horizontal reinforcing shall be discontinuous at control joints.
- E. Fill space between steel frames and masonry solidly with mortar unless otherwise indicated.
- F. Fill cores in hollow CMUs with grout 24 inches (600 mm) under bearing plates, beams, lintels, posts, and similar items unless otherwise indicated.

3.4 MORTAR BEDDING AND JOINTING

- A. Lay hollow brick and CMUs as follows:
 1. Bed face shells in mortar and make head joints of depth equal to bed joints.
 2. Bed webs in mortar in all courses of piers, columns, and pilasters.
 3. Bed webs in mortar in grouted masonry, including starting course on footings.

4. Fully bed entire units, including areas under cells, at starting course on footings where cells are not grouted.
- B. Lay solid masonry units with completely filled bed and head joints; butter ends with sufficient mortar to fill head joints and shove into place. Do not deeply furrow bed joints or slush head joints.
- C. Tool exposed joints slightly concave when thumbprint hard, using a jointer larger than joint thickness unless otherwise indicated.
- D. Cut joints flush for masonry walls to receive plaster or other direct-applied finishes (other than paint) unless otherwise indicated.

3.5 MASONRY-JOINT REINFORCEMENT

- A. General: Install entire length of longitudinal side rods in mortar with a minimum cover of 5/8 inch (16 mm) on exterior side of walls, 1/2 inch (13 mm) elsewhere. Lap reinforcement a minimum of 6 inches (150 mm).
 1. Vertical wall reinforcing: Provide (1) #4 each side of masonry openings, control joints, and as shown, in grout filled cores.
 2. Horizontal wall reinforcing: Per ASTM A-82, 9 ga, hot dipped galvanized per ASTM A-153 (1.5 oz per sf.), ladder type, equal to Dur-A-Wal. Bed joints at 16" o.c. and at 1st and 2nd bed joints at bottom of wall, top of wall, above lintels and below sills. Reinforcing continuous except at vertical control joints. Side rods lapped a minimum of 6" at splices. Provide prefabricated corners and tees.
- B. Interrupt joint reinforcement at control and expansion joints unless otherwise indicated.
- C. Provide continuity at wall intersections by using prefabricated T-shaped units.
- D. Provide continuity at corners by using prefabricated L-shaped units.

3.6 ANCHORING MASONRY TO STRUCTURAL STEEL AND CONCRETE

- A. Anchor masonry to structural steel and concrete, where masonry abuts or faces structural steel or concrete, to comply with the following:
 1. Provide an open space not less than 1/2 inch (13 mm) 1 inch (25 mm) 2 inches (50 mm) wide between masonry and structural steel or concrete unless otherwise indicated. Keep open space free of mortar and other rigid materials.
 2. Anchor masonry with anchors embedded in masonry joints and attached to structure.
 3. Space anchors as indicated, but not more than 24 inches (610 mm) o.c. vertically and 36 inches (915 mm) o.c. horizontally.

3.7 FLASHING, WEEP HOLES, AND CAVITY VENTS

- A. General: Install embedded flashing and weep holes in masonry at lintels, other obstructions to downward flow of water in wall, and where indicated.
- B. Install flashing as follows unless otherwise indicated:
 1. Prepare masonry surfaces so they are smooth and free from projections that could puncture flashing. Where flashing is within mortar joint, place through-wall flashing on sloping bed of mortar and cover with mortar. Before covering with mortar, seal penetrations in flashing with adhesive, sealant, or tape as recommended by flashing manufacturer.
 2. At multiwythe masonry walls, including cavity walls, extend flashing through outer wythe, turned up a minimum of 8 inches (200 mm), and through inner wythe to within 1/2 inch (13 mm) of the interior face of wall in exposed masonry. Where interior face of

wall is to receive furring or framing, carry flashing completely through inner wythe and turn flashing up approximately 2 inches (50 mm) on interior face.

3. At lintels and shelf angles, extend flashing a minimum of 6 inches (150 mm) into masonry at each end. At heads and sills, extend flashing 6 inches (150 mm) at ends and turn up not less than 2 inches (50 mm) to form end dams.
 4. Install metal drip edges beneath flexible flashing at exterior face of wall. Stop flexible flashing 1/2 inch (13 mm) back from outside face of wall, and adhere flexible flashing to top of metal drip edge.
 5. Install metal flashing termination beneath flexible flashing at exterior face of wall. Stop flexible flashing 1/2 inch (13 mm) back from outside face of wall, and adhere flexible flashing to top of metal flashing termination.
- C. Install weep holes in exterior wythes and veneers in head joints of first course of masonry immediately above embedded flashing.
1. Use open head joints to form weep holes.
 2. Space weep holes 24 inches (600 mm) o.c. unless otherwise indicated.
- D. Place cavity drainage material in cavities to comply with configuration requirements for cavity drainage material in "Miscellaneous Masonry Accessories" Article.

3.8 REINFORCED UNIT MASONRY INSTALLATION

- A. Temporary Formwork and Shores: Construct formwork and shores as needed to support reinforced masonry elements during construction.
1. Construct formwork to provide shape, line, and dimensions of completed masonry as indicated. Make forms sufficiently tight to prevent leakage of mortar and grout. Brace, tie, and support forms to maintain position and shape during construction and curing of reinforced masonry.
 2. Do not remove forms and shores until reinforced masonry members have hardened sufficiently to carry their own weight and that of other loads that may be placed on them during construction.
- B. Placing Reinforcement: Comply with requirements in ACI 530.
1. Horizontal wall reinforcing: Bed joints at 16" o.c. and at 1st and 2nd bed joints at bottom of wall, top of wall, above lintels and below sills. Reinforcing continuous except at vertical control joints. Side rods lapped a minimum of 6" at splices. Provide prefabricated corners and tees.
 2. Vertical wall reinforcing: 1 - #4 each side of masonry openings, control joints and as shown, in grout filled block cores.
- C. Grouting: Do not place grout until entire height of masonry to be grouted has attained enough strength to resist grout pressure.
1. Comply with requirements in TMS 602/ACI 530.1/ASCE 6 for cleanouts and for grout placement, including minimum grout space and maximum pour height.
 2. Limit height of vertical grout pours to not more than 48 inches (1220 mm).
 3. Grouting shall be mechanically consolidated in place; consolidation by rodding is not acceptable.
 4. Provide completely grouted units:
 - a. Under cast-in-place concrete floor bearing.
 - b. Under steel joist or beam bearing.

3.9 FIELD QUALITY CONTROL

- A. Testing and Inspecting: The General Contractor will engage special inspectors to perform tests and inspections and prepare reports. Allow inspectors access to scaffolding and work

areas as needed to perform tests and inspections. Retesting of materials that fail to comply with specified requirements shall be done at Contractor's expense.

- B. Inspections: Level 1 special inspections according to the Michigan Building Code.
 - 1. Begin masonry construction only after inspectors have verified proportions of site-prepared mortar.
 - 2. Place grout only after inspectors have verified compliance of grout spaces and of grades, sizes, and locations of reinforcement.
 - 3. Place grout only after inspectors have verified proportions of site-prepared grout.
- C. Testing Prior to Construction: One set of tests.
- D. Testing Frequency: One set of tests for each 5000 sq. ft. (464 sq. m) of wall area or portion thereof.
- E. Clay Masonry Unit Test: For each type of unit provided, according to ASTM C 67 for compressive strength.
- F. Concrete Masonry Unit Test: For each type of unit provided, according to ASTM C 140 for compressive strength.
- G. Mortar Aggregate Ratio Test (Proportion Specification): For each mix provided, according to ASTM C 780.
- H. Mortar Test (Property Specification): For each mix provided, according to ASTM C 780. Test mortar for mortar air content and compressive strength.
- I. Grout Test (Compressive Strength): For each mix provided, according to ASTM C 1019.

3.10 CLEANING

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

3.11 MASONRY WASTE DISPOSAL

- A. Excess Masonry Waste: Remove excess clean masonry waste and legally dispose of off Owner's property.

END OF SECTION 042000

SECTION 053100 - STEEL DECKING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Roof Deck
 - 2. Noncomposite form deck.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of deck, accessory, and product indicated.
- B. Shop Drawings:
 - 1. Include layout and types of deck panels, anchorage details, reinforcing channels, pans, cut deck openings, special jointing, accessories, and attachments to other construction.

1.3 INFORMATIONAL SUBMITTALS

- A. Welding certificates.
- B. Product Certificates: For each type of steel deck.
- C. Evaluation reports.
- D. Field quality-control reports.

1.4 QUALITY ASSURANCE

- A. Testing Agency Qualifications: Qualified according to ASTM E 329 for testing indicated.
- B. Welding Qualifications: Qualify procedures and personnel according to AWS D1.3/D1.3M, "Structural Welding Code - Sheet Steel."

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Protect steel deck from corrosion, deformation, and other damage during delivery, storage, and handling.
- B. Stack steel deck on platforms or pallets and slope to provide drainage. Protect with a waterproof covering and ventilate to avoid condensation.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. AISI Specifications: Comply with calculated structural characteristics of steel deck according to AISI's "North American Specification for the Design of Cold-Formed Steel Structural Members."

2.2 ROOF DECK

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. ASC Profiles, Inc.; a Blue Scope Steel company.

2. Canam United States; Canam Group Inc.
3. CMC Joist & Deck.
4. Consolidated Systems, Inc.; Metal Dek Group.
5. Cordeck.
6. DACS, Inc.
7. Epic Metals Corporation.
8. Marlyn Steel Decks, Inc.
9. New Millenium Building Systems, LLC.
10. Nucor Corp.; Vulcraft Group.
11. Roof Deck, Inc.
12. Valley Joist; Subsidiary of EBSCO Industries, Inc.
13. Verco Manufacturing Co.
14. Wheeling Corrugating Company; Div. of Wheeling-Pittsburgh Steel Corporation.

B. Roof Deck: Fabricate panels, without top-flange stiffening grooves, to comply with "SDI Specifications and Commentary for Steel Roof Deck," in SDI Publication No. 31, and with the following:

1. Prime-Painted Steel Sheet: ASTM A 1008/A 1008M, Structural Steel (SS), Grade 33 (230) minimum, shop primed with manufacturer's standard baked-on, rust-inhibitive primer.
 - a. Color: Manufacturer's standard.
2. Deck Profile: Type WR, wide rib.
3. Profile Depth: 1-1/2 inches (38 mm).
4. Design Uncoated-Steel Thickness 0.0358 inch (0.91 mm).

2.3 NONCOMPOSITE FORM DECK

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. ASC Profiles, Inc.; a Blue Scope Steel company.
2. Canam United States; Canam Group Inc.
3. CMC Joist & Deck.
4. Consolidated Systems, Inc.; Metal Dek Group.
5. Cordeck.
6. DACS, Inc.
7. Marlyn Steel Decks, Inc.
8. New Millenium Building Systems, LLC.
9. Nucor Corp.; Vulcraft Group.
10. Roof Deck, Inc.
11. Valley Joist; Subsidiary of EBSCO Industries, Inc.
12. Verco Manufacturing Co.
13. Wheeling Corrugating Company; Div. of Wheeling-Pittsburgh Steel Corporation.

B. Noncomposite Form Deck: Fabricate ribbed-steel sheet noncomposite form-deck panels to comply with "SDI Specifications and Commentary for Noncomposite Steel Form Deck," in SDI Publication No. 31, with the minimum section properties indicated, and with the following:

1. Galvanized and Shop-Primed Steel Sheet: ASTM A 653/A 653M, Structural Steel (SS), Grade 50 (230), G60 (Z180) zinc coating; cleaned, pretreated, and primed with manufacturer's standard baked-on, rust-inhibitive primer.
 - a. Color: Manufacturer's standard.
2. Deck Profile; 1.5 C20.
3. Profile Depth: 1 1/2 inch (38 mm).
4. Design Uncoated-Steel Thickness: 0.0358 inch (0.91 mm).

5. Panel width: Nominal 36 inches.
6. Span Condition: Double span minimum.
7. Side Laps: Overlapped.

2.4 ACCESSORIES

- A. General: Provide manufacturer's standard accessory materials for deck that comply with requirements indicated.
- B. Mechanical Fasteners: Corrosion-resistant, low-velocity, power-actuated or pneumatically driven carbon-steel fasteners; or self-drilling, self-threading screws.
- C. Side-Lap Fasteners: Corrosion-resistant, hexagonal washer head; self-drilling, carbon-steel screws, No. 12 (5.6-mm) minimum diameter.
- D. Flexible Closure Strips: Vulcanized, closed-cell, synthetic rubber.
- E. Miscellaneous Sheet Metal Deck Accessories: Steel sheet, minimum yield strength of 33,000 psi (230 MPa), not less than 0.0359-inch (0.91-mm) design uncoated thickness, of same material and finish as deck; of profile indicated or required for application.
- F. Flat Sump Plates: Single-piece steel sheet, 0.0747 inch (1.90 mm) thick, of same material and finish as deck. For drains, cut holes in the field.
- G. Repair Paint: Manufacturer's standard rust-inhibitive primer of same color as primer.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Install deck panels and accessories according to applicable specifications and commentary in SDI Publication No. 31, manufacturer's written instructions, and requirements in this Section.
- B. Place deck panels flat and square and fasten to supporting frame without warp or deflection.
- C. Cut and neatly fit deck panels and accessories around openings and other work projecting through or adjacent to deck.
- D. Provide additional reinforcement and closure pieces at openings as required for strength, continuity of deck, and support of other work.
- E. Comply with AWS requirements and procedures for manual shielded metal arc welding, appearance and quality of welds, and methods used for correcting welding work.
- F. Mechanical fasteners may be used in lieu of welding to fasten deck. Locate mechanical fasteners and install according to deck manufacturer's written instructions.
- G. Roof Sump Pans and Sump Plates: Install over openings provided in roof deck and weld flanges to top of deck. Space welds not more than 12 inches (305 mm) apart with at least one weld at each corner.
 1. Install reinforcing channels or zees in ribs to span between supports and weld.
- H. Miscellaneous Roof-Deck Accessories: Install ridge and valley plates, finish strips, end closures, and reinforcing channels according to deck manufacturer's written instructions. Weld to substrate to provide a complete deck installation.

1. Weld cover plates at changes in direction of roof-deck panels unless otherwise indicated.

I. Sound-Absorbing Insulation: Roofing contractor will install insulation into topside ribs of deck as specified in Division 7 Section "Polyvinyl-Chloride (PVC) Roofing."

3.2 FIELD QUALITY CONTROL

A. The Construction Manager will engage a qualified testing agency to perform field tests and inspections, and to prepare written reports.

B. Field welds will be subject to inspection.

C. Prepare test and inspection reports.

3.3 PROTECTION

A. Repair Painting: Wire brush and clean rust spots, welds, and abraded areas on both surfaces of prime-painted deck immediately after installation and apply repair paint.

END OF SECTION 053100

SECTION 055000 - METAL FABRICATIONS

PART 1 - GENERAL

1.1 SUMMARY

- A. Products furnished, but not installed, under this Section include the following:
 - 1. Loose steel lintels.
 - 2. Miscellaneous plates and angles

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: Show fabrication of structural-steel components.

1.3 QUALITY ASSURANCE

- A. Fabricator Qualifications: A qualified fabricator that participates in the AISC Quality Certification Program and is designated an AISC-Certified Plant, Category STD.

PART 2 - PRODUCTS

2.1 STRUCTURAL- STEEL MATERIALS

- A. Steel Plates, Shapes, and Bars: ASTM A 36
- B. Wide Flange Shapes: ASTM A992

2.2 MISCELLANEOUS MATERIALS

- A. Galvanizing Repair Paint: High-zinc-dust-content paint complying with SSPC-Paint 20 and compatible with paints specified to be used over it.
- B. Steel Primer: Rust Inhibiting alkyd industrial primer, SSPC 6.
- C. Nonshrink, Nonmetallic Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C 1107/C 1107M. Provide grout specifically recommended by manufacturer for interior and exterior applications.

2.3 LOOSE STEEL LINTELS

- A. Fabricate loose steel lintels from steel angles and shapes of size indicated for openings and recesses in masonry walls and partitions at locations indicated.

2.4 STEEL AND IRON FINISHES

- A. Primed with Steel Primer, Minimum coating thickness of 1.5 mil except steel which is to receive sprayed-on fireproofing.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required for installing metal fabrications. Set metal fabrications accurately in location, alignment, and elevation;

with edges and surfaces level, plumb, true, and free of rack; and measured from established lines and levels.

- B. Provide temporary bracing or anchors in formwork for items that are to be built into concrete, masonry, or similar construction.

END OF SECTION 055000

SECTION 061053 - ROUGH CARPENTRY

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Framing with dimension lumber.
 - 2. Wood blocking and nailers.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of process and factory-fabricated product.
 - 1. Include data for wood-preservative treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements

1.3 INFORMATIONAL SUBMITTALS

- A. Material Certificates: For dimension lumber specified to comply with minimum allowable unit stresses. Indicate species and grade selected for each use and design values approved by the ALSC Board of Review.
- B. Evaluation Reports: For the following, from ICC-ES:
 - 1. Wood-preservative-treated wood.
 - 2. Power-driven fasteners.
 - 3. Metal framing anchors.

PART 2 - PRODUCTS

2.1 WOOD PRODUCTS, GENERAL

- A. Lumber: DOC PS 20 and applicable rules of grading agencies indicated. If no grading agency is indicated, comply with the applicable rules of any rules-writing agency certified by the ALSC Board of Review. Grade lumber by an agency certified by the ALSC Board of Review to inspect and grade lumber under the rules indicated.
 - 1. Factory mark each piece of lumber with grade stamp of grading agency.
 - 2. Dress lumber, S4S, unless otherwise indicated.
- B. Maximum Moisture Content of Lumber: 15 percent for 2-inch nominal (38-mm actual) thickness or less.

2.2 WOOD-PRESERVATIVE-TREATED MATERIAL

- A. Preservative Treatment by Pressure Process: AWWA U1; Use Category UC2 for interior construction and Category UC3b for exterior construction.
 - 1. Preservative Chemicals: Acceptable to authorities having jurisdiction and containing no arsenic or chromium.
- B. Kiln-dry lumber after treatment to a maximum moisture content of 19 percent. Do not use material that is warped or that does not comply with requirements for untreated material.
- C. Mark lumber with treatment quality mark of an inspection agency approved by the ALSC Board of Review.

- D. Application: Treat items indicated on Drawings, and the following:
 - 1. Wood, nailers, blocking, stripping, and similar members in connection with flashing.
 - 2. Wood sills, sleepers, blocking, furring, stripping, and similar concealed members in contact with masonry or concrete.

2.3 FIRE-RETARDANT-TREATED MATERIALS

- A. General: Where fire-retardant-treated materials are indicated, use materials complying with requirements in this article, that are acceptable to authorities having jurisdiction, and with fire-test-response characteristics specified as determined by testing identical products per test method indicated by a qualified testing agency.
- B. Fire-Retardant-Treated Lumber and Plywood by Pressure Process: Products with a flame spread index of 25 or less when tested according to ASTM E 84, and with no evidence of significant progressive combustion when the test is extended an additional 20 minutes, and with the flame front not extending more than 10.5 feet (3.2 m) beyond the centerline of the burners at any time during the test.
 - 1. Exterior Type: Treated materials shall comply with requirements specified above for fire-retardant-treated lumber and plywood by pressure process after being subjected to accelerated weathering according to ASTM D 2898. Use for exterior locations and where indicated.
 - 2. Interior Type A: Treated materials shall have a moisture content of 28 percent or less when tested according to ASTM D 3201 at 92 percent relative humidity. Use where exterior type is not indicated.
- C. Kiln-dry lumber and plywood after treatment to a maximum moisture content of 15 percent.
- D. Identify fire-retardant-treated wood with appropriate classification marking of qualified testing agency.
- E. Application: Treat items indicated on Drawings, and the following:
 - 1. Plywood backing panels.

2.4 DIMENSION LUMBER FRAMING

- A. Framing: No. 2 grade of any of the following species:
 - 1. Hem-fir (north); NLGA.
 - 2. Southern pine; SPIB.
 - 3. Douglas fir-larch; WCLIB or WWPA.
 - 4. Hem-fir; WCLIB or WWPA.

2.5 MISCELLANEOUS LUMBER

- A. General: Provide miscellaneous lumber indicated and lumber for support or attachment of other construction, including the following:
 - 1. Blocking.
 - 2. Nailers.
 - 3. Furring.
 - 4. Grounds.
- B. Dimension Lumber Items: Construction or No. 2 grade lumber of any species.
- C. Concealed Boards: 15 percent maximum moisture content and any of the following species and grades:
 - 1. Mixed southern pine or southern pine; No. 2 grade; SPIB.
 - 2. Eastern softwoods; No. 2 Common grade; NeLMA.

3. Northern species; No. 2 Common grade; NLGA.
4. Western woods; Construction or No. 2 Common grade; WCLIB or WWPA.

2.6 FASTENERS

- A. General: Fasteners shall be of size and type indicated and shall comply with requirements specified in this article for material and manufacture.
 1. Where rough carpentry is exposed to weather, in ground contact, pressure-preservative treated, or in area of high relative humidity, provide fasteners with hot-dip zinc coating complying with ASTM A 153/A 153M.
- B. Power-Driven Fasteners: Fastener systems with an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC70.

2.7 METAL FRAMING ANCHORS

- A. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:
 1. Cleveland Steel Specialty Co.
 2. KC Metals Products, Inc.
 3. Phoenix Metal Products, Inc.
 4. Simpson Strong-Tie Co., Inc.
 5. USP Structural Connectors.
- B. Allowable Design Loads: Provide products with allowable design loads, as published by manufacturer, that meet or exceed those of products of manufacturers listed. Manufacturer's published values shall be determined from empirical data or by rational engineering analysis and demonstrated by comprehensive testing performed by a qualified independent testing agency.
- C. Galvanized-Steel Sheet: Hot-dip, zinc-coated steel sheet complying with ASTM A 653/A 653M, G60 (Z180) coating designation.
 1. Use for interior locations unless otherwise indicated.
- D. Hot-Dip, Heavy-Galvanized Steel Sheet: ASTM A 653/A 653M; structural steel (SS), high-strength low-alloy steel Type A (HSLAS Type A), or high-strength low-alloy steel Type B (HSLAS Type B); G185 (Z550) coating designation; and not less than 0.036 inch (0.9 mm) thick.
 1. Use for wood-preservative-treated lumber and where indicated.

2.8 MISCELLANEOUS MATERIALS

- A. Flexible Flashing: Composite, self-adhesive, flashing product consisting of a pliable, rubberized-asphalt compound, bonded to a high-density polyethylene film, aluminum foil, or spunbonded polyolefin to produce an overall thickness of not less than 0.025 inch (0.6 mm).
- B. Adhesives for Gluing Furring and Sleepers to Concrete or Masonry: Formulation complying with ASTM D 3498 that is approved for use indicated by adhesive manufacturer.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Framing Standard: Comply with AF&PA's WCD 1, "Details for Conventional Wood Frame Construction," unless otherwise indicated.

- B. Set rough carpentry to required levels and lines, with members plumb, true to line, cut, and fitted. Fit rough carpentry accurately to other construction. Locate furring, nailers, blocking, grounds, and similar supports to comply with requirements for attaching other construction.
- C. Do not splice structural members between supports unless otherwise indicated.
- D. Comply with AWPA M4 for applying field treatment to cut surfaces of preservative-treated lumber.
- E. Metal Framing Anchors: Install metal framing anchors to comply with manufacturer's written instructions. Install fasteners through each fastener hole.
- F. Securely attach rough carpentry work to substrate by anchoring and fastening as indicated, complying with the following:
 - 1. Table 2304.9.1, "Fastening Schedule," in ICC's International Building Code (IBC).
 - 2. Table R602.3(1), "Fastener Schedule for Structural Members," and Table R602.3(2), "Alternate Attachments," in ICC's International Residential Code for One- and Two-Family Dwellings.
 - 3. ICC-ES evaluation report for fastener.

END OF SECTION 061000

SECTION 079200 - JOINT SEALANTS

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes joint sealants for the following applications, including those specified by reference to this Section and following applications:
1. Exterior joints in the following vertical surfaces and horizontal nontraffic surfaces:
 - a. Joints between different materials.
 - b. Perimeter joints between materials and frames of doors and louvers.
 - c. Other joints as indicated.
 2. Exterior joints in the following horizontal traffic surfaces:
 - a. Isolation and contraction joints in cast-in-place concrete slabs.
 - b. Other joints as indicated.
 3. Interior joints in the following vertical surfaces and horizontal nontraffic surfaces:
 - a. Tile control and expansion joints.
 - b. Vertical joints on exposed surfaces of interior ceramic tile and glazed concrete masonry walls.
 - c. Perimeter joints between interior wall surfaces and frames of interior doors and windows.
 - d. Joints between plumbing fixtures and adjoining walls, floors, and counters.
 - e. Other joints as indicated.
 4. Interior joints in the following horizontal traffic surfaces:
 - a. Isolation joints in cast-in-place concrete slabs.
 - b. Joints in tile flooring.
 - c. Other joints as indicated.

1.2 PERFORMANCE REQUIREMENTS

- A. Provide elastomeric joint sealants that establish and maintain watertight and airtight continuous joint seals without staining or deteriorating joint substrates.
- B. Provide joint sealants for interior applications that establish and maintain airtight and water-resistant continuous joint seals without staining or deteriorating joint substrates.

1.3 SUBMITTALS

- A. Product Data: For each joint-sealant product indicated.
- B. Samples: For each type and color of joint sealant required, provide Samples with joint sealants in 1/2-inch- (13-mm-) wide joints formed between two 6-inch- (150-mm-) long strips of material matching the appearance of exposed surfaces adjacent to joint sealants.

1.4 QUALITY ASSURANCE

- A. Preconstruction Field-Adhesion Testing: Before installing elastomeric sealants, field test their adhesion to Project joint substrates according to the method in ASTM C 1193 that is appropriate for the types of Project joints.

1.5 WARRANTY

- A. Special Installer's Warranty: Installer's standard form in which Installer agrees to repair or replace elastomeric joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.
1. Warranty Period: Two years from date of Substantial Completion.

- B. Special Manufacturer's Warranty: Manufacturer's standard form in which elastomeric sealant manufacturer agrees to furnish elastomeric joint sealants to repair or replace those that do not comply with performance and other requirements specified in this Section within specified warranty period.
 - 1. Warranty Period: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Products: Subject to compliance with requirements, provide one of the products listed in other Part 2 articles.

2.2 MATERIALS, GENERAL

- A. Compatibility: Provide joint sealants, backings, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by sealant manufacturer, based on testing and field experience.
- B. Colors of Exposed Joint Sealants: As selected by Architect from manufacturer's full range.

2.3 ELASTOMERIC JOINT SEALANTS

- A. Elastomeric Sealants: Comply with ASTM C 920 and other requirements indicated for each liquid-applied chemically curing sealant specified, including those referencing ASTM C 920 classifications for type, grade, class, and uses related to exposure and joint substrates.
- B. Stain-Test-Response Characteristics: Where elastomeric sealants are specified to be nonstaining to porous substrates, provide products that have undergone testing according to ASTM C 1248 and have not stained porous joint substrates indicated for Project.
- C. Suitability for Immersion in Liquids. Where elastomeric sealants are indicated for Use I for joints that will be continuously immersed in liquids, provide products that have undergone testing according to ASTM C 1247 and qualify for the length of exposure indicated by reference to ASTM C 920 for Class 1 or 2. Liquid used for testing sealants is deionized water, unless otherwise indicated.
- D. Low-Modulus Neutral -Curing Polyurethane Sealant: Where joint sealants of this type are indicated, provide products complying with the following:
 - 1. Available Products:
 - a. Pecora Corporation; Dynatrol I-XL.
 - b. Tremco; DyMonic.
 - c. Tremco; Vulkem 921.
 - 2. Type and Grade: S (single component) and NS (nonsag).
 - 3. Class: 25.
 - 4. Use Related to Exposure: NT (nontraffic).
 - 5. Uses Related to Joint Substrates: M, G, A, and, as applicable to joint substrates indicated, O.
 - a. Coated glass, aluminum coated with a high-performance coating, color anodic aluminum, galvanized steel, brick, limestone, marble, granite, plastic, tile, wood.
- E. Single-Component Mildew-Resistant Acid-Curing Silicone Sealant: Where joint sealants of this type are indicated, provide products formulated with fungicide that are intended for sealing interior ceramic tile joints and other nonporous substrates that are subject to in-service exposures of high humidity and temperature extremes, and that comply with the following:

1. Available Products:
 - a. Dow Corning Corporation; 786 Mildew Resistant.
 - b. GE Silicones; Sanitary SCS1700.
 - c. Tremco; Tremsil 200 White.
 2. Type and Grade: S (single component) and NS (nonsag).
 3. Class: 25.
 4. Use Related to Exposure: NT (nontraffic).
 5. Uses Related to Joint Substrates: G, A, and, as applicable to joint substrates indicated,
 - a. Coated glass, aluminum coated with a high-performance coating, color anodic aluminum, galvanized steel, marble, granite, plastic and tile.
- F. Single-Component Pourable Urethane Sealant: Where joint sealants of this type are indicated, provide products complying with the following:
1. Available Products:
 - a. Pecora Corporation; Urexpan NR-201.
 - b. Polymeric Systems Inc.; Flexiprene 952.
 - c. Tremco; Tremflex S/L.
 - d. Tremco; Vulkem 45.
 - e. Sonneborn Building Products, Div., ChemRex Inc.; SL 1.
 2. Type and Grade: S (single component) and P (pourable).
 3. Class: 25.
 4. Use Related to Exposure: T (traffic) and NT (nontraffic).
 5. Uses Related to Joint Substrates: M, A, and, as applicable to joint substrates indicated,
 - a. Color anodic aluminum, aluminum coated with a high-performance coating, galvanized steel, brick, granite, marble, ceramic tile and wood.

2.4 JOINT-SEALANT BACKING

- A. General: Provide sealant backings of material and type that are nonstaining; are compatible with joint substrates, sealants, primers, and other joint fillers; and are approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.
- B. Cylindrical Sealant Backings: ASTM C 1330, Type C (closed-cell material with a surface skin), O (open-cell material), B (bicellular material with a surface skin) or any of the preceding types, as approved in writing by joint-sealant manufacturer for joint application indicated, and of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance:
- C. Elastomeric Tubing Sealant Backings: Neoprene, butyl, EPDM, or silicone tubing complying with ASTM D 1056, nonabsorbent to water and gas, and capable of remaining resilient at temperatures down to minus 26 deg F (minus 32 deg C). Provide products with low compression set and of size and shape to provide a secondary seal, to control sealant depth, and to otherwise contribute to optimum sealant performance.
- D. Bond-Breaker Tape: Polyethylene tape or other plastic tape recommended by sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint-filler materials or joint surfaces at back of joint where such adhesion would result in sealant failure. Provide self-adhesive tape where applicable.

2.5 MISCELLANEOUS MATERIALS

- A. Primer: Material recommended by joint-sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint-sealant-substrate tests and field tests.

- B. Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials, free of oily residues or other substances capable of staining or harming joint substrates and adjacent nonporous surfaces in any way, and formulated to promote optimum adhesion of sealants to joint substrates.
- C. Masking Tape: Nonstaining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants.
 - 1. Remove all foreign material from joint substrates that could interfere with adhesion of joint sealant.
 - a. Clean porous joint substrate surfaces by brushing, grinding, blast cleaning, mechanical abrading, or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealants. Remove loose particles remaining after cleaning operations above by vacuuming or blowing out joints with oil-free compressed air.
 - 2. Remove laitance and form-release agents from concrete.
 - a. Clean nonporous surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants.
- B. Joint Priming: Prime joint substrates, where recommended in writing by joint-sealant manufacturer, based on preconstruction joint-sealant-substrate tests or prior experience. Apply primer to comply with joint-sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.
- C. Masking Tape: Use masking tape where required to prevent contact of sealant with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

3.2 INSTALLATION

- A. General: All dissimilar materials are to be caulked.
- B. Sealant Installation Standard: Comply with recommendations in ASTM C 1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.
- C. Install sealant backings of type indicated to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.
 - 1. Do not leave gaps between ends of sealant backings.
 - 2. Do not stretch, twist, puncture, or tear sealant backings.
 - 3. Remove absorbent sealant backings that have become wet before sealant application and replace them with dry materials.
- D. Install bond-breaker tape behind sealants where sealant backings are not used between sealants and backs of joints.
- E. Install sealants using proven techniques that comply with the following and at the same time backings are installed:
 - 1. Place sealants so they directly contact and fully wet joint substrates.

2. Completely fill recesses in each joint configuration.
 3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.
- F. Tooling of Nonsag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants according to requirements specified below to form smooth, uniform beads of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint.
1. Remove excess sealant from surfaces adjacent to joints.
 2. Use tooling agents that are approved in writing by sealant manufacturer and that do not discolor sealants or adjacent surfaces.
 3. Provide concave joint configuration per Figure 5A in ASTM C 1193, unless otherwise indicated.
- G. Clean off excess sealant or sealant smears adjacent to joints as the Work progresses by methods and with cleaning materials approved in writing by manufacturers of joint sealants and of products in which joints occur.

3.3 JOINT-SEALANT SCHEDULE

- A. Joint-Sealant Application: contraction joints in cast-in-place concrete slabs.
1. Joint Sealant: Single-component pourable urethane sealant.
 2. Joint-Sealant Color: As selected by Architect from Manufacturers full color range.
- B. Joint-Sealant Application: Exterior vertical and horizontal joints between different materials.
1. Joint Sealant: Low- Modulus Neutral-Curing Polyurethane Sealant.
 2. Joint-Sealant Color: As selected by Architect from Manufacturers full color range.
- C. Joint-Sealant Application: Exterior perimeter joints between materials and frames of doors and louvers.
1. Joint Sealant: Low- Modulus Neutral-Curing Polyurethane Sealant.
 2. Joint-Sealant Color: As selected by Architect from Manufacturers full color range.
- D. Joint-Sealant Application: Interior perimeter joints of exterior openings.
1. Joint Sealant: Low-Modulus Neutral-Curing Polyurethane Sealant.
 2. Joint-Sealant Color: As selected by Architect from Manufacturers full color range.
- E. Joint-Sealant Application: Vertical interior joints in ceramic tile or glazed CMU walls, where non-porous surface wraps into joint.
1. Joint Sealant: Single-component mildew-resistant acid-curing silicone sealant.
 2. Joint Sealant Color: As selected by Architect from Manufacturers full color range to match mortar or grout color of walls.
- F. Joint-Sealant Application: Vertical interior control / expansion joints joints in glazed CMU walls, where non-porous surface is face shell only, and porous concrete masonry or poured concrete are the primary bonding surfaces.
1. Joint Sealant: Dow Corning 790 Single-component neutral curing silicone sealant.
 2. Joint Sealant Color: As selected by Architect from Manufacturers full color range to match mortar or grout color of walls.
 3. Joint Sealant Primer: Dow Corning 1200 OS primer: where sealant ajoins non-porous substrates, or where recommended by sealant manufacturer.

END OF SECTION 079200

SECTION 092216 - NON-STRUCTURAL METAL FRAMING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Suspension systems for interior gypsum ceilings.

1.2 SUBMITTALS

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

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Fire-Test-Response Characteristics: Provide materials and construction identical to those tested according to ASTM E 119.
- B. Deflection limits: maximum deflection of 1/360 of distance between supports.

2.2 SUSPENSION SYSTEMS

- A. Tie Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 0.062-inch- (1.59-mm-) diameter wire, or double strand of 0.048-inch- (1.21-mm-) diameter wire.
- B. Hanger Attachments to Concrete:
 - 1. Anchors: Capable of sustaining a load equal to 5 times that imposed as determined by ASTM E 488.
 - a. Type: Post-installed, chemical anchor or post-installed, expansion anchor.
 - 2. Powder-Actuated Fasteners: Capable of sustaining, a load equal to 10 times that imposed as determined by ASTM E 1190.
- C. Wire Hangers: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 0.16 inch (4.12 mm) in diameter.
- D. Carrying Channels: Cold-rolled, commercial-steel sheet with a base-metal thickness of 0.053 inch (1.34 mm) and minimum 1/2-inch- (13-mm-) wide flanges.
 - 1. Depth: 2 inches (51 mm).
- E. Furring Channels (Furring Members):
 - 1. Cold-Rolled Channels: 0.053-inch (1.34-mm) uncoated-steel thickness, with minimum 1/2-inch (13 mm) wide flanges, 3/4 inch (19 mm) deep.
 - 2. Steel Studs and Runners: ASTM C 645. Use either steel studs and runners or dimpled steel studs and runners of equivalent minimum base-metal thickness.
 - a. Minimum Base-Metal Thickness: 0.018 inch (0.45 mm).
 - b. Depth: 2-1/2 inches (64 mm).
 - 3. Hat-Shaped, Rigid Furring Channels: ASTM C 645, 7/8 inch (22 mm) deep.
 - a. Minimum Base-Metal Thickness: 0.033 inch (0.84 mm).
 - 4. Resilient Furring Channels: 1/2-inch- (13-mm-) deep members designed to reduce sound transmission.
 - a. Configuration: Asymmetrical.
- F. Manufactured Suspension Systems:
 - 1. At Contractor's option manufactured drywall suspension systems may be used in lieu of site fabricated suspension systems.

2. Manufacturer: Subject to compliance with requirements, provide USG Drywall Suspension System, or a comparable product by one of the following:
 - a. Armstrong.
 - b. Certainteed.

2.3 AUXILIARY MATERIALS

- A. Fasteners for Metal Framing: Of type, material, size, corrosion resistance, holding power, and other properties required to fasten steel members to substrates.
- B. Isolation Strip at Exterior Walls: Provide asphalt saturated organic felt.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Installation Standard: ASTM C 754.
 1. Gypsum Board Assemblies: Also comply with requirements in ASTM C 840 that apply to framing installation.
- B. Install supplementary framing, and blocking as required.
- C. Install bracing at terminations in assemblies.

3.2 INSTALLING SUSPENSION SYSTEMS

- A. Coordinate with work of other trades, including mechanical and electrical. Installation of conduit and ductwork above suspension system shall be complete before installation of suspension system.
- B. Install suspension system components not greater than spacings required by referenced installation standards for assembly types.
- C. Isolate suspension systems from building structure where they abut or are penetrated by building structure to prevent transfer of loading imposed by structural movement.
- D. Suspend hangers from building structure as follows:
 1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structural or suspension system.
 - a. Splay hangers only where required to miss obstructions and offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.
 2. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with locations of hangers, install supplemental suspension members and hangers in the form of trapezes or equivalent devices.
 3. Wire Hangers: Secure by looping and wire tying, either directly to structures or to inserts, eye screws, or other devices and fasteners that are secure and appropriate for substrate, and in a manner that will not cause hangers to deteriorate or otherwise fail.
 4. Do not attach hangers to steel roof deck.
 5. Do not connect or suspend steel framing from ducts, pipes, or conduit.
- E. Fire-Resistance-Rated Assemblies: Wire tie furring channels to supports.
- F. Installation Tolerances: Install suspension systems that are level to within 1/8 inch in 12 feet (3 mm in 3.6 m) measured lengthwise on each member that will receive finishes and transversely between parallel members that will receive finishes.

END OF SECTION 092216

SECTION 092900 - GYPSUM BOARD

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Interior gypsum board.

1.2 ACTION SUBMITTALS

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

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Fire-Resistance-Rated Assemblies: For fire-resistance-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E 119 by an independent testing agency.
- B. Low Emitting Materials: For ceiling and wall assemblies, provide materials and construction identical to those tested in assembly and complying with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

2.2 INTERIOR GYPSUM BOARD

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. USG Corporation.
 - 2. National Gypsum Company.
 - 3. American Gypsum.
 - 4. CertainTeed Corp.
 - 5. Georgia-Pacific Gypsum LLC.
 - 6. Lafarge North America Inc.
- B. Mold Resistant Gypsum Board: ASTM C 1396/C 1396M with moisture and mold resistant core and paper surfaces.
 - 1. Thickness: 5/8 inch (15.9 mm) type x.
 - 2. Long Edges: Tapered.
 - 3. Mold Resistance: ASTM D3273, Score of 10 as rated according to ASTM D3274.

2.3 TRIM ACCESSORIES

- A. Interior Trim: ASTM C 1047.
 - 1. Material: Galvanized or aluminum-coated steel sheet, rolled zinc, plastic, or paper-faced galvanized steel sheet.
- B. Aluminum Trim: ASTM B 221 (ASTM B 221M), Alloy 6063-T5.

2.4 JOINT TREATMENT MATERIALS

- A. General: Comply with ASTM C 475/C 475M.

- B. Joint Tape:
 - 1. Interior Gypsum Board: Paper.
- C. Joint Compound for Interior Gypsum Board: For each coat use formulation that is compatible with other compounds applied on previous or for successive coats.
 - 1. Prefilling: At open joints, rounded or beveled panel edges, and damaged surface areas, use setting-type taping compound.
 - 2. Embedding and First Coat: For embedding tape and first coat on joints, fasteners, and trim flanges, use drying-type, all-purpose compound.
 - 3. Fill Coat: For second coat, use drying-type, all-purpose compound.
 - 4. Finish Coat: For third coat, use drying-type, all-purpose compound.
 - 5. Skim Coat: For final coat of Level 5 finish, use drying-type, all-purpose compound or high-build interior coating product designed for application by airless sprayer and to be used instead of skim coat to produce Level 5 finish.

2.5 AUXILIARY MATERIALS

- A. General: Provide auxiliary materials that comply with referenced installation standards and manufacturer's written recommendations.
- B. Laminating Adhesive: Adhesive or joint compound recommended for directly adhering gypsum panels to continuous substrate.
 - 1. Laminating adhesive shall have a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
 - 2. Durabond 90 or equal.
- C. Steel Drill Screws: ASTM C 1002, unless otherwise indicated.

PART 3 - EXECUTION

3.1 APPLYING AND FINISHING PANELS

- A. Comply with ASTM C 840.
- B. Examine panels before installation. Reject panels that are wet, moisture damaged, and mold damaged.
- C. Fasten panels to studs / framing with manufacturer approved fasteners at recommended spacing.
- D. Isolate perimeter of gypsum board applied to non-load-bearing partitions at structural abutments, except floors. Provide 1/4- to 1/2-inch- (6.4- to 12.7-mm-) wide spaces at these locations and trim edges with edge trim where edges of panels are exposed. Seal joints between edges and abutting structural surfaces with acoustical sealant.
- E. Install trim with back flanges intended for fasteners, attach to framing with same fasteners used for panels. Otherwise, attach trim according to manufacturer's written instructions.
 - 1. Aluminum Trim: Install in locations indicated on Drawings.
 - 2. Control Joints: Install control joints according to ASTM C 840 and in specific locations approved by Architect for visual effect.
- F. Prefill open joints, rounded or beveled edges, and damaged surface areas.
- G. Apply joint tape over gypsum board joints, except for trim products specifically indicated as not intended to receive tape.
- H. Gypsum Board Finish Levels: Finish panels to levels indicated below and according to ASTM C 840:

1. Level 1: Ceiling plenum areas, concealed areas, and where indicated.
2. Level 5: At panel surfaces that will be exposed to view unless otherwise indicated.
 - a. Primer and its application to surfaces are specified in other Division 09 Sections.
- I. Protect adjacent surfaces from drywall compound and texture finishes and promptly remove from floors and other non-drywall surfaces. Repair surfaces stained, marred, or otherwise damaged during drywall application.
- J. Remove and replace panels that are wet, moisture damaged, and mold damaged.

END OF SECTION 092900

SECTION 099123 - INTERIOR PAINTING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes surface preparation and the application of paint systems on the following interior substrates:
 - 1. Concrete masonry units (CMU).
 - 2. Steel.
 - 3. Gypsum board.
- B. Refer to Division 9 Section "High Performance Coatings" for painting of embedded steel lintels.

1.2 DEFINITIONS

- A. Gloss Level 1: Not more than 5 units at 60 degrees and 10 units at 85 degrees, according to ASTM D 523.
- B. Gloss Level 2: Not more than 10 units at 60 degrees and 10 to 35 units at 85 degrees, according to ASTM D 523.
- C. Gloss Level 3: 10 to 25 units at 60 degrees and 10 to 35 units at 85 degrees, according to ASTM D 523.
- D. Gloss Level 4: 20 to 35 units at 60 degrees and not less than 35 units at 85 degrees, according to ASTM D 523.
- E. Gloss Level 5: 35 to 70 units at 60 degrees, according to ASTM D 523.
- F. Gloss Level 6: 70 to 85 units at 60 degrees, according to ASTM D 523.
- G. Gloss Level 7: More than 85 units at 60 degrees, according to ASTM D 523.

1.3 SUBMITTALS

- A. Product Data: For each type of product. Include preparation requirements and application instructions.
- B. Samples: Paint drawdown cards for each color and type of topcoat.

PART 2 - PRODUCTS

2.1 PAINT, GENERAL

- A. MPI Standards: Provide products that comply with MPI standards indicated and that are listed in its "MPI Approved Products List."
- B. Material Compatibility:
 - 1. Provide materials for use within each paint system that are compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
 - 2. For each coat in a paint system, provide products recommended in writing by manufacturers of topcoat for use in paint system and on substrate indicated.

- C. VOC Content: Products shall comply with VOC limits of authorities having jurisdiction.
 - 1. Flat Paints and Coatings: 50 g/L.
 - 2. Nonflat Paints and Coatings: 150 g/L.
 - 3. Dry-Fog Coatings: 400 g/L.
 - 4. Primers, Sealers, and Undercoaters: 200 g/L.
 - 5. Anticorrosive and Antirust Paints Applied to Ferrous Metals: 250 g/L.
 - 6. Zinc-Rich Industrial Maintenance Primers: 340 g/L.
 - 7. Pretreatment Wash Primers: 420 g/L.
 - 8. Floor Coatings: 100 g/L.
 - 9. Shellacs, Clear: 730 g/L.
 - 10. Shellacs, Pigmented: 550 g/L.

2.2 PRIMERS/SEALERS

- A. Primer Sealer, Latex, Interior: MPI #50.
- B. Primer, Latex, for Interior Wood: MPI #39.
- C. Primer, Block Filler, Latex, interior, MPI #4

2.3 METAL PRIMERS

- A. Primer, Alkyd, Anti-Corrosive, for Metal: MPI #79.
- B. Primer, Alkyd, Quick Dry, for Metal: MPI #76.
- C. Primer, Galvanized, Water Based: MPI #134.

2.4 WATER-BASED PAINTS

- A. Latex, Interior: MPI #43.
- B. Latex, Interior: MPI #54.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.
- B. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:
 - 1. Concrete: 12 percent.
 - 2. Masonry (Clay and CMU): 12 percent.
 - 3. Wood: 15 percent.
 - 4. Gypsum Board: 12 percent.
 - 5. Plaster: 12 percent.
- C. Verify suitability of substrates, including surface conditions and compatibility with existing finishes and primers.
- D. Proceed with coating application only after unsatisfactory conditions have been corrected.
 - 1. Application of coating indicates acceptance of surfaces and conditions.

3.2 PREPARATION

- A. Comply with manufacturer's written instructions and recommendations in "MPI Manual" applicable to substrates indicated.
- B. Remove hardware, covers, plates, and similar items already in place that are removable and are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.
 - 1. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection if any.
- C. Clean substrates of substances that could impair bond of paints, including dust, dirt, oil, grease, and incompatible paints and encapsulants.
 - 1. Remove incompatible primers and reprime substrate with compatible primers or apply tie coat as required to produce paint systems indicated.

3.3 APPLICATION

- A. Apply primers and paints according to manufacturer's written instructions and to recommendations in "MPI Manual."
- B. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.

3.4 CLEANING AND PROTECTION

- A. Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.
- B. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

3.5 INTERIOR PAINTING SCHEDULE

- A. Steel Substrates:
 - 1. Quick-Drying Enamel System:
 - a. Prime Coat: Primer, alkyd, anti-corrosive, for metal, MPI #79 or primer, alkyd, quick dry, for metal, MPI #76.
 - b. Intermediate Coat: Alkyd, quick dry, matching topcoat.
 - c. Topcoat: Alkyd, quick dry, semi-gloss (Gloss Level 5), MPI #81.
- B. Gypsum Board Substrates:
 - 1. Latex System:
 - a. Prime Coat: Primer sealer, latex, interior, MPI #50.
 - b. Intermediate Coat: Latex, interior, matching topcoat.
 - c. Topcoat: Latex, interior, (Gloss Level 5), MPI #43.

3.6 PAINT COLOR SCHEDULE

- A. P-1 Sherwin Williams SW7005 Pure White
 - 1. Location: New Gypsum Board and existing plaster at ceilings.

END OF SECTION 099123

BAY CITY CENTRAL FITNESS CENTER UPGRADES

INDEX OF SPECIFICATION SECTIONS

SECTION	TITLE
Division 23 - Heating, Ventilating and Air Conditioning	
23 05 00	HVAC Requirements
23 05 53	HVAC Identification
23 05 93	Testing, Adjusting and Balancing
23 07 13	External Duct Insulation
23 07 14	Internal Acoustical Duct Lining
23 25 00	HVAC Systems Testing, Cleaning, Water Treatment and Startup
23 30 00	Air Distribution
23 80 00	Temperature Control System
Division 26 - Electrical	
26 00 00	Basic Electrical Requirements
26 05 00	Common Work Results for Electrical
26 05 05	Selective Demolition for Electrical
26 05 19	Low-Voltage Electrical Power Conductors and Cables
26 05 26	Grounding and Bonding for Electrical Systems
26 05 29	Hangers and Supports for Electrical Systems
26 05 33.13	Conduit for Electrical Systems
26 05 33.16	Boxes for Electrical Systems
26 05 53	Identification for Electrical Systems
26 05 83	Wiring Connections
26 09 23	Lighting Control Devices
26 24 16	Panelboards
26 27 26	Wiring Devices
26 51 00	Interior Lighting
Division 28 - Electronic Safety & Security	
28 46 13	Fire Alarm System

MAI: 2024-1524

SECTION 23 05 00

HVAC REQUIREMENTS

PART 1 GENERAL

1.1 RELATED SPECIFICATIONS AND DOCUMENTS

- A. Drawings and related specifications for this project including General and Supplementary Conditions, Division 1, General Requirements, Instructions to Bidders, Addenda's, etc. apply to and are considered a part of Division 23 - Mechanical Work.
- B. Information in this division is intended to clarify or make additions to the requirements set forth in the General Conditions, Supplementary Conditions, and Division I of these specifications. Any conflict between this Division 23 and other sections or divisions of the specifications or drawings shall be brought to the attention of the Architect/Engineer in writing as a request for addendum prior to the bid opening.
- C. Furnish all equipment, materials, articles, items, operations or methods listed, mentioned or scheduled on drawings, these specifications, manufacturer's installation instructions and include all labor, materials, equipment and incidentals necessary for their complete installation and operation.
- D. All information contained in this section applies to all sections within Division 23 as if it was part of each section.

1.2 DRAWINGS AND SPECIFICATIONS

- A. The drawings and these specifications are intended to supplement each other and any material or labor called for in one shall be furnished even if not specifically mentioned in both. Any material or labor which is neither shown on the drawings nor listed in this specification, but is normally incurred or required for completion of work shall be furnished. If there is a discrepancy between the drawings and specifications, the more stringent of the two shall be followed.
- B. Drawings are diagrammatic and are intended to show approximate location and general arrangement of systems and equipment. No attempt has been made to show every ell, tee, etc. Drawings shall not be scaled for location of systems, equipment, etc. All dimensions whether given on drawings or scaled shall be verified in field and coordinated with all other trades and existing field conditions. Some ductwork, piping, equipment, etc. locations may require changes in location due to field conditions and coordination with other trades will be made with no additional cost to the Owner. Failure to check will be no reason for additional compensation.
- C. These drawings and the associated specifications are intended to provide complete furnishing, installation and operational HVAC systems as specified. If these drawings and associated specifications have information omitted that would not allow a completely operational system as is the intent of the Engineer, the bidder shall notify the Engineer a minimum one week prior to the bid date to allow for addenda. Once bids have been received, the Contractor shall be responsible for material, labor, etc., to furnish and install a completely operational

mechanical system as is the intent of these drawings and associated specification.

- D. The installation of all systems, equipment, etc., is subject to clarification with submitted shop drawings and field coordination requirements. Equipment outlines shown on drawings or dimensioned on drawings are limiting dimensions. Any equipment that reduces the indicated clearances or exceeds specified or scheduled equipment dimensions shall not be used.
- E. The Architect/Engineer and Owner reserve the right to make minor changes in the location of equipment, piping, ductwork, etc. at the time of rough-in without additional cost to the Owner.
- F. The Mechanical Trades Contractor shall have completed for his portion of work, at least one installation of size and type comparable to this project and has been in satisfactory operation for at least two complete years. The Mechanical Trades Contractor shall also have a developed service department capable of negotiating service contracts with the Owner for systems herein specified.

1.3 AUTOCAD BACKGROUND FILES

- A. The Contractor shall include in their bid any cost for requesting AutoCAD backgrounds for their use from the Architect or Engineer. The cost will be \$150.00 for the first plan, and \$50.00 for each additional plan that may be requested for AutoCAD use. A waiver of responsibility for the Architect and Engineer related to Contractor use of the CAD files shall be signed by the Contractor.

1.4 MANUFACTURER'S SPECIFICATIONS AND CAPACITIES

- A. Some equipment, materials, etc. that are scheduled on the drawings or listed in any addenda may not be specified in this specification. The manufacturer's specification and capacities shall be considered included and part of this specification whether it is specified in this specification or noted or scheduled on the drawings. The contractor shall remove and replace any "substituted" equipment or material that has been installed or is on site, which in the opinion of the Architect/Engineer does not meet the scheduled equipment or materials manufacturer's capacities or specification at no additional cost to the Owner.

1.5 DEFINITIONS

- A. Finished Spaces: Spaces other than mechanical and electrical equipment rooms, furred spaces, pipe and duct shafts, unheated spaces immediately below roof, spaces above ceilings, unexcavated spaces, crawlspaces, and tunnels.
- B. Exposed, Interior Installations: Exposed to view indoors. Examples include finished occupied spaces and mechanical equipment rooms.
- C. Exposed, Exterior Installations: Exposed to view outdoors or subject to outdoor ambient temperatures and weather conditions. Examples include rooftop locations.

- D. Concealed, Interior Installations: Concealed from view and protected from physical contact by building occupants. Examples include above ceilings and in duct shafts.
- E. Concealed, Exterior Installations: Concealed from view and protected from weather conditions and physical contact by building occupants but subject to outdoor ambient temperatures. Examples include installations within unheated shelters.

1.6 LOCAL CONDITIONS

- A. Before submitting proposals, each contractor shall examine these specifications and associated drawings, addenda, etc. and shall examine the site of the project. The bidder shall fully investigate the site of this project, investigate coordination of his work with all other trades and existing conditions and completely satisfy himself as to the conditions to which the work is to be performed before submitting his/her bid. No allowances or considerations will be given at a later date for alleged misunderstanding as to the requirements of the work, materials to be furnished, or conditions required by the nature of this project site and coordination by the neglect on the bidder's part to make such an examination and coordination.
- B. Drawings show approximate location of existing services. The mechanical and electrical trades shall check with local utility companies or municipal agencies for exact location of services which they expect to encounter. The Mechanical Trades Contractor shall be responsible for hiring a company such as "Miss Dig" to stake out and locate all utilities in areas of excavation before commencing any work. The Mechanical Trades Contractor shall verify all elevations and locations of existing underground lines which are to be connected into or routed over or under. This verification shall be done prior to beginning work at this project.

1.7 QUALITY ASSURANCE

- A. All work shall be performed in accordance with all local and state codes, laws and regulations applicable to the work for this project. The contractor shall be responsible for all permits and costs for inspections, etc., and for checking with each utility company supplying service to this project and shall determine from them all, any changes in boxes, meters, valves, service, etc., and shall include all cost for inspections, revisions to services, etc. in his bid as required by local agencies, utilities, etc. No extra payment will be made for such items after the contractor submits his bid.
- B. In addition to all applicable Federal, State and local codes, the standards and codes listed below shall apply to all mechanical work. The reference to codes and standards shall be referenced to the latest edition or revision.
 - 1. Air Diffusion Council (ADC)
 - 2. Air Moving and Conditioning Assoc., Inc. (AMCA)
 - 3. American Boiler Manufacturer's Association (ABMA)
 - 4. American Gas Association (AGA)
 - 5. American National Standard Institute (ANSI)
 - 6. American Refrigeration Institute (ARI)

7. American Society of Heating, Refrigeration, and Air Conditioning Engineers (ASHRAE)
 8. American Society of Mechanical Engineers (ASME)
 9. American Society for Testing materials (ASTM)
 10. American Welding Society
 11. ANSI code of Pressure Piping and Unified Pressure Vessels
 12. ASME Boiler and Pressure Vessel Code
 13. Institute of Boiler and Radiator Manuf. (IBR)
 14. National Electrical Manufacturer's Association (NEMA)
 15. Sheet Metal & Air Conditioning Contractors National Association (SMACNA)
 16. Standards of the Hydraulic Institute
 17. Underwriters' Laboratories (UL)
 18. Williams-Steiger Occupational Safety & Health Act (OSHA)
- C. In the event of conflict between drawings, codes, standards or specifications, the most stringent requirement shall apply

1.8 SUBMITTALS AND SHOP DRAWINGS

- A. Submit electronic sets of complete shop drawings for all mechanical equipment and materials associated with Division 23 and associated drawings to the Architect/Engineer for review before fabrication of work or ordering of equipment. Shop drawings shall be submitted at the earliest possible time.
- B. Shop drawings shall be first reviewed by the contractor. Inaccurate shop drawings shall be corrected by the contractor to meet specifications and schedules for this project. The contractor shall then initial the shop drawings as having been reviewed before submitting to the Architect/Engineer. Shop drawings shall have, in addition to the mechanical information, the electrical requirements for minimum circuit amperes and maximum fuse size ratings of the equipment.
- C. Drawings which are rejected must be corrected and returned for Architect/Engineer review before ordering.
- D. Furnish to the job site copies or prints of shop drawings that have been reviewed by the Engineer as soon as possible.
- E. Include a copy of each shop drawing in the Operation and Maintenance Manual.
- F. The checking and reviewing of shop drawings by the Architect/Engineer shall be construed as assisting the contractor and the Architect/Engineer's action does not relieve the contractor from the responsibility for errors or omissions which may exist thereon. The contractor shall be held responsible for errors or omissions that are discovered after approval process and must be made good by the contractor.
- G. The Sheet Metal Contractor, etc. shall include in their bid any cost for requesting AutoCAD backgrounds for their use from the Architect or Engineer at a minimum \$100.00 for the first file, and \$50.00 for each additional file that may be requested for AutoCAD use.

1.9 PERMITS, INSPECTIONS AND TESTS

- A. The Mechanical Trades Contractor shall take out all permits and arrange for necessary inspections and shall pay all assessments, fees and costs, etc., and make all tests as required by applicable codes. At the completion of the project, the Mechanical Trades Contractor shall furnish certificates of inspection and approval and secure final occupancy permit. Record copies shall be included in the Operation and Maintenance manuals.

1.10 RECORD DRAWINGS

- A. Maintain an up-to-date set of "record" drawings showing actual equipment, piping, duct, etc. installation locations. Exact dimensions from column lines for all concealed work and tie-ins with elevations noted shall be included.
- B. Include a set of reproducible drawings and a set of prints in each Operation and Maintenance Manual.
- C. The Engineer reserves the right to request and be furnished any additional information he deems necessary to be shown on the record drawings.

1.11 OWNER'S INSTRUCTIONS

- A. Upon completion of the project, the contractor shall be responsible for instructing the Owner's operating staff, in the presence of the Architect/Engineer's representative, in the proper operation and maintenance of the mechanical systems and equipment. Include a statement signed by the Owner that instructions have been given for proper operation and maintenance of the mechanical systems and equipment.

1.12 GUARANTEES

- A. Furnish a written guarantee, to the Architect/Engineer, that will make the contractor responsible at his own expense for any imperfections in material and/or workmanship which may develop under ordinary use within a period of one (1) year from final Owner's acceptance of the work.
- B. Furnish all written guarantees from equipment and/or material manufacturers which shall include the operating and performance conditions and capabilities upon which they are based.
- C. Permanent equipment that is used for temporary heat or cooling shall be guaranteed for one (1) year from the date of final acceptance of the project.

1.13 PORTABLE AND DETACHABLE PARTS

- A. Retain all portable and detachable parts of installation such as keys, spare accessories, operating manuals, etc. include in the Operation and Maintenance Manual.

1.14 OPERATION AND MAINTENANCE MANUALS

- A. Furnish to the Architect/Engineer two (2) copies of an approved bound (3 ring binder) book with tabs for sections covering each item of equipment. These notebooks shall include shop drawings, maintenance manuals, operating manuals

and parts lists to instruct the Owner on proper operation and use as well as maintenance for each piece of equipment. These books shall also include contractors', subcontractors' and manufacturers' names, telephone numbers and addresses.

- B. Manuals shall also include sequence of operation, control equipment literature, wiring and control diagrams, certificates of guarantees, certificates of inspection, mechanical system test and balancing reports. The contractor shall accumulate and summarize the control and maintenance sequence in a typewritten sheet to be included in the report.
- C. The manuals must be approved by the Architect/Engineer before final payment to the contractor. The Engineer reserves the right to request and be furnished any additional information that he deems necessary to be included in the manuals.

1.15 RESPONSIBILITIES FOR USE OF SUBSTITUTE MATERIALS

- A. Contractor shall notify Architect/Engineer in writing at least ten (10) calendar days before bids are due for approval to use materials and/or equipment other than that which has been specified or scheduled. If substitute materials and/or equipment are approved and used, it will be this contractor's responsibility to guarantee that the items will function as the specified equipment or materials, will in no way alter the design of the structure or system, and will not require any additional mechanical work such as piping, ductwork, etc. Any additional cost required by substitute materials will be the responsibility of the contractor.
- B. It will be the contractor's responsibility, at his own expense, to remove or replace any non-approved equipment or material or any approved equipment or materials not originally specified or scheduled if equipment and materials do not meet with the satisfaction of the Architect/Engineer.
- C. It shall be the Contractor's (Mechanical Trades) responsibility to coordinate and pay for any Electrical Contractor costs due to any changes in substitute materials and/or equipment's power requirements, which differ from that shown on the design documents.
- D. No consideration will be given to requests for substitute materials because of delivery problems unless the contractor can prove that orders were placed as soon as possible after contract was awarded and that delays were not caused by submittal of unscheduled or unspecified (substituted) materials to the Architect/Engineer.

1.16 COST BREAKDOWN AND EQUIPMENT LIST

- A. The successful bidder shall be responsible for submitting a cost breakdown to the Architect/Engineer and Owner within ten (10) calendar days after date of request of the breakdown. During progress of the work, if changes occur which cause additional cost, the price on such items shall be broken down in accordance with the items listed in the breakdown.
- B. The bidders shall be responsible for submitting a complete list of all equipment manufacturers, makes, models, etc. that will be used for this project with their

proposal. The equipment list shall be typed on the contractor's letterhead and shall be signed by the authorized officer.

1.17 MATERIALS AND EQUIPMENT

- A. Materials and equipment furnished under this project shall have a minimum warrantee of one (1) year. All materials and equipment shall be new, of first class quality and shall be furnished, delivered, erected, installed and finished in every detail and shall be so selected and arranged as to fit into the building space. All material or equipment that is not specified but necessary for this project shall be subject to the approval of the Architect/Engineer.
- B. Any materials or equipment not specified or scheduled but similar to that which has had prior approval shall be listed as a substitution and noted on the proposal form as such.
- C. The contractor shall include all miscellaneous materials and labor required to completely install and operate the mechanical systems as is intended by these drawings and specification.

1.18 TEMPORARY HEATING OR COOLING OF SPACE/BUILDING DURING CONSTRUCTION

- A. It is not recommended to use HVAC equipment being furnished for the project for temporary heating and cooling of the space/building during construction. If it is necessary to utilize the HVAC equipment for tempering air, filters shall be placed at face of each return diffuser or grille. Mechanical Contractor shall be responsible for removing temporary; filters at each return diffuser, cleaning return air ductwork and installing new filters within the HVAC equipment before space/building is turned over to the Owner.

1.19 SCHEDULE, COORDINATION AND INSTALLATION OF WORK

- A. The contractor shall carry on work in such a manner as to meet the dates as scheduled by the General Contractor and shall work overtime at no expense to the Owner as required to comply with the schedule. This contractor shall schedule all work with Owner and Architect/Engineer and schedule shut down of systems with Owner.
- B. Examine the site and all drawings and specifications and coordinate work with all other trades before commencing work for this project. Arrange work essentially as shown with the exact layout to be made on the job to suit actual conditions. Precise locations of equipment and materials shall be coordinated and shall be the responsibility of this contractor. Should any conflicts in location occur, and necessary deviations from drawings are required as determined by the Architect/Engineer, the contractor shall make necessary adjustments without additional cost to the Owner. Any damage to HVAC equipment due to HVAC equipment operation during construction shall be paid for by the Mechanical Contractor.
- C. All equipment, piping, ductwork, etc. shall be located and/or routed to allow for the most convenient access for servicing.

- D. Arrange for necessary access doors, panels, etc. to allow servicing of equipment, piping, valves, fire dampers, etc. Perform any cutting and patching as required, made necessary by failure to make proper arrangements.
- E. Indicated equipment connections, sizes and locations shall be verified and connected according to manufacturer's shop drawings and installation instructions. Thoroughly investigate the space provided for equipment and connections before ordering equipment. All equipment shall be selected to fit into the space allowed, including connections with adequate space allowed for operation and maintenance.
- F. All work shall be installed in a neat and workmanlike manner, using skilled personnel thoroughly qualified in the trade or duties that they are to perform. Rough work will be rejected.
- G. Coordinate all equipment deliveries and schedules to allow timely installation. Contractor shall separate equipment into sections and reassemble in building if required by the installation at no extra cost to the Owner.
- H. Furnish a superintendent approved by the Architect/Engineer to oversee and coordinate the work to be performed with all other trades.
- I. Coordinate location of pipes, ductwork, etc. with other building components such as structural components (beams, joists, columns, etc.), electrical components (lighting, conduits, etc.) and architectural components (walls, ceilings, floors, pipe chases, roof, etc.).
- J. Before starting work, Contractor shall verify that available space for proposed pipes, ducts, equipment etc. is adequate for the intended purpose and will result in a first class installation. Irregardless of drawings, responsibility for first class operating systems rests with the Contractor.
- K. Arrange for chases, slots, openings, etc. and other building components to allow for mechanical systems installation. Coordinate cutting and patching of these components to accommodate installation. This contractor shall be responsible for accurately locating for the general trades all chases, shafts, etc. and shall be responsible for all cutting and patching if these chases were not accurate or not coordinated in time with the general trades. Coordinate installation of all sleeves in walls, on floors or other structural or architectural components.
- L. Sequence, coordinate and integrate installation of equipment and materials for efficient work flow during the project. Particular attention should be spent on larger pieces of equipment.
- M. Install equipment and materials with provisions for necessary access for service and maintenance. Allow space for removal of all parts that may require replacement or servicing.
- N. Coordinate installation of required supporting devices and set sleeves in poured-in-place concrete and other structural components as they are constructed.
- O. Coordinate requirements for access panels and doors for mechanical items requiring access that are concealed behind finished surfaces. When access

panels are required, valves and equipment components requiring access shall be located to minimize the number of panels.

- P. Examine the work as it progresses and alert the Architect/Engineer in writing of any instances or obstructions that will prevent this contractor from performing his/her work.

1.20 DELIVERY, STORAGE, AND HANDLING

- A. Deliver pipes and tubes with factory-applied end caps. Maintain end caps through shipping, storage, and handling to prevent pipe end damage and to prevent entrance of dirt, debris, and moisture.
- B. Furnish and maintain a weatherproof storage facility on the site of adequate size to store miscellaneous equipment and/or materials to prevent exposure to the weather. Location of shed shall be determined by the Owner and Architect/Engineer. The Owner reserves the right to deny storage of materials or equipment in any existing or new buildings.

1.21 COOPERATION WITH ARCHITECT/ENGINEER AND OTHERS

- A. Coordinate all aspects of the mechanical system installation with all other trades, existing conditions, etc.
- B. If the bidder believes that changes in design are required to meet intended design capacities and operation or material and/or equipment is obviously omitted from these specifications and drawings, the bidder shall contact the Architect/Engineer in writing at least ten (10) days before bid date. The acceptance of a bid by the Owner shall be binding and shall indicate that the bidder does not require any changes in design nor additional costs in order to meet the design and performance of the mechanical system as indicated in these specifications and drawings.

1.22 WORK INVOLVING OTHER TRADES

- A. Equipment or materials specified in Division 23 may have to be installed by other trades (such as electrical trades or architectural trades) due to code requirements or union jurisdictional requirements. Where this occurs, this contractor shall include all costs required by other trades to complete the work and hire the respective trade to perform this work.

1.23 PERFORMANCE DATA AND ACCESSIBILITY

- A. All performance data specified in this specification or scheduled on drawings shall be considered actual performance of the equipment after installation. The supplier and installer shall be responsible for suitable allowances to adjust equipment to design capacities when actual operating and installation conditions differ from drawings.
- B. All equipment and materials shall be installed to allow access for servicing and maintenance. Coordinate final location of such equipment and materials that are concealed with required access doors on panels. Allow ample space for replacement or servicing. Extend all grease fittings to an accessible location.

1.24 CUTTING AND PATCHING

- A. Unless noted otherwise, the Mechanical Trades shall be responsible for all cutting, patching and associated work required under Division 23. This work shall be performed by trades normally performing this type of work except drilling of holes shall be done by the contractor requiring same. This includes replacing areas of cutting required by this work with proper reinforcing, termite shielding, materials, finishing, etc. to restore the areas to their original condition, and filling all openings around ducts, piping, etc. with approved fire retardant materials. Regardless, all drilling of holes shall be the responsibility of the Contractor requiring same.
- B. If noted on drawings that the General Trades will be responsible for all cutting and patching, it will be the Mechanical Trades responsibility to notify all General Trades during bidding of all areas requiring cutting and patching. Regardless, all drilling of holes shall be the responsibility of the contractor requiring same.

1.25 WORK IN EXISTING BUILDINGS

- A. Coordinate and schedule all work in existing building with Owner and Architect/Engineer. Systems shall be kept in operation at all times if at all possible. If a system shut-down is required, the contractor shall schedule with the Owner, the time and length of shut-down. A system shall not be shut down without written permission from the Owner.
- B. All existing equipment, piping, ductwork, etc. that is to be removed shall remain the property of the Owner. The contractor shall remove and locate this material that remains the property of the Owner to a location determined by the Owner somewhere on site. If the Owner does not want to maintain possession of the removed material, the contractor shall be responsible for removing material from the site and disposing of this material as necessary to meet all codes and requirements and shall pay all costs as required for any disposal fees, inspections, permits, etc.
- C. All existing piping, equipment, etc. whether shown on drawings or not that is to be removed and/or abandoned and does not remain property of the Owner shall be removed from site.
- D. Any existing piping, valves, mechanical equipment, etc. serving the existing building which are shown or not shown on drawings and are required for systems operation shall remain in use. If these systems require relocation to allow installation of new systems, the contractor shall be responsible for relocating to an Owner and Architect/Engineer approved location. The contractor shall pay all cost for this work and include such cost in his/her bid. (As specified previously, contractor shall be responsible for examining site and include all cost for work required to complete this project.)
- E. When active services, etc. are encountered in this project, the contractor shall furnish and install bracing, support, etc. as required to protect and keep these services active. (As specified previously, these drawings are diagrammatical. The contractor shall be responsible for verification of all existing services, piping, equipment, etc.).

1.26 ACCESS TO EQUIPMENT, HEATING COILS, VALVES, ETC.

- A. Coordinate access panels with type of construction and furnish access panels in areas that are non-accessible. Access panels shall be furnished by this contractor and installed by the General Contractor. The access panels shall be all approved, UL labeled and fire rated and shall be located and sized to allow access to equipment, heating coils, valves, fire dampers, etc.
- B. Where access panels are required, valves, equipment etc. shall be located as to require the least number of access panels.

1.27 EQUIPMENT GUARDS

- A. All rotating or moving parts of equipment that are located so as to be a hazard shall be fully enclosed or properly guarded as to meet or exceed all regulations and OSHA requirements.

1.28 EQUIPMENT CONNECTIONS

- A. Connections to equipment, plumbing fixtures, etc. shall be made in accordance with shop drawings, rough-in dimensions furnished by the manufacturer, codes, etc. and may vary with connections shown on drawings. The contractor shall be responsible for making connections and number of connectors as per shop drawings, codes, etc. at no additional cost to the Owner.

1.29 ELECTRICAL CONNECTIONS

- A. The Electrical Trades shall be responsible for furnishing and installing all electrical equipment, wiring, etc. required for operation of mechanical equipment unless otherwise noted on the drawings. The Mechanical Trades shall furnish detailed information and wiring diagrams to the Electrical Trades for all equipment specified and/or scheduled for this project. In the event that the Mechanical Trades furnishes an "approved equal" or "alternate" that require changes in the original electrical design, the Mechanical Trades shall pay all costs to the Electrical Trades as required to make satisfactory adjustments. All electrical work shall be done in accordance with the latest edition of the National Electric Code.
- B. See the temperature control or building automation system specification (if applicable) for description of electrical contractor work and Division 23 temperature control work.

1.30 MOTORS, MOTOR STARTERS AND DISCONNECTS

- A. Unless otherwise noted on drawings, motors shall be of constant speed 1750 rpm, new NEMA Design B, 40°C rise, horse power rated, open drip-proof except TEFC in dirty atmosphere, induction type motor with service factor of 1.15 and be of sufficient capacity to continuously operate the apparatus to which it is connected under all conditions of operation without exceeding nameplate ratings.
- B. Motors shall be premium efficiency as calculated using IEEE test method 112B.

- C. Motors ½ Hp. or larger shall be three phase; motors under ½ Hp. shall be 115 volt, 60 cycle, single phase. Before ordering the motors, the contractor shall verify correct motor voltage with the Electrical Trades and field conditions.
- D. The Mechanical Trades shall furnish, for equipment under Division 23, all special switches, disconnects, starters, alternators, etc. as specified or scheduled to be factory furnished and/or factory installed with the equipment including wiring diagrams, etc. whether it is to be factory installed or field wired. All other motor starters, disconnects, etc. not noted as factory furnished shall be furnished and installed by the Electrical Trades.
- E. Starters that are to be factory furnished with equipment shall be of the combination type and shall be as specified under Electrical Trades Division. Furnish overload protection for each phase.
- F. All wiring methods and materials shall meet NEMA, National Electric Code and State of Michigan Code requirements.
- G. All displays on control panels shall be on face of the panels.
- H. Motors having V-belt shall be furnished with base slide rails or other form of adjustment.

1.31 LUBRICATION AND MAINTENANCE

- A. Contractor shall maintain, oil, lubricate, etc. all equipment furnished under Division 23 until final acceptance by the Owner. Protect all bearings and shafts during installation and thoroughly grease the steel shafts to prevent corrosion. The contractor shall be responsible for any and all damage to bearings, shaft, etc. of Division 23 equipment operated or not until final acceptance by the Owner.

1.32 BASES AND SUPPORTS

- A. This contractor shall be responsible for furnishing all equipment pads and supports for equipment and materials required by Division 23 unless otherwise noted on drawings.
- B. All floor mounted mechanical equipment shall have a reinforced concrete pad furnished unless otherwise noted on drawings. The concrete pads shall be tied to the building floor with expansion bolts located maximum of 4'-0" on centers with a minimum of four (4) bolts, set before pouring and concealed within the pad. The Mechanical Trades shall verify exact pad or support size with the equipment manufacturer and shall size pad with adequate area to allow sufficient room for installation of vibration isolators, equipment mounting hardware, etc. Concrete pads shall have a 45 degree bevel at the top edge. The contractor shall verify exact location of concrete pads.
- C. Furnish all steel, hanging material, rods, etc. for suspending equipment off floor unless otherwise noted on drawings for equipment to be furnished under Division 23. This includes all structural steel for supporting between beams.
- D. All support structure shall be of strength to safely withstand all stresses and loads to which they will be subjected and shall distribute load properly over the

building area. Supports shall be designed to avoid undue strain to equipment and to avoid interference with piping, pipe connections, service and maintenance clearances, etc.

- E. Where equipment is to be floor mounted and requires legs, this contractor shall furnish and install structural steel members or steel pipe and fittings for legs. Fasten and brace to equipment and furnish flange at base to allow bolting to floor.
- F. Where equipment is to be ceiling or wall mounted, furnish necessary platform, structural steel, hardware, etc. as is most suitable for support of this equipment.
- G. All supports shall be approved by the Architect/Engineer.
- H. All piping, ductwork, etc. shall be suspended from structural steel members utilizing rods and approved hanger devices. Do not use metal deck for support. Beam clamps such as the Grinnell Fig. 260 or approved equal shall be used. Sheet metal "straps" shall not be used in place of rods.
- I. The mechanical trades shall be responsible for furnishing and setting in place all mechanical equipment, roof curbs and piping/duct roof curbs. The general trade shall be responsible for the roof work and associated flashing. The mechanical trade shall furnish and install treated wood base blocking as required to level curb and to match roof insulation thickness. Curb shall be as specified, or if not specified should be similar to Pate or Thy-curb with heavy gauge galvanized steel, insulated and with wood nailer. Height of curb scheduled or specified shall be height required to top of curb above finished roof. If height is not specified or noted, a minimum 12" high above finished roof will be required. (pipe support units shall be at height required). Rooftop units will be shipped knocked down with the mechanical trade responsible for assembly on site. Roof curb shall mate with unit and provide support and a watertight installation.

1.33 SLEEVES, PLATES AND COLLARS

- A. Furnish all sleeves, plates and collars for piping, ductwork, etc. passing through walls, floor ceilings, foundations, etc. Coordinate with the General Contractor the exact location and size of required openings. No pipe or duct shall pass through a wall, floor ceiling, etc. without a sleeve. This contractor shall be responsible for sleeve locations and securing sleeves before concrete is formed.
- B. Sleeves for steel pipe shall be standard weight black steel pipe. For walls, foundations and ceilings, sleeve shall be kept flush with finished surfaces. For floors, the sleeve shall be set flush with bottom of concrete construction and be extended up ¼" above concrete floor. Sleeves shall be set in place before construction of walls, floors, ceilings, etc.
- C. Sleeves for copper pipe shall be type "M" hard copper tubing installed typical to that of steel pipe sleeves.
- D. Sleeves for piping shall be sized to allow insulation to run continuous through sleeve whenever possible and to allow not less than ¼" all around bare pipe or insulation.

- E. Sleeves for ducts passing through floors shall be 14 gauge black steel for ducts up to 24" maximum dimension, and 12 gauge black steel for ducts 25" and over maximum dimension. Sleeves shall be kept flush with the finished wall surface.
- F. Where insulated piping passes through walls or floor sleeves, furnish 22 gauge galvanized band around insulation of same length as the sleeve length. Band shall fit snugly over insulation and be held in place by steel metal collars all around insulation to cover openings.
- G. All penetration voids shall be sealed smoke tight with non-combustible materials similar to 3M or Hilti firestop systems to maintain the integrity of the fire rated structure. In a non-fire rated assembly, seal all voids with non-hardening sealant.
- H. Where bare piping 2" and smaller pass through wall or floors, furnish polished chrome plated brass escutcheons, split type. Bare piping 2½" and larger that pass through walls or floor, furnish 22 gauge galvanized steel metal collars so as to cover opening.
- I. Where piping penetrates an outside wall, below grade, utilize a mechanical sleeve, similar to link-seal, with stainless steel nuts and bolts on fasteners.

1.34 RIGGING AND HOISTING

- A. Perform all required rigging, hoisting, transportation, moving, etc. of all equipment, materials, etc. to be furnished and/or installed under Division 23 whether furnished by this contractor or by the Owner or other trades.

1.35 STORAGE FACILITY

- A. Furnish and maintain a weatherproof storage facility on the site of adequate size to store miscellaneous equipment and/or materials to prevent exposure to the weather. Location of shed shall be determined by the Owner and Architect/Engineer. The Owner reserves the right to deny storage of materials or equipment in any existing or new buildings.

1.36 PROTECTION FROM DAMAGE

- A. The contractor shall be responsible for all materials, equipment, etc. and all work installed by himself and shall protect it from damage until final acceptance of this project by the Owner.
- B. Furnish all coverings and protection from dirt, dust, rain, storm, heat, traffic, wear, etc. and all possible injury including that by other workmen. Any equipment, workmanship, materials, etc. damaged prior to final acceptance by the Owner of this project shall be properly repaired at no expense to the Owner.
- C. Protect all plumbing fixtures and other equipment from damage by covering or coating. Any dented, scratched, rusted or marred surface finishes will not be accepted.
- D. Protect all equipment, materials, etc. from freezing.

1.37 COMMON PIPE MATERIALS AND INSTALLATION INSTRUCTIONS

- A. Refer to individual Division 23 piping Sections for pipe, tube, and fitting materials and joining methods.
- B. Pipe Threads: ASME B1.20.1 for factory-threaded pipe and pipe fittings.
- C. Refer to individual Division 23 piping Sections for special joining materials not listed below.
 - 1. Pipe-Flange Gasket Materials: Suitable for chemical and thermal conditions of piping system contents.
 - a. ASME B16.21, nonmetallic, flat, asbestos-free, 1/8-inch (3.2-mm) maximum thickness unless thickness or specific material is indicated.
 - 1) Full-Face Type: For flat-face, Class 125, cast-iron and cast-bronze flanges.
 - 2) Narrow-Face Type: For raised-face, Class 250, cast-iron and steel flanges.
 - 2. Flange Bolts and Nuts: ASME B18.2.1, carbon steel, unless otherwise indicated.
 - 3. Plastic, Pipe-Flange Gasket, Bolts, and Nuts: Type and material recommended by piping system manufacturer, unless otherwise indicated.
 - 4. Solder Filler Metals: ASTM B 32, lead-free alloys. Include water-flushable flux according to ASTM B 813.
 - 5. Brazing Filler Metals: AWS A5.8, BCuP Series, copper-phosphorus alloys for general-duty brazing, unless otherwise indicated; and AWS A5.8, BAg1, silver alloy for refrigerant piping, unless otherwise indicated.
 - 6. Welding Filler Metals: Comply with AWS D10.12 for welding materials appropriate for wall thickness and chemical analysis of steel pipe being welded.
 - 7. Solvent Cements for Joining Plastic Piping:
 - a. ABS Piping: ASTM D 2235.
 - b. CPVC Piping: ASTM F 493.
 - c. PVC Piping: ASTM D 2564. Include primer according to ASTM F 656.
 - d. PVC to ABS Piping Transition: ASTM D 3138.
 - 8. Fiberglass Pipe Adhesive: As furnished or recommended by pipe manufacturer.

1.38 PIPE HANGERS AND SUPPORTS

- A. Hangers and saddles shall be Modern Pipe Support Corp., Grinnel/Anvil, Autogrip, or M-CO. Inserts shall be of the type to receive a machine bolt head or nut after installation, permit horizontal adjustment, and shall be flush with the surface. For copper pipe with steel hangers, clean and wrap pipe with two layers of plastic insulating tape at point of contact. Roller supports shall be adjustable type with insulated standoff. Rods shall be used for suspended installation. Sheet metal "straps" shall not be used in place of rods.
- B. Hangers for piping with vapor barrier sealed insulation shall be multipurpose pipe saddles fitting over the insulation. Wire or perforated strap iron will not be permitted for pipe supports. Do not support hangers from roof deck. Furnish and install all support steel as required to suspend from structural steel joist or beams. Hangers shall be clevis or split ring type with vertical adjustment and beam clamp similar to Grinnell/Anvil Fig. 260, with maximum spacing per ASHRAE Standards:

Pipe Size	Steel Pipe	Copper Pipe	PVC Pipe	Rod Size
½ to ¾ inch	6 feet	5 feet	4 feet	3/8"
1 inch	7 feet	5 feet	4 feet	3/8"
1 ¼ inch	7 feet	7 feet	4 feet	3/8"
1½ inch	7 feet	7 feet	4 feet	1/2"
2 inch	10 feet	8 feet	4 feet	1/2"
2½ inch	11 feet	9 feet	4 feet	5/8"
3 inch	11 feet	9 feet	4 feet	5/8"
3 ½ inch	13 feet	11 feet	4 feet	5/8"
4 inch	14 feet	12 feet	4 feet	3/4"
5 inch	14 feet	12 feet	4 feet	3/4"
6 inch	14 feet	--	4 feet	3/4"
8 inch	16 feet	--	4 feet	7/8"
10 inch	16 feet	--	4 feet	7/8"
12 inch	20 feet	--	4 feet	1"
14 inch	20 feet	--	4 feet	1¼"
16 inch	20 feet	--	4 feet	1¼"
18 inch	20 feet	--	4 feet	1¼"

- C. Conform to ASME B31.9, ASTM F708, MSS SP58, MSS SP69 and MSS SP89.
- D. Hangers for Hot Pipe Sizes ½ to 1½ Inch: Malleable iron, adjustable swivel, split ring.
- E. Hangers for Cold Pipes sizes ½" to 1½" and Hot and Cold Pipe Sizes 2 Inches and Over: Carbon steel, adjustable, clevis.
- F. Hangers for Hot Pipe Sizes thru 4 Inches: Carbon steel, adjustable, clevis.
- G. Hangers for Hot Pipe Sizes 5 Inches and Over: Adjustable steel yoke, cast iron roll, double hanger.
- H. Multiple or Trapeze Hangers: Steel channels with welded spacers and hanger rods.
- I. Multiple or Trapeze Hangers for Hot Pipe Sizes 6 Inches and Over: Steel channels with welded spacers and hanger rods, cast iron roll.
- J. Wall Support for Pipe Sizes up thru 3 Inches: Cast iron hook.
- K. Wall Support for Pipe Sizes 4 Inches and Over: Welded steel bracket and wrought steel clamp.
- L. Wall Support for Hot Pipe Sizes 6 Inches and Over: Welded steel bracket and wrought steel clamp with adjustable steel yoke and cast iron roll.
- M. Vertical Support: Steel riser unistrut clamps at high, mid, and low locations.

- N. Floor Support for Cold Pipe all sizes and Hot Pipe Sizes up thru 4 Inches: Cast iron adjustable pipe saddle, lock nut, nipple, floor flange, and concrete pier or steel support.
- O. Floor Support for Hot Pipe Sizes 5 Inches and Over: Adjustable cast iron roll and stand, steel screws, and concrete pier or steel support.
- P. Copper Pipe Support: Carbon steel ring, adjustable, copper plated.
- Q. Hanger Rods: Mild steel threaded both ends, threaded one end, or continuous threaded.
- R. Inserts: Malleable iron case of steel shell and expander plug for threaded connection with lateral adjustments, top slot for reinforcing rods, lugs for attaching to forms, size inserts to suit threaded hanger rods.

1.39 PIPING, DUCTWORK AND EQUIPMENT SUPPORT

- A. Attachments of mechanical equipment to structural members are the responsibility of the installing trade. Structural members shall not be field cut, welded or otherwise modified without approval of the Architect/Engineer. Attachment to steel joist shall be made at panel points. When routing piping or ductwork perpendicular to joist, a support shall be provided at every steel joist; when parallel to joist, a support shall be provided at no more than 6' on centers or two panel bays. Structural members shall not be overloaded as a result of attachments. Attachment/equipment loading for all trades resulting in total load greater than an equivalent uniform 5 psf for any member shall be submitted to the Architect/Engineer for review. Mechanical Trades may contact the project Structural Engineer as required for panel point location assistance and welder certification requirements. Electrical Trades are still responsible for design, layout, and fabrication and installation of electrical supports and support attachment methods. Mechanical Trades shall submit attachment methods to the Structural Engineer for review.
- B. Install products in accordance with manufacturer's instructions.
- C. Do not fasten supports to pipes, ducts, mechanical equipment, and conduit.
- D. Do not use spring steel clips and clamps.
- E. Do not use powder-actuated anchors.
- F. Do not drill or cut structural members without permission from Architect/Engineer.
- G. Fabricate supports from structural steel or steel channel. Rigidly weld members or use hexagon head bolts to present neat appearance with adequate strength and rigidity. Use spring lock washers under all nuts.

1.40 PIPING SYSTEMS SHUT OFF VALVES

- A. Shut off valves shall be installed at all branch lines off main piping, or where mains divide/separate to serve different areas, to allow isolation of all branch

piping and systems they serve such as air handling units, areas or wings of the building, etc.

1.41 CLEANING AND FINISHING

- A. During construction period, remove all debris, rubbish, tools, equipment, unused materials, etc. as required or requested by the Architect/Engineer. All cost for cleanup and removal will be the responsibility of the contractor.
- B. Upon completion of the project and before final acceptance by the Owner, the entire installation shall be thoroughly cleaned, all rubbish and unused material removed to the satisfaction of the Architect/Engineer. All dust and dirt shall be removed from all equipment, piping, ductwork, etc.
- C. Thoroughly clean all heating units, fans and fan wheels, diffusers and grilles, air handler plenums and air filter frames, etc. using compressed air if necessary.
- D. Finish paint all equipment, materials, piping, etc. as noted on drawings or listed in this specification. Match Owner's existing color scheme. Any Division 23 equipment which has been scratched or damaged shall be finished equal to the original finish.

1.42 DUCTWORK MANUAL BALANCING DAMPERS

- A. All duct branch take off's to diffusers, grilles, regulators, etc. shall have manual balancing dampers installed to allow balancing of outlets.

1.43 EQUIPMENT/SYSTEMS START-UP

- A. Furnish and schedule manufacturer's start-up service for all equipment and systems. These start-up services shall be performed in the presence of, and to the satisfaction of the Owner and Architect/Engineer.

1.44 EQUIPMENT/SYSTEMS SIGN-OFF

- A. The Mechanical Trades shall furnish written sign-offs on all systems stating that the equipment and systems have been checked, tested, started and that their operation has been verified correct through the entire range of operation that can be expected through the seasons.

1.45 SUBSTANTIAL COMPLETION

- A. Contractor shall submit a letter to the Architect/Engineer advising that all work has been completed in accordance with plans and specifications and the project is ready for a final walk-thru.

END OF SECTION

MAI: 2024-1524

SECTION 23 05 53

HVAC IDENTIFICATION

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Nameplates.
- B. Tags.
- C. Stencils.
- D. Pipe Markers.

1.2 PRODUCTS INSTALLED BUT NOT FURNISHED UNDER THIS SECTION

- A. Medical Gas Systems: Supply of pipe labels for placement by this Section.

1.3 REFERENCES: Material and/or equipment specified in this section shall meet or exceed one or more of the property requirements or installation requirements of the following specifications/publications as applicable to the specific product or end use:

- A. ANSI or equal standards for the Identification of Piping Systems.

PART 2 PRODUCTS

2.1 NAMEPLATES

- A. Description: Laminated three-layer plastic with engraved black letters on light contrasting background color. Furnish and install on all mechanical equipment.

2.2 TAGS

- A. Metal Tags: Brass with stamped letters; tag size minimum 1½ inch diameter with smooth edges.
- B. Chart: Typewritten letter size list in anodized aluminum frame.

2.3 STENCILS

- A. Stencils: With clean cut symbols and letters of following size:
 - 1. ¾ to 1¼ inch Outside Diameter of Insulation or Pipe: 8 inch long color field, ½ inch high letters.
 - 2. 1½ to 2 inch Outside Diameter of Insulation or Pipe: 8 inch long color field, ¾ inch high letters.
 - 3. 2½ to 6 inch Outside Diameter of Insulation or Pipe: 12 inch long color field, 1¼ inch high letters.
 - 4. 8 to 10 inch Outside Diameter of Insulation or Pipe: 24 inch long color field, 2½ inch high letters.
 - 5. Over 10 inch Outside Diameter of Insulation or Pipe: 32 inch long color field, 3½ inch high letters.

6. Ductwork and Equipment: 2½ inch high letters.

B. Stencil Paint shall be semi-gloss enamel, colors conforming to ASME A13.1.

2.4 PIPE MARKERS

A. Color: Match existing or conform to ANSI/OSHA standards.

B. Plastic Pipe Markers: Factory fabricated, flexible, semi-rigid plastic, preformed to fit around pipe or pipe covering; minimum information indicating flow direction arrow and identification of fluid being conveyed.

C. Plastic Tape Pipe Markers: Flexible, vinyl film tape with pressure sensitive adhesive backing and printed markings.

D. Underground Plastic Pipe Markers: Bright colored continuously printed plastic ribbon tape, minimum 6 inches wide by 4 mil thick, manufactured for direct burial service.

2.5 CEILING TACKS

A. Description: Steel with ¾ inch diameter color coded head.

B. Color code as follows:

1. Yellow - HVAC equipment
2. Red - Fire dampers/smoke dampers
3. Green - Plumbing valves
4. Blue - Heating/cooling valves

PART 3 EXECUTION

3.1 PREPARATION

A. Degrease and clean surfaces to receive adhesive for identification materials.

B. Prepare surfaces as required by manufacturer's installations for stencil painting.

3.2 INSTALLATION

A. Install plastic nameplates with corrosive-resistant mechanical fasteners, or adhesive. Apply with sufficient adhesive to ensure permanent adhesion and seal with clear lacquer.

B. Install tags with corrosion resistant chain.

C. Install plastic pipe markers in accordance with manufacturer's instructions.

D. Install plastic tape pipe markers complete around pipe in accordance with manufacturer's instructions.

E. Install underground plastic pipe markers 6 to 8 inches below finished grade, directly above buried pipe.

- F. Identify each piece of equipment with plastic nameplates. Small devices, such as in-line pumps, may be identified with tags.
- G. Identify control panels and major control components outside panels with plastic nameplates.
- H. Identify thermostats relating to terminal boxes or valves with nameplates.
- I. Identify valves in main and branch piping with tags.
- J. Tag automatic controls, instruments, and relays. Key to control schematic.
- K. Identify piping, concealed or exposed, with plastic tape pipe markers or stenciled painting. Identify service, flow direction, and pressure. Install in clear view and align with axis of piping. Locate identification not to exceed 10 feet on straight runs including risers and drops, adjacent to each valve and tee, at each side of penetration of structure or enclosure, and at each obstruction.
- L. Identify ductwork with stenciled painting. Identify with air handling unit identification number and area served. Locate identification at air handling unit, at each side of penetration of structure or enclosure, and at each obstruction.
- M. Provide ceiling tacks to locate valves or dampers above T-bar type panel ceilings. Locate in corner of panel closest to equipment.
- N. Identify access points at the exterior of all fire, smoke, or combination fire/smoke dampers with a permanent label, having letters not less than ½" in height, reading fire damper, smoke damper or fire/smoke damper respectively.

END OF SECTION

MAI: 2024-1524

SECTION 23 05 93

TESTING, ADJUSTING, AND BALANCING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Testing, adjustment, and balancing of air systems.
- B. Testing, adjustment, and balancing of hydronic systems.
- C. Measurement of final operating condition of HVAC systems.

1.2 RELATED SECTIONS AND DRAWINGS

- A. All drawings and specification sections apply to work in this section. Furnish all items, articles, materials, equipment, operations or methods that are mentioned, listed or scheduled on drawings or are in this specification including all labor, equipment, materials and miscellaneous incidentals necessary and/or required for the completion of this project. The work covered under this section of the specifications is in no way complete within itself but is supplementary to the entire specification and drawings.

1.3 REFERENCES: Material and/or equipment specified in this section shall meet or exceed one or more of the property requirements or installation requirements of the following specifications/publications as applicable to the specific product or end use:

- A. AABC - National Standards for Total System Balance.
- B. ADC - Test Code for Grilles, Registers, and Diffusers.
- C. ASHRAE 111 - Practices for Measurement, Testing, Adjusting, and Balancing of Building Heating, Ventilation, Air-conditioning, and Refrigeration Systems.
- D. NEBB - Procedural Standards for Testing, Adjusting, and Balancing of Environmental Systems.
- E. SMACNA - HVAC Systems Testing, Adjusting, and Balancing.

1.4 SUBMITTALS

- A. Submit electronic draft copies of report for review prior to final acceptance of Project. Provide electronic final copies for Architect/Engineer review and for inclusion in operating and maintenance manuals.
- B. Provide reports in 3-ring binder manuals, complete with index page and indexing tabs, with cover identification at front and side. Include set of reduced drawings with air outlets and equipment identified to correspond with data sheets, and indicating thermostat locations. Binder shall be high quality hard cover type.
- C. Include detailed procedures, agenda, sample report forms and copy of NEBB Project Performance Guaranty prior to commencing system balance.

- D. Test Reports: Indicate data on AABC National Standards for Total System Balance forms or forms approved in writing by Architect/Engineer.

1.5 PROJECT RECORD DOCUMENTS

- A. Record actual locations of flow measuring stations and/or balancing valves and rough setting.

1.6 QUALITY ASSURANCE

- A. Perform total system balance in accordance with AABC National Standards for Field Measurement and Instrumentation, Total System Balance.
- B. Maintain one copy of each document on site.
- C. The final air balance report shall be approved by the Architect/Engineer prior to final payment to the Contractor. The Engineer reserves the right to ask for and be furnished any additional information he deems necessary to be shown on air/water balance report.

1.7 QUALIFICATIONS

- A. Agency: Independent company (not associated with the systems installing contractor) specializing in the testing, adjusting, and balancing of systems specified in this Section with minimum three years experience and NEBB certified. The test and balance agency selected by the Contractor shall be approved by the Engineer. The Mechanical Trades shall be responsible for any cost differences between the test and balance agency selected by the Contractor and the test and balance agency approved by the Engineer.

1.8 SEQUENCING AND SCHEDULING

- A. Sequence work to commence after completion of systems and schedule completion of work before Substantial Completion of Project. Coordinate project schedule with contractor. The Mechanical Trades shall coordinate and schedule the on-site balancing with the Engineer to allow the Engineer the ability to be at the project site during the time of the balancing. If the Engineer is not scheduled to oversee the balance of systems, the Mechanical Trades shall be responsible for rebalancing the system in the presence of the Engineer and be responsible for all costs for such.
- B. The Test and Balance Agency shall schedule/coordinate (through the Mechanical Contractor) with the Temperature Control Contractor. The Temperature Control Contractor should be on site during the air balance to verify proper operation of the system required for the air balance.
- C. Acceptable Test and Balance Contractors.
 1. HiTech Test and Balance (Freeland, MI)
 2. Absolute Balance Company (South Lyon, MI)
 3. Enviro-Aire/Total Balance Company (St Clair Shores, MI)
 4. Ener-Tech Testing (Holly, MI)
 5. International Test & Balance (Southfield, MI)

PART 2 PRODUCTS

TESTING, ADJUSTING AND BALANCING

Not used

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that systems are complete and operable before commencing work. Ensure the following conditions:
 - 1. Systems are started and operating in a safe and normal condition.
 - 2. Temperature control systems are installed complete and operable.
 - 3. Proper thermal overload protection is in place for electrical equipment.
 - 4. Final filters are clean and in place. If required, install temporary media in addition to final filters.
 - 5. Duct systems are clean of debris.
 - 6. Fans are rotating correctly.
 - 7. Fire and volume dampers are in place and open.
 - 8. Air coil fins are cleaned and combed.
 - 9. Access doors are closed and duct end caps are in place.
 - 10. Air outlets are installed and connected.
 - 11. Duct system leakage is minimized.
 - 12. Hydronic systems are flushed, filled, and vented.
 - 13. Pumps are rotating correctly.
 - 14. Proper strainer baskets are clean and in place.
 - 15. Service and balance valves are open.
- B. Submit field reports. Report defects and deficiencies noted during performance of services which prevent system balance.
- C. Beginning of work means acceptance of existing conditions.

3.2 PREPARATION

- A. Provide a review of proposed design drawings and advise appropriate trades about additional balancing devices required to attain design conditions.
- B. Advise Engineer about additional balancing devices required to attain design conditions.
- C. Provide instruments required for testing, adjusting, and balancing operations. Make instruments available to Architect/Engineer to facilitate spot checks during testing.

3.3 INSTALLATION TOLERANCES

- A. Air Handling Systems: Adjust to within plus or minus 10 percent of design for supply, return and exhaust systems.
- B. Air Outlets and Inlets: Adjust to within plus 10 percent and minus 5 percent of design and to Owner's satisfaction. Respond to Owner complaints of unsatisfactory room temperatures by adjusting outlets and/or inlets to more or less air as required.
- C. Hydronic Systems: Adjust to within plus or minus 10 percent of design.

3.4 ADJUSTING

- A. Ensure recorded data represents actual measured or observed conditions.
- B. Permanently mark settings of adjustment devices allowing settings to be restored. Set and lock memory stops.
- C. After adjustment, take measurements to verify balance has not been disrupted or that such disruption has been rectified.
- D. Leave systems in proper working order, replacing belt guards, closing access doors, closing doors to electrical switch boxes, and restoring thermostats to specified settings.
- E. At final inspection, recheck random selections of data recorded in report. Recheck points or areas as selected and witnessed by the Owner.
- F. Check and adjust systems approximately six months after final acceptance and submit report.

3.5 AIR SYSTEM PROCEDURE

- A. Adjust air handling and distribution systems to provide required or design supply, return, and exhaust air quantities. The air balance agency shall be responsible for removing all adjustable motor pulleys and replacing them with fixed motor pulleys after air balancing the system. Include costs for all air systems to be readjusted to required air volumes. Pitot duct mains at supply air and return air ducts at air handling systems and exhaust fans to verify air quantity at units vs. at diffusers and grilles.
- B. Make air quantity measurements in ducts by Pitot tube traverse of entire cross sectional area of duct.
- C. Measure air quantities at air inlets and outlets.
- D. Adjust distribution system to obtain uniform space temperatures free from objectionable drafts and noise.
- E. Use volume control devices at outlets to regulate air quantities so that outlets do not create objectionable air motion or sound levels. Effect volume control by duct internal devices such as dampers in ducts.
- F. Vary total system air quantities by adjustment of fan speeds. Provide drive changes required. Vary branch air quantities by damper regulation.
- G. Provide system schematic with required and actual air quantities recorded at each outlet or inlet.
- H. Measure static air pressure conditions on air supply units, including filter and coil pressure drops, and total pressure across the fan. Make allowances for 50 percent loading of filters.
- I. Adjust outside air automatic dampers, outside air, return air, and exhaust dampers for design conditions.

- J. Measure temperature conditions across outside air, return air, and exhaust dampers to check leakage.
- K. Where modulating dampers are provided, take measurements and balance at extreme conditions. Balance variable volume systems at maximum air flow rate, full cooling, and at minimum air flow rate, full heating.
- L. Measure building static pressure and adjust supply, return, and exhaust air systems to provide required relationship between each to maintain approximately 0.05 inches positive static pressure near the building entries.
- M. Check units for motorized damper leakage. Adjust air quantities with mixing dampers set first for cooling, then heating, then modulating.
- N. For variable air volume units set volume controller to air flow setting indicated. Confirm connections properly made and confirm proper operation for automatic variable air volume temperature control.
- O. On VAV boxes, adjust for proper operation.
- P. Advise Mechanical Contractor about additional balancing devices required to attain design conditions.
- Q. Adjust adjustable pitch sheaves to setting as required by actual conditions. If sheave size or type changes are recommended, include the recommendation in the draft copy of the report to allow the Owner to be informed of, and be responsible for, the recommendation for the change.

3.6 SCHEDULES

- A. Equipment Requiring Testing, Adjusting, and Balancing shall include but not be limited to: Air moving equipment such as exhaust fans, air handlers, return fans, etc.; terminal devices such as grilles and diffusers, variable air volume boxes, etc.; all hydronic systems such as pumps, chillers, flow control valves, coils, etc. See drawings for equipment utilized for this project and submit applicable report forms for this project air and/or water system(s).
- B. Report Forms
 - 1. Title Page:
 - a. Name of Testing, Adjusting, and Balancing Agency
 - b. Address of Testing, Adjusting, and Balancing Agency
 - c. Telephone number of Testing, Adjusting, and Balancing Agency
 - d. Project name
 - e. Project location
 - f. Project Architect
 - g. Project Engineer
 - h. Project Contractor
 - i. Project altitude
 - j. Report date
 - 2. Summary Comments:
 - a. Design versus final performance
 - b. Notable characteristics of system
 - c. Description of systems operation sequence

- d. Summary of outdoor and exhaust flows to indicate amount of building pressurization
- e. Nomenclature used throughout report
- f. Test conditions
- 3. Instrument List:
 - a. Instrument
 - b. Manufacturer
 - c. Model number
 - d. Serial number
 - e. Range
 - f. Calibration date
- 4. Electric Motors:
 - a. Manufacturer
 - b. Model/Frame
 - c. HP/BHP
 - d. Phase, voltage, amperage; nameplate, actual, no load
 - e. RPM
 - f. Service factor
 - g. Starter size, rating, heater elements
 - h. Sheave Make/Size/Bore
- 5. V-Belt Drive:
 - a. Identification/location
 - b. Required driven RPM
 - c. Driven sheave, diameter and RPM
 - d. Belt, size and quantity
 - e. Motor sheave diameter and RPM
 - f. Center to center distance, maximum, minimum, and actual
- 6. Pump Data:
 - a. Identification/number
 - b. Manufacturer
 - c. Size/model
 - d. Impeller
 - e. Service
 - f. Design flow rate, pressure drop, BHP
 - g. Actual flow rate, pressure drop, BHP
 - h. Discharge pressure
 - i. Suction pressure
 - j. Total operating head pressure
 - k. Shut off, discharge and suction pressures
 - l. Shut off, total head pressure
 - m. Heat output
- 7. Air Cooled Condenser:
 - a. Identification/number
 - b. Location
 - c. Manufacturer
 - d. Model number
 - e. Serial number
 - f. Entering DB air temperature, design and actual
 - g. Leaving DB air temperature, design and actual
 - h. Number of compressors
- 8. Cooling Coil Data:
 - a. Identification/number
 - b. Location
 - c. Service

- d. Manufacturer
 - e. Air flow, design and actual
 - f. Entering air DB temperature, design and actual
 - g. Entering air WB temperature, design and actual
 - h. Leaving air DB temperature, design and actual
 - i. Leaving air WB temperature, design and actual
 - j. Water flow, design and actual
 - k. Water pressure drop, design and actual
 - l. Entering water temperature, design and actual
 - m. Leaving water temperature, design and actual
 - n. Saturated suction temperature, design and actual
 - o. Air pressure drop, design and actual
9. Heating Coil Data:
- a. Identification/number
 - b. Location
 - c. Service
 - d. Manufacturer
 - e. Air flow, design and actual
 - f. Water flow, design and actual
 - g. Water pressure drop, design and actual
 - h. Entering water temperature, design and actual
 - i. Leaving water temperature, design and actual
 - j. Entering air temperature, design and actual
 - k. Leaving air temperature, design and actual
 - l. Air pressure drop, design and actual
10. Heat Exchanger:
- a. Identification/number
 - b. Location
 - c. Service
 - d. Manufacturer
 - e. Model number
 - f. Serial number
 - g. Steam pressure, design and actual
 - h. Primary water entering temperature, design and actual
 - i. Primary water leaving temperature, design and actual
 - j. Primary water pressure drop, design and actual
 - k. Secondary water leaving temperature, design and actual
 - l. Secondary water flow, design and actual
 - m. Secondary water pressure drop, design and actual
11. Air Moving Equipment:
- a. Location
 - b. Manufacturer
 - c. Model number
 - d. Serial number
 - e. Arrangement/Class/Discharge
 - f. Air flow, specified and actual per pilot readings at equipment and per totaled outlets.
 - g. Return air flow, specified and actual per pitot readings at equipment and per totaled inlets.
 - h. Outside air flow, specified and actual per pitot.
 - i. External and total static pressure, specified and actual
 - j. Inlet pressure
 - k. Discharge pressure
 - l. Sheave Make/Size/Bore
 - m. Number of Belts/Make/Size

- n. Fan RPM
- 12. Return Air/Outside Air Data:
 - a. Identification/location
 - b. Design return air flow
 - c. Actual return air flow per pitot readings at equipment and per totaled grilles air flow measurement
 - d. Design outside air flow
 - e. Actual outside air flow per pitot readings
 - f. Return air temperature
 - g. Outside air temperature
 - h. Required mixed air temperature
 - i. Actual mixed air temperature
 - j. Design outside/return air ratio
 - k. Actual outside/return air ratio
- 13. Exhaust Fan Data:
 - a. Location
 - b. Manufacturer
 - c. Model number
 - d. Serial number
 - e. Air flow, specified and actual per pitot readings at exhaust fan and per totaled exhaust grilles or duct inlets.
 - f. Static pressure, specified and actual
 - g. Inlet pressure
 - h. Discharge pressure
 - i. Sheave Make/Size/Bore
 - j. Number of Belts/Make/Size
 - k. Fan RPM
- 14. Duct Traverse:
 - a. System zone/branch and at all equipment (AHUs, RTUs, EFs, etc.)
 - b. Duct size
 - c. Area
 - d. Design velocity
 - e. Design air flow
 - f. Test velocity
 - g. Test air flow
 - h. Duct static pressure
 - i. Air temperature
 - j. Air correction factor
- 15. Duct Leak Test:
 - a. Description of ductwork under test
 - b. Duct design operating pressure
 - c. Duct design test static pressure
 - d. Duct capacity, air flow
 - e. Maximum allowable leakage duct capacity times leak factor
 - f. Test apparatus
 - 1) Blower
 - 2) Orifice, tube size
 - 3) Orifice size
 - 4) Calibrated
 - g. Test static pressure
 - h. Test orifice differential pressure
 - i. Leakage
- 16. Air Distribution Test Sheet:
 - a. Air terminal number
 - b. Room number/location

- c. Terminal type
- d. Terminal size
- e. Area factor
- f. Design velocity
- g. Design air flow
- h. Test (final) velocity
- i. Test (final) air flow
- j. Percent of design air flow

END OF SECTION

MAI: 2024-1524

SECTION 23 07 13

EXTERNAL DUCT INSULATION

PART 1 GENERAL

1.1 SECTION INCLUDES EXTERNAL INSULATION FOR:

- A. Supply air ducts. Note: If drawings or Section 230825 call for internal duct insulation, delete external duct insulation.

1.2 RELATED SECTIONS

- A. All drawings and specification sections apply to work in this section. Furnish all items, articles, materials, equipment, operations or methods that are mentioned, listed or scheduled on drawings or are in this specification including all labor, equipment, materials and miscellaneous incidentals necessary and/or required for the completion of this project. The work covered under this section of the specifications is in no way complete within itself but is supplementary to the entire specification and drawings.

1.3 REFERENCES

- A. Thermal insulation materials shall meet the property requirements of one or more of the following specifications as applicable to the specific product or end use:
 - 1. American Society for Testing of Materials and Specifications:
 - a. ASTM C533, "Standard Specification for Calcium Silicate Pipe and Block Insulation"
 - b. ASTM C553, "Standard Specification for Mineral Fiber Blanket and Felt Insulation"
 - c. ASTM C612, "Standard Specification for Mineral Fiber Block and Board Thermal Insulation"
 - d. ASTM C1136, "Standard Specification for Barrier Material, Vapor," Type 1 or 2 (jacket only)
- B. Insulation materials, including all weather and vapor barrier material, closures, hangers, supports, fitting covers, and other accessories shall be furnished and installed in strict accordance with project drawings, plans and specifications.

1.4 SCOPE

- A. The work covered by this specification consists of furnishing all labor, equipment, materials and performing all operations required, for the correct fabrication and installation of thermal insulation applied to commercial ductwork systems in accordance with the applicable project specifications, and drawings, subject to the terms and conditions of the contract.
- B. The above temperature ranges are typical for these systems. However, if contract specifications call for service temperatures outside the above ranges, consult the manufacturer's published data to determine the operating temperature limitations of the insulation products or products under consideration.

1.5 DEFINITIONS

- A. The term "mineral fiber" as defined by the above specifications includes fibers manufactured of glass, rock, or slag processed from a molten state with or without binder.
- B. Exposed ductwork shall include ductwork installed in areas used by personnel in the normal use of the building, such as finished work rooms, offices, mechanical rooms, storage rooms, etc.
- C. Exposed finished areas include areas that normally have finished walls, ceilings, floors, etc. such as offices.
- D. Concealed ductwork shall include ductwork installed in areas similar to pipe tunnels, covered pipe trenches, spaces inside walls, duct or pipe shafts, spaces above dropped ceilings, unfinished attic spaces, crawl spaces, etc.

1.6 SYSTEM PERFORMANCE

- A. Insulation materials furnished and installed hereunder should meet the minimum economic insulation thickness requirements of the North American Insulation Manufacturer's Association (NAIMA) (Formerly known as TIMA), to ensure cost effective energy conservation performance. Alternatively, materials should exceed the minimum thickness requirements of National Voluntary Consensus Standard 90.1 (1989), energy Efficient Design of New Buildings", of the American Society of Heating, Refrigeration, and Air Conditioning Engineers (ASHRAE). However, if other factors such as condensation control or personnel protection are to be considered, the selection of the thickness of insulation should satisfy the controlling factor.
- B. Insulation materials furnished and installed hereunder shall be Class A, maximum of 25 flame spread, 35 fuel contributed and 50 smoke developed rating and shall meet the fire hazard requirements of the following specifications:
 - 1. American Society for Testing of Materials ASTM E84
 - 2. Underwriter's laboratories, Inc. UL 723
 - 3. National Fire Protection Association NFPA 255
- C. Calcium silicate products shall include a visual identification system to permit positive field determination of their asbestos-free characteristic.

1.7 QUALITY ASSURANCE

- A. Insulation materials and accessories furnished and installed hereunder shall, where required, be accompanied by manufacturers' current submittal or data sheets showing compliance with applicable specifications.
- B. Insulation materials and accessories shall be installed in a workmanlike manner by skilled and experienced workers who are regularly engaged in commercial insulation work.

1.8 DELIVERY AND STORAGE OF MATERIALS

- A. All of the insulation materials and accessories covered by this specification shall be delivered to the job site and stored in a safe, dry place with appropriate labels and/or other product identification.
- B. The contractor shall use whatever means are necessary to protect the insulation materials and accessories before, during and after installation. No insulation materials shall be installed that has become damaged in any way. The contractor shall also use all means necessary to protect work and materials installed by other trades.
- C. If any insulation material has become wet the contractor shall not install such material, and shall remove it from the job site. An exception may be allowed in cases where the contractor is able to demonstrate that wet insulation when fully dried out (either before installation, or afterward following exposure to system operating temperatures) will provide installed performance that is equivalent in all respects to new, completely dry insulation. In such cases, consult the insulation manufacturer for technical assistance.

PART 2 PRODUCTS

2.1 DUCTWORK AND STACKS LOCATED INDOORS

- A. Ductwork shall be externally insulated with Fiberglas insulation in blanket, batt or board form, selected to conform readily to the surface to which it will be applied. Vapor barrier shall be legibly printed by the manufacturer to indicate nominal thickness, R-value and type of insulation. External insulation shall be as follows:
 - 1. Concealed Ductwork
 - a. Rectangular, round or oval ductwork: Fiberglas All-Service duct wrap, light density glass fiber insulation in roll form, 1½" thick, 1.0 lb per cubic foot density, faced with a reinforced foil/kraft laminate vapor barrier. All joints shall be stapled with outward clinching staples and where a vapor barrier is required, sealed with pressure sensitive tape matching the facing, FRK backing stock or glass fabric and mastic. Adjacent sections shall be tightly butted with the 2" tape flap overlapping.
 - 2. Ductwork Located in Attic Space
 - a. Rectangular, round or oval ductwork: Fiberglas All-Service duct wrap, light density glass fiber insulation in roll form, 2" thick, 1.0 lb per cubic foot density, faced with a reinforced foil/kraft laminate vapor barrier. All joints shall be stapled with outward clinching staples and where a vapor barrier is required, sealed with pressure sensitive tape matching the facing, FRK backing stock or glass fabric and mastic. Adjacent sections shall be tightly butted with the 2" tape flap overlapping.
 - 3. Exposed Rectangular Ductwork
 - a. Rectangular: Fiberglas type 705, 2" thick, 3.0 lbs per cubic foot density insulation, heavy density glass fiber insulation in semi-rigid or rigid board form, faced with reinforced foil/kraft laminate vapor barrier. All joints shall be stapled with outward clinching staples and where a vapor barrier is required, sealed with pressure sensitive tape matching the facing, FRK backing stock or glass fabric and mastic. Adjacent sections shall be tightly butted with the 2" tape flap overlapping.
 - 4. Exposed Round or Oval Ductwork

- a. Cross Section less than 10" diameter: Fiberglas all-service duct wrap, 1½" thick, 1.5 lb per cubic foot density, with FSK foil face. All joints shall be stapled with outward clinching staples and where a vapor barrier is required, sealed with pressure sensitive tape matching the facing, FRK backing stock or glass fabric and mastic. Adjacent sections shall be tightly butted with the 2" tape flap overlapping. If installed in high abuse areas like gymnasiums or locker rooms, use 1" thick elastomeric with foil type wrap (similar to Venture Clad Plus).
 - b. Cross section 10" or more in diameter: Fiberglas, Pipe and Tank Insulation, heavy density glass 1½" thick 4.5 lb per cubic foot density, semi-rigid insulation, end grain factory-adhered to ASJ all-service jacket. All joints shall be stapled with outward clinching staples where a vapor barrier is required, sealed with pressure sensitive tape matching the facing, FRK backing stock or glass fabric and mastic. Adjacent sections shall be tightly butted with the 2" tape flap overlapping.
5. Accessory Materials
- a. Accessory materials installed as part of insulation work under this section shall include (but not be limited to):
 - 1) Closure Materials - Butt strips, bands, wires, staples, mastics, adhesives; pressure sensitive tapes.
 - 2) Field-applied jacketing materials - Sheet metal, plastic, canvas, fiberglass cloth, insulating cement; PVC fitting covers.
 - 3) Support materials - Hanger straps, hanger rods, saddles.
 - 4) Fasteners, weld pins/studs, speed clips, insulation washers.
 - 5) Metal mesh or expanded metal lagging.
 - b. All accessory materials shall be installed in accordance with project drawings and specifications, manufacturer's instructions and/or in conformance with the current edition of the Midwest insulation Contractors Association (MICA) "Commercial & Industrial Insulation Standards".
6. Ductwork Located Outdoors
- a. All ductwork (supply, return, exhaust, outside air, relief air) located outdoors shall be covered externally with either 2" of flexible elastomeric closed-cell insulation or 2" of Foamglas® closed cell insulation.
 - b. Installation shall meet manufacturer's recommendations, with all joints firmly butted and secured with adhesives or fasteners.
 - c. All ductwork insulation shall be jacketed with a multi-ply, fabric reinforced, self-adhesive insulation cladding material with a vapor barrier and a thickness of 0.015". Jacketing system shall be Venture Clad Plus #1579CW-E, or equal.
 - d. Install all insulation and jacketing in accordance with manufacturer's installation instructions.
 - e. Rectangular ductwork shall be installed with a crown or slope on top to prevent water from ponding. Insulation and jacketing shall be installed on top of duct and crown or slope shim.
 - f. Jacketing shall be installed to each of the sides separately, starting with bottom, then sides and finally the top. Each side shall overlap the other by 3". The sides shall overlap the bottom and the top shall overlap the sides.
 - g. All jacketing seams must be taped with manufacturer's recommended jointing/seaming tape.
 - h. All underlying foil faced insulation must be sealed with foil or FSK tape.
7. Ductwork Located in Unconditioned Attic Space

- a. All ductwork routed through unconditioned attic spaces shall be insulated, even if not called to be insulated, when located in an unconditioned space. Supply air ductwork insulation thickness in an unconditioned attic space shall be twice (double) the insulation thickness listed in the specification.

PART 3 EXECUTION

3.1 SITE INSPECTION

- A. Before starting work under this section, carefully inspect the site and installed work of other trades and verify that such work is complete to the point where installation of materials and accessories under this section can begin.
- B. Verify that all materials and accessories can be installed in accordance with project drawings and specifications and material manufacturers' recommendations.
- C. Verify by inspecting product labeling, submittal data, and/or certifications which may accompany the shipments that all materials and accessories to be installed on the project comply with applicable specifications and standards and meet specified thermal and physical properties.

3.2 PREPARATION

- A. Ensure that all seams and joints in ductwork have been sealed by the contractor responsible for duct systems.
- B. Ensure that pressure testing of duct systems has been completed prior to installing insulation.
- C. Ensure that all duct surfaces over which or within which insulation is to be installed are clean and dry.
- D. Ensure that insulation is clean, dry, and in good mechanical condition with all factory-applied vapor or weather barriers intact and undamaged. Wet, dirty, or damaged insulation shall not be acceptable for installation.

3.3 INSTALLATION

- A. General
 1. Install insulation in accordance with manufacturer's published instructions and recognized industry practice to ensure that it will serve its intended purpose.
 2. Install insulation materials with smooth and even surfaces. Butt joints firmly together to ensure complete and tight fit over surfaces to be covered.
 3. Maintain the integrity of factory-applied vapor barrier jacketing on all insulation, protecting it against puncture, tears or other damage. All staples used on ductwork insulation shall be coated with suitable sealant to maintain vapor barrier integrity.
- B. Penetrations
 1. Extend ductwork insulation without interruption through walls, floors etc., except at fire dampers or unless noted otherwise.

- C. Duct Wrap Insulation
 - 1. Insulation shall be applied to sheet metal ductwork or plenums with all joints butted firmly together, using manufacturer's recommended stretch-out tables (see Owens-Corning Pub. No. 3-MS-9266) to prevent excessive compression. Insulation shall be secured with mechanical fasteners spaced at 16" maximum centers on the bottom of 24" or wider ducts to prevent the insulation from sagging.
 - 2. All joints shall be firmly butted together and where a vapor barrier is required, sealed with pressure sensitive tape matching the facing, FRK backing stock or glass fabric and mastic. Adjacent sections shall be tightly butted with the 2" tape flap overlapping.

- D. Rigid Insulation
 - 1. Board shall be secured to ductwork with adhesive or with mechanical fasteners with welded pins, secured with insulation caps and washers matching color of the vapor barrier facing. If used, mechanical fasteners shall be within 3" (max.) of board edges, 12" maximum on center.
 - 2. All joints shall be firmly butted together and where a vapor barrier is required, sealed with pressure sensitive tape matching the facing, FRK backing stock or glass fabric and mastic. Adjacent sections shall be tightly butted with the 2" tape flap overlapping.
 - 3. Corner angles shall be installed on all external corners of rigid duct insulation in exposed finished areas before jacketing, except kitchen hood exhaust duct insulation which shall have no corner angles.

3.4 FIELD QUALITY ASSURANCE

- A. Upon completion of all insulation work covered by this specification, visually inspect the work and verify that it has been correctly installed. This may be done while work is in progress, to assure compliance with requirements herein to cover and protect insulation materials during installation.

3.5 PROTECTION

- A. Replace damaged insulation which cannot be satisfactorily repaired, including insulation with vapor barrier damage and moisture-saturated insulation.
- B. Protect the insulation work during the remainder of the construction period to avoid damage and deterioration of the finished insulation work.

3.6 SAFETY PRECAUTIONS

- A. Insulation contractor's employees shall be properly protected during installation of all insulation. Protection shall include proper attire when handling and applying insulation materials, and shall include (but not be limited to) disposable dust respirators, gloves, hard hats, and eye protection.
- B. The insulation contractor shall conduct all job site operations in compliance with applicable provisions of the Occupational Safety and Health Act, as well as with all state and/or local safety and health codes and regulations that may apply to the work.

3.7 ASBESTOS INSULATION

- A. Any existing asbestos insulation on existing ductwork, equipment, etc. where tie-ins are required, shall be removed by the Owner at the Owner's expense. The Contractor and Architect/Engineer shall not be responsible for any cost or work involved with removal or encapsulation of asbestos insulation.

END OF SECTION

MAI: 2024-1524

SECTION 23 07 14

INTERNAL ACOUSTICAL DUCT LINING

PART 1 GENERAL

1.1 SECTION INCLUDES INTERNAL ACOUSTICAL DUCT LINING FOR:

- A. Supply Air Duct
 - 1. Within 10 feet of unit.
- B. Return Air Duct
 - 1. All return air ductwork.

1.2 REFERENCES

- A. Acoustical duct lining materials shall meet the property requirements of the following specifications as applicable to the specific product or end use:
 - 1. Blanket and board
 - a. UL 723 and ASTM E84-75: Surface burning characteristics flame spread less than 25, smoke developed less than 50.
 - b. ASTM C518-70: Thermal Conductivity.
 - c. ASTM C423-66: Absorption Coefficients.
 - d. ASTM C1071.
 - e. NFPA 90A.
- B. Duct lining materials, including all accessories shall be furnished and installed in strict accordance with project drawings, plans and specifications.

1.3 DEFINITIONS

- A. The term "mineral fiber" as defined by the above specifications includes fibers manufactured of glass, rock, or slag processed from a molten state with or without binder.

1.4 SYSTEM PERFORMANCE

- A. Acoustical materials furnished and installed hereunder shall be Class A, maximum of 25 flame spread, 35 fuel contributed, and 50 smoke developed rating.

1.5 QUALITY ASSURANCE

- A. Materials and accessories furnished and installed hereunder shall, where required, be accompanied by manufacturers' current submittal or data sheets showing compliance with applicable specifications.
- B. Materials and accessories shall be installed in a workmanlike manner by skilled and experienced workers who are regularly engaged in commercial insulation work.

PART 2 PRODUCTS

2.1 ACOUSTICAL LINING

- A. Acoustical Lining shall be in blanket or board form, selected to conform readily to the surface to which it will be applied.
 - 1. Fiberglas duct liner in blanket or board form, 1" thick, 1.5 lb. density with a fire-resistant coating to bond the fibers of the airstream surface and rated for air velocity of 5,000 fpm minimum.

2.2 ACCESSORY MATERIALS

- A. Accessory materials installed as part of work under this section shall include (but not be limited to):
 - 1. Adhesives.
 - 2. Fasteners, weld pins/studs, speed clips, insulation washers.

PART 3 EXECUTION

3.1 SITE INSPECTION

- A. Before starting work under this section, carefully inspect the site and installed work of other trades and verify that such work is complete to the point where installation of materials and accessories under this section can begin.
- B. Verify that all materials and accessories can be installed in accordance with project drawings and specifications and material manufacturers' recommendations.
- C. Verify by inspecting product labeling, submittal data, and/or certifications which may accompany the shipments that all materials and accessories to be installed on the project comply with applicable specifications and standards and meet specified thermal and physical properties.

3.2 PREPARATION

- A. Ensure that all seams and joints in ductwork have been sealed by the contractor responsible for the duct systems.
- B. Ensure that pressure testing of duct systems has been completed prior to installing insulation.
- C. Ensure that all duct surfaces over which or within which insulation is to be installed are clean and dry.
- D. Ensure that material is clean, dry, in good mechanical condition, and undamaged. Wet, dirty, or damaged material shall not be acceptable for installation.

3.3 INSTALLATION

- A. General
 - 1. Install lining in accordance with manufacturer's published instructions and recognized industry practice to ensure that it will serve its intended purpose.

B. Duct Lining

1. All airstream surfaces of ducts, plenums, housings, and air shafts designated to receive lining shall be completely covered with lining adhered with 90% minimum coverage of adhesive meeting. All leading edges and transverse joints shall be adhesive-coated. If air velocities exceed 4000 FPM, metal nosing shall be used on all transverse leading edges. Transverse joints shall be neatly butted and there shall be no interruptions or gaps. Install lining with smooth and even surfaces. The duct liner shall be additionally secured with weld secured mechanical fasteners which shall compress the duct liner sufficiently to hold it firmly in place. Mechanical fasteners shall be spaced in accordance with manufacturer's published schedule for the applicable interior plenum, housing or shaft width.

3.4 FIELD QUALITY ASSURANCE

- A. Upon completion of all work covered by this specification, visually inspect the work and verify that it has been correctly installed.

3.5 PROTECTION

- A. Replace damaged work which cannot be satisfactorily repaired.
- B. Protect the work during the remainder of the construction period, to avoid damage and deterioration of the finished work.

3.6 SAFETY PRECAUTIONS

- A. Contractor's employees shall be properly protected during the course of all work. Protection shall include proper attire when handling and applying insulation materials, and shall include (but not be limited to) disposable dust respirators, gloves, hard hats, and eye protection.
- B. The contractor shall conduct all job site operations in compliance with applicable provisions of the Occupational Safety and Health Act, as well as with all state and/or local safety and health codes and regulations that may apply to the work.

3.7 ASBESTOS INSULATION

- A. Any existing asbestos insulation on existing ductwork, equipment, etc. where tie-ins are required, shall be removed by the Owner at the Owner's expense. The Contractor and Architect/Engineer shall not be responsible for any cost or work involved with removal or encapsulation of asbestos insulation.

END OF SECTION

MAI: 2024-1524

SECTION 23 25 00

HVAC SYSTEMS TESTING, CLEANING, WATER TREATMENT & STARTUP

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Substantial completion check list and sign-off forms.

1.2 PRODUCTS FURNISHED, BUT NOT INSTALLED, UNDER THIS SECTION

- A. Chemical shot feeder, glycol feed system, placement of water coupon rack, etc. shall be furnished by the contractor responsible for chemical treatment of the systems, installed by the Mechanical Trade. Shot feeder shall be installed at a serviceable, low height.

1.3 QUALIFICATIONS

- A. The chemical treatment company shall specialize in water treatment of mechanical systems. The company shall have local representatives with water analysis laboratories and full time service personnel.

1.4 REGULATORY REQUIREMENTS

- A. Conform to applicable code for addition of non-potable chemicals to building mechanical systems, and for public sewage systems.
- B. Products requiring electrical connection and listed and classified by UL as suitable for the purpose specified and indicated.

1.5 MAINTENANCE SERVICE

- A. Furnish service and maintenance of treatment systems and system water for one year from date of substantial completion.
- B. Provide monthly technical service visits to perform field inspections and make water analysis on site. Detail findings in writing on proper practices, chemical treating requirements, and corrective actions needed. Submit two copies of field service report to Owner after each visit.
- C. Provide laboratory and technical assistance services during this maintenance period.
- D. Provide training course for Owner's personnel, instructing them on installation, care, maintenance, testing, and operation of the water treatment systems. Arrange course at startup of systems.
- E. Provide on-site inspections of equipment during scheduled or emergency shutdown to properly evaluate success of water treatment program, and make recommendations in writing based on these inspections.

1.6 MAINTENANCE MATERIALS

- A. Provide sufficient chemicals for treatment and testing during warranty period.

PART 2 PRODUCTS - Not used

PART 3 - EXECUTION

3.1 SYSTEM COMPLETION CHECKLIST

- A. The checklist which follows this specification section is to be considered part of the specifications.
- B. The checklist is to be completed by the Installing Contractor and the prime Mechanical Contractor for each item as directed.

END OF SECTION

MAI: 2024-1524

SYSTEMS COMPLETION
 CHECKLIST

Review Item	Notice Required	Installing Contractor		Date	Owner's Representative Signature	Remarks
		Name	Signature			
Items						
Heat Exchanger	When Completed					Verify heat exchangers have been piped properly per drawing and thoroughly cleaned of all oil, dust and debris.
Duct Connections	When Completed					Verify all duct connections to be complete and that flex duct connections were used.
Dampers	When Completed					Verify linkages are free to operate and temperature control operation is correct.
Smoke Detectors	When Completed					Verify duct smoke detectors have been installed and are operational.
Temperature Controls	When Completed					Verify all temperature controls have been installed and are operational.
AHU Labeling	When Completed					Verify AHU properly identified and labeled per specification.
Condensate Drain	When Completed					Verify P-trap on drain is piped correctly with minimum depth greater than total static pressure possible by RTU. Verify drain extended to roof drain.
Filters	When Completed					Verify prefilters and final filters are clean and ready for final air flow.
Blower	When Completed					Verify proper rotation and operation.

**SYSTEMS COMPLETION
 CHECKLIST**

/Review Item	Notice Required	Installing Contractor		Date	Owner's Representative Signature	Remarks
		Name	Signature			
Network Systems						
Inspection	When Completed					Verify all joints have been sealed and connectors made, etc.
Dampers	When Completed					Verify balance dampers are installed on each duct branch and duct takeoff.
Smoke Dampers	When Completed					Verify dampers are operational and open prior to air handling system operation.
Ductwork	When Completed					Verify flex duct installed without "kinks" and have maximum 5 foot length.
Insulation	When Completed					Verify all insulation has been installed and sealed on duct systems as specified.
Cleaning	When Completed					Verify all dust, dirt and debris removed from ducts.
Grilles and Registers	When Completed					Verify installation is complete and properly supported.

**SYSTEMS COMPLETION
 CHECKLIST**

		Name	Signature			
Miscellaneous Requirements						
As-built drawings of all systems	At completion of installation					Per specification
Operation and Maintenance manuals	At completion of installation					Per specification
Air Balance Report	At completion					Per specification

	of installation					
Water Balance Report	At completion of installation					Per specif
One complete set of shop drawings for Owner	At completion of project					Per specif
Inspection, local authority approvals, etc.	At completion of project					

SECTION 23 30 00

AIR DISTRIBUTION

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Metal ductwork.
- B. Nonmetal ductwork.
- C. Dampers.
- D. Duct cleaning.

1.2 REFERENCES: Material and/or equipment specified in this section shall meet or exceed one or more of the property requirements or installation requirements of the following specifications/publications as applicable to the specific product or end use:

- A. ASTM A36 - Structural Steel.
- B. ASTM A90 - Weight of Coating on Zinc-Coated (Galvanized) Iron or Steel Articles.
- C. ASTM A167 - Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip.
- D. ASTM A366 - Steel, Sheet, Carbon, Cold Rolled, Commercial Quality.
- E. ASTM A480 - General Requirements for Flat-Rolled Stainless and Heat Resisting Steel Plate, Sheet, and Strip.
- F. ASTM A525 - General Requirements for Steel Sheet.
- G. ASTM A527 - Steel Sheet, Zinc Coated (Galvanized) by Hot Dip Process, Lock Forming Quality.
- H. ASTM A568 - Steel, Sheet, Carbon, and High-Strength, Low Alloy, Hot-Rolled and Cold-Rolled.
- I. ASTM A569 - Steel, Carbon (0.15 Maximum, Percent), Hot-Rolled Sheet and Strip, Commercial Quality.
- J. ASTM B209 - Aluminum and Aluminum-Alloy Sheet and Plate.
- K. AWS D9.1 - Welding of Sheet Metal.
- L. NBS PS 15 - Voluntary Product Standard for Custom Contact-Molded Reinforced-Polyester Chemical Resistant Process Equipment.
- M. NFPA 54 - National Fuel Gas Code.
- N. NFPA 70 - National Electric Code.

- O. NFPA 90A - Installation of Air Conditioning and Ventilating Systems.
- P. NFPA 90B - Installation of Warm Air Heating and Air Conditioning Systems.
- Q. NFPA 91 - Installation of Blower and Exhaust Systems for Dust, Stock and Vapor Removal or Conveying.
- R. NFPA 96 - Installation of Equipment for the Removal of Smoke and Grease-Laden Vapors from Commercial Cooking Equipment.
- S. SMACNA - HVAC Air Duct Leakage Test Manual.
- T. SMACNA - HVAC Duct Construction Standards - Metal and Flexible.
- U. SMACNA - Fibrous Glass Duct Construction Standards.
- V. UL 33 - Heat Responsive Links for Fire Protection Systems.
- W. UL 181 - Factory-Made Air Ducts and Connectors.
- X. UL 555 - Fire Dampers and Ceiling Dampers.

1.3 SCOPE

- A. The work covered by this specification consists of furnishing all labor, equipment, materials and performing all operations required, for the correct and complete fabrication and installation of ductwork in accordance with the applicable project specifications, drawings, codes, regulations and standards.

1.4 PERFORMANCE REQUIREMENTS

- A. No variation of duct configuration or sizes will be permitted except by written permission from the Engineer. Size round ducts installed in place of rectangular ducts in accordance with ASHRAE table of equivalent rectangular and round ducts.

1.5 QUALITY ASSURANCE

- A. Perform Work in accordance with SMACNA - HVAC Duct Construction Standards - Metal and Flexible as a minimum. Where requirements are specified in this specification, or noted on drawings above the minimum SMACNA Standards, the more stringent specified and noted requirements and practices shall be followed.
- B. Maintain one copy of document on site.

1.6 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing the Products specified in this section with minimum three years experience.
- B. Installer: Company specializing in performing the work of this section with minimum five years experience.

1.7 REGULATORY REQUIREMENTS

- A. Construct ductwork to NFPA 90A and SMACNA standards, latest edition.

1.8 ENVIRONMENTAL REQUIREMENTS

- A. Do not install duct sealants when temperatures are less than those recommended by sealant manufacturers.
- B. Maintain temperatures during and after installation of duct sealants.

1.9 SPECIAL INSPECTION FOR SMOKE CONTROL (per Michigan Building Code 1704.14)

- A. Special Inspection for Smoke Control: Smoke control systems shall be tested by a special inspector.
- B. Testing scope: The test scope shall be as follows:
 - 1. During erection of ductwork and prior to concealment for the purposes of leakage testing and recording of device location.
 - 2. Prior to occupancy and after sufficient completion for the purposes of pressure difference testing, flow measurements, and detection and control verification.
- C. Qualifications: Special inspection agencies for smoke control shall have expertise in fire protection engineering, mechanical engineering and certification as air balancers.

PART 2 PRODUCTS

2.1 DUCT - SHEET METAL HVAC DUCTWORK

- A. Galvanized Steel Ducts: ASTM A525 and ASTM A527 galvanized steel sheet, lock-forming quality, having G60 zinc coating of in conformance with ASTM A90.
- B. Fasteners: Rivets, bolts, or sheet metal screws.
- C. Sealant:
 - 1. Non-hardening, water resistant, fire resistive, compatible with mating materials; liquid used alone or with tape, or heavy mastic. All ductwork joints, connections, etc. shall be sealed.
- D. Duct Hangers: Rod and trapeze duct support shall be used for all ductwork with one dimension 18" or larger. Smaller duct may be installed with strap hanger system using SMACNA Standard as minimum.
 - 1. Hanger Rod: ASTM A36; steel; threaded both ends, threaded one end, or continuously threaded, with steel angle trapeze and non-eccentric beam clamps.
 - 2. Hanger rods, angles trapeze sizing and spacing shall meet SMACNA standards, and local and state building codes for duct sizes being supported.
 - 3. Straps and hanger attachment system sizing, spacing, and installation shall meet SMANCA Standards, local and state building codes, etc. for duct size and supports.
 - 4. Duct hangers shall not be supported from metal deck. Furnish and install all support steel as required to suspend with beam clamps similar to Grinnell Fig. 260 from structural steel joists or beams.

2.2 DUCTWORK FABRICATION

- A. Fabricate and support in accordance with SMACNA HVAC Duct Construction Standards - Metal and Flexible as a minimum. Where requirements are specified in this specification, or noted on drawings above the minimum SMACNA Standards, the more stringent specified and noted requirements and practices shall be followed. Provide duct material, gages, reinforcing, and sealing for operating pressures not less than 6" w.c. on upstream side (higher pressure side) of variable air volume boxes. Return air duct, exhaust air duct and downstream side of variable air volume boxes (low pressure side) shall be constructed to not less than 2" w.c.
- B. Construct T's, bends, and elbows with radius of not less than 1½ times width of duct on centerline. Where not possible, and engineer's written approval is obtained, rectangular elbows may be used, provided turning vanes are utilized. Where acoustical lining is indicated, provide turning vanes of perforated metal with glass fiber insulation.
- C. Increase duct sizes gradually, not exceeding 15 degrees divergence wherever possible; maximum 30 degrees divergence upstream of equipment and 45 degrees convergence downstream.
- D. Fabricate continuously welded round and oval duct fittings two gages heavier than duct gages indicated in SMACNA Standard. Joints shall be minimum 4 inch cemented slip joint, brazed or electric welded. Prime coat welded joints.
- E. Provide standard 45 degree lateral wye takeoffs unless otherwise indicated where 90 degree conical tee connections may be used.
- F. Duct Sealant
- G. All ductwork including supply air, outside air, return air, exhaust air and relief air ductwork shall have joints sealed.
 - 1. Ductwork designed at SMACNA 6" pressure shall meet SMACNA Class "A" seal requirements.
 - 2. Ductwork designed at SMACNA 2" pressure shall meet SMACNA Class "C" seal requirements.

2.3 MANUFACTURED DUCTWORK AND FITTINGS

- A. Manufacture in accordance with SMACNA HVAC Duct Construction Standards - Metal and Flexible as a minimum. Where requirements are specified in this specification, or noted on drawings above the minimum SMACNA Standards, the more stringent specified and noted requirements and practices shall be followed. Provide duct material, gages, reinforcing, and sealing for operating pressures not less than 6" w.c. unless otherwise noted on drawings.
 - 1. Flat Oval Ducts:
 - a. Machine made from round spiral lockseam duct with light reinforcing corrugations; fittings manufactured of at least two gages heavier metal than duct.
 - 2. Double Wall Insulated Flat Oval Ducts:
 - a. Machine made from round spiral lockseam duct with light reinforcing corrugations, galvanized steel outer wall, 1 inch (25 mm) thick fiberglass

insulation, perforated galvanized steel inner wall; fittings manufactured with solid inner wall.

3. PVC Coated Steel Ducts:
 - a. UL 181, Class 1, galvanized steel duct coated with polyvinyl chloride plastic, 4 mil (0.1 mm) thick on outside and 2 mil (0.05 mm) thick on inside.
4. Double Wall Insulated Round Ducts:
 - a. Round spiral lockseam duct with galvanized steel outer wall, 1 inch (25 mm) thick fiberglass insulation, perforated galvanized steel inner wall; fitting with solid inner wall.
5. Transverse Duct Connection System:
 - a. SMACNA rated rigidly class connection, interlocking angle and duct edge connection system with sealant, gasket, cleats, and corner clips for not less than 6" w.c. operating pressure unless otherwise noted on drawings.

2.4 DUCT TEST HOLES

- A. Temporary Test Holes: Cut or drill in ducts as required. Cap with neat patches, neoprene plugs, threaded plugs, or threaded or twist-on metal caps.
- B. Permanent Test Holes: Factory fabricated, air tight flanged fittings with screw cap. Provide extended neck fittings to clear insulation.

2.5 EQUIPMENT FLEXIBLE DUCT CONNECTIONS (To air moving equipment.)

- A. Fabricate in accordance with SMACNA HVAC Duct Construction Standards - Metal and Flexible as a minimum. Where requirements are specified in this specification, or noted on drawings above the minimum SMACNA Standards, the more stringent specified and noted requirements and practices shall be followed.
- B. Connector: Fabric crimped into metal edging strip.
 1. Fabric: UL listed fire-retardant neoprene coated woven glass fiber fabric to NFPA 90A, minimum density 30 oz per sq yd.
 2. Net Fabric Width: Approximately 3 inches wide.
 3. Metal: 3 inch wide 24 gage galvanized steel.

2.6 FLEXIBLE INSULATED DUCTS

- A. All flexible ducts used to connect diffuser, grilles, etc. shall be similar to Flexmaster USA, Inc.; Type #3. Flex duct shall be insulated type consisting of a factory fabricated assembly of a trilaminate of aluminum foil, fiberglass and polyester. It shall be mechanically locked without adhesive into a formed aluminum helix on the ducts outside surface and shall withstand a minimum 6" w.c. operating pressure. The duct material shall be factory wrapped in a thick blanket of fiberglass insulation with a "C" factor of .25 or less. The insulation shall be encased in a fire retardant polyethylene protective vapor barrier with a perm rating of not over 0.1 grains per square foot per hour per inch of mercury. The flexible duct shall be constructed in accordance with and be listed as UL 181 Class I air duct and comply with NFPA 90A and 90B and have a flame spread of not over 25 and a smoke developed of not over 50. The flexible duct shall have a minimum pressure rating of 12" w.c. through a temperature range of -20°F to 250°F. Flexible duct shall be UL rated.

- B. Maximum length of flexible duct shall be 5'-0" to each outlet unless indicated otherwise on drawing.
- C. Flexible duct shall be installed without bends unless so indicated on drawing.

2.7 DUCT SPIN-IN FITTINGS

- A. Low pressure spin-in fittings (take-offs from main duct to flexible duct) shall be similar to Flexmaster USA, Inc. Model CB-D conical bellmouth fitting with damper and positive locking wing nut. Edges of the take-off opening in the duct shall be sealed with fire retardant duct sealer.

2.8 AIR TURNING DEVICES/EXTRACTORS

- A. Multi-blade device with blades aligned in short dimension, steel construction, with individually adjustable blades and mounting straps.

2.9 BACKDRAFT DAMPERS.

- A. Gravity Backdraft Dampers, Size 18 x 18 inches or Smaller, Furnished with Air Moving Equipment: Air moving equipment manufacturers standard construction.
- B. Multi-Blade, Parallel Action Gravity Balanced Backdraft Dampers: 16 gage thick galvanized steel with center pivoted blades of maximum 6 inch width, with felt or flexible vinyl sealed edges, linked together in rattle-free manner with 90 degree stop, steel ball bearings, and plated steel pivot pin; adjustment device to permit setting for varying differential static pressure.

2.10 FIRE, SMOKE AND COMBINATION FIRE/SMOKE DAMPERS

- A. Fire dampers shall be fabricated in accordance with NFPA 90A and UL 555. They shall have a minimum rating of 1½ hour, have a dynamic closure rating of 3,000 fpm and 6" wg and be so identified with a UL label. Smoke dampers shall be fabricated in accordance with NFPA 90A and UL 555S with same rating as fire damper and be so identified with a UL label. Smoke damper shall be opposed blade type, normal functions to close automatically and opened by a factory installed electric actuator. A smoke damper may also be a fire damper if it's location lends itself to the multiple functions and it meets the requirements of both.
- B. Provide factory sleeve and collar for each damper.
- C. Operators: Factory installed UL listed and labeled spring closed motorized open, electric type suitable for 120 volts, single phase, 60 Hz. Provide end switches to indicate damper position. Locate damper operator on exterior of duct and link to damper operating shaft.
- D. Normally Closed Smoke Responsive Fire Dampers: Curtain type, opening by gravity upon actuation of electro-thermal link, flexible stainless steel blade edge seals to provide constant sealing pressure.
- E. Normally Open Smoke Responsive Fire Dampers: Curtain type, closing upon actuation of electro-thermal link, flexible stainless steel blade edge seals to

provide constant sealing pressure, stainless steel springs with locking devices to ensure positive closure for units mounted horizontally.

- F. Ceiling Dampers: Galvanized steel, 22 gage frame and 16 gage flap, two layers 0.125 inch ceramic fiber on top side with locking clip.
- G. Horizontal Dampers: Galvanized steel, 22 gage frame, stainless steel closure spring, and lightweight, heat retardant non-asbestos fabric blanket.
- H. Curtain Type Dampers: Galvanized steel with interlocking blades. Provide stainless steel closure springs and latches for horizontal installations and closure under air flow conditions. Configure with blades out of air stream.
- I. Fusible Links: Listed for 165 degrees F unless higher or lower temperature rating is required. Contractor shall verify usages and ratings for fusible link temperature rating.

2.11 VOLUME CONTROL DAMPERS.

- A. Provide balancing dampers on all duct take-offs to diffusers, grilles and registers; at points on supply, return and exhaust systems where branches take off from larger ducts, as required for air balancing (install damper a minimum of 2 duct widths from take-off; as required by balancing agency; and where indicated on drawings. Where access to dampers cannot be achieved, access panels shall be installed. If access panels are not preferred, remote dampers shall be installed. Fabricate in accordance with SMACNA HVAC Duct Construction Standards - Metal and Flexible as a minimum. Where requirements are specified in this specification, or noted on drawings above the minimum SMACNA Standards, the more stringent specified and noted requirements and practices shall be followed. All dampers shall have a locking device per SMACNA Standards, to hold the damper in a fixed position without vibrating.
- B. Splitter Dampers:
 - 1. Material: Same gage as duct to 24 inches size in either direction, and two gages heavier for sizes over 24 inches.
 - 2. Blade: Fabricate of single thickness sheet metal to streamline shape, secured with continuous hinge or rod.
 - 3. Operator: Minimum ¼ inch diameter rod in self aligning, universal joint action, flanged bushing with set screw.
- C. Single Blade Dampers: Fabricate for duct sizes up to 6 x 30 inch.
- D. Multi-Blade Damper: Fabricate of opposed blade pattern with maximum blade sizes 8 x 72 inch. Assemble center and edge crimped blades in prime coated or galvanized channel frame with suitable hardware.
- E. End Bearings: Except in round ductwork 12 inches and smaller, provide end bearings. On multiple blade dampers, provide oil-impregnated nylon or sintered bronze bearings.
- F. Quadrants:
 - 1. Provide locking, indicating quadrant regulators on single and multi-blade dampers.

2. On insulated ducts mount quadrant regulators on stand-off mounting brackets, bases, or adapters.
3. Where rod lengths exceed 30 inches provide regulator at both ends.

2.12 ROOF CURBS

- A. The mechanical trades shall be responsible for furnishing and setting in place all mechanical equipment, roof curbs and piping/duct roof curbs. The general trade shall be responsible for the roof work and associated flashing. The mechanical trade shall furnish and install treated wood base blocking as required to level curb and to match roof insulation thickness. Curb shall be as specified, or if not specified should be similar to Pate or Thy-curb with heavy gauge galvanized steel, insulated and with wood nailer. Height of curb scheduled or specified shall be height required to top of curb above finished roof. If height is not specified or noted, a minimum 12" high above finished roof will be required. (pipe support units shall be at height required). Rooftop units will be shipped knocked down with the mechanical trade responsible for assembly on site. Roof curb shall mate with unit and provide support and a watertight installation.

PART 3 EXECUTION

3.1 DUCT INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Install and seal ducts in accordance with SMACNA HVAC Duct Construction Standards - Metal and Flexible as a minimum. Where requirements are specified in this specification, or noted on drawings above the minimum SMACNA Standards, the more stringent specified and noted requirements and practices shall be followed. Note: All ductwork joints, fittings, etc. shall be sealed.
- C. Duct Sizes are inside clear dimensions. For lined ducts, maintain sizes inside lining.
- D. Provide openings in ductwork for pitot tube where required for testing of systems, complete with metal can with spring device or screw to ensure against air leakage. Where openings are provided in insulated ductwork, install insulation material inside a metal ring.
- E. Locate ducts with sufficient space around equipment to allow normal operating and maintenance activities.
- F. Use crimp joints with bead for joining round duct sizes 8 inch and smaller with crimp in direction of air flow.
- G. Use double nuts and lock washers on threaded rod supports.
- H. Slope underground ducts to plenums or low pump out points at 1/8" per foot. Provide access doors for inspection.
- I. Tape joints of PVC coated metal ductwork with PVC tape.
- J. Insulate buried supply duct runs with two inch thick insulation styrofoam covered with plastic vapor barrier.

- K. Connect flexible ducts to metal ducts mechanically without adhesives. Connect outlets to low pressure ducts with flexible duct held in place with strap or clamp.
- L. Coordinate duct locations with available space, route ducts around obstructions as required, and review duct changes with Engineer, all before starting construction.
- M. Set plenum doors 6 to 12 inches above floor. Arrange door swings so that fan static pressure holds door in closed position.
- N. Provide residue traps in kitchen hood exhaust ducts at base of vertical risers with provisions for clean out. Use stainless steel for ductwork exposed to view and stainless steel or carbon steel for ducts where concealed.
- O. During construction provide temporary closures of metal or taped polyethylene on open ductwork to prevent construction dust from entering ductwork system.
- P. Install manual balancing dampers in ductwork at all branch take-offs, all diffuser and grille take offs, etc.
- Q. Install roof exhaust fans on minimum 18" high roof curbs but not less than 12" higher than parapet walls within 10'-0" of fan.

3.2 DUCT CLEANING

- A. Clean duct system and force air at high velocity through duct to remove accumulated dust. To obtain sufficient air, clean half the system at a time. Protect equipment which may be harmed by excessive dirt with temporary filters, or bypass during cleaning.

3.3 SMOKE AND FIRE DAMPER PREPARATION

- A. Verify that electric power is available and of the correct characteristics.

3.4 FIRE DAMPER, ACCESS DOOR AND FLEXIBLE DUCT INSTALLATION

- A. Install accessories in accordance with manufacturer's instructions, NFPA 90A, and follow SMACNA HVAC Duct Construction Standards - Metal and Flexible for 6" pressure duct system as a minimum. Where requirements are specified in this specification, or noted on drawings above the minimum SMACNA Standards, the more stringent specified and noted requirements and practices shall be followed.
- B. Provide backdraft dampers on exhaust fans or exhaust ducts nearest to outside and where indicated.
- C. Provide duct access doors for inspection and cleaning before and after filters, coils, fans, automatic dampers, at fire dampers, combination fire and smoke dampers, and elsewhere as indicated. Provide for cleaning kitchen exhaust ductwork in accordance with NFPA 96. Provide minimum 12x12 inch size for hand access, 18 x 18 inch size for shoulder access, and as indicated unless limited by duct size.
- D. Provide duct test holes where indicated and required for testing and balancing purposes.

- E. Provide fire dampers, combination fire and smoke dampers and smoke dampers at locations indicated, where ducts and outlets pass through fire rated components, and where required by authorities having jurisdiction. Install with required perimeter mounting angles, sleeves, breakaway duct connections, corrosion resistant springs, bearings, bushings and hinges in accordance with NFPA 92A and the latest edition of "SMACNA State Fire Marshal, Fire and Smoke Damper Clarification" manual as published by SMACNA.
- F. Demonstrate re-setting of fire dampers to Owner's representative.
- G. Provide flexible connections immediately adjacent to equipment in ducts associated with fans and motorized equipment.
- H. Provide balancing dampers at points on supply, return, and exhaust systems where branches are taken from larger ducts as required for air balancing. Install minimum 2 duct widths from duct take-off.
- I. Use splitter dampers only where indicated.
- J. Provide balancing dampers on duct take-off to diffusers, grilles, and registers, regardless of whether dampers are specified as part of the diffuser, grille, or register assembly.
- K. Provide balancing dampers where recommended by balancing agency.

3.5 DIFFUSER AND GRILLE INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Check location of outlets and inlets and make necessary adjustments in position to conform with architectural features, symmetry, and lighting arrangement.
- C. Install diffusers to ductwork with air tight connection.
- D. Provide balancing dampers on duct take-off to diffusers, grilles and registers, whether dampers are specified as part of the diffuser, grille or register assembly.
- E. Paint ductwork visible behind air outlets and inlets matte black.
- F. Diffuser/grille color shall be selected from the full range of manufacturer available colors and finishes.

END OF SECTION

MAI: 2024-1524

SECTION 23 80 00

TEMPERATURE CONTROL SYSTEM

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Products Furnished but Not Installed Under This Section
- B. Related Sections
- C. Description
- D. Approved Control System Contractor
- E. Quality Assurance
- F. System Performance
- G. Submittals
- H. Warranty
- I. Ownership of Proprietary Material

1.2 PRODUCTS FURNISHED BUT NOT INSTALLED UNDER THIS SECTION

- A. Control Valves
- B. Pressure and Temperature Sensor Wells and Sockets
- C. Automatic Dampers
- D. Terminal Unit Controls
- E. Pressure Transmitters
- F. Temperature Transmitters
- G. Power Transmitters
- H. Thermostats
- I. Sensors
- J. Controllers
- K. Smoke Detectors

1.3 RELATED SECTIONS

- A. The General Conditions of the Contract, Supplementary Conditions, and General Requirements are a part of these Specifications and shall be used in conjunction with this Section as a part of the Contract Documents. Consult them for further instructions pertaining to this work. The Contractor is bound by the provisions of Division 0 and Division 1.

1.4 DESCRIPTION

- A. General: The control system shall be as indicated on the drawings and described in the specifications.
- B. Direct Digital Control (DDC) technology shall be used to provide the functions necessary for control of mechanical systems on this project.
- C. The control system shall accommodate simultaneous multiple user operation. Access to the control system data should be limited only by operator password. Multiple users shall have access to all valid system data. An operator shall be able to log onto any work-station on the control system and have access to all appropriate data.
- D. The control system shall be designed such that each mechanical system will be able to operate under stand-alone control. As such, in the event of a network communication failure, or the loss of any other controller, the control system shall continue to independently operate under control.
- E. Communication between the control panels and all work-stations shall be over a high speed network. All nodes on this network shall be peers. The operator shall not have to know the panel identifier or location to view or control an object. Application Specific Controllers shall be constantly scanned by the network controllers to update point information and alarm information.
- F. The documentation is schematic in nature. The Contractor shall provide hardware and software necessary to implement the functions and sequences shown.

1.5 BASIC SCOPE OF WORK

- A. The following Scope notes the basic temperature control system items, but is not all inclusive. See drawings for further information. All new temperature control devices shall be direct digital controlled. The existing control system is Johnson Controls.
- B. The Temperature Control Contractor shall provide all necessary unitary controllers for rooftop unit (RTU-1). Provide all sequences as stated in the Sequence of Operations in this section.
- C. The Temperature Control Contractor shall be responsible for controls, control sequences, control devices, control wiring, etc. rooftop unit (RTU-1).
- D. The Temperature Control Contractor shall utilize the existing control panel/building.
- E. Verify if existing building control panel is large enough to connect new

equipment and expand as necessary to connect the new unitary controllers (i.e. RTU-1, etc.) into.

- F. The Temperature Control Contractor shall provide associated software, color graphics, etc. to control and monitor new and existing equipment.
- G. It is the intent of this project and Temperature Controls Contractor's responsibility to have all new HVAC equipment to be completely operational and functional through the existing temperature control system.
- H. The Temperature Control Contractor shall coordinate with Air Balance Contractor to calibrate all new volume boxes.
- I. The temperature control contractor shall complete all work as necessary to provide proper temperature, and airflows to each space at the completion of each phase as denoted by the Architect. Refer to architectural drawings for phasing process.

1.6 APPROVED CONTROL SYSTEM CONTRACTOR

- A. Approved Control System Contractor:
 - 1. Johnson Controls (Base Bid) - Contact Mike Bierek for scope/pricing. Johnson Controls, Inc. shall interface with the existing JCI system and supply all necessary control devices, control valves, etc. for a complete operable temperature control system. The new system shall be Web based for monitoring and adjusting HVAC system by Owner.
- B. Codes and Standards: Meet requirements of all applicable standards and codes, except when more detailed or stringent requirements are indicated by the Contract Documents, including requirements of this section.
 - 1. Underwriters Laboratories: Products shall be UL-916-PAZX listed.
 - 2. National Electrical Code - NFPA 70.
 - 3. Federal Communications Commission - Part J.
 - 4. ASHRAE/ANSI 135-1995 (BACnet)
- C. All products used in this installation shall be new, currently under manufacture, and shall be applied in similar installations for a minimum of 2 years.
- D. This installation shall not be used as a test site for any new products unless explicitly approved by the Owner's representative in writing prior to bid date.
- E. Spare parts shall be available for at least 5 years after completion of this contract.

1.7 SYSTEM PERFORMANCE

- A. Performance Standards. The system shall conform to the following:
 - 1. Graphic Display. The system shall display a graphic with a minimum of 20 dynamic points. All current data shall be displayed within 20 seconds of the request.
 - 2. Graphic Refresh. The system shall update all dynamic points with current data within 30 seconds.

3. Object Command. The maximum time between the command of a binary object by the operator and the reaction by the device shall be 10 seconds. Analog objects shall start to adjust within 10 seconds.
4. Object Scan. All changes of state and change of analog values shall be transmitted over the high-speed network such that any data used or displayed at a controller or work-station will be current, within the prior 60 seconds.
5. Alarm Response Time. The maximum time from when an object goes into alarm to when it is annunciated at the work-station shall not exceed 45 seconds. Temperature Control Contractor shall provide Owner with means to receive e-mail or text of alarm.
6. Program Execution Frequency. Custom and standard applications shall be capable of running as often as once every 5 seconds. The Contractor shall be responsible for selecting execution times consistent with the mechanical process under control.
7. Performance. Programmable Controllers shall be able to execute DDC PID control loops at a selectable frequency from at least once every 5 seconds. The controller shall scan and update the process value and output generated by this calculation at this same frequency.
8. Multiple Alarm Annunciation. All work-stations on the network shall receive alarms within 5 seconds of each other.
9. Reporting Accuracy. Table 1 lists minimum acceptable reporting accuracies for all values reported by the specified system.
10. Table I -- Reporting Accuracy

Space temperature	±0.5 C (±1 F)
Ducted air	±1.0 C (±2 F)
Outside air	±1.0 C (±2 F)
Water temperature	±0.5 C (±1 F)
Delta-T	±0.15 C (±0.25 F)
Relative humidity	±5% RH
Water flow	±5% of full scale
Air flow (terminal)	±10% of reading (Not
Air flow (measuring station)	±5% of reading
Air pressure (ducts)	±25 Pa (±0.1" w.g.)
Air pressure (space)	±3 Pa (±0.01" w.g.)
Water pressure	±2% full scale (Note
Electrical power	5% of reading (Note
Carbon Monoxide (CO)	±50 PPM
Carbon Dioxide (CO ₂)	±50 PPM

1.8 SUBMITTALS

- A. Contractor shall provide shop drawings and manufacturers' standard specification data sheets on all hardware and software to be provided. No work may begin on any segment of this project until submittals have been reviewed by the Engineer and Owner for conformity with the plan and specifications. Electronic copies are required.
- B. Quantities of items submitted shall be reviewed by the Engineer and Owner. Such review shall not relieve the contractor from furnishing quantities required for completion.

- C. Provide the Engineer and Owner, any additional information or data which is deemed necessary to determine compliance with these specifications or which is deemed valuable in documenting the system to be installed.

- D. Submit the following within 60 days of contract award:
 - 1. A complete bill of materials of equipment to be used indicating quantity, manufacturer and model number.
 - 2. A schedule of all control valves including the valve size, model number (including pattern and connections), flow, CV, pressure rating, and location.
 - 3. A schedule of all control dampers. This shall include the damper size, pressure drop, manufacturer and model number.
 - 4. Provide manufacturers cut sheets for major system components. When manufacturer's cut sheets apply to a product series rather than a specific product, the data specifically applicable to the project shall be highlighted or clearly indicated by other means. Each submitted piece of literature and drawings shall clearly reference the specification and/or drawing that the submittal is being submitted to cover. Include:
 - a. Building Controllers
 - b. Custom Application Controllers
 - c. Application Specific Controllers
 - d. Auxiliary Control Devices
 - e. Proposed control system riser diagram showing system configuration, device locations, addresses, and cabling.
 - f. Detailed termination drawings showing all required field and factory termination's. Terminal numbers shall be clearly labeled.
 - g. Points list showing all system objects, and the proposed English language object names
 - h. Sequence of operations for each system under control. This sequence shall be specific for the use of the Control System being provided for this project.
 - i. Provide a BACnet Product Implementation Conformance Statement (PICS) for each BACnet device type in the submittal.
 - j. Color prints of proposed graphics with a list of points for display.

- E. Project Record Documents: Upon completion of installation submit three (3) copies of record (as-built) documents. The documents shall be submitted for approval prior to final completion and include:
 - 1. Project Record Drawings - These shall be as-built versions of the submittal shop drawings. One set of magnetic media including CAD .DWG or .DXF drawing files shall also be provided.
 - 2. Testing and Commissioning Reports and Checklists.
 - 3. Operating and Maintenance (O & M) Manual - These shall be as-built versions of the submittal product data. In addition to that required for the submittals, the O & M manual shall include:
 - a. Names, address and 24-hour telephone numbers of Contractors installing equipment, and the control systems and service representative of each.
 - b. Operators Manual with procedures of operating the control systems including logging on/off, alarm handling, producing point reports, trending data, overriding computer control, and changing set points and other variables.

- c. Programming Manual with a description of the programming language including syntax, statement descriptions including algorithms and calculations used, point database creation and modification, program creation and modification, and use of the editor.
- d. Engineering, Installation and Maintenance Manual(s) that explains how to design and install new points, panels, and other hardware; preventative maintenance and calibration procedures; how to debug hardware problems; and how to repair or replace hardware.
- e. A listing and documentation of all custom software created using the programming language including the point database. One set of magnetic media containing files of the software and database shall also be provided.
- f. One set of magnetic media containing files of all color-graphic screens created for the project.
- g. A list of recommended spare parts with part numbers and supplier.
- h. Complete original issue documentation, installation and maintenance information for all third party hardware provided including computer equipment and sensors.
- i. Complete original issue diskettes for all software provided including operating systems, programming language, operator work-station software, and graphics software.
- j. Licenses, Guarantee, and Warrantee documents for all equipment and systems.
- k. Recommended preventive maintenance procedures for all system components including a schedule of tasks (inspection, cleaning, calibration, etc.), time between tasks, and task descriptions.

1.9 WARRANTY

- A. Warrant all work as follows:
 1. Labor & materials for control system specified shall be warranted free from defects for a period of twelve (12) months after final completion acceptance by the Owner. Control System failures during the warranty period shall be adjusted, repaired, or replaced at no charge or reduction in service to the Owner. The Contractor shall respond to the Owner's request for warranty service within 24 hours during customary business hours.
 2. At the end of the final start-up/testing, if equipment and systems are operating satisfactorily to the Owner and Engineer, the Owner shall sign certificates certifying that the control system's operation has been tested and accepted in accordance with the terms of this specification. The date of Owner's acceptance shall be the start of warranty.
 3. Operator work-station software, project specific software, graphics, database, and firmware updates shall be provided to the Owner at no charge during the warranty period. Written authorization by Owner must, however, be granted prior to the installation of such changes.

1.10 OWNERSHIP OF PROPRIETARY MATERIAL

- A. All project developed hardware and software shall become the property of the Owner. These include but are not limited to:
 1. Project graphic images
 2. Record drawings

3. Project database
4. Job-specific application programming code
5. All documentation.

PART 2 PRODUCTS

2.1 MANUFACTURER

- A. Johnson Controls Co. (Trane, Honeywell, Siemens Add/Deduct Alternate)
 1. When a product or component is referred to by Manufacturers name and/or model number, the Contractor shall use only that product.

2.2 ELECTRICAL WORK FOR CONTROLS

- A. Complying with the principle of "unit responsibility" all electrical work for automatic controls, except as otherwise specified, or shown on the electrical drawings shall be included. The Temperature Control Contractor shall connect 120 volt power for controls to emergency power system so all controls are on emergency power.
- B. Electrical work shall, in general, comply with the following:
 1. All low voltage wiring in finished rooms shall be concealed below working heights and exposed above the ceiling.
 2. Electrical work may include both line voltage and low voltage wiring, as required, to complete electronic control circuit from the circuit breaker in the electrical distribution panel.
 3. Connect a maximum of six (6) VAV boxes on one 120 volt circuit, and identify in a permanent manner the panel and circuit number serving each box. Refer to VAV box schedule on drawings.
 4. Conduit network for power systems may be used for running control high voltage wiring.
 5. All electrical work shall comply with the N.E.C. and local electrical codes.
 6. All safety devices shall be wired through both hand and auto positions of motor starting device to insure 100% safety shut-off.
 7. All magnetic starters furnished by Electrical Contractor for mechanical equipment shall be furnished with integral 120 volt control transformers, sized to handle the additional VA needed for the controls - pilots, EP valves, etc.
 8. The motor starter supplier shall provide auxiliary contacts as required for interlock by FMS Contractor. The supplier shall estimate an allowance of at least one auxiliary contract per starter. All interlock and control wiring shown on the electrical prints is by the electrical subcontractor.
 9. Electrical contractor shall install outlet boxes and conduit for temperature control sensors in finished areas only. Conduit shall extend up to ceiling space of accessible ceilings in finished areas. Coordinate exact box and trim ring configuration with electrical trade to neatly accept temperature sensors.
 10. Conduit shall be run by Temperature Control Trade in Mechanical rooms or other unfinished areas, surface mounted as required for all temperature control work.
 11. Low voltage plenum rated wiring can be run exposed above working heights in equipment rooms and above accessible ceiling. Wiring shall be

neatly tied to pipes, EMT or other devices and not laid on ceiling tile.

- C. DDC System Multi-Conductor Instrumentation and Communication Cabling
 - 1. Analog Input, Analog Output, Binary Input, Binary Output, 24 VAC and General Purpose Cabling
 - a. Cable shall consist of copper conductors not less No. 18 AWG-stranded.
 - b. Shall be 2 or 3 conductor twisted cable with a drain wire.
 - c. Cable shall have a 100% overall shield.
 - d. Cable shall be a plenum-rated.
 - e. Cable shall meet or exceed NEC voltage rating of 300V.
 - f. Cable shall be NEC type CMP.
 - g. Cable shall meet or exceed UL temperature rating of +60 degrees C.
 - h. Cable shall be labeled at a minimum of every 18" with the DDC System manufacturer's name and the type of signal carried within the cable, i.e. Analog Input, Analog Output, Binary Input, Binary Output, 24 VAC.
 - i. Each of the cable types specified in Item A shall be of a different color coding for easy identification and troubleshooting.
 - 2. Primary and Secondary Communications Network Cabling
 - a. Cable shall be of type recommend by the DDC System Manufacturer.
 - b. Cable shall be shielded.
 - c. Cable shall be a plenum-rated.
 - d. Cable shall meet or exceed NEC voltage rating of 150V.
 - e. Cable shall meet or exceed UL temperature rating of +60 degrees C.
 - f. Cable shall be labeled at a minimum of every 18" with the DDC System manufacturer's name, system name and the communications network name.
 - g. Each of the cable types shall be of a different color coding for easy identification and trouble shooting and shall be of a different color than the cable specified in Item A above.
 - 3. Room Sensor Cabling
 - a. Cable shall consist of copper conductors not less No. 24 AWG.
 - b. Shall be multi-paired (at least two pairs) twisted cable.
 - c. Cable shall have a 100% overall shield.
 - d. Cable shall be a plenum-rated.
 - e. Cable shall meet or exceed NEC voltage rating of 300V.
 - f. Cable shall be NEC type Article 800-CMP.
 - g. Cable shall meet or exceed UL temperature rating of +75 degrees C.
 - h. Cable shall be labeled at a minimum of every 18" with the DDC System manufacturer's name and labeled as stat cable.
- D. Drawings and Layouts
 - 1. The FMS manufacturer shall submit description of operation and schematic drawings of the System to the Engineer for approval before starting work. At least eight sets of submittals shall be sent through channels. At least four sets of operator and maintenance manuals with "as built" drawings, parts list, etc., shall be provided at job completion.
- E. Control Equipment and Devices
 - 1. The control system shall include all necessary and specified control equipment properly installed in accordance with specifications and drawings, and shall include the automatic control of the following:
 - 2. Control Dampers: Dampers required in the temperature and smoke control

functions of the automatic control system shall be factory fabricated and shall be manufactured by the FMS Systems Manufacturer. All dampers shall be sized as shown on drawings or as specified. All damper frames shall be constructed of 13 gauge galvanized sheet metal or extruded aluminum of 12 gauge thickness, and shall have a flange or duct mounting. The blades shall be parallel or opposed, as required, and suitable for the air velocities to be encountered in the system. Replaceable Butyl rubber seals are to be provided on damper blades and installed along with the top and bottom of the frame. Stainless steel damper blades and seals shall be installed inside the frame sides. Seals and bearings shall be able to withstand temperatures ranging from minus 40 degrees F to plus 200 degrees F. Dampers shall be leak rated for 3 CFM/per square foot at 1" WG and 20 CFM/per square foot, squared at 4" WG or less in full closed position at 4" WG pressure differential across damper. All smoke control dampers must conform to UL555S and be Ruskin SD-60 or Johnson Control SD-1300 or equal.

3. Damper blades shall not exceed 6" in width or 48" in length. Longer units shall be fabricated in sections. All blades are to be corrugated type construction, fabricated from two sheets of #22 gauge galvanized sheet steel, spot welded together. Blades are to be suitable for high velocity performance. Dampers shall be similar to Ruskin CD-60 or Johnson Controls D-1300 or equal.
4. Control Valves: Valves shall be sized by the control manufacturer to produce the required capacity at a pressure loss not exceeding the allowable pressure drop indicated on the drawing. Nominal body rating shall be not less than 125 PSI. However, the valve body and packing selected shall be sized to withstand the system static head plus the maximum pump head and the maximum temperature of the control medium, chilled water, steam, and/or hot water. Two-way modulating valves shall have close-off ratings exceeding the maximum pressure difference, at any load condition, between the outlet and inlet. Each valve shall be equipped with proper packing to assure there will be no leakage at the valve stem. All control valves shall be motor operated closed, spring driven open.
5. Operators: A damper or valve operator shall be electric and be provided for each automatic damper or valve and shall be of sufficient capacity to operate the damper or valve under all conditions and to guarantee tight close-off of valves, as specified, against system pressure encountered. Damper and valve operators are to be made out of diecast metal; no plastic or sheet metal bodies will be allowed.
6. Sensors and Controllers:
 - a. Differential Pressure Switch for water shall have a single-pole, single-throw (SPST) contact, adjustable setpoint, UL rated 6 amperes at 120 volts, 100 psig design, and shall be Johnson Controls P74 Series with automatic reset, or equal. Each switch shall be provided with isolation and drain valves.
 - b. Differential Pressure Switch for air shall have a single-pole, single-throw (SPST) contact, adjustable setpoint, UL rated 9.8 amperes at 120 volts, and shall be Johnson Controls P32 Series or equal.
 - c. Low Limit Thermostats shall be of manual reset type, with setpoint adjustment. The sensing element shall be 20 foot minimum and shall be installed completely across the coil. When any one foot of the element

- senses a temperature as low as the setpoint, the thermostat contacts shall open. These shall contain double pole switches for simultaneous remote alarms or as desired. Thermostat shall be Johnson Controls A70 or equal.
- d. Duct Type Temperature Transmitter shall be a general purpose RTD sensing element, moisture resistant transmitter for mounting into a duct. The operating range shall be as indicated with an accuracy of $\pm 1\%$ over the full range. The output shall be compatible with the panel it serves.
 - e. Duct Averaging Type Temperature Transmitter shall be a general purpose RTD sensing element, moisture resistant transmitter for mounting into a duct. The operating range shall be as indicated with an accuracy of $\pm 1\%$ over the full range. The output shall be compatible with the panel it serves. Transmitter shall be with 17 feet of sensor capillary.
 - f. Space Temperature Transmitter shall contain an RTD sensing element to monitor room air temperatures in the range of 30 degrees F to 90 degrees F, unless indicated otherwise. The transmitter shall be factory calibrated to an accuracy of $\pm 1\%$. The assembly shall be installed within a metal ventilated enclosure suitable for wall mounting. The output shall be compatible with the panel it serves. Transmitter shall be factory calibrated to an accuracy of $\pm 1\%$ over the full range. Transmitter shall have an adjustable temperature wheel, override/reset button and cancel button.
 - g. Pipe Temperature Transmitter shall contain an RTD sensing element to monitor water temperature. The Contractor shall provide brass wells of sufficient size for the pipe to be installed. The output shall be compatible with the panel it serves. Transmitter shall be factory calibrated to an accuracy of $\pm 1\%$ over the full range.
 - h. Outdoor Air Temperature Transmitter shall contain an RTD sensing element mounting in an enclosure rated for outdoor use. The output shall be compatible with the panel it serves. Transmitter shall be factory calibrated to an accuracy of $\pm 1\%$ over the full range.
 - i. Humidity Transmitter Duct shall be capable of providing continuous measurement of percent relative humidity with an accuracy of $\pm 4\%$ over the range of 10 to 80% RH. The output shall be proportional VDC over a cable pair.
 - j. Humidity Transmitter Outside Air shall be capable of providing continuous measurement of percent relative humidity with an accuracy of $\pm 2\%$ over the range 20 to 90% RH. The output shall be a 4 to 20 Ma signal over a shielded cable pair. Transmitter shall have outside weather enclosure. Transmitter shall be General Eastern RH-2 or equal.
 - k. Pressure Transducer shall be for steam service and have a stainless steel sensor. The device shall output a 4-20 mA signal which is linear in relation to the sensed pressure. Accuracy shall be $\pm .05\%$ of the full scale. Power shall be from the controller and range from 22-26 volts DC. The unit shall have temperature compensation so that thermal effects are no more than $\pm .05\%$ of the full scale from 0-175 DEGF. The unit shall be suitable for the media and pressure measured.
 - l. Differential Pressure Transducer shall be for air or water service. The device shall output a 4-20 mA signal which is linear in relation to the sensed pressure. Accuracy shall be $\pm .01\%$ of full scale. The power shall

be from the controller and shall be in the range of 22-26 volts DC. The unit shall have temperature compensation so that thermal effects are no more than $\pm .05\%$ of the full scale from 32-100 degrees F. The transducer shall be suitable for the media and pressure measured.

- m. Smoke Detectors shall be ionization type for duct installation with supply and return sampling tubes. Detector shall be UL listed with housing, relays for air handling unit stop and remote alarm. Duct mounted smoke detector shall be BRK Model DH1851AC or equal with duct sampling tube to match duct work, 120 volt, 60 hertz, single-phase power source, reset switch, two SPST contacts rated for 125 V AC and 3 amp, and local indicator light.
- n. Sensors, thermostats and humidistats at locations that receive rough use and other locations as designated by Architect/Engineer, shall have protective covers.

2.3 GENERAL PRODUCT DESCRIPTION

- A. The Facility Management System (FMS) shall be capable of integrating multiple building functions, including equipment supervision and control, alarm management, energy management, and trend data collection.
- B. The FMS shall consist of the following:
 - Utilization of Existing Operator Workstation
 - New network control panel
 - Standalone Application Specific Controllers (ASCs)
 - Portable Remote Access Operator Zone Terminal
 - Dial up troubleshooting support communications capability
- C. The system shall be modular in nature, and shall permit expansion of both capacity and functionality through the addition of sensors, actuators, ASCs, and operator devices.
- D. The failure of any single component or network connection shall not interrupt the execution of control strategies at other operational devices.
- E. All newly installed system components and software shall be Y2K compliant and have been previously tested as such.

2.4 NETWORKING/COMMUNICATIONS

- A. General: The design of the FMS shall be networked. Inherent in the system's design shall be the ability to expand or modify the network either via a local network, auto-dial telephone line modem connections, or a combination of the two networking schemes.

2.5 LOCAL NETWORK

- A. Panel Support: The Network Control Panel shall directly oversee a local network such that communications may be executed directly to and between ASCs.
- B. Data Access: All operator devices, either network resident or connected via dial-up modems, shall have the ability to access all point status and application data on the network. Access to system data shall not be restricted by the

hardware configuration of the facility management system.

- C. Global Data Sharing: Global Data Sharing or Global Point Broadcasting shall allow point data to be shared between ASCs when it would be inefficient or impractical to locate multiple sensors.
- D. General Network Design: The network minimum baud rate shall be 9600 baud, supporting a minimum of 100 ASCs. The network shall detect single or multiple failures of ASCs or the network media. The network shall be composed of commonly available, multiple-sourced, networking components operating an industry standard protocol, such as Optomux, and IEEE RS-485 communications interface.

2.6 OPERATOR INTERFACE

- A. Command Entry/Menu Selection Process: Operator interface software shall minimize operator training through the use of English language prompting and English language point identification. The operator interface shall also have the option of using a mouse or similar pointing device for a "point and click" approach to facilities management.
- B. 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.
- C. 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.
- D. Passwords shall be exactly the same for all operator devices.
- E. A minimum of four (4) levels of access shall be supported.
- F. 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.
- G. User-definable, automatic log-off timers of from 1 to 60 minutes shall be provided to prevent operators from inadvertently leaving devices logged on.
- H. 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
 - 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 demand limiting
 - Enable/Disable duty cycle
 - Enable/Disable average/high/low signal select and reset
- I. 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 types of reports:
- J. A general listing of all points in the system shall include, but not be limited to, the following:
- Points currently in alarm
 - Off-line points
 - Points currently in override status
 - Points in Weekly Schedules
 - Holiday Programming
- K. 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 of the facility management system. Under no conditions shall the operator need to specify the address of hardware controller to obtain system information.
- L. 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.
1. The system shall be provided complete with all equipment 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

- I. Programming Description: Definition of operator device characteristics, ASCs, individual points, applications and control sequences shall be performed through fill-in-the-blank templates.
- J. Network-Wide Strategy Development: Inputs and outputs for any process shall not be restricted to a single ASC, but shall be able to include data from any and all other ASCs to allow the development of network-wide control strategies.
- K. System Definition/Control Sequence Documentation: All portions of system definition shall be self-documenting to provide hard copy printouts of all configuration and application data.
- L. Data base Save/Restore/Back-Up: Back-up copies of all ASC and Digital Panel data bases shall be stored in at least one personal computer or laptop. Users shall also have the ability to manually execute downloads of an ASC or Digital Panel data base.

2.7 NETWORK CONTROL PANELS

- A. General: Network Control Panels shall be microprocessor-based, multi-tasking, multi-user, digital control processors.
- B. Each Network Control Panel shall have sufficient memory to support its own operating system and data bases including:
 - Control Processes
 - Energy Management Applications
 - Alarm Management
 - Trend Data
 - Maintenance Support Applications
 - Operator I/O
 - Dial-Up Communications
 - Manual Override Monitoring
- C. Expandability: The system shall be modular in nature, and shall permit easy expansion through the addition of field controllers, sensors, and actuators.
- D. Serial Communication Ports: Network Control Panels shall provide at least two RS-232C serial data communication ports for simultaneous operation of multiple operator I/O devices, such as laptop computers, Personal Computers, and Video Display terminals.
- E. Hardware Override Monitoring: Network Control Panels shall monitor the status of all overrides, and include this information in logs and summaries to inform the operator that automatic control has been inhibited.
- F. Integrated On-line Diagnostics: Each Network Control Panel shall continuously perform self-diagnostics, communication diagnosis and diagnosis of all subsidiary equipment. Master Digital Panels 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 Network Control Panel.

- G. Surge and Transient Protection: 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 as to allow all signal wiring to be run in the same conduit as high voltage wiring where acceptable by electrical code.
- H. Power-fail Restart: In the event of the loss of normal power, there shall be an orderly shutdown of the Network Control Panel 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 Network Control Panel shall automatically resume full operation without manual intervention. Should Network Control Panel memory be lost for any reason, the user shall have the capability of reloading the Network Control Panel via the local RS-232C port.

2.8 DDC CONTROLLERS

- A. General: Standalone DDC panels shall be microprocessor based, multi-tasking, multi-user, real-time digital control processors. Each standalone DDC panel shall consist of modular hardware with plug-in enclosed processors, communication controllers, power supplies, and input/output modules. A sufficient number of controllers shall be supplied to fully meet the requirements of this specification and the attached point list.
- B. Memory: Each DDC panel shall have sufficient memory to support its own operating system and databases including:
 - Control processes
 - Energy Management Applications
 - Alarm Management
 - Historical/Trend Data for all points
 - Custom Processes
 - Manual Override Monitoring
- C. Point types: Each DDC panel shall support the following types of point inputs and outputs:
 - Digital Inputs for status/alarm contacts
 - Digital Outputs for on/off equipment control
 - Analog Inputs for temperature, pressure, humidity, flow, and position measurements
 - Analog Outputs for valve and damper position control, and capacity control of primary equipment
- D. Serial Communication Ports: Standalone DDC panels shall provide at least two RS-232C serial data communication ports for simultaneous operation of multiple operator I/O devices such as industry standard printers, laptop workstations, PC workstations, and panel mounted or portable DDC panel Operator's Terminals
- E. Hardware Override Switches: The operator shall have the ability to manually override automatic or centrally executed commands at the DDC panel via local,

point discrete, onboard hand/off/auto operator override switches for binary control points and gradual switches for analog control type points. These override switches shall be operable whether the panel is powered or not.

- F. Hardware Override Monitoring: DDC panels shall monitor the status or position of all overrides, and include this information in logs and summaries to inform the operator that automatic control has been inhibited. DDC panels shall also collect override activity information for daily and monthly reports.
- G. Local Status Indicator Lamps: The DDC panel shall provide local status indication for each binary input and output for constant, up-to-date verification of all point conditions without the need for an operator I/O device.
- H. Integrated on-line Diagnostics: Each DDC panel shall continuously perform self-diagnostics, communication diagnosis and diagnosis of subsidiary equipment. The DDC panel 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 DDC panel, and shall not require the connection of an operator I/O device.
- I. Surge and Transient Protection: Isolation shall be provided at all network termination, as well as all field point termination's to suppress induced voltage transients consistent with IEEE Standard 587-1980.
- J. Power-fail Restart: In the event of the loss of normal power, there shall be an orderly shutdown of all standalone DDC panels to prevent the loss of database or operating system software. Non-Volatile memory shall be incorporated for all critical controller configuration data, and battery back-up shall be provided to support the real-time clock and all volatile memory for a minimum of 72 hours.
- K. Upon restoration of normal power, the DDC panel shall automatically resume full operation without manual intervention.
- L. Should DDC panel memory be lost for any reason, the panel will automatically receive a download via the local area network, phone lines, or connected computer. In addition, the user shall have the capability of reloading the DDC panel via the local area network, via the local RS-232C port, or via telephone line dial-in.
- M. SOFTWARE FEATURES
 - 1. Control Software Description:
 - a. Pre-Tested Control Algorithms: The DDC panels shall have the ability to perform the following pre-tested control algorithms:
 - 1) Two Position Control
 - 2) Proportional Control
 - 3) Proportional plus Integral Control
 - 4) Proportional, Integral, plus Derivative Control
 - 5) Automatic Control Loop Tuning
 - b. Equipment Cycling Protection: Control software shall include a provision for limiting the number of times each piece of equipment may be cycled within a one-hour period.
 - c. Heavy Equipment Delays: 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.
- d. Power-fail Motor Restart: Upon the resumption of normal power, the DDC panel shall analyze the status of all controlled equipment, compare it with normal occupancy scheduling, and turn equipment on or off as necessary to resume normal operation.
2. Energy Management Applications:
 - a. DDC Panels shall have the ability to perform any or all of the following energy management routines:
 - Time of Day Scheduling
 - Calendar Based Scheduling
 - Holiday Scheduling
 - Temporary Schedule Overrides
 - Optimal Start
 - Optimal Stop
 - Night Setback Control
 - Enthalpy Switch Over (Economizer)
 - Peak Demand Limiting
 - Temperature Compensated Load Rolling
 - Fan Speed/CFM Control
 - Heating/Cooling Interlock
 - Hot Water Reset
 - b. All programs shall be executed automatically without the need for operator intervention, and shall be flexible enough to allow operator customization. Programs shall be applied to building equipment as described in the Execution portion of this specification.
 3. Custom Process Programming Capability: DDC panels shall be able to execute custom, job-specific processes defined by the operator, to automatically perform calculations and special control routines.
 - a. Process Inputs and Variables: It shall be possible to use any of the following in a custom process:
 - Any system-measured point data or status
 - Any calculated data
 - Any results from other processes
 - User-Defined Constants
 - Arithmetic functions (+,-,*,/, square root, exponential, etc.)
 - Boolean logic operators (and, or, exclusive or, etc.)
 - On-delay/Off-delay/One-shot timers
 - b. Process Triggers: Custom processes may be triggered based on any combination of the following:
 - Time interval
 - Time of day
 - Date
 - Other processes
 - Time programming
 - Events (e.g., point alarms)
 - c. Dynamic Data Access: A single process shall be able to incorporate measured or calculated data from any and all other DDC panels on the local area network. In addition, a single process shall be able to issue commands to points in any and all other DDC panels on the local area network.

- d. Advisory/Message Generation: Processes shall be able to generate operator messages and advisories to operator I/O devices. A process shall be able to directly send a message to a specified device, buffer the information in a follow-up file, or cause the execution of a dial-up connection to a remote device such as a printer.
 - e. Custom Process Documentation: The custom control programming feature shall be self-documenting. All interrelationships defined by this feature shall be documented via graphical flowcharts and English language descriptors.
4. Alarm Management: Alarm management shall be provided to monitor, buffer, and direct alarm reports to operator devices and memory files. Each DDC panel shall perform distributed, independent alarm analysis and filtering to minimize operator interruptions due to non-critical alarms, minimize network traffic, and prevent alarms from being lost. At no time shall the DDC panel's ability to report alarms be affected by either operator activity at a PC Workstation or local I/O device, or communications with other panels on the network.
- a. Point Change Report Description: All alarm or point change reports shall include the point's English language description, and the time and date of occurrence.
 - b. Prioritization: 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. Each DDC panel shall automatically inhibit the reporting of selected alarms during system shutdown and start-up. Users shall have the ability to manually inhibit alarm reporting for each point. The user shall also be able to define under which conditions point changes need to be acknowledged by an operator, and/or sent to follow-up files for retrieval and analysis at a later date.
 - c. Report Routing: Alarm reports, messages, and files will be directed to a user-defined list of operator devices or PC disk files used for archiving alarm information. Alarms shall also be automatically directed to a default device in the event a primary device is found to be off-line.
 - d. Alarm Messages: In addition to the point's descriptor and the time and date, the user shall be able to print, display or store a 65-character alarm message to more fully describe the alarm condition or direct operator response. Each standalone DDC panel shall be capable of storing a library of at least 250 Alarm Messages. Each message may be assignable to any number of points in the panel.
 - e. Auto-Dial Alarm Management: In Dial-up applications, only critical alarms shall initiate a call to a remote operator device. In all other cases, call activity shall be minimized by time-stamping and saving reports until an operator scheduled time, a manual request, or until the buffer space is full. The alarm buffer must store a minimum of 50 alarms.
 - f. Transaction Logging: Operator commands and system events shall be automatically logged to disk in Personal Computer industry standard database format. Operator commands initiated from Direct-connected workstations, dial-up workstations, and local DDC panel Network Terminal devices shall all be logged to this transaction file. This data shall be available at the Operator Workstation. A utility shall be provided to allow the user to search the transaction file using standard database query techniques, including searching by dates, operator name, data point name, etc. In addition, this transaction file shall be

- accessible with standard third party database and spreadsheet packages.
5. Historical Data and Trend Analysis: A variety of Historical data collection utilities shall be provided to automatically sample, store, and display system data in all of the following ways:
 - a. Continuous Point Histories: Standalone DDC panels shall store Point History Files for all analog and binary inputs and outputs. The Point History routine shall continuously and automatically sample the value of all analog inputs at half hour intervals. Samples for all points shall be stored for the past 24 hours to allow the user to immediately analyze equipment performance and all problem-related events for the past day. Point History Files for binary input or output points and analog output points shall include a continuous record of the last ten status changes or commands for each point.
 - b. Control Loop Performance Trends: Standalone DDC panels shall also provide high resolution sampling capability in one-second increments for verification of control loop performance.
 - c. Extended Sample Period Trends: Measured and calculated analog and binary data shall also 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 2 hours shall be provided. Each standalone DDC panel shall have a dedicated buffer for trend data, and shall be capable of storing a minimum of 5000 data samples.
 - d. Data Storage and Archiving: Trend data shall be stored at the Standalone DDC panels, and uploaded to hard disk storage when archival is desired. Uploads shall occur based upon either user-defined interval, manual command, or when the trend buffers become full. All trend data shall be available in disk file format compatible with Third Party personal computer applications.
 6. Runtime Totalization: Standalone DDC panels shall automatically accumulate and store runtime hours for binary input and output points as specified in the Execution portion of this specification.
 - a. The Totalization routine shall have a sampling resolution of one minute or less.
 - b. The user shall have the ability to define a warning limit for Runtime Totalization. Unique, user-specified messages shall be generated when the limit is reached.

2.9 APPLICATION SPECIFIC CONTROLLERS

- A. Each Standalone DDC Controller shall be able to extend its performance and capacity through the use of remote Application Specific Controllers (ASCs).
- B. Each ASC shall operate as a standalone 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.
- C. Each ASC shall have sufficient memory to support its own operating system and data bases including:
 - Control Processes
 - Energy Management Applications
 - Operator I/O

- D. The operator interface to any ASC point data or programs shall be through any network-resident PC workstation, or any PC or portable operator's terminal connected to any DDC panel in the network.
- E. Application Specific Controllers shall directly support the use of a portable terminal. The capabilities of the portable terminal shall include but not be limited to the following:
 - 1. Display temperatures
 - 2. Display status
 - 3. Display setpoints
 - 4. Display control parameters
 - 5. Override binary output control
 - 6. Override analog setpoints
 - 7. Modification of gain and offset constants
- F. Power-fail Protection: 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 controller.
- G. Configuration and Download: The ASCs shall have the capability of receiving configuration and program loading by both of the following: 1) locally, via a direct connect portable laptop service tool, 2) over the network, from the portable laptop service tool, and; 3) from the Operator Workstation, via the communication networks.
- H. Continuous Zone Temperature Histories: Application Specific Controllers shall have the capability to automatically and continuously maintain a history of the associated zone temperature to allow users to quickly analyze space comfort and equipment performance for the past 24 hours. A minimum of two samples per hour shall be stored.
- I. HVAC Application Descriptions:
 - 1. Unitary Controllers:
 - a. Unitary Controllers shall support, but not be limited to, the following types of systems to address specific applications described in the Execution portion of this specification, and for future expansion:
 - Unit Vents (ASHRAE Cycle I, II, III, or IV)
 - Heat Pumps (Air-to-Air, Water-to-Air)
 - Packaged Rooftops
 - Fan Coils (Two-Pipe, Four-Pipe)
 - b. Unitary Controllers shall support the following types of point inputs and outputs:
 - Economizer Switch Over Inputs
 - Drybulb
 - Outdoor Air Enthalpy
 - Differential Temperature
 - Binary Input from a separate controller
 - Economizer Outputs
 - Integrated Analog with minimum position
 - Binary output to enable self-contained economizer actuator
 - Heating and Cooling Outputs
 - 1 to 3 Stages

- Analog Output with two-pipe logic
 - Reversing valve logic for Heat Pumps
 - Fan Output
 - On/Off Logic Control
 - c. Unitary controllers shall support the following library of control strategies to address the requirements of the sequences described in the Execution portion of this specification, and for future expansion:
 - Daily/Weekly Schedules
 - Comfort/Occupancy Mode
 - Economy Mode
 - Standby Mode/Economizer Available
 - Unoccupied/Economizer Not Available
 - Shutdown
 - Lighting Logic Interlock to Economy Mode
 - Temporary Override Mode
 - Temporary Comfort Mode (Occupancy-Based Control)
 - Boost (Occupant Warmer/Cooler Control)
 - d. Occupancy-Based Standby/Comfort Mode Control: Each Unitary Controller shall have a provision for occupancy sensing overrides. Based upon the contact status of either a manual wall switch or an occupancy sensing device, the Unitary Controller shall automatically select either Standby or Comfort mode to minimize the heating and cooling requirements while satisfying comfort conditions.
 - e. Occupancy-Based Zone Lighting Control: Unitary Controllers shall provide an auxiliary binary output to serve as the interface to an associated lighting relay. Based upon the status of either an occupancy sensing device, or manual wall switch, the Unitary Controller shall provide a contact output to automatically adjust the lighting level to accommodate occupant requirements while reducing electrical consumption. Standby/Comfort (described in the previous section) and lighting overrides shall be served by the same occupancy override input.
 - f. Alarm Management: Each Unitary Controller shall perform its own limit and status monitoring and analysis to maximize network performance by reducing unnecessary communications.
2. HVAC Application Specific Controller Configuration
- a. The Application Specific Controllers shall be configured using an intuitive, easy-to-use configuration tool. Standard, pre-tested, HVAC applications will be "built-in" the tool. It is the intent that a non-programmer, fluent with HVAC systems, and not necessarily with computer programming, be capable of using the configuration tool with minimal training.
 - b. The tool will utilize a question and answer format to aid the user in configuration. The tool will automatically query the user for desired operational characteristics, along with desired fail-safe and fault condition configurations, in order to assure proper HVAC system operation and protection.
 - c. Systems that require free-form programming will not be acceptable.

2.10 SYSTEM SOFTWARE FEATURES

A. General

1. All necessary software to form a complete operating system, as described

- in this specification, shall be provided.
2. The software programs specified in this section shall be provided as an integral part of the Network Control Panel, and shall not be dependent upon any higher level computer for execution.
- B. Control Software Description
1. Equipment Cycling Protection: Control software shall include a provision for limiting the number of times each piece of equipment may be cycled within any one-hour period.
 2. Heavy Equipment Delays: 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.
 3. Power-fail Motor Restart: Upon the resumption of normal power, the DDC panel shall analyze the status of all controlled equipment, compare it with normal occupancy scheduling, and turn equipment on or off as necessary to resume normal operation.
- C. Network Control Panels 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
 - Average/High/Low Signal Select and Reset
- D. All programs shall be executed automatically without the need for operator intervention, and shall be flexible enough to allow user customization. Programs shall be applied to building equipment described in the "Sequence of Operation" portion of this specification.
- E. Programming Capability: Network Control Panels shall be able to execute configured processes defined by the user to automatically perform calculations and control routines.
1. 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)
 2. Configured processes may be triggered based on any combination of the following:
 - Time of day
 - Calendar Date
 - Other process
 - Events (e.g., point alarms)
 3. Data Access: A single process shall be able to incorporate measured or calculated data from any and all other ASCs. In addition, a single process shall be able to issue commands to points in any and all other ASCs on the

local network.

- F. Alarm Management: Alarm management shall be provided to monitor, buffer, and direct alarm reports to operator devices and memory files. Each Network Control Panel shall perform distributed, independent alarm analysis and filtering to minimize operator interruptions due to non-critical alarms, minimize network traffic, and prevent alarms from being lost. At no time shall the Digital Panel's ability to report alarms be affected by either operator activity at the local I/O device, or communications with other ASCs on the network.
1. Point Change Report Description: All alarm or point change reports shall include the point's English language description, and the time and date of occurrence.
 2. Prioritizing: 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 four (4) 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.
 3. Report Routing: Alarm reports and messages shall be directed to an operator device.
 4. Alarm Messages: 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 Network Control Panel shall be capable of storing a library of at least 100 Alarm Messages. Each message may be assignable to any number of points in the panel.
 5. Remote Alarm Horn: Each Network Control Panel shall be capable of triggering a binary output on an ASC when a critical or network alarm is received. The alarm horn feature shall be silenced when the critical alarm is acknowledged.
- G. Trend Analysis: A data collection utility shall be provided to automatically sample, 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 Network Control Panel shall have a dedicated buffer for trend data, and shall be capable of storing 32 trend logs. Each trend log shall have up to 4 points trended at 168 data samples each. Data shall be stored at the Network Control Panel.
- H. Runtime Totalization: Network Control Panels shall automatically accumulate and store runtime hours for binary input and output points specified in the "Sequence of Operation" portion of this specification.
1. The Totalization routine shall have a sampling resolution of one minute.
 2. The user shall have the ability to define a warning limit for Runtime Totalization. Unique, user specified messages shall be generated when the limit is reached.

- I. Pulse Totalization: Network Control Panels shall automatically sample, calculate and store consumption totals on a daily, weekly, or monthly basis for user selected binary pulse input type points.
 1. Totalization shall provide calculation and storage accumulations of up to 9,999,999 units (e.g. KWH, gallons, KBTU, tons. etc.).
 2. The Totalization routine shall have a sampling resolution of one minute.
 3. The user shall have the ability to define a warning limit. Unique, user specified messages shall be generated when the limit is reached.
 4. The information available from the 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
 - Sunday through Saturday Demand KW
 - Demand KW annual history for past 12 periods
 - KWH annual history for past 12 periods

- J. Event Totalization: Network Control Panels shall have the ability to count events, such as the number of times a pump or fan system is cycled on and off.
 1. The Event Totalization feature shall be able to store the records associated with a minimum of 9,999,999 events before reset.
 2. The user shall have the ability to define a warning limit. Unique, user specified messages shall be generated when the limit is reached.

2.11 OPERATOR INTERFACE

- A. The system shall be able to communicate by using a DOS based PC with a color graphics software package provided by the Temperature Control Contractor. This software shall utilize a color graphic representation of each piece of equipment specified to allow for complete monitoring and modification capabilities. The software shall also be customized for this particular project, as part of the temperature control contractor's base bid, by utilizing an icon-based system to link the various color screens to one another. The temperature control contractor shall provide all the necessary communication converters, cabling, and connectors necessary to interface.

PART 3 EXECUTION

3.1 SECTION INCLUDES:

- A. Examination
- B. General Workmanship
- C. Wiring
- D. Installation of Sensors
- E. Flow Switch Installation
- F. Actuators

- G. Warning Labels
- H. Identification of Hardware and Wiring
- I. Controllers
- J. Programming
- K. Cleaning
- L. Protection
- M. Training
- N. Field Quality Control
- O. Check-out, Start-up, and Testing
- P. Acceptance

3.2 EXAMINATION

- A. The project plans shall be thoroughly examined for control device and equipment locations, and any discrepancies, conflicts, or omissions shall be reported to the Architect/Engineer for resolution before rough-in work is started.
- B. The contractor shall inspect the site to verify that equipment is installable as shown, and any discrepancies, conflicts, or omissions shall be reported to the Architect/Engineer for resolution before rough-in work is started.

3.3 GENERAL WORKMANSHIP

- A. Install equipment, piping, wiring/conduit parallel to building lines (i.e. horizontal, vertical, and parallel to walls) wherever possible.
- B. Provide sufficient slack and flexible connections to allow for vibration of piping and equipment.
- C. Install all equipment in readily accessible location as defined by Chapter 1, Article 100, Part A of the NEC. Control panels shall be attached to structural walls unless mounted in equipment enclosure specifically designed for that purpose. Panels shall be mounted to allow for unobstructed access for service.
- D. Verify integrity of all wiring to ensure continuity and freedom from shorts and grounds.
- E. All equipment, installation, and wiring shall comply with acceptable industry specifications and standards for performance, reliability, and compatibility and be executed in strict adherence to local codes and standard practices.

3.4 WIRING METHODS

- A. All control and interlock wiring shall comply with the national and local electrical codes and Electrical Specifications. Where the requirements of this section differ with those in Electrical Specifications, the requirements of this section shall take precedence.
- B. Where Class 2 wires are in concealed and accessible locations including ceiling return air plenums, approved cables not in raceway may be used provided that:
 - 1. Circuits meet NEC Class 2 (current-limited) requirements. (Low-voltage power circuits shall be sub-fused when required to meet Class 2 current-limit.)
 - 2. All cables shall be UL listed for application, i.e. cables used in ceiling plenums shall be UL listed specifically for that purpose.
- C. Do not install Class 2 wiring in conduit containing Class 1 wiring. Boxes and panels containing high voltage may not be used for low voltage wiring except for the purpose of interfacing the two (e.g. relays and transformers).
- D. Where class 2 wiring is run exposed, wiring shall be run parallel along a surface or perpendicular to it, and bundled, using approved wire ties at no greater than 3 m (10 ft) intervals. Such bundled cable shall be fastened to the structure, using specified fasteners, at 1.5 m (5 ft) intervals or more often to achieve a neat and workmanlike result.
- E. All wire-to-device connections shall be made at a terminal blocks or terminal strip. All wire-to-wire connections shall be at a terminal block, or with a crimped connector. All wiring within enclosures shall be neatly bundled and anchored to permit access and prevent restriction to devices and terminals.
- F. Maximum allowable voltage for control wiring shall be 120V. If only higher voltages are available, the Control System Contractor shall provide step down transformers.
- G. All wiring shall be installed as continuous lengths, where possible. Any required splices shall be made only within an approved junction box or other approved protective device.
- H. Install plenum wiring in sleeves where it passes through walls and floors. Maintain fire rating at all penetrations in accordance with other sections of this specification and local codes.
- I. Size of conduit and size and type of wire shall be the design responsibility of the Control System Contractor, in keeping with the manufacturer's recommendation and NEC.
- J. Control and status relays are to be located in designated enclosures only. These relays may also be located within packaged equipment control panel enclosures. These relays shall not be located within Class 1 starter enclosures.
- K. Follow manufacturer's installation recommendations for all communication and network cabling. Network or communication cabling shall be run separately from other wiring.

- L. Adhere to Electrical Specification requirements for installation of raceway.
- M. This Contractor shall terminate all control and/or interlock wiring and shall maintain updated (as-built) wiring diagrams with termination's identified at the job site.
- N. Flexible metal conduits and liquid-tight, flexible metal conduits shall not exceed 3' in length and shall be supported at each end. Flexible metal conduit less than 1/2" electrical trade size shall not be used. In areas exposed to moisture, including chiller and boiler rooms, liquid-tight, flexible metal conduits shall be used.
- O. Cable wiring labeling shall conform to the following convention at each end of input and output points:

System	Wire ID	Equipment	Wire ID	Equip #	Device	Wire ID	
Heating Hot Water	HW	Chiller	CH	01	Discharge Air	DAT	
Chilled Water	CW	Cooling Tower	CT	02	Return Air Temp	RAT	
Condensor Water	CO	Boiler	BO	03	Space Temp	SPT	
Steam Heating	ST	Supply Fan	SF	04	Outside Air Temp	OAT	
Air Handling	AH	Return Fan	RF	05	Mixed Air Temp	MAT	
Exhaust	EX	Exhaust Fan	EF	06	Return Air Humidity	RAH	
Control Air	CA	Relief Fan	RE	07	Supply Air Humidity	SAH	
		Fan Coil	FC	08	Zone Air Humidity	ZAH	
		Unit Ventilator	UV	09	Space Pressure	SPR	
		Heat Pump	HP	10	Plenum Pressure	PPR	
		VAV Box	VV	11	Building Pressure	BPR	
		CV Box	CV	12	Steam Pressure	SPR	
		Booster Coils	BC	13	Supply Water Temp	SWT	
		Circulating Pump	CP	14	Return Water Temp	RWT	
		Air Curtain	AC	15	Supply Air Flow	SAF	
		Condensing Unit	CU	16	Return Air Flow	RAF	
		Variable Speed Drive	VS	17	Freeze Stat	FRZ	
		Booster Pump	BP	18	Smoke Detector	SMD	
		Compressor	CO	19	Filter Status	FLT	
Examples:					Status Input	STA	
Cooling Coil Valve on Air Handler #1 from Chiller #2			AHCH02CCV		Current Sensor	AMP	
					Relay	REL	
Discharge Air Temperature on Unit Ventilator #21			AHUV21DAT		Cooling Coil Valve	CCV	
					Hot Water Valve	HWV	
Chilled Water Discharge Temperature on Chiller #1			CWCH01SWT		Steam Valve	STV	
					Humidifier Valve	HUV	
Condensor Water Return Temp Cooling Tower #2			COCT02RWT		Outside Air Dampers	OAD	
					Return Air Dampers	RAD	
If other items than those shown are required, they shall follow the same number of characters and documented in the as-builts						Exhaust Air Dampers	EAD
						Outside/Return Dampers	ORD
						Variable Speed Control	VSC

3.5 INSTALLATION OF SENSORS

- A. Install sensors in accordance with the manufacturer's recommendations.
- B. Mount sensors rigidly and adequate for the environment within which the sensor operates.
- C. Room temperature sensors shall be installed on concealed junction boxes

properly supported by the wall framing.

- D. All wires attached to sensors shall be air sealed in their conduits or in the wall to stop air transmitted from other areas affecting sensor readings.
- E. Install duct static pressure tap with tube end facing directly down-stream of air flow.
- F. Sensors used in mixing plenums, and hot and cold decks shall be of the averaging type. Averaging sensors shall be installed in a serpentine manner horizontally across duct. Each bend shall be supported with a capillary clip.
- G. All pipe mounted temperature sensors shall be installed in wells. Install all liquid temperature sensors with heat conducting fluid in thermal wells.
- H. Wiring for space sensors shall be concealed in building walls. EMT conduit is acceptable within mechanical and service rooms.
- I. Install outdoor air temperature sensors on north wall complete with sun shield at designated location.

3.6 ACTUATORS

- A. The Temperature Control Contractor shall provide 24-volt actuator. Mount and link control damper actuators per manufacturer's instructions.
- B. To compress seals when spring return actuators are used on normally closed dampers, power actuator to approximately 5ø open position, manually close the damper, and then tighten the linkage.
- C. Check operation of damper/actuator combination to confirm that actuator modulates damper smoothly throughout stroke to both open and closed positions.
- D. Valves - Actuators shall be mounted on valves with adapters approved by the actuator manufacturer. Actuators and adapters shall be mounted following manufacturer's recommendations.

3.7 WARNING LABELS

- A. Affix plastic labels on each starter and equipment automatically controlled through the Control System. Label shall indicate the following: "C A U T I O N This equipment is operating under automatic control and may start at any time without warning."

3.8 IDENTIFICATION OF HARDWARE AND WIRING

- A. All wiring and cabling, including that within factory-fabricated panels, shall be labeled at each end within 2" of termination with a cable identifier and other descriptive information.
- B. Permanently label or code each point of field terminal strips to show the

instrument or item served.

- C. Identify control panels with minimum 1 cm letters on laminated plastic nameplates.
- D. Identify all other control components with permanent labels. Identifiers shall match record documents. All plug-in components shall be labeled such that removal of the component does not remove the label.

3.9 CONTROLLERS

- A. Provide a separate Controller for each major piece of HVAC equipment unless controller on unit can be utilized. Verify which units have controllers and if compatible with control system. Points used for control loop reset such as outside air or space temperature are exempt from this requirement.
- B. Building Controllers and Custom Application Controllers shall be selected to provide a minimum of 15% spare I/O point capacity for each point type found at each location. If input points are not universal, 15% of each type is required. If outputs are not universal, 15% of each type is required. A minimum of one spare is required for each type of point used.
- C. Future use of spare capacity shall require providing the field device, field wiring, point database definition, and custom software. No additional Controller boards or point modules shall be required to implement use of these spare points.

3.10 PROGRAMMING

- A. Provide sufficient internal memory for the specified control sequences and trend logging. There shall be a minimum of 25% of available memory free for future use.
- B. Point Naming: System point names shall be modular in design, allowing easy operator interface without the use of a written point index.
- C. Software Programming
 - 1. Provide programming for the system as per specifications and adhere to the strategy algorithms provided. All other system programming necessary for the operation of the system but not specified in this document shall also be provided by the Control System Contractor. Imbed into the control program sufficient comment statements to clearly describe each section of the program. The comment statements shall reflect the language used in the sequence of operations.
- D. Operators' Interface
 - 1. Standard Graphics. Provide graphics for each major piece of equipment and floor plan in the building. These standard graphics shall show all points dynamically as specified in the points list.
 - 2. The controls contractor shall provide all the labor necessary to install, initialize, start-up, and trouble-shoot all operator interface software and their functions as described in this section. This includes any operating system software, the operator interface data base, and any third party software installation and integration required for successful operation of

the operator interface.

3.11 CLEANING

- A. This contractor shall clean up all debris resulting from his or her activities daily. The contractor shall remove all cartons, containers, crates, etc. under his control as soon as their contents have been removed. Waste shall be collected and placed in a location designated by the Construction Manager or General Contractor.
- B. At the completion of work in any area, the Contractor shall clean all of his/her work, equipment, etc., making it free from dust, dirt and debris, etc.
- C. At the completion of work, all equipment furnished under this Section shall be checked for paint damage, and any factory finished paint that has been damaged shall be repaired to match the adjacent areas. Any metal cabinet or enclosure that has been deformed shall be replaced with new material and repainted to match the adjacent areas.

3.12 PROTECTION

- A. The Contractor shall protect all work and material from damage by his/her work or workers, and shall be liable for all damage thus caused.
- B. The Contractor shall be responsible for his/her work and equipment until finally inspected, tested, and accepted. The Contractor shall protect his/her work against theft or damage, and shall carefully store material and equipment received on site that is not immediately installed. The Contractor shall close all open ends of work with temporary covers or plugs during storage and construction to prevent entry of foreign objects.

3.13 FIELD QUALITY CONTROL

- A. All work, materials and equipment shall comply with the rules and regulations of applicable local, state, and federal codes and ordinances as identified in Part 1 of this Section.
- B. Contractor shall continually monitor the field installation for code compliance and quality of workmanship. All visible piping and or wiring runs shall be installed parallel to building lines and properly supported.
- C. Contractor shall arrange for field inspections by local and/or state authorities having jurisdiction over the work.

3.14 ACCEPTANCE

- A. The control systems will not be accepted as meeting the requirements of Completion until all tests described in this specification have been performed to the satisfaction of both the Engineer and Owner. Any tests that cannot be performed due to circumstances beyond the control of the Contractor may be exempt from the Completion requirements if stated as such in writing by the Owner's representative. Such tests shall then be performed as part of the

warranty.

3.15 INSTRUCTIONS TO OTHER CONTRACTORS

A. Control Valve Installation

1. Valve submittals shall be coordinated for type, quantity, size, and piping configuration to ensure compatibility with pipe design.
2. All control valves shall be installed so that the stem position is not more than 60 degrees from the vertical up position.
3. Valves shall be installed in accordance with the manufacturer's recommendations.
4. Control valves shall be installed so that they are accessible and serviceable, and such that actuators may be serviced and removed without interference from structure or other pipes and/or equipment.
5. Isolation valves shall be installed such that control valve body may be serviced without draining the supply/return side piping system. {Note to designer: this must also be shown.} Unions shall be installed at all connections to screwed type control valves.
6. Provide tags for all control valves indicating service and number. Tags shall be brass, 1-1/2" in diameter, with 1/4" high letters. Securely fasten with chain and hook. Match identification numbers as shown on approved controls shop drawings.

B. Motorized and Control Damper Installation

1. Damper submittals shall be coordinated for type, quantity, and size to ensure compatibility with sheet metal design. The Temperature Control Contractor shall provide 24-volt actuators as necessary for damper operation.
2. Duct openings shall be free of any obstruction or irregularities that might interfere with blade or linkage rotation or actuator mounting. Duct openings shall measure 1/4" larger than damper dimensions and shall be square, straight, and level.
3. Individual damper sections, as well as entire multiple section assemblies, must be completely square and free from racking, twisting, or bending. Measure diagonally from upper corners to opposite lower corners of each damper section. Both dimensions must be equal $\pm 1/8"$.
4. Follow manufacturer's instructions for field installation of control dampers. Unless specifically designed for vertical blade application, dampers must be mounted with blade axis horizontal.
5. Install extended shaft or jackshaft per manufacturer's instructions. (Typically, a sticker on the damper face shows recommended extended shaft location. Attach shaft on labeled side of damper to that blade.)
6. Damper blades, axles, and linkage must operate without binding. Before system operation, cycle damper after installation to assure proper operation. On multiple section assemblies, all sections must open and close simultaneously.
7. Provide a visible and accessible indication of damper position on the drive shaft end.
8. Support duct-work in area of damper when required to prevent sagging due to damper weight.
9. After installation of low-leakage dampers with seals, caulk between frame and duct or opening to prevent leakage around perimeter of damper.

3.16 TRAINING, COMMISSIONING & SYSTEM EVALUATION

- A. Owner Training Services: All specified owner training services for the HVAC equipment and controls furnished under this specification section shall be provided by the building automation contractor. This temperature control shall assemble representatives from all of the equipment and control device vendors and perform the owner training with their assistance. The temperature control contractor representative shall be present during all owner training of all HVAC equipment and complete temperature control system. At initial system start-up, the temperature controls contractor shall provide a minimum of **4 hours** of Owner Training.
- B. Training shall be provided for the building automation and control system and all HVAC equipment furnished by the mechanical contractor.
- C. During the initial system training session(s), the temperature controls contractor will train the designated staff of Owner's representative and Owner to enable them to proficiently operate the system; create, modify and delete programming; add, remove and modify physical points for the system; add additional panels when required.
- D. The instructors shall be factory-trained instructors experienced in presenting this material.

PART 4 - SEQUENCE OF OPERATION

4.1 VAV GAS/ELECTRIC RTU CONTROL

- A. Building Automation System Interface: The Building Automation System (BAS) shall send the controller Occupied Bypass, Morning Warm-up / Pre-Cool, Occupied / Unoccupied and Heat / Cool modes. If a BAS is not present, or communication is lost with the BAS the controller shall operate using default modes and setpoints.
- B. Occupied Mode: During occupied periods, the supply fan shall run continuously and the outside air damper shall open to maintain minimum ventilation requirements. The unit controller shall control the supply fan speed to maintain the current duct static pressure setpoint (adj.). The DX cooling and gas heat shall stage to maintain the current discharge air temperature setpoint. If economizing is enabled the outside air damper shall modulate to maintain the current discharge air temperature setpoint.
- C. Unoccupied Mode: When the space temperature is below the unoccupied heating setpoint of 60.0 deg. F (adj.) the supply fan shall modulate as necessary to maintain duct static pressure setpoint (adj.), the outside air damper shall remain closed and the gas heat shall be enabled. When the space temperature rises above the unoccupied heating setpoint of 60.0 deg. F (adj.) plus the unoccupied differential of 4.0 deg. F (adj.) the supply fan shall stop and the gas heat shall be disabled.
- D. When the space temperature is above the unoccupied cooling setpoint of 85.0

deg. F (adj.) the supply fan shall modulate as necessary to maintain duct static pressure setpoint (adj.), the outside air damper shall open if economizing is enabled and remain closed if economizing is disabled and the DX cooling shall be enabled. When the space temperature falls below the unoccupied cooling setpoint of 85.0 deg. F (adj.) minus the unoccupied differential of 4.0 deg. F (adj.) the supply fan shall stop, the DX cooling shall be disabled and the outside air damper shall close.

- E. Optimal Start: The BAS shall monitor the scheduled occupied time, occupied space setpoints and space temperature to calculate when the optimal start occurs.
- F. Morning Warm-Up Mode: During optimal start, if the average space temperature is below the occupied heating setpoint a morning warm-up mode shall be activated. When morning warm-up is initiated the unit shall enable the heating and supply fan. The outside air damper shall remain closed. When the average space temperature reaches the occupied heating setpoint (adj.), the unit shall transition to the occupied mode.
- G. Pre-Cool Mode: During optimal start, if the average space temperature is above the occupied cooling setpoint, pre-cool mode shall be activated. When pre-cool is initiated the unit shall enable the fan and cooling or economizer. The outside air damper shall remain closed, unless economizing. When the average space temperature reaches occupied cooling setpoint (adj.), the unit shall transition to the occupied mode.
- H. Optimal Stop: The BAS shall monitor the scheduled unoccupied time, occupied setpoints and space temperature to calculate when the optimal stop occurs. When the optimal stop mode is active the unit controller shall maintain the space temperature to the space temperature offset setpoint.
- I. Occupied Bypass: The BAS shall monitor the status of the "on" and "cancel" buttons of the space temperature sensors. When an occupied bypass request is received from a space sensor, the unit shall transition from its current occupancy mode to occupied bypass mode and the unit shall maintain the space temperature to the occupied setpoints (adj.).
- J. Economizer: The supply air sensor shall measure the dry bulb temperature of the air leaving the evaporator coil while economizing. When economizing is enabled and the unit is operating in the cooling mode, the economizer damper shall be modulated between its minimum position and 100% to maintain the discharge air temperature setpoint. The economizer damper shall modulate toward minimum position in the event the mixed air temperature falls below the low limit temperature setting. Compressors shall be delayed from operating until the economizer has opened to 100%.
- K. Comparative Enthalpy: Outside air (OA) enthalpy shall be compared with Return air (RA) enthalpy point. The economizer shall enable when OA enthalpy is less than RA enthalpy - 3.0 BTU/LB. The economizer shall disable when OA enthalpy is greater than RA enthalpy.
- L. Supply Fan: The supply fan shall be enabled while in the occupied mode and

cycled on during the unoccupied mode. A differential pressure switch shall monitor the differential pressure across the fan. If the switch does not open within 40 seconds after a request for fan operation a fan failure alarm shall be annunciated at the BAS, the unit shall stop, requiring a manual reset.

- M. Supply Duct Static Pressure Control: The unit controller shall modulate the supply fan output as required to maintain the duct static pressure setpoint. If the duct static pressure falls below the supply air static setpoint + deadband, the unit controller shall increase the output to the supply fan to maintain setpoint. If the duct static pressure rises above the supply air static setpoint + deadband, the unit controller shall decrease the output to the supply fan to maintain setpoint.
- N. Building Pressure Control: The power exhaust shall operate with increased building pressure. As the building pressure increases, the pressure in the unit return section also increases, operating exhaust fan and relieving air.
- O. Filter Status: A differential pressure switch shall monitor the differential pressure across the filter when the fan is running. If the switch closes for 2 minutes after a request for fan operation a dirty filter alarm shall be annunciated at the BAS.
- P. Operator Station Display: Indicate the following on operator workstation display terminal:
 - 1. System graphic.
 - 2. System on-off indication.
 - 3. System occupied/unoccupied mode.
 - 4. Supply fan on-off indication.
 - 5. Power exhaust fan on-off indication.
 - 6. Outside air temperature indication.
 - 7. Outside air damper minimum position.
 - 8. Room relative humidity indication.
 - 9. Room relative humidity set point.
 - 10. Compressor on/off.
 - 11. Gas heat on/off.
 - 12. Mixed air damper position.
 - 13. Filter air pressure drop indication.
 - 14. Filter low air pressure set point.
 - 15. Filter high air pressure set point.
 - 16. Supply fan discharge air temperature indication.
 - 17. Supply fan discharge air temperature set point.
 - 18. Supply fan discharge static pressure indication.
 - 19. Supply fan discharge static pressure set point.
 - 20. High/low duct static setpoint alarm.
 - 21. Supply fan speed.
 - 22. Static pressure sensor fail alarm.
 - 23. Building static pressure indication.
 - 24. Building static pressure set point.
 - 25. Occupied cooling setpoint
 - 26. Occupied heating setpoint
 - 27. Occupied standby cooling setpoint
 - 28. Occupied standby heating setpoint
 - 29. Unoccupied cooling setpoint

30. Unoccupied heating setpoint
31. Occupied bypass timer
32. Economizer minimum position
33. Heating mode setpoint
34. Cooling mode setpoint
35. Setpoint offset

END OF SECTION

MAI: 2024-1524

SECTION 26 00 00

BASIC ELECTRICAL REQUIREMENTS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Basic electrical Requirements specifically applicable to Division 26 & 28 Sections, in addition to Division 1 - General Requirements.
- B. Information in this section is intended to clarify or make additions to the requirements set forth in the General Conditions, Supplementary Conditions and Division 1 of these specifications. Any conflict between Division 26 & 28 and those in the General Conditions or within the Division 26 drawings, Supplementary Conditions and Division 1 shall be brought to the attention of the Architect/Engineer in writing as a request for addendum prior to the bid opening.
- C. Furnish all equipment, materials, articles, items, operations or methods listed, mentioned or scheduled on drawings, these specifications, manufacturer's installation instructions and include all labor materials, equipment and incidentals necessary for complete installation and operation.
- D. All information contained in this section applies to all sections within Division 26 as it was part of each section.
- E. Final walk-thru. Electrical Contractor shall submit in writing to the Architect's office or the Construction Manager advising that all of the Division 26 & 28 work has been completed in accordance with the plans and specifications. The intent is to acknowledge the Contractor is ready for a walk-thru. Open items that are part of the required construction work should be completed prior to the final walk-thru to avoid developing a so called construction completion list. The engineer reserves the right to reschedule the final walk-thru as determined accordingly.
- F. Pre-bid questions. All pre-bid questions, clarifications, etc. must be submitted in writing to the Architect Office or the Construction Manager. All phone calls, faxes or e-mails from bidders and manufacturers, etc. directly received by the Engineers office during the bidding phase will be deferred back to the Architect Office or the Construction Manager.
- G. Electrical Contractor shall review all of the project plans and specifications and not rely solely on the electrical drawings to establish a project bid. Refer to the structural and mechanical drawings for final mechanical equipment locations. Mechanical drawings shall govern over the electrical drawing locations.
- H. Unit Pricing: Contractor shall furnish pricing as listed in the Bid Proposal Forms.
- I. The Contractor shall include in their bid any cost for requesting AutoCAD backgrounds for their use from the Architect or Engineer. The cost will be \$150.00 for the first plan, and \$50.00 for each additional plan that may be requested for AutoCAD use. A waiver of responsibility for the Architect and

Engineer related to Contractor use of the CAD files shall be signed by the Contractor.

1.2 LAYOUT OF THE WORK

- A. Examine the site and all the drawings before proceeding with the layout and installation of this work. Verify all door swings and clearances to cabinets, etc., before locating switch and outlet boxes. Locate conduit, boxes, etc., essentially as shown on the drawings but in exact layout determined on the job to suit actual conditions. Confer and cooperate with the other trades on the job so all parts will be installed in proper relationship. Precise locations of parts to coordinate with other work is the responsibility of the Contractor.
- B. The Electrical Trades shall complete all cutting and patching for the electrical work, unless noted or specified otherwise. Division 26 & 28 Contractor shall be responsible to coordinate with the site Restoration Contractor for the new underground electrical work.
- C. Arrange exposed work as closely as practicable to wall or ceiling surfaces in an accurate alignment. Locate concealed work so fittings, connectors and other projections will clear surfaces. Exposed work is defined as non-finished spaces, such as mechanical/electrical rooms or as indicated on architectural room schedules. All finished spaces, installation shall be concealed. Refer to Architectural drawing for room finish schedules.
- D. During the bidding phase, if any design or discrepancy issues are discovered between the electrical drawings, specifications and other project plans, the contractor shall notify the Architect/Engineer. The intent is to resolve any issues during the bidding phase. For pertinent issues, addendums will be issued accordingly. After entering into a contract, it shall be considered there are no identified conflicts.
- E. No drilling of existing laminated beams for new work is permitted without review with the project Structural Engineer

1.3 INTERFERENCES

- A. The Electrical Contractor shall examine the plans of mechanical trades, the architectural and structural drawings and shall notify the Architect/Engineer to resolve such interference or discrepancy. The Electrical Contractor bid shall not be based solely on the Electrical Plans and Specifications. Contractor shall obtain and review all project documents. The Contractor, when directed, shall make such changes or off-sets as required so that the work shall be properly located and coordinated with the other trades. Failure to comply with the foregoing will not relieve contractor's responsibilities of making such changes. Such changes shall be completed at no additional cost to the Owner.
- B. All changes in location of equipment, fixtures, distribution equipment, receptacles, etc., from those shown on plans, shall be made without charge when directed by the Architect/Engineer before installation. At this time, an agreement shall be made if such a change is an additional cost to the owner.
- C. The Electrical Contractor shall confer with other trades regarding location and size of pipes, equipment, fixtures, conduit, duct openings, switches, outlets, etc.,

in order that there may be no interference in the installation of the work of any trades or delay in the progress of any work.

- D. Any changes made, necessary through failure to make proper arrangement to avoid interference, shall not be considered as extra.
- E. The Electrical Contractor shall cooperate with those performing work under other divisions in his preparation of interference drawings, to the extent that the location of plumbing piping, heating piping, and/or ventilation ducts, with respect to the installation of other trades, shall be mutually agreed on by those performing work under other divisions.
- F. In the event the described work on the drawings doesn't match requirements described in the specification, the more stringent shall be provided.
- G. Electrical Contractor shall review the Architectural drawings for work station, casework details and section drawings that show raceway details. Furnish the raceway as noted and detailed.
- H. Contractor shall carefully review the Code sections pertaining to safe working clearances to avoid piping, ducts interferences and other equipment. Install the electrical equipment to meet Code requirements. Adjust the locations shown as required.

1.4 MATERIALS AND WORKMANSHIP

- A. All materials and equipment furnished for installation on this project shall be new and in strict accordance with this specification. All packaged materials shall be delivered in the original containers which show the manufacturer's name and the identifying designations as to size, quality, etc. Materials delivered to the job in unmarked or mutilated packages will be immediately inspected by the Contractor. Materials or equipment judged as "damaged" by the Contractor's own inspection shall be immediately addressed with the supplier. All electrical equipment shall bear the Underwriter's Label.
- B. All work shall be performed in a professional manner under the supervision of the electrical project manager. The project manager shall be considered the main point of contact for the Architect/Owner's daily communication.
- C. Should any dispute arise as to the quality or fitness of the materials or workmanship, Architect, Owner, Engineer and Electrical Contractor shall mutually agree work is non-acceptable and shall be reworked at no additional cost to the Owner.
- D. Division 26 & 28 equipment schedule descriptions shall govern if it is found that the manufacturer's catalog numbering shown on the drawing is not current, or changed by the manufacturer without notification. Division 26 & 28 Contractor shall notify the Architect/Engineer with any conflicts during the bidding phase to get clarifications. After entering into a Contract, it shall be considered the equipment schedules provide the information to meet the intended specifications for quality and performance.

1.5 GUARANTEES

- A. All equipment and work performed under Division 26 & 28 shall be guaranteed for one (1) year from time of substantial completion of project, unless directed otherwise in Division 1.

1.6 VOLUNTARY ALTERNATES

- A. The Architect/Engineer will only accept voluntary alternate as a bid deduct. Alternate must maintain the same level of quality to meet the design intent. Voluntary alternates must be submitted with the bid for review by the Owner. Failure to comply will be no reason to accept any voluntary alternates after entering into a contract.

1.7 OWNERS ACCEPTANCE OF EQUIPMENT

- A. Refer to Division 1.
- B. Upon the Owner's written acceptance, the Electrical Contractor's guarantee period shall begin and the Owner shall accept the responsibility for operation and maintenance and the Contractor's liability shall be limited to the conditions covered in the guarantee as described in these specifications.

1.8 REFERENCES

- A. Conform to requirements of 2015 Michigan Building Code, 2023 National Electrical Code, 2023 Michigan Electrical Code Rules Part 8, 2017 ICC/ANSI A117.1 and local code requirements.

1.9 SUBMITTALS

- A. Submit electronic shop drawing files.
- B. Proposed Products List: Include Products specified in the following Sections:
 - 1. Section 26 05 19 - Low Voltage Electrical Power Conductors and Cables
 - 2. Section 26 09 23 - Lighting Control Devices
 - 3. Section 26 24 16 - Panelboards
 - 4. Section 26 27 26 - Wiring Devices
 - 5. Section 26 51 00 - Interior Lighting
 - 6. Section 28 46 13 - Fire Alarm System
- C. Submit shop drawings and product data grouped to include complete submittals of related systems, products, and accessories in single submittals.
- D. Mark dimensions and values in units to match those specified.
- E. Shop drawings shall be reviewed and checked by the Electrical Contractor for specification compliance prior to release for the Engineer's review. Failure to comply will be no cause or reason for additional costs to the Owner with project delays.
- F. Electrical distribution submittal shall include cut sheets for each piece of equipment. Written description is not acceptable.
- G. Bill of materials shall be submitted as part of O&M Manual. Bill of Materials is not considered a shop drawing.

1.10 REGULATORY REQUIREMENTS

- A. Conform to applicable Building Code.
- B. Conform to requirements of 2015 Michigan Building Code, 2023 National Electrical Code, 2023 Michigan Electrical Code Rules Part 8, 2017 ICC/ANSI A117.1 and local code requirements.
- C. Equipment: U.L. tested and approved for its purpose.
- D. The Electrical Contractor shall obtain and pay for all permits and inspection fees. Provide the Owner with final inspection documents from authorities having jurisdiction.
- E. State of Michigan, Bureau of Fire Services for Emergency Lighting and Fire Alarm Plan Review.
- F. Equipment: Conform to requirements of 2015 Michigan Building Code, 2023 National Electrical Code, 2023 Michigan Electrical Code Rules Part 8, 2017 ICC/ANSI A117.1 and local code requirements.
- G. Life Safety NFPA 101 - The State of Michigan current adopted edition.
- H. Fire Alarm Code NFPA 72 - The State of Michigan current adopted edition.
- I. 2015 Michigan Energy Code.
- J. ASHRAE 90.1 2013 Edition.
- K. 2019 School Rules.

1.11 PROJECT/SITE CONDITIONS

- A. Install Work in locations shown on drawings, unless prevented by project conditions.
- B. All bidders shall personally inspect the site and acquaint themselves with all existing conditions involved in execution of this contract, and make all necessary measurements. No "extra" will be considered for additional work required because of bidder's failure to do so.
- C. Arc flash warning labels. Provide arc flash generic warning labels in accordance with 2023 NEC Section 110 requirements.
- D. Provide PPE arc flash warning labels as specified with arc flash/short circuit coordination study

1.12 TEMPORARY SERVICES

- A. Division 26 Trades shall provide and maintain wiring for all interior construction lighting and power to meet OSHA Standards. Division 26 Trade shall provide and maintain all required lamps and guards. Contractor's power tools, cords, etc. shall be in strict accordance with National Electrical Code 2023, Article 590.

- B. Electrical Contractor shall pay for all temporary internet and power for their office and or construction trailer.
- C. Electrical Contractor shall be responsible to review Division 1 requirements to provide project temporary lighting and power requirements for the construction and demolition phases.

1.13 RECORD DRAWINGS

- A. The Electrical Contractor shall furnish as-constructed drawings, including all Addendums, Bulletins and associated Field Directed Changes included as part of the record drawings.

1.14 OPERATION AND MAINTENANCE MANUALS

- A. Verbal instruction and written operational instructions are to be given on all equipment and systems under this contract. A time is to be scheduled with the Architect/Engineer and Owner for these instructions and a time submitted in writing for instructions at the facility.
- B. Two (2) bound sets of Operating and Maintenance Manuals are to be submitted to the Architect/Engineer for approval. Manuals are to include complete parts list and maintenance procedures as well as operating instructions on all equipment supplied under Division 26 & 28.

END OF SECTION

MAI: 2024-1524

SECTION 26 05 00

COMMON WORK RESULTS FOR ELECTRICAL

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes basic electrical requirements, which are applicable to all Division 26 sections.

1.2 REGULATORY REQUIREMENTS

- A. Conform to requirements of the applicable:
 - 1. Michigan Building Code
 - 2. National Fire Protection Association 70, 2023 National Electrical Code
 - 3. 2023 State of Michigan Electrical Code Rules Part 8
 - 4. 2017 ICC/ANSI A117.1
 - 5. Local Codes
 - 6. National Fire Protection Association 101, Life Safety Code
 - 7. National Fire Protection Association 72, Fire Alarm Code
 - 8. Other applicable National Fire Protection Association Codes
 - 9. State of Michigan Uniform Energy Code.

1.3 WORKMANSHIP

- A. Should any dispute arise as to the quality or fitness of the materials or workmanship, Engineer, Owner and Electrical Contractor shall mutually agree Work is non-acceptable and collaborate on an agreeable solution.
- B. All Division 26 Work shall be done under the direction of a currently licensed State of Michigan Master Electrician. All Work shall be provided in a professional manner.

PART 2 PRODUCTS

2.1 GENERAL PRODUCTS

- A. All Products, shall be listed by and shall bear the label of an approved Nationally Recognized Testing Laboratory (NRTL) as identified by the United States Occupations Safety and Health Administration (OSHA), per the OSHA Nationally recognized Testing Laboratory Program. If none of the approved electrical testing laboratories has published standards for a particular item, then other national independent testing standards, if available, applicable, and approved by the owner, shall apply and such items shall bear those labels here one of the approved electrical testing laboratories has an applicable system listing and label, the entire system, shall be so labeled.
- B. Where Products are used which defer in arrangement, configuration, dimensions, ratings, or engineering parameters from these indicated on the contract documents, the contractor is responsible for all costs involved in integrating the equipment or accessories into the system and the assigned space, and for obtaining the performance from the system into which these items are placed.

- C. Manufacturer references used herein are intended to establish a level of quality and performance requirements unless more explicit restrictions are stated to apply.
- D. All Products provided for installation on this project shall be new and in strict accordance with this specification. All packaged material shall be delivered in the original containers which show the manufacture's name and the identifying designations as to size, quality, etc. Material delivered to the Project in unmarked or mutilated packages will be ordered to be removed from the site at once. Materials or equipment judged as "damaged" by the Owner or Engineer shall be removed from the Project. All electrical equipment shall bear the Underwriters Label.
- E. Divisions 26 Product schedule descriptions shall govern if it is found that the manufacture's catalog numbers as shown on the Drawings are not current or changed by the manufacturer without notification. Divisions 26 contractor shall notify the Engineer with any conflicts during the bidding phase to get clarifications. After entering into a Contract, it shall be considered the equipment schedules provide the information to meet the intended specification for quality and performance.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine the site and all the Drawings before proceeding with the layout and installation of this Work. Verify all door swings and clearances to cabinets, etc., before locating devices, boxes support Etc. Locate conduit, boxes, etc., essentially as shown on the drawings but in exact layout determined on the job to suit actual conditions. Confer and cooperate with the Owner and other trades performing Work on site so all parts will be installed in proper relationship. Precise locations of parts to coordinate with other Work is the responsibility of the Contractor.

3.2 TEMPORARY SERVICES

- A. Division 26 trades shall provide and maintain wiring for all interior construction lighting and power to meet OSHA standards. Division 26 Trade shall provide and maintain all required lamps and guards. Contractor's power tools, cords, etc. shall be in strict accordance with the National Electric Code 2023 Article 590.

3.3 POWER OUTAGES

- A. No power outages shall be permitted on existing systems except at the time and interval specified by the Owner/Engineer. The Owner may require written approval, any outage must be scheduled when the interruption causes the least interference with normal schedules and business routines. NO extra costs will be paid to the Contractor for such outages which must occur outside of regular weekly working hours.
- B. The Contractor shall provide a detailed outage plan and conduct outage planning meetings with the Owner/Engineer in preparation for the outage.

- C. The Contractor shall restore any circuit interrupted as a result of this work to proper operation as soon as possible.

3.3 RECORD DRAWINGS

- A. The Electrical Contractor shall furnish as-constructed drawings, including all Addendums, Bulletins and associated Field Directed changes included as part of the record drawings.

END OF SECTION

MAI: 2024-1524

SECTION 26 05 05

SELECTIVE DEMOLITION FOR ELECTRICAL

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Electrical demolition per plans and specifications.
- B. Conduit supports.

1.2 RELATED SECTIONS

- A. All drawings and specification sections apply to work in this section. Furnish all items, articles, materials, equipment, operations or methods that are mentioned, listed or scheduled on drawings or are in this specification including all labor, equipment, materials and miscellaneous incidentals necessary and/or required for the completion of this project. The work covered under this section of the specifications is in no way complete within itself but is supplementary to the entire specification and drawings.

PART 2 PRODUCTS

2.1 MATERIALS AND EQUIPMENT

- A. Materials and equipment for patching and extending work: As specified in individual Sections.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Electrical Contractor shall examine the project documents and visit the site as they deem necessary prior to submitting a bid. Do not rely solely on the Electrical Plans for all demolition requirements. Review all Project Documents prior to submitting a bid.
- B. The demolition information is provided to assist with labor costs associated with the electrical systems removal. The Electrical Contractor shall be responsible to confirm all quantities and the information provided.
- C. Upon removal of the existing ceiling, the Electrical Trades shall immediately notify the construction manager, Architect and Engineer in writing regarding existing conduits scheduled to remain that are not properly supported. Conduit evaluation shall be conducted with the Owner, Architect and Engineer. Failure for the Electrical Trades to submit a written conduit support condition will obligate the trade to support the conduits to meet current Code methods at no additional cost to the Owner.

3.2 PREPARATION

- A. Confirm with the Architect's Office and/or Construction Manager Project Schedules and review the Architectural, Structural and Mechanical drawings prior to commencing demolition.

3.3 DEMOLITION

- A. As noted or shown on the demolition plans, remove the lighting electrical system for mechanical units. Use care during the demolition phase to avoid damage or any glazed block, tile or brick veneered walls. Electrical Contractors are responsible to confirm all quantities and information provided.
- B. Electrical Trades shall remove all existing fire alarm devices and associated conduits and surface mounted raceways. Patch to match. Temporarily support devices and reinstall.
- C. Electrical Trades shall transport all of the electrical salvaged materials to the Owner and include all transportation costs.
- D. Remove all unused conduits and wiring serving lighting and power being removed from the finished ceiling space. Remove all abandoned low voltage cables from accessible portions in accordance with NEC Sections 760.25(A), 640(A), 645.3(A), 725.3(B), 770.3(A), 800.3(C), 820.3(A) and 830.3(A). Include costs in bid to walk the ceiling spaces with the Construction Manager and the Owner for visual assessment of abandoned cables.
- E. Electrical Contractors are responsible to confirm all demolition quantities. Make pre-bid site visit arrangements as deemed necessary.

END OF SECTION

MAI: 2024-1524

SECTION 26 05 19

LOW VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Building wire and cable.
- B. Fire rated cables.
- C. MC cable
- D. Non-metallic "NM" sheath cable.

1.2 RELATED SECTIONS

- A. All drawings and specification sections apply to work in this section. Furnish all items, articles, materials, equipment, operations or methods that are mentioned, listed or scheduled on drawings or are in this specification including all labor, equipment, materials and miscellaneous incidentals necessary and/or required for the completion of this project. The work covered under this section of the specifications is in no way complete within itself but is supplementary to the entire specification and drawings.

1.3 REFERENCES

- A. Conform to requirements of 2015 Michigan Building Code, 2023 National Electrical Code, 2023 Michigan Electrical Code Rules Part 8, 2017 ICC/ANSI A117.1 and local code requirements.

1.4 PROJECT CONDITIONS

- A. Verify that field measurements are as shown on Drawings.
- B. Conductor sizes are based on copper.
- C. Routing shown on Drawings is approximate unless dimensioned. Field route as required to best suit Project Conditions.
- D. Where wire and cable routing is not shown, and only a load destination is shown, determine exact routing and lengths required.

1.5 COORDINATION

- A. Coordinate Work under provisions of Division 1.
- B. Determine required separation between cable and other work.
- C. Determine cable routing to avoid interference with other work.

1.6 REGULATORY REQUIREMENTS

- A. Conform to requirements of 2015 Michigan Building Code, 2023 National Electrical Code, 2023 Michigan Electrical Code Rules Part 8, 2017 ICC/ANSI A117.1 and local code requirements.
- B. Furnish products listed and classified by Underwriters Laboratories, Inc. as suitable for purpose specified and indicated.

PART 2 PRODUCTS

2.1 BUILDING WIRE AND CABLE

- A. Description: Single conductor insulated wire.
- B. Conductor: Copper.
- C. Insulation Voltage Rating: 600 volts.
- D. Insulation: ANSI/NFPA 70, Type THW, THHN/THWN, XHHW-2.

2.2 MC CABLE

- A. Factory assembled multiple insulated conductors enclosed in armor of interlocking metal corrugated sheath.
- B. Provide all clips and supports.

2.3 NON-METALLIC SHEATH CABLE

- A. Use "NM" "Romex" cable. Not approved for this project.

2.4 FIRE RATED CABLE

- A. RHH fire rated type.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that interior of building has been protected from weather.
- B. Verify that mechanical work likely to damage wire and cable has been completed.

3.2 INSTALLATION

- A. Install products in accordance with manufacturer's instructions.
- B. Use stranded conductors for control circuits.
- C. Use conductor size not smaller than 12 AWG for power and lighting circuits.
- D. Use 10 AWG conductors for 20 ampere, 120 volt branch circuits longer than 100 feet.

- E. Use 10 AWG conductors for 20 ampere, 277 volt branch circuits longer than 200 feet.
- F. Pull all conductors into raceway at same time.
- G. Protect exposed cable from damage.
- H. Support cables above accessible ceiling, using spring metal clips or plastic cable ties to support cables from structure. Do not rest cable on ceiling panels.
- I. Use suitable cable fittings and connectors.
- J. Neatly train and lace wiring inside boxes, equipment, and panelboards.
- K. Clean conductor surfaces before installing lugs and connectors.
- L. Splices are not permitted.
- M. All power wiring shall be installed in conduit. Low-voltage wiring shall utilize the channel trays-hooks or free-air method, or other cable management methods that meet industry standards as noted on the drawings. Conduit drops for fire alarm devices, card readers, power assisted doors, and voice/data outlets shall be required. Electrical Trades shall be responsible for coordinating with the Owner's low-voltage system and drawings for required raceway. Low voltage cables installed in accessible ceiling space need not to be in conduit. However, the cables must be properly secured to the ceiling structure.
- N. Refer to Section 26 09 23 for Occupancy Sensors wiring.
- O. Refer to Section 28 46 13 for Fire Alarm wiring.
- P. If the Electrical Trades Contractor elects, at their option, to combine homerun circuits installed in a single conduit, the derating 2023 NEC 310.15(b) Table must be utilized for allowable conductor ampacity values. If the derating method is utilized, then furnish and install properly derated cables and properly sized conduits to meet Code. Electrical Trades Contractor shall be responsible to obtain inspection from the Electrical Inspector and pay all supplemental inspection and/or requested plan review fees.
- Q. Shared neutrals for lighting and power circuits are not permitted.
- R. MC cable shall only be acceptable as the final connection to light fixtures installed in accessible ceilings. Maximum cable shall not exceed 12 feet. MC cable shall not be used for homeruns or feeders.

3.3 INTERFACE WITH OTHER PRODUCTS

- A. Identify wire and cable under provisions of Section 26 05 53.
- B. Identify each conductor with its circuit number or other designation indicated on Drawings.

3.4 FIELD QUALITY CONTROL

- A. Perform field inspection and testing to assure proper operation.
- B. Inspect wire and cable for physical damage and proper connection.
- C. Measure tightness of bolted connections and compare torque measurements with manufacturer's recommended values.
- D. Verify continuity of each branch circuit conductor.

END OF SECTION

MAI: 2024-1524

SECTION 26 05 26

GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Grounding electrodes and conductors.
- B. Equipment grounding conductors.
- C. Bonding.

1.2 RELATED SECTIONS

- A. All drawings and specification sections apply to work in this section. Furnish all items, articles, materials, equipment, operations or methods that are mentioned, listed or scheduled on drawings or are in this specification including all labor, equipment, materials and miscellaneous incidentals necessary and/or required for the completion of this project. The work covered under this section of the specifications is in no way complete within itself but is supplementary to the entire specification and drawings.

1.3 REFERENCES

- A. Conform to requirements of 2015 Michigan Building Code, 2023 National Electrical Code, 2023 Michigan Electrical Code Rules Part 8, 2017 ICC/ANSI A117.1 and local code requirements.

1.4 PERFORMANCE REQUIREMENTS

- A. Resistance: Meet the NEC Code requirements.

1.5 PROJECT RECORD DOCUMENTS

- A. Accurately record actual locations of grounding electrodes.

1.6 REGULATORY REQUIREMENTS

- A. Conform to requirements of 2015 Michigan Building Code, 2023 National Electrical Code, 2023 Michigan Electrical Code Rules Part 8, 2017 ICC/ANSI A117.1 and local code requirements.
- B. Furnish products listed and classified by Underwriters Laboratories, Inc. as suitable for purpose specified and indicated.

PART 2 PRODUCTS

2.1 ROD ELECTRODE

- A. Material: Copper-clad steel or copper-weld type.

B. Diameter: as scheduled on the drawings.

C. Length: as scheduled on the drawings.

2.2 MECHANICAL CONNECTORS

A. As scheduled on the drawings.

2.3 WIRE

A. Material: As scheduled on the drawings.

B. Foundation Electrodes: Size to meet NFPA 70 requirements.

C. Grounding Electrode Conductor: Size to meet NFPA 70 requirements.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install Products in accordance with manufacturer's instructions.

B. Provide bonding to meet Regulatory Requirements.

C. Equipment Grounding Conductor: Provide a separate grounding conductor for lighting and power circuits as noted or specified on the drawings.

3.2 FIELD QUALITY CONTROL

A. Inspect grounding and bonding system conductors and connections for tightness and proper installation.

END OF SECTION

MAI: 2024-1524

SECTION 26 05 29

HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Conduit and equipment supports.
- B. Anchors and fasteners.

1.2 RELATED SECTIONS

- A. All drawings and specification sections apply to work in this section. Furnish all items, articles, materials, equipment, operations or methods that are mentioned, listed or scheduled on drawings or are in this specification including all labor, equipment, materials and miscellaneous incidentals necessary and/or required for the completion of this project. The work covered under this section of the specifications is in no way complete within itself but is supplementary to the entire specification and drawings.

1.3 REFERENCES

- A. Conform to requirements of 2015 Michigan Building Code, 2023 National Electrical Code, 2023 Michigan Electrical Code Rules Part 8, 2017 ICC/ANSI A117.1 and local code requirements.

1.4 REGULATORY REQUIREMENTS

- A. Conform to requirements of 2015 Michigan Building Code, 2023 National Electrical Code, 2023 Michigan Electrical Code Rules Part 8, 2017 ICC/ANSI A117.1 and local code requirements.
- B. Furnish products listed and classified by Underwriters Laboratories, Inc. as suitable for purpose specified and indicated.

PART 2 PRODUCTS

2.1 PRODUCT REQUIREMENTS

- A. Materials and Finishes: Provide adequate corrosion resistance.
- B. Provide materials, sizes, and types of anchors, fasteners and supports to carry the loads of equipment and conduit. Consider weight of wire in conduit when selecting products.
- C. Anchors and Fasteners:
 - 1. Concrete Structural Elements: Use expansion anchors.
 - 2. Steel Structural Elements: Use beam clamps.
 - 3. Concrete Surfaces: Use self-drilling anchors and expansion anchors.
 - 4. Hollow Masonry, Plaster, and Gypsum Board Partitions: Use toggle bolts and hollow wall fasteners.

5. Solid Masonry Walls: Use expansion anchors.
6. Sheet Metal: Use sheet metal screws.
7. Wood Elements: Use wood screws.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Attachments of electrical equipment to structural members are the responsibility of the installing trade. Structural members shall not be field cut, welded or otherwise modified without approval of the Architect/Engineer. Attachment to steel joist shall be made at panel points whenever possible. Structural members shall not be overloaded as a result of attachments. Attachment/equipment loading for all trades resulting in total load greater than an equivalent uniform 5 psf for any member shall be submitted to the Architect/Engineer for review. Electrical Trades are still responsible for design, layout, and fabrication and installation of electrical supports and support attachment methods. Electrical Trades shall submit attachment methods to the Structural Engineer for review.
- B. Install products in accordance with manufacturer's instructions.
- C. Do not fasten supports to pipes, ducts, mechanical equipment, and conduit.
- D. Do not use spring steel clips and clamps.
- E. Do not use powder-actuated anchors.
- F. Do not drill or cut structural members without permission from Architect/Engineer.
- G. Fabricate supports from structural steel or steel channel. Rigidly weld members or use hexagon head bolts to present neat appearance with adequate strength and rigidity. Use spring lock washers under all nuts.

END OF SECTION

MAI: 2024-1524

SECTION 26 05 33.13

CONDUIT FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Metal conduit.
- B. Flexible metal conduit.
- C. Liquidtight flexible non-metallic conduit.
- D. Electrical metallic tubing.
- E. Electrical nonmetallic tubing.
- F. Flexible nonmetallic conduit.
- G. Fittings and conduit bodies.
- H. MC Cable.
- I. Flexible metal conduit.

1.2 REGULATORY REQUIREMENTS

- A. Conform to requirements of 2015 Michigan Building Code, 2023 National Electrical Code, 2023 Michigan Electrical Code Rules Part 8, 2017 ICC/ANSI A117.1 and local code requirements.
- B. Furnish products listed and classified by Underwriters Laboratories, Inc. as suitable for purpose specified and indicated.

1.3 RELATED SECTIONS

- A. All drawings and specification sections apply to work in this section. Furnish all items, articles, materials, equipment, operations or methods that are mentioned, listed or scheduled on drawings or are in this specification including all labor, equipment, materials and miscellaneous incidentals necessary and/or required for the completion of this project. The work covered under this section of the specifications is in no way complete within itself but is supplementary to the entire specification and drawings.

1.4 REFERENCES

- A. ANSI C80.1 - Rigid Steel Conduit, Zinc Coated.
- B. ANSI C80.3 - Electrical Metallic Tubing, Zinc Coated.
- C. ANSI C80.3 - Rigid Aluminum Conduit.

- D. ANSI/NEMA FB 1 - Fittings, Cast Metal Boxes, and Conduit Bodies for Conduit and Cable Assemblies.
- E. Conform to requirements of 2015 Michigan Building Code, 2023 National Electrical Code, 2023 Michigan Electrical Code Rules Part 8, 2017 ICC/ANSI A117.1 and local code requirements.
- F. NEMA RN 1 - Polyvinyl Chloride (PVC) Externally Coated Galvanized Rigid Steel Conduit and Intermediate Metal Conduit.
- G. NEMA TC 2 - Electrical Plastic Tubing (EPT) and Conduit (EPC-40 and EPC-80).

1.5 DESIGN REQUIREMENTS

- A. Conduit Size: ANSI/NFPA 70.

1.6 PROJECT RECORD DOCUMENTS

- A. Submit under provisions of Division 1.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, protect, and handle Products to site.
- B. Accept conduit on site. Inspect for damage.
- C. Protect conduit from corrosion and entrance of debris by storing above grade. Provide appropriate covering.

1.8 PROJECT CONDITIONS

- A. Verify routing and termination locations of conduit prior to rough-in.
- B. Conduit routing shown is diagrammatic, field route conduit to avoid interferences.

1.9 REGULATORY REQUIREMENTS

- A. Conform to requirements of 2015 Michigan Building Code, 2023 National Electrical Code, 2023 Michigan Electrical Code Rules Part 8, 2017 ICC/ANSI A117.1 and local code requirements.
- B. Furnish products listed and classified by Underwriters Laboratories, Inc. as suitable for purpose specified and indicated.

PART 2 PRODUCTS

2.1 CONDUIT REQUIREMENTS

- A. Minimum Size: $\frac{3}{4}$ inch unless otherwise specified.
- B. Outdoor Locations, Above Grade: Use rigid steel conduit.

- C. Wet and Damp Locations: Use rigid conduit or liquid-tight non-metallic flexible conduit.
- D. Dry Locations:
 - 1. Concealed: Use electrical metallic tubing.
 - 2. Exposed: Use electrical metallic tubing.
 - 3. Use minimum ¾" conduit for fire alarm drops.
 - 4. Use flexible metal conduit for final wiring connections to motors, VFD units, light fixtures in accessible ceiling and interior transformers.

2.2 METAL CONDUIT

- A. Rigid Steel Conduit: ANSI C80.1.
- B. Fittings and Conduit Bodies: ANSI C80.5.
- C. Intermediate Metal Conduit (IMC): Rigid Steel.
- D. Fittings and Conduit Bodies: ANSI/NEMA FB 1; material to match conduit.

2.3 FLEXIBLE METAL CONDUIT

- A. Description: Interlocked steel construction.
- B. Fittings: ANSI/NEMA FB 1.

2.4 LIQUID-TIGHT NON-METALLIC FLEXIBLE METAL CONDUIT

- A. Description: Type NM. Manufacturer with a spiral of rigid PVC embedded reinforcement with a flexible PVC wall.
- B. Compatible fittings.
- C. Use for wet or exterior location as final wiring connections to motors or electrical equipment, etc.

2.5 ELECTRICAL METALLIC TUBING (EMT)

- A. Description: ANSI C80.3; galvanized tubing.
- B. Fittings and Conduit Bodies: ANSI/NEMA FB 1; set screw type.

2.6 MC CABLE

- A. Corrugated steel tubing with integral conductors.
- B. Use MC cable as noted on the drawings and specified in Low Voltage Electrical Power Conductors & Cables Specification 26 05 19.
- C. MC cable is not permitted for homeruns or feeders or branch device drops.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Install nonmetallic conduit in accordance with manufacturer's instructions.
- B. Arrange supports to prevent misalignment during wiring installation.
- C. Support conduit using coated steel or malleable iron straps, lay-in adjustable hangers, clevis hangers, and split hangers.
- D. Group related conduits; support using conduit rack. Construct rack using steel channel; provide space on each for 25 percent additional conduits.
- E. Fasten conduit supports to building structure and surfaces under provisions of Section 26 05 29.
- F. Do not support conduit with wire or perforated pipe straps. Remove wire used for temporary supports.
- G. Do not attach conduit to ceiling support wires.
- H. Arrange conduit to maintain headroom and present neat appearance.
- I. Route conduit parallel and perpendicular to walls or building centerlines.
- J. Route conduit installed above accessible ceilings parallel and perpendicular to walls. Install metal conduit sleeves or fire rated assembly in all fire rated wall as identified on the electrical or architectural life safety plans.
- K. Maintain adequate clearance between conduit and piping.
- L. Maintain 12 inch clearance between conduit and surfaces with temperatures exceeding 104 degrees F.
- M. Cut conduit square using saw or pipecutter; de-burr cut ends.
- N. Bring conduit to shoulder of fittings; fasten securely.
- O. Join nonmetallic conduit using cement as recommended by manufacturer. Wipe nonmetallic conduit dry and clean before joining. Apply full even coat of cement to entire area inserted in fitting. Allow joint to cure for 20 minutes, minimum.
- P. Use conduit hubs or sealing locknuts to fasten conduit to sheet metal boxes in damp and wet locations and to cast boxes.
- Q. Install no more than equivalent of three 90-degree bends between boxes. Use conduit bodies to make sharp changes in direction, as around beams.
- R. Provide suitable fittings to accommodate expansion and deflection where conduit crosses, control and expansion joints. Use a UL listed expansion joint. If expansion length exceeds the manufactured expansion fitting, the use of PVC coated metallic flexible conduit is an acceptable method.
- S. Provide suitable pull wire in each empty conduit except sleeves and nipples.
- T. Use suitable caps to protect installed conduit against entrance of dirt and moisture.

- U. Ground and bond conduit under provisions of Section 26 05 26.
- V. Identify conduit under provisions of Section 26 05 53.
- W. Firestop the conduits passing thru fire rated walls. Electrical Contractor shall be responsible to review the Architectural Life Safety drawings for fire rated wall locations.
- X. The control system contractor shall be responsible to adhere to the mechanical plans and/or temperature control system drawings to establish conduit routes.
- Y. Electrical Contractor shall be required to install new conduit (concealed) in all finished areas for the following, but not limited to: exit lights, clocks, light fixtures, receptacles, sensors, switching, fire alarm manual pull stations, horn/strobe unit and strobe units, etc. Saw cut, channel and patch the walls. Neatly saw cut all existing brick veneer, glazed block or tiled areas to complete the new work. Firestop all conduits passing through fire rated walls, floors or separation barriers. Take the necessary steps to prevent chipping during the saw cutting and or wall channeling operation in the brick veneer, glazed tile or block areas. It shall be acceptable to install conduit from the opposite wall side to minimize brick veneer, glaze block or tile work. In non-finished spaces such as janitor closets, mechanical rooms, hub rooms, electrical rooms and storage rooms, conduit can be surface mounted. Provide flush mounted device boxes in all new wall construction as shown on the architectural drawings. Conduit drops or MC cable shall be concealed in the new walls and as noted and specified on the drawings.
- Z. All power, voice, clock, public address, data, fire alarm, occupancy sensor lighting wiring installed in exposed spaces shall be installed in conduit.
- AA. Contractor shall provide separate raceway for the emergency power distribution system.
- BB. Electrical Contractor shall identify emergency power. Identify all of the junction box cover plates with panelboard source ID and circuit number(s). Provide engraved label. Handwritten on the junction box cover plate is not acceptable.

3.2 INTERFACE WITH OTHER PRODUCTS

- A. Install conduit to preserve fire resistance rating of partitions and other elements, using materials and methods consistent with facility standards or this project specification. Contractor is responsible to review the Architectural drawings to determine fire rated locations.
- B. Route conduit through roof openings for piping and ductwork or through suitable roof jack with pitch pocket or detail to match roof type specified.

END OF SECTION

MAI: 2024-1524

SECTION 26 05 33.16

BOXES FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Pull and junction boxes.
- B. Fire alarm device boxes.
- C. Occupancy sensor boxes.

1.2 RELATED SECTIONS

- A. All drawings and specification sections apply to work in this section. Furnish all items, articles, materials, equipment, operations or methods that are mentioned, listed or scheduled on drawings or are in this specification including all labor, equipment, materials and miscellaneous incidentals necessary and/or required for the completion of this project. The work covered under this section of the specifications is in no way complete within itself but is supplementary to the entire specification and drawings.

1.3 REFERENCES

- A. NEMA FB 1 - Fittings and Supports for Conduit and Cable Assemblies.
- B. NEMA OS 1 - Sheet-steel Outlet Boxes, Device Boxes, Covers, and Box Supports.
- C. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum).
- D. Conform to requirements of 2015 Michigan Building Code, 2023 National Electrical Code, 2023 Michigan Electrical Code Rules Part 8, 2017 ICC/ANSI A117.1 and local code requirements.

1.4 SUBMITTALS FOR REVIEW

- A. Provide submittal as listed in Section 26 00 00.

1.5 REGULATORY REQUIREMENTS

- A. Conform to requirements of 2015 Michigan Building Code, 2023 National Electrical Code, 2023 Michigan Electrical Code Rules Part 8, 2017 ICC/ANSI A117.1 and local code requirements.
- B. Furnish products listed and classified by Underwriters Laboratories, Inc. as suitable for purpose specified and indicated.

PART 2 PRODUCTS

2.1 BRANCH DEVICE BOXES

- A. Sheet Metal Outlet Boxes: Use 4" square stamped steel box with single gang device ring as general project requirement.
- B. Nonmetallic Outlet Boxes: NEMA OS 2. (Not permitted unless as noted on the drawing).
- C. Cast Aluminum Boxes: for exterior location use a single gang shallow box with thread hub connection. Provide gasketed cover by box manufacturer.
- D. Use masonry box in masonry walls.

2.2 PULL AND JUNCTION BOXES

- A. Sheet Metal Boxes
 1. NEMA 1 enclosure for interior location.
 2. NEMA 3R or 4X for exterior location.
 3. Stainless steel for food service area.
 4. Non-metallic pull and junction boxes are not permitted for this project unless noted otherwise.

2.3 OCCUPANCY SENSORS

- A. Refer to the manufacturer for box requirements.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Install in locations as shown on Drawings, and as required for wire pulling, equipment connections and compliance with regulatory requirements.
- B. Set wall mounted boxes at elevations to accommodate mounting heights indicated.
- C. Electrical boxes are shown on Drawings in approximate locations unless dimensioned.
- D. Orient boxes to accommodate wiring devices oriented as specified in Section 26 27 26.
- E. Maintain headroom and present neat mechanical appearance.
- F. Install pull boxes and junction boxes above accessible ceilings and in unfinished areas only.
- G. Inaccessible Ceiling Areas: Install outlet and junction boxes no more than 6 inches from ceiling access panel or from removable recessed luminaire.
- H. Install boxes to preserve fire resistance rating of partitions and other elements.
- I. Locate outlet boxes to allow luminaires positioned as shown.
- J. Do not fasten boxes to ceiling support wires.

- K. Support boxes independently of conduit.
- L. Use gang box where more than one device is mounted together. Do not use sectional box.
- M. Use gang box with plaster ring for single device outlets.
- N. Junction box cover plates installed above the ceiling shall be facing down.

3.2 INTERFACE WITH OTHER PRODUCTS

- A. Coordinate installation of outlet box for equipment connected under other sections.
- B. Refer to Section 28 46 13 for fire alarm mounting height.

3.3 ADJUSTING

- A. Install knockout closures in unused box openings.

END OF SECTION

MAI: 2024-1524

SECTION 26 05 53

IDENTIFICATION FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Nameplates and labels.
- B. Wire and cable markers.
- C. Conduit markers.
- D. Labeling methods and standards.
- E. Conductor color coding and identification.
- F. Panelboard directory.
- G. Arc flash warning labels.
- H. Electrical distribution equipment.

1.2 RELATED SECTIONS

- A. All drawings and specification sections apply to work in this section. Furnish all items, articles, materials, equipment, operations or methods that are mentioned, listed or scheduled on drawings or are in this specification including all labor, equipment, materials and miscellaneous incidentals necessary and/or required for the completion of this project. The work covered under this section of the specifications is in no way complete within itself but is supplementary to the entire specification and drawings.

1.3 REFERENCES

- A. Conform to requirements of 2015 Michigan Building Code, 2023 National Electrical Code, 2023 Michigan Electrical Code Rules Part 8, 2017 ICC/ANSI A117.1 and local code requirements.

1.4 REGULATORY REQUIREMENTS

- A. Conform to requirements of 2015 Michigan Building Code, 2023 National Electrical Code, 2023 Michigan Electrical Code Rules Part 8, 2017 ICC/ANSI A117.1 and local code requirements.
- B. Furnish products listed and classified by Underwriters Laboratories, Inc. as suitable for purpose specified and shown.

PART 2 PRODUCTS

2.1 NAMEPLATES AND LABELS

- A. Nameplates:

1. Engraved three-layer laminated plastic, black letters on white background for normal power.
 2. Emergency power panels and associated equipment shall be white letters on red.
- B. Locations:
1. Each electrical distribution panelboard, switchboard and power panel.
 2. Each disconnect.
 3. Emergency circuit junction box cover plates.
- C. Nameplate size minimum 1"x3" or match existing.

2.2 WIRE MARKERS

- A. Manufacturers:
1. Brady or equal.
- B. Description: Tape type wire markers.
- C. Locations: Each conductor at panelboard gutters, pull boxes, outlet and junction boxes, and each load connection.
- D. Legend:
1. Power and Lighting Circuits: Branch circuit or feeder number indicated on drawings.
 2. Control Circuits: Control wire numbers.

2.3 LABELING METHODS AND STANDARDS

- A. Engraved Labels
1. All electrical panels, starters, disconnect switches, or fire alarm panel shall be permanently identified using engraved labels. These labels shall be secured with double face type or mechanically fastened in applications where the tape may have a tendency to fail.
 2. Normal power fed systems shall have white labels with black lettering. Emergency power fed systems shall have red labels with white lettering.
 3. Lettering sizes may vary due to space constraints or to distinguish between main versus branch systems. Sizes should be consistent throughout the project, use the following guidelines:

Switchboard or Panelboard Main Label:	1" high minimum
Switchboard or Panelboard Branches	1/2" high minimum
Starters, Disconnects	1/2" high minimum
 4. All labels shall identify where panel or equipment is fed from. Ex (panel A fed from MDP)

- B. Adhesive Tape Labels
 - 1. Receptacles shall have the circuit number identified on the device cover plate using clear adhesive tape labels with 1/4" high printed block characters in black.
 - 2. Provide circuit identification on junction or pull box covers for all circuits within.
 - 3. Conductors in branch circuit panelboards shall have phase conductors, neutrals and grounds identified with adhesive labels within the panel at junction or pull boxes and at the device outlet box. Refer also to conductor color coding with respect to operating voltage.

2.4 CONDUCTOR COLOR CODING AND IDENTIFICATION

- A. Feeder phase conductors shall be identified as to phase and operating voltage using colored tape as follows:

	<u>480 Volt</u>	<u>120/208 Volt</u>
Phase A	yellow	black
Phase B	brown	red
Phase C	orange	blue
Neutral	gray	white
Ground	green	green

- B. Conductors from #18 up through #10 shall have colored insulating jackets to match the color code and phasing scheme as described above for feeders. Receptacle and lighting circuit conductors shall be #12 minimum for 15 or 20 amp circuits. Conductors #18 through #14 shall only be used for control circuits with colored jackets and wire numbers correlated to each system accordingly.
- C. Spare conductors shall be clearly identified as such through color, labels, tags, etc.

2.5 PANELBOARD DIRECTORY

- A. Provide typed directory. Handwritten is not acceptable.

PART 3 EXECUTION

3.1 PREPARATION

- A. Degrease and clean surfaces to receive nameplates and labels.

3.2 APPLICATION

- A. Install nameplate and label parallel to equipment lines.
- B. Secure nameplate to inside surface of door on panelboard.

- C. Contractor shall review the drawings to confirm all label schemes or ID requirements listed or noted on the drawings. Review mechanical drawings for equipment ID designation to provide a ID tag that corresponds to the mechanical equipment.
- D. Provide arc flash generic warning label on all electrical distribution equipment in accordance with NEC 2023 requirements.
- E. Panelboard, switchboards, transformers, etc. shall include their source of power included in nameplate label. (i.e. LPA feed from PP2)

END OF SECTION

MAI: 2024-1524

SECTION 26 05 83
WIRING CONNECTIONS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Mechanical equipment.
- B. Occupancy sensor equipment.

1.2 RELATED SECTIONS

- A. All drawings and specification sections apply to work in this section. Furnish all items, articles, materials, equipment, operations or methods that are mentioned, listed or scheduled on drawings or are in this specification including all labor, equipment, materials and miscellaneous incidentals necessary and/or required for the completion of this project. The work covered under this section of the specifications is in no way complete within itself but is supplementary to the entire specification and drawings.

1.3 REFERENCES

- A. NEMA WD 1 - General Purpose Wiring Devices.
- B. NEMA WD 6 - Wiring Device Configurations.
- C. Conform to requirements of 2015 Michigan Building Code, 2023 National Electrical Code, 2023 Michigan Electrical Code Rules Part 8, 2017 ICC/ANSI A117.1 and local code requirements.

1.4 COORDINATION

- A. Coordinate work under provisions of Division 1.
- B. Obtain and review shop drawings, product data, and manufacturer's instructions for equipment furnished under other sections.
- C. Determine connection locations and requirements.
- D. Sequence rough-in of electrical connections to coordinate with installation schedule for equipment.
- E. Sequence electrical connections to coordinate with start-up schedule for equipment.
- F. Mechanical Trades shall be responsible to furnish and install all temperature control components, associated conduit, wiring and 120 volt power supplies.

1.5 REGULATORY REQUIREMENTS

- A. Conform to requirements of 2015 Michigan Building Code, 2023 National Electrical Code, 2023 Michigan Electrical Code Rules Part 8, 2017 ICC/ANSI A117.1 and local code requirements.
- B. Furnish products listed and classified by Underwriters Laboratories, Inc. as suitable for purpose specified and indicated.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify conditions under provisions of Division 1.
- B. Verify that equipment is ready for electrical connection, wiring, and energization.

3.2 ELECTRICAL CONNECTIONS

- A. Make electrical connections in accordance with equipment manufacturer's instructions.
- B. Make conduit connections to equipment using metallic flexible conduit for all dry interior locations. Use liquid tight non-metallic flexible conduit with watertight connectors in damp or wet locations and kitchen areas.
- C. Make wiring connections using wire and cable with insulation suitable for temperatures encountered in heat producing equipment.
- D. Install disconnect switches, power relays, motor starters and as noted on the drawings.
- E. Complete all lighting controls as scheduled, noted and shown on the drawings.
- F. Electrical Contractor shall complete all main power wiring to the mechanical equipment shown and noted.

END OF SECTION

MAI: 2024-1524

SECTION 26 09 23

LIGHTING CONTROL DEVICES

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Power packs.
- B. Occupancy sensor.
- C. Low voltage push button stations.
- D. CAT 5E wiring.
- E. Low-voltage momentary switching.

1.2 RELATED SECTIONS

- A. All drawings and specification sections apply to work in this section. Furnish all items, articles, materials, equipment, operations or methods that are mentioned, listed or scheduled on drawings or are in this specification including all labor, equipment, materials and miscellaneous incidentals necessary and/or required for the completion of this project. The work covered under this section of the specifications is in no way complete within itself but is supplementary to the entire specification and drawings.

1.3 REFERENCES

- A. ASHRAE 90.1 2013 Energy Code.
- B. Conform to requirements of 2015 Michigan Building Code, 2023 National Electrical Code, 2023 State of Michigan Code Rules Part 8, 2017 ICC/ANSI A117.1 and local code requirements.
- C. 2015 Michigan Energy Code.

1.4 SUBMITTALS

- A. Provide submittal as listed in Section 26 00 00.
- B. Shop Drawings: Occupancy sensor cut sheets, control panel layouts, wiring connections, diagrams, and dimensions. Cut sheets shall either be marked or arrowed components with catalog numbers. Failure to comply will be cause to return the submittals for corrections at no delays or extra costs to the Owner.

1.5 REGULATORY REQUIREMENTS

- A. ASHRAE 90.1 2013.
- B. Conform to requirements of 2015 Michigan Building Code, 2023 National Electrical Code, 2023 State of Michigan Code Rules Part 8, 2017 ICC/ANSI A117.1 and local code requirements.

- C. Products: Furnish products listed or labeled to conform to requirements of 2023 National Electric Code, 2023 State of Michigan Electric Code Rules Part 8, and local authority having jurisdiction.
- D. 2015 Michigan Energy Code.
- E. 2015 Life Safety Code. NFPA 101. Chapter 7 – 7.8.1.2.2 Means of Egress Lighting.

PART 2 PRODUCTS

2.1 SYSTEM COMPLIANCE

- A. System components manufactured in accordance with UL 916 and UL 924 standards where applicable.
- B. System components manufactured in accordance with CFR Title 47, Part 15 standards where applicable.
- C. System components manufactured in accordance with ISED Canada RSS-247 standards where applicable.
- D. System components manufactured in accordance with IFT-008-2015 and NOM-208-SCFI-2016 standards where applicable.
- E. System listed as qualified under DesignLights Consortium Networked Lighting Control System Specification v5.0.
- F. Performance Criteria:
 - 1. Regulatory Requirements:
 - a. Listed and labeled in accordance with NFPA 70, by qualified electrical testing laboratory recognized by authorities having jurisdiction, and marked for intended location and application.

2.2 OCCUPANCY SENSORS

- A. As scheduled on the drawings.

2.3 CAT 5E WIRING

- A. As scheduled on the drawings.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Install in accordance with manufacturer's instructions and wiring diagrams.
- B. Contractor shall provide all components, etc. above those specified or shown for a complete installation.

3.2 FUNCTIONAL TESTING

- A. Provide functional testing with 2013 ASHRAE.

- B. Provide certified documents that lighting controls were tested for programming and working conditions.

END OF SECTION

MAI: 2024-1524

SECTION 26 24 16

PANELBOARDS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Distribution panelboards.
- B. Branch circuit panelboards.
- C. ARC Energy reduction NEC 2023 Article 240.87.

1.2 RELATED SECTIONS

- A. All drawings and specification sections apply to work in this section. Furnish all items, articles, materials, equipment, operations or methods that are mentioned, listed or scheduled on drawings or are in this specification including all labor, equipment, materials and miscellaneous incidentals necessary and/or required for the completion of this project. The work covered under this section of the specifications is in no way complete within itself but is supplementary to the entire specification and drawings.

1.3 REFERENCES

- A. NEMA AB 1 - Molded Case Circuit Breakers.
- B. NEMA KS 1 - Enclosed Switches.
- C. NEMA PB 1 - Panelboards.
- D. NEMA PB 1.1 - Instructions for Safe Installation, Operation and Maintenance of Panelboards Rated 600 Volts or Less.
- E. Conform to requirements of 2015 Michigan Building Code, 2023 National Electrical Code, 2023 Michigan Electrical Code Rules Part 8, 2017 ICC/ANSI A117.1 and local code requirements.

1.4 SUBMITTALS

- A. Provide submittal as listed in Section 26 00 00.
- B. Shop Drawings: Indicate outline and support point dimensions, voltage, main bus ampacity, integrated short circuit ampere rating, circuit breaker and fusible switch arrangement and sizes.
- C. Manufacturer's Installation Instructions: Indicate application conditions and limitations of use stipulated by Product testing agency. Include instructions for storage, handling, protection, examination, preparation, installation, and starting of Product.

- D. Panelboard submittal shall match drawing schedule arrangement. Submittal shall custom edit schedules to match design drawings.
- E. Manufacturer and Contractor shall verify the overcurrent protective device to match wire size as shown and noted in the bid documents.

1.5 OPERATION AND MAINTENANCE DATA

- A. Maintenance Data: Include spare parts data listing; source and current prices of replacement parts and supplies; and recommended maintenance procedures and intervals.

1.6 REGULATORY REQUIREMENTS

- A. Conform to requirements of 2015 Michigan Building Code, 2023 National Electrical Code, 2023 Michigan Electrical Code Rules Part 8, 2017 ICC/ANSI A117.1 and local code requirements.
- B. Furnish products listed and classified by UL as suitable for purpose specified and indicated.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. As scheduled on the drawings.

2.2 DISTRIBUTION PANELBOARDS

- A. Panelboards: NEMA PB 1, circuit breaker type or fusible switch type per plan.
- B. Molded Case Circuit Breakers: NEMA AB 1. Provide circuit breakers with integral thermal and instantaneous magnetic trip in each pole. Provide circuit breakers UL listed as Type HACR for air conditioning equipment branch circuits.
- C. Molded Case Circuit Breakers with Current Limiters: NEMA AB 1. Provide circuit breakers with replaceable current limiting elements, in addition to integral thermal and instantaneous magnetic trip in each pole.
- D. Current Limiting Molded Case Circuit Breakers: NEMA AB 1. Provide circuit breakers with integral thermal and instantaneous magnetic trip in each pole, coordinated with automatically resetting current limiting elements in each pole.
- E. Provide circuit breaker accessory trip units and auxiliary switches as indicated.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Provide filler plates for unused spaces in panelboards.
- B. Provide typed circuit directory for each branch circuit panelboard. Revise directory to reflect circuiting changes required to balance phase loads.

- C. Provide engraved plastic nameplates under the provisions of Section 26 05 53.

3.2 FIELD QUALITY CONTROL

- A. Field inspection and testing will be performed to assure proper operation.
- B. Visual and Mechanical Inspection: Inspect for physical damage, proper alignment, anchorage, and grounding. Check proper installation and tightness of connections for circuit breakers, fusible switches, and fuses.

END OF SECTION

MAI: 2024-1524

SECTION 26 27 26

WIRING DEVICES

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Receptacles.
- B. Device plates.

1.2 RELATED SECTIONS

- A. All drawings and specification sections apply to work in this section. Furnish all items, articles, materials, equipment, operations or methods that are mentioned, listed or scheduled on drawings or are in this specification including all labor, equipment, materials and miscellaneous incidentals necessary and/or required for the completion of this project. The work covered under this section of the specifications is in no way complete within itself but is supplementary to the entire specification and drawings.

1.3 REFERENCES

- A. NEMA WD 1 - General Requirements for Wiring Devices.
- B. NEMA WD 6 - Wiring Device -- Dimensional Requirements.
- C. Conform to requirements of 2015 Michigan Building Code, 2023 National Electrical Code, 2023 Michigan Electrical Code Rules Part 8, 2017 ICC/ANSI A117.1 and local code requirements.
- D. ADA - Americans with Disabilities Act - As amended.

1.4 REGULATORY REQUIREMENTS

- A. Conform to requirements of 2015 Michigan Building Code, 2023 National Electrical Code, 2023 Michigan Electrical Code Rules Part 8, 2017 ICC/ANSI A117.1 and local code requirements.
- B. Furnish products listed and classified by Underwriters Laboratories, Inc. as suitable for purpose specified and indicated.

PART 2 PRODUCTS

2.1 RECEPTACLES

- A. Manufacturers:
 - 1. Hubbell, Pass & Seymour, Leviton, or equal
- B. Description: NEMA WD 1, Heavy-duty specification grade duplex receptacle.
- C. Device Body: Color to be determined from standard colors by the Architect.

- D. Configuration: NEMA WD 6, type as specified and indicated.
- E. Convenience Receptacle: Type 5-20.
- F. GFCI Receptacle: Convenience duplex receptacle with integral ground fault circuit interrupter to meet regulatory requirements.
- G. Damp and wet location receptacles shall be rated "WR".

2.2 WALL PLATES

- A. Cover Plate: Color to be determined from standard colors by the Architect.
- B. Use "in use" weather proof metallic covers at exterior locations as indicated on the drawings to meet 2023 NEC Section 406.
- C. Provide blank metal cover plates on abandoned boxes.
- D. Provide stamped metal cover plate for unfinished spaces.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that outlet boxes are installed at proper height.
- B. Verify that wall openings are neatly cut and will be completely covered by wall plates.
- C. Verify that branch circuit wiring installation is completed, tested, and ready for connection to wiring devices.

3.2 PREPARATION

- A. Provide extension rings to bring outlet boxes flush with finished surface.
- B. Clean debris from outlet boxes.

3.3 INSTALLATION

- A. Install devices plumb and level.
- B. Install receptacles with grounding pole on bottom.
- C. Connect wiring device grounding terminal to outlet box with bonding jumper or branch circuit equipment grounding conductor where specified.
- D. Install plates on receptacle, and blank outlets in finished areas.
- E. Connect wiring devices by wrapping conductor around screw terminal.
- F. Install galvanized steel plates on outlet boxes and junction boxes in unfinished areas, above accessible ceilings, and on surface mounted outlets.

- G. Install protective rings on active flush cover service fittings.
- H. Shared neutral are not permitted for lighting and power circuits.

3.4 INTERFACE WITH OTHER PRODUCTS

- A. Refer to section 28 48 13 and drawing notes for fire alarm device mounting heights.

3.5 FIELD QUALITY CONTROL

- A. Inspect each wiring device for defects.
- B. Operate each wall switch with circuit energized and verify proper operation.
- C. Verify that each receptacle device is energized.
- D. Test each receptacle device for proper polarity.
- E. Test each GFCI receptacle device for proper operation.

3.6 ADJUSTING

- A. Adjust devices and wall plates to be flush and level.

END OF SECTION

MAI: 2024-1524

SECTION 26 51 00
INTERIOR LIGHTING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Interior luminaires per schedule.

1.2 RELATED SECTIONS

- A. All drawings and specification sections apply to work in this section. Furnish all items, articles, materials, equipment, operations or methods that are mentioned, listed or scheduled on drawings or are in this specification including all labor, equipment, materials and miscellaneous incidentals necessary and/or required for the completion of this project. The work covered under this section of the specifications is in no way complete within itself but is supplementary to the entire specification and drawings.

1.3 REFERENCES

- A. NEMA WD 6 - Wiring Devices-Dimensional Requirements.
- B. Conform to requirements of 2015 Michigan Building Code, 2023 National Electrical Code, 2023 Michigan Electrical Code Rules Part 8, 2017 ICC/ANSI A117.1 and local code requirements.
- C. NFPA 101 - Life Safety Code, current adopted edition.
- D. 2015 Michigan Energy Code.
- E. ASHRAE 90.1 2013 Edition.
- F. LED Standards LM 79 and LM 80.

1.4 SUBMITTALS FOR REVIEW

- A. Provide submittal as listed in Section 26 00 00.
- B. Shop Drawings: Indicate dimensions and components for each luminaire that is not a standard product of the manufacturer.
- C. Product Data: Provide dimensions, ratings, and performance data.

1.5 REGULATORY REQUIREMENTS

- A. Conform to requirements of 2015 Michigan Building Code, 2023 National Electrical Code, 2023 Michigan Electrical Code Rules Part 8, 2017 ICC/ANSI A117.1 and local code requirements.
- B. Conform to requirements of NFPA 101.

- C. Products: Listed and classified by Underwriters Laboratories, Inc. as suitable for the purpose specified and indicated.
- D. 2015 Michigan Energy Code.

PART 2 PRODUCTS

2.1 LUMINAIRES

- A. Furnish Products as scheduled on the drawings.

2.2 LED DRIVERS

- A. LED drivers shall include a factory disconnecting means in accordance with 2023 NEC 410-130G.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Support luminaires independent of ceiling framing.
- B. Locate recessed ceiling luminaires as indicated on reflected ceiling plan.
- C. Exposed Grid Ceilings: Provide auxiliary members spanning ceiling grid members to support surface mounted luminaires. Fasten surface mounted luminaires to ceiling grid members using bolts, screws, rivets, or suitable clips at a minimum of (4) points of attachment to prevent movement.
- D. Install recessed luminaires to permit removal from below.
- E. Install recessed luminaires using accessories and firestopping materials to meet regulatory requirements for fire rating.
- F. Install clips to secure recessed grid-supported luminaires in place at a minimum of (4) points of attachment to prevent movement.
- G. Install accessories furnished with each luminaire.
- H. Connect emergency luminaires and exit signs to the emergency distribution or inverter as noted and shown on the drawings.
- I. Make wiring connections to branch circuit using building wire with insulation suitable for temperature conditions within luminaire.
- J. Bond products and metal accessories to branch circuit equipment grounding conductor.

3.2 FIELD QUALITY CONTROL

- A. Operate each luminaire after installation and connection. Inspect for proper connection and operation.

3.3 ADJUSTING

- A. Contract Closeout: Division 1: Adjusting installed work.
- B. Aim and adjust luminaires as indicated or as directed.

3.4 CLEANING

- A. Contract Closeout: Cleaning installed work.
- B. Clean electrical parts to remove conductive and deleterious materials.
- C. Remove dirt and debris from enclosures.
- D. Clean photometric control surfaces as recommended by manufacturer.
- E. Clean finishes and touch up damage.

3.5 DEMONSTRATION AND INSTRUCTIONS

- A. Replace light fixtures with non-working LED's, broken or discolored lens.

3.6 PROTECTION OF FINISHED WORK

- A. Contract Closeout: Protecting installed work.

3.7 SCHEDULES

- A. Refer to Drawings.

END OF SECTION

MAI: 2024-1524

SECTION 28 46 13
FIRE ALARM SYSTEM

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Modify existing Simplex 4010 point addressable main fire alarm panel, devices, and NAC panels as noted.
- B. Fire alarm system shall not be limited to: Manual pull stations, magnetic door holders, duct smoke detectors, ceiling smoke detectors, audio/visual devices and visual devices. Include all associated code mandated components, wiring for a complete operating system.
- C. Fire alarm ADA signaling devices.
- D. Fire alarm wiring.
- E. The Fire Alarm vendor shall include in their bid any cost for requesting AutoCAD backgrounds for their use from the Architect or Engineer. The cost will be \$150.00 for the first plan, and \$50.00 for each additional plan that may be requested for AutoCAD use. A waiver of responsibility for the Architect and Engineer related to Contractor use of the CAD files shall be signed by the Fire Alarm vendor.
- F. Fire alarm system interface to egress lighting to meet Chapter 7 Life Safety Code Article 7.8 requirements.

1.2 RELATED SECTIONS

- A. All drawings and specification sections apply to work in this section. Furnish all items, articles, materials, equipment, operations or methods that are mentioned, listed or scheduled on drawings or are in this specification including all labor, equipment, materials and miscellaneous incidentals necessary and/or required for the completion of this project. The work covered under this section of the specifications is in no way complete within itself but is supplementary to the entire specification and drawings.

1.3 REFERENCES

- A. Conform to requirements of 2015 Michigan Building Code, 2023 National Electrical Code, 2023 State of Michigan Code Rules Part 8, 2017 ICC/ANSI A117.1 and local code requirements.
- B. NFPA 72 - Current adopted code.
- C. State of Michigan - Bureau of Fire Services for Fire Alarm Plan Review and Inspections.
- D. Local authorities having jurisdiction.
- E. State of Michigan, 2016 School Rules.

- F. Underwriters Laboratories Inc.
- G. National Fire Protection Association Standards
 - 1. NFPA 13 - Installation of Sprinkler Systems.
 - 2. NFPA 15 - Water Spray Fixed Systems.
 - 3. NFPA 16 - Deluge Foam Water Systems.
 - 4. NFPA 72 - National Fire Alarm Code.
 - 5. NFPA 101 - Life Safety Code.
 - 6. NFPA 720 - Standard for Installation of CO Detection.
- H. All equipment shall be approved by Underwriters Laboratories Inc. (UL) for its intended purpose for the following standards as applicable.
 - 1. UL864 UOJZ - Control units for fire protective signaling systems local signaling unit.
 - a. Central station signaling protected premises unit.
 - b. Remote signaling protected premises unit.
 - 2. UL2075 - CO detectors connected to face.
 - 3. UL864 SYZV - Releasing device control unit (water release only).
 - 4. UL268 - Smoke detectors for fire protective signaling systems.
 - 5. UL268A - Smoke detectors for duct application.
 - 6. UL217 - Smoke detectors for single stations.
 - 7. UL521 - Heat detectors for fire protective signaling systems.
 - 8. UL228 - Door holders for fire protective signaling systems.
 - 9. UL464 - Audible signaling appliances.
 - 10. UL1638 - Visual signaling appliances.
 - 11. UL38 - Manually activated signaling boxes.
 - 12. UL346 - Waterflow indicators for fire protective signaling systems.
 - 13. UL1481 - Power supplies for fire protective signaling systems.

1.4 AMERICANS WITH DISABILITIES ACT (ADA)

- A. All visual notification appliances and manual pull stations shall comply with the requirements with ADA.

1.5 SUBMITTALS

- A. Provide submittal as listed in Section 26 01 00. Submittal cut sheets shall be arrowed or marked with catalog numbers. Failure to comply will be cause for returning submittal for corrections at no delays or extra cost to the Owner.
 - 1. Plan drawings showing the locations (with room names and numbers) of the system components, including any adjustments in the quantities and locations of initiating devices and notification appliances to meet code requirements.
 - 2. Riser diagram showing system components, interconnecting wiring and connections to other building systems and equipment.
 - 3. Wiring diagrams showing manufacturer and field connections at component terminals, complete with conductor color codes and wire numbers.
 - 4. System configuration list showing inputs, outputs, device addresses and custom location labels, device configurations and program logic.
 - 5. Submit bill of materials, and not part of the submittal, with O&M Manuals.
 - 6. Catalog pages showing system components.
 - 7. System battery sizing calculations.

8. Power supply, amplifier and circuit sizing calculations.
9. Door hold-open power supply sizing calculations.

- B. Shop Drawings: Provide control panel layout and system wiring diagram showing each device and wiring connection required.

1.6 PROJECT RECORD DOCUMENTS

- A. Record actual locations for complete fire alarm system.

1.7 OPERATION AND MAINTENANCE DATA

- A. Submit as specified.
- B. Operation Data: Operating instructions.
- C. Maintenance Data: Maintenance and repair procedures.

1.8 REGULATORY REQUIREMENTS

- A. Conform to requirements of 2015 Michigan Building Code, 2023 National Electrical Code, 2023 State of Michigan Code Rules Part 8, 2017 ICC/ANSI A117.1 and local code requirements.
- B. NFPA 72 - Current adopted edition.
- C. NFPA 101 - Life Safety Code, current adopted edition.
- D. State of Michigan, Bureau of Fire Services for Plan Review and Inspections.
- E. Local authorities having jurisdiction.
- F. State of Michigan, 2016 School Rules.
- G. NFPA 90A Current Adopted Edition.
- H. NFPA 92A Current Adopted Edition.
- I. NFPA 92B Current Adopted Edition.
- J. All equipment shall be approved by Underwriters Laboratories Inc. (UL) for its intended purpose for the following standards as applicable.
 1. UL864 UOJZ - Control units for fire protective signaling systems local signaling unit.
 - a. Central station signaling protected premises unit.
 - b. Remote signaling protected premises unit.
 2. UL2075 - CO detectors connected to face.
 3. UL864 SYZV - Releasing device control unit (water release only).
 4. UL268 - Smoke detectors for fire protective signaling systems.
 5. UL268A - Smoke detectors for duct application.
 6. UL217 - Smoke detectors for single stations.
 7. UL521 - Heat detectors for fire protective signaling systems.
 8. UL228 - Door holders for fire protective signaling systems.
 9. UL464 - Audible signaling appliances.

10. UL1638 - Visual signaling appliances.
11. UL38 - Manually activates signaling boxes.
12. UL346 - Waterflow indicators for fire protective signaling systems.
13. UL1481 - Power supplies for fire protective signaling systems.

1.9 SCOPE OF WORK

- A. This bid package shall include temporary support of noted fire alarm devices and recertification of the system.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Existing Simplex 4010 fire alarm control panel.
- B. Engineered service distribution (ESD) is not a requirement with non-proprietary system.

2.2 OPERATION

- A. The operation of any manual pull station, flow switch, tamper switch, smoke detector, duct smoke detector, shall cause the sounding of all alarm horns on a temporal pattern basis, sequential flashing of system strobes, activate common alarm relay contacts on the control panel and indicate on the control panel's LCD display the zone and type of device sounding the alarm.
- B. In addition, the operation of any duct smoke detector shall shut down its associated fan or damper motor. Complete interwiring between detector and mechanical equipment control panel.
- C. Refer to the current adopted NFPA 72 Fire Alarm Code for the allowable detector distance and location from the pair of doors.
- D. The operation of the panel mounted alarm silencing switch will turn off all horns but the strobes will continue to flash until the device actuating the alarm is reset to its normal position and the panel mounted system reset button is operated, at which time the system will return to its normal stand by (supervisory) mode.
- E. Any system trouble condition such as an open circuit or ground condition will activate a common trouble LED and indicate on the control panel LCD display the exact zone, circuit or internal panel condition causing the trouble condition. Correction of the trouble source will return the panel to its normal standby mode.
- F. Initiating device circuits shall be two-wire style B, and horn or strobe circuits shall be two-wire style Y utilizing end of line resistors for circuit supervision. All wiring to initiating and signaling devices shall be looped and continuous to the end of line resistor on its respective circuit. T-tapping is not permissible.
- G. The fire alarm control panel shall communicate with each addressable initiating and control divide individually via shielded twisted pair signaling line circuits.
- H. Each signaling line circuit shall be capable of accessing up to 127/250 addressable devices.

- I. Each signaling line circuit shall allow up to 10,000 feet of wire length to the furthest addressable device.
- J. Communications shall be completely digital and shall include parity data bit error checking routines for address codes and check sum routines for the data transmission protocol.
- K. Each device shall be uniquely identified by the device address.
- L. There shall be no limit to the number of initiating devices which may be activated simultaneously.
- M. Each device shall be individually annunciated at the panel. Annunciation shall include the following conditions for each device.
 - 1. Alarm, supervisory or trouble condition.
 - 2. Open, short or ground.
 - 3. Device failure or incorrect device installed.

2.3 DEVICES (all point addressable type that is compatible to the main panel)

- A. **Duct Smoke Detectors:** Individually addressable and consist of a housing, sampling tubes, a baffle and a detachable detector head. Duct detectors shall include an alarm LED, a local test switch, and an auxiliary SPDT relay for ventilation system control. Duct detectors shall be resettable by actuating the panel reset pushbutton. The sampling tubes shall be capable of being cleaned through the housing cover.
 - 1. The detector heads shall be photoelectric as specified above, but shall be capable of accepting ionization detector heads.
 - 2. Duct detectors shall include remote alarm indicators and test switches shall be installed in readily accessible locations.
- B. **Audio/Visual Units:** Provide horn and strobe units with 24VDC horn and ADA approved strobe for mounting to a 4" square box.
- C. **Strobes:** As shown for proper illuminance, clear Lexan lens with red "FIRE" or international fire symbol lettering, capable of being synchronized, and capable of wall or ceiling mounting.
- D. **Audio/Visual and Visual Units:** For ceiling installation shall include vertical lettering. Horizontal lettering is not acceptable.
- E. Fire alarm panel contact for egress lighting interface to meet Chapter 7 Life Safety Code Article 7.8 requirements.

2.4 FIRE ALARM WIRING

- A. Use (1) pair #18/2 twisted shielded for initiating devices unless directed otherwise by the manufacturer.
- B. Use (1) pair #14 for power duct smoke detectors as directed by the manufacturer.
- C. Use (1) pair #14 for horn/strobe circuits as directed by the manufacturer.

- D. Use (2) pair #18 for control to remote alarm and test station with duct smoke detector.
- E. All fire alarm wiring shall be in compliance with NEC Article 760.
- F. Fire alarm supplier to provide circuiting to comply with voltage drop and load calculations per Code requirements.
- G. All wire sizes indicated are minimum.

2.5 NAC PANEL

- A. Node and NAC panels shall be modular with solid state, microprocessor based electronics, operator interfaces, power supplies, audio generators, amplifiers, battery chargers and batteries as required. All components shall be supervised.
- B. Fire alarm vendor/manufacturer shall be responsible for determining the required quantity and location.

2.6 POWER SUPPLIES

- A. Fire alarm vendor shall furnish and install power supplies as required for a complete operating system. Electrical Trades shall field select the location as advised by the fire alarm vendor.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Install fire alarm wiring in conduit for device shown storage room, mechanical rooms and similar space. Use 5'-0" minimum conduit drop in for physical protection.
- B. All junction boxes for fire alarm raceway system shall be painted red labeled "FIRE ALARM". Junction boxes installed in theatrical space where the project requires a black room finish scheme, label the junction box "fire alarm".
- C. Provide and install the fire alarm system in strict accordance with the plans and specifications, codes and manufacturer's instructions.
- D. Fully test the fire alarm system in accordance with NFPA 72, Chapter 7.
- E. Fire alarm vendor shall be responsible to certify the sound coverage for the entire facility.
- F. Audio/visual and visual units shall be installed in accordance with Michigan Building Code under the fire protection system section or NFPA 72 Fire Alarm Code wall mounted appliance shall be mounted such that the entire lens is not less than 80 inches, and not greater than 96 inches above the finished floor. Ceiling mounted device is an acceptable method. Ceiling mounting devices are designated with a C subscript letter.
- G. Electrical Trades shall complete the entire fire alarm system in accordance with plans and specifications.

- H. All fire alarm wiring installation that may be required to be installed through non-accessible ceiling spaces, and cannot be installed in conduit or cable tray, free air method will be acceptable for those spaces. Open wiring is acceptable method. Properly secure to ceiling structure, use J hooks or D-rings. The cable shall be plenum rated for this application.
- I. Ceiling mounted fire alarm device locations are shown diagrammatic. The design requirement shall be to install the device centered in the classrooms, corridor, offices, etc. Confirm the location with lighting, speaker, HVAC diffusers, to avoid interferences.
- J. NAC panel(s) require a dedicated 120 volt power source. The Contractor shall be responsible for coordinating NAC panel quantities and locations with their fire alarm vendor and include all power circuit costs in the bid.
- K. Electrical Trades and their respective fire alarm vendor shall field determine the remote duct detector test station location to maintain easy access for the Owner usage.
- L. Complete interface wiring from fire alarm panel to egress lighting.

3.2 MANUFACTURER/DISTRIBUTOR SERVICES

- A. The following supervision shall be provided by a factory trained service technician from the distributor of the fire alarm equipment.
- B. A pre-installation visit to the job site to review equipment submittals and to verify the method by which the system is to be wired.
- C. Upon completion of wiring, final checkout and certification of the system shall be made under supervision of this technician.
- D. At that time of the formal checkout, technician shall give operational instructions to the Owner.

3.3 WARRANTY

- A. Provide a one-year guarantee from date of system acceptance by the Owner.

3.4 CLOSE-OUT

- A. Provide O&M manuals, warranty letter, as-built drawings and inspection sign-off.

END OF SECTION

MAI: 2024-1524